



OKANAGAN

THE UNIVERSITY OF BRITISH COLUMBIA

UBC Okanagan

ACADEMIC

CALENDAR

2022/23

www.calendar.ubc.ca/okanagan



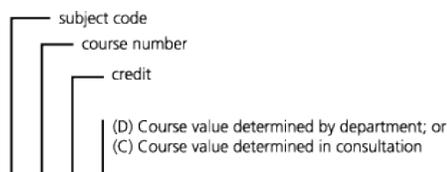
This chapter provides an archive of courses offered by UBC. For current course sections and schedules, please visit the online Course Schedule (<http://okanagan.students.ubc.ca/courses>).

Introduction

This chapter provides an archive of courses offered by the UBC Okanagan campus. For current course sections and schedules, please visit the online Course Schedule.

Course Numbering

In most faculties, the courses numbered 100–199 are primarily for first-year students, those numbered 200–299 are primarily for second-year students; similarly 300–399 for third-year students and 400–499 for fourth-year students. Courses numbered 500 and above are considered graduate-level, and are only available to undergraduates by permission of the departments concerned. Where faculties have a different style of classification of courses, the level of study is indicated in the description of their study programs.



CHEM 415 (3/6) D CHEMISTRY LABORATORY I. Integrated laboratory course designed to illustrate principles of modern analytical, inorganic, organic and physical chemistry. Prerequisite: All of CHEM 304, CHEM 310, CHEM 311, CHEM 312 and 1 of CHEM 313, CHEM 330. [0-8*-0; 0-8*-0]

HOURS:	
First Digit	Lectures
Second Digit	Lab
Third Digit	Discussion or Tutorial or Assigned Problem
*	Alternate weeks
;	Separates terms

Credit

In the course descriptions, the credit value of a course, where given, is shown in parentheses following the course number. In general, 1 credit represents one hour of instruction or two to three hours of laboratory work per week throughout one term of a Winter Session (September to December or January to May). A credit is approximately one semester hour.

Courses with Variable Credits

Some courses are listed with a choice of credit value; the form: (2–6) implies that the course may be given for any number of credits from 2 to 6 inclusive; the form: (2/6) implies that the course will be given either for 2 credits or 6 credits.

Where the parentheses are followed immediately by "c", the credit value of the course will be determined by the student in consultation with the department offering the course. Where the parentheses are followed immediately by "d", the credit value of the course in any particular session will be determined by the department offering the course.

In all cases, the maximum credit value is that which may be obtained by a student during the complete program of study (i.e., it is not the maximum for a given year).

Prerequisites & Corequisites

If specific studies are required as background to a certain course, they are notated as such in the course description. A prerequisite is a course that the student must have completed prior to registering for the selected course. A corequisite is a course that the student must take prior to or concurrently with the selected course. In some instances, prerequisites and corequisites may be

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waived at the discretion of the instructor. General prerequisites that apply to all courses in a list are frequently given just before the list. In a dispute over the adequacy of prerequisites, the course instructor will make the decision. In all cases where prerequisites are indicated, the implication is "or the equivalent" and "or the consent of the instructor."

Equivalents

An equivalent course indicates that it is a duplicate of the course selected.

Special Topics Courses

Some courses offered as special topics are on offer as pilot programs for material that is later incorporated into permanent courses. In such instances where a special topic and permanent course substantially duplicate material, only one of the special topic or permanent course may be taken for credit.

Hours

The number of hours assigned each week to lectures (first digit) and to laboratories (second digit) are shown in square brackets at the end of a course description. Where a third digit appears, it refers to periods where discussions, tutorials, or assigned problems are done. An asterisk (*) indicates alternate weeks. The first set of digits refers to the first term (September to December) and the second set to the second term (January to May); when only one set is given, it means either term. Graduate courses and courses in some faculties are not so designated.

Courses Offered

Not all courses listed are offered each year. Most courses offered in a Winter Session, as well as places and times of class meeting and names of instructors, appear in the online Course Schedule (<https://courses.students.ubc.ca/cs/main>). For those courses not so listed, contact the department concerned.



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This chapter provides an archive of courses offered by UBC. For current course sections and schedules, please visit the online Course Schedule (<http://okanagan.students.ubc.ca/courses>).

ANTH	Anthropology	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=ANTH)	APSC	Applied Science	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=APSC)
ARTH	Art History and Visual Culture	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=ARTH)	ASTR	Astronomy	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=ASTR)
BIOC	Biochemistry	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=BIOC)	BIOL	Biology	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=BIOL)
CCS	Creative and Critical Studies	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=CCS)	CHEM	Chemistry	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=CHEM)
CHIN	Chinese	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=CHIN)	COOP	Cooperative Education	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=COOP)
CORH	Communications and Rhetoric	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=CORH)	COSC	Computer Science	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=COSC)
CRWR	Creative Writing	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=CRWR)	CULT	Cultural Studies	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=CULT)
CUST	Curriculum Studies	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=CUST)	DATA	Data Science	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=DATA)
DICE	Design, Innovation, Creativity, Entrepreneurship	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=DICE)	DIHU	Digital Humanities	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=DIHU)
EADM	Educational Administration	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=EADM)	EAP	English for Academic Purposes	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=EAP)
ECED	Early Childhood Education	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=ECED)	ECON	Economics	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=ECON)
EDST	Educational Studies	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=EDST)	EDUC	Education	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=EDUC)
EESC	Earth & Environmental Sciences	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=EESC)	ENGL	English	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=ENGL)
ENGR	Engineering	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=ENGR)	EPSE	Educational Psychology and Special Education	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=EPSE)
ETEC	Educational Technology	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=ETEC)	FDSY	Food Systems	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=FDSY)
FILM	Film	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=FILM)	FREN	French	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=FREN)
GEOG	Geography	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=GEOG)	GERM	German	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=GERM)
GISC	Geospatial Information Science	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=GISC)	GWST	Gender, Women and Sexuality Studies	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=GWST)
HEAL	Health Studies	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=HEAL)	HEBR	Hebrew	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=HEBR)
HES	Health & Exercise Sciences	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=HES)	HINT	Health-Interprofessional	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=HINT)
HIST	History	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=HIST)	HMKN	Human Kinetics	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=HMKN)
IGS	Interdisciplinary Graduate Studies	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=IGS)	INDG	Indigenous Studies	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=INDG)
INLG	Indigenous Language	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=INLG)	JPST	Japanese Studies	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=JPST)
KORN	Korean	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=KORN)	LATN	Latin	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=LATN)
LLED	Language and Literacy Education	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=LLED)	MANF	Manufacturing Engineering	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=MANF)
MATH	Mathematics	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=MATH)	MDST	Media Studies	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=MDST)
MGCO	Management Co-Op	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=MGCO)	MGMT	Management	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=MGMT)
MUSC	Music	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=MUSC)	NRSG	Nursing	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=NRSG)
NSYL	Nsylvxn	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=NSYL)	PHIL	Philosophy	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=PHIL)
PHYS	Physics	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=PHYS)	POLI	Political Science	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=POLI)
PSYO	Psychology	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=PSYO)	SOCI	Sociology	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=SOCI)
SOCW	Social Work	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=SOCW)	SPAN	Spanish	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=SPAN)
STAT	Statistics	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=STAT)	SUST	Sustainability	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=SUST)
THTR	Theatre	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=THTR)	VANT	Vantage College	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=VANT)
VGRS	Visiting Graduate Students	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=VGRS)	VISA	Visual Arts	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=VISA)
VURS	Visiting Undergraduate Research Students	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=VURS)	WRLD	World Literature	(http://www.calendar.ubc.ca/okanagan/courses.cfm?code=WRLD)



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Anthropology, Faculty of Arts and Social Sciences

ANTH: Anthropology

ANTH 100 (3) Introduction to Cultural Anthropology

An overview of social and cultural anthropology its origins, its distinctive methods and concepts, and its place in the contemporary world. A critical examination of human diversity and how social and cultural differences are produced and shaped by local and global patterns. [3-0-0]

ANTH 103 (3) Introduction to World Archaeology

Peoples and cultures of prehistory. Examines archaeologists and their work in archaeological sites around the world, from the earliest evidence of humankind and hunting and gathering culture, to the emergence of civilization and state-level societies. [3-0-0]

ANTH 111 (3) Introduction to Biological Anthropology

Examination of the place of humans in nature. Human genetics, biologically-determined variation in contemporary populations, human growth and development, comparative primatology, human evolution, and human disease. [3-0-0]

ANTH 170 (3) Introduction to Linguistic Anthropology

Exploration of human communication, both verbal and non-verbal. The structure, cognitive role, and social functions of the spoken languages of the world will be emphasized. [3-0-0]

ANTH 200 (3) Public Anthropology: Engagement and Advocacy

Examines the range of approaches to public anthropology and how its methods and insights can be used to effect social change, encourage broader public conversation and debate, and respond to inequality, injustice, and human suffering. [3-0-0]

Prerequisite: Either (a) one of ANTH 100, ANTH 103 or (b) ANTH 170. Second-year standing.

ANTH 205 (3) Gender, Sexuality, and the Body

An anthropological exploration of how understandings of gender, sex, and the body are culturally and historically shaped, with a focus on theory as well as case studies. How globalization and transnationalism are changing norms of gender and sexuality is also explored. [3-0-0]

Prerequisite: Second-year standing.

ANTH 210 (3) Archaeological Inquiry and Practice

Examines challenges and opportunities for archaeologists in the 21st century, including tensions in the discipline, the composition and differing interests of the archaeological community, the impact of the digitization of archaeology and ownership of the past and historical perspectives in archaeological thinking. [3-0-0]

Prerequisite: ANTH 103.

ANTH 218 (3) Tourism, Desire and Difference

Anthropological approaches to tourism, the politics of cultural encounters, and how the desire for difference shapes peoples' everyday lives and pleasure travel. [3-0-0]

Prerequisite: Second-year standing.

ANTH 227 (3) Culture, Health, and Illness

Introduction to the discipline of medical anthropology. Overview into the relationship of ecology, evolution, biology, and culture to issues such as what it means to be healthy, why people become ill, and how people respond to sickness and disease. Health as a human adaptation to the environment. [3-0-0]

Prerequisite: Second-year standing.

ANTH 230 (3) Culture, Happiness, and Wellness

A cross-cultural exploration of the experience, meanings, expressions and understandings of happiness and wellness. How emotional states are culturally defined as positive or pleasant ranging from contentment to intense joy will be examined. [3-0-0]

ANTH 245 (3) Culture and Environment

Introduction to environmental anthropology with an emphasis on the relationship of cultural systems to contemporary environmental issues. Includes material from the Okanagan region and diverse societies around the world. May include one or more local field trips. [3-0-0]



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Prerequisite: ANTH 100.

ANTH 252 (3) Visual Anthropology and New Media

Provides an introduction to visual anthropology and the history of film in anthropological research. Students critically evaluate how anthropologists and documentary filmmakers represent other peoples and cultures through film and new media. [3-0-0]

ANTH 260 (3) Ethnobotany: Plants and People

Introduction to ethnobotany, the study of people's use, classification, and management of plants. Explores ethnobotany's beginnings; fundamental principles and practices; the diverse relationship between people and plants, including the use of plants for food, medicine, and materials; and the role of plants in ritual and religion. [3-0-0]

Prerequisite: Second-year standing.

ANTH 270 (3) Phonology

Cross-cultural exploration of how sounds of language are produced (articulatory phonetics) and organized into the sound systems of individual languages (phonemics), the history of phonological theory, and the method for discovering the phonemic system of individual languages (phonological analysis). [3-0-0]

Prerequisite: ANTH 170.

ANTH 277 (3) Anthropology of Reading and Writing

Critical inquiry into the development and role of reading and writing in cross-cultural context. Emphasis on the origins of writing from archaeological evidence, the impact of writing systems on societies past and present, the social functions of writing, and innovations in new media. [3-0-0]

Prerequisite: Second-year standing

ANTH 295 (3/6) d Current Topics in Anthropology

Contemporary issues in anthropology topics. [3-0-0]

Prerequisite: Varies with the topic; contact the department.

ANTH 307 (3) Ethnographic Methods: Acquiring Research Skills

What are ethnographic methods and how is anthropological research conducted? Topics include research design, relationships with study participants, field techniques, ethical debates, data analysis and presentation. The emphasis is on interactive, workshop-style group learning. Credit will be granted for only one of ANTH 307 or ANTH 407. [3-0-0]

Prerequisite: One of ANTH 100, ANTH 170, ANTH 200, ANTH 252. Third-year standing.

ANTH 312 (3) Anthropology of Religion

Critical examination of religious beliefs and practices in the context of both past and contemporary societies. Surveys approaches to related phenomena such as myth, ritual, witchcraft and shamanism, as well as theories regarding the changing role of religion in a globalized world shaped by secularism, fundamentalism, nationalism, and new religious movements. [3-0-0]

Prerequisite: ANTH 100.

ANTH 313 (3) Anthropology of Gender

Nature of gender relations, their social and cultural expression, and theories of gender inequality drawn from anthropological research. [3-0-0]

Prerequisite: ANTH 100.

ANTH 319 (3) Settling Down: An Archaeology of Early State Societies

Survey of archaeological evidence and theories for the origins and spread of settled village life, food production systems, and complex social and political organization. Begins with the Early Neolithic period and continues through to the appearance of the old world civilizations. [3-0-0]

Prerequisite: ANTH 103 and third-year standing.

ANTH 320 (3) Central American Indigenous Medicine

Cultural survey of the nature, history, and complexity of Indigenous medical systems; the study of concepts of illness, health, and healing as embodied cultural experiences among various Central American societies. [3-0-0]

Prerequisite: One of ANTH 100, ANTH 227 and third-year standing.

ANTH 325 (3) Cultural Epidemiology

A historical and contemporary exploration of the connections between patterns of disease and patterns of culture. [3-0-0]

Prerequisite: ANTH 100 and third-year standing.

ANTH 327 (3) Things: Exploring Material Cultures

Drawing on anthropology, archaeology and material culture studies, this course examines the value, significance and meaning of the material world, and the role of objects and things in the production of social life and culture. Past and present examples



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include commodities, ritualized gift exchanges, food, and the role of social media and new technology in shaping human interactions. [3-0-0]

Prerequisite: One of ANTH 100, ANTH 103 and third-year standing.

ANTH 330 (3) Cross-Cultural Perspectives on Mental Health

A cross-cultural survey of the ways in which the concepts and the experience of mental health and illness are shaped by cultural content and historical context. [3-0-0]

Prerequisite: ANTH 227.

ANTH 345 (3) Living in the Anthropocene

The human impact on the environment is now so far-reaching that the term Anthropocene is being used to refer to the current geological epoch. An examination of the defining characteristics of this time period and its implications for future engagements of humans with more-than-human worlds. Credit will be granted for only one of ANTH 345 or ANTH 490H. [3-0-0]

Prerequisite: ANTH 100. Third-year standing.

ANTH 350 (3) Ethnography of Special Areas

Advanced study of ethnographic and theoretical problems specific to a region and topic that will vary each term. Credit will be granted for only one of ANTH 350 or ANTH 403. [3-0-0]

Prerequisite: ANTH 100.

ANTH 353 (3) India in Motion: Ethnographic Perspectives

Advanced study of ethnographic and theoretical problems in India. Topics such as religion, caste, gender and sexuality, agriculture and urban development, nationalism, Bollywood cinema, and globalization. [3-0-0]

Prerequisite: ANTH 100 and third-year standing

ANTH 355 (3) Development and the Politics of Aid

An examination and critique of the social and cultural foundations of development, as both discourse and practice, and the close relationship of development aid and ideologies with contemporary forms of global capitalism. [3-0-0]

Prerequisite: ANTH 100. Third-year standing.

ANTH 370 (3) Morphology, Syntax, and Semantics

Cross-cultural exploration of grammar focusing on the structure of words, organization of words into phrases and sentences, coding of meaning in grammar, methods used in grammatical analysis, and history of grammatical theory. [3-0-0]

Prerequisite: ANTH 170.

ANTH 373 (3) The Acquisition of Language and Cultural Practice

Foundations, theories, and methods of language socialization. The cultural basis of language learning across the human lifespan with emphasis on the role of family, schooling, heritage, and endangerment.

Prerequisite: One of ANTH 100, ANTH 170. Third-year standing. ANTH 170 is preferred.

ANTH 375 (3) Economic Anthropology

Investigation of the ways in which human desire is controlled, expressed, and manifested in economic activity; the relationship of economic anthropology to neo-classical economics, traditional political economy, and current approaches to conceptualizing the relationship between culture and economics. [0-0-3]

Prerequisite: ANTH 100 and 6 additional credits of ANTH at the 200 level or above.

ANTH 377 (3) Sociolinguistics

Examines the sociopolitical organization of language variation: multilingualism; dialectology; and the use of language to indicate formality, ethnicity, gender, age, political attitudes, socio-economic status, and class. [3-0-0]

Prerequisite: Either (a) ANTH 100 or (b) ANTH 170. Third-year standing. ANTH 170 is preferred.

ANTH 400 (3) History of Anthropology

Review of anthropological theory and practice beginning with the origin of the discipline in the late nineteenth century and ending with the contemporary period. [3-0-0]

Prerequisite: ANTH 100 and third-year standing.

ANTH 401 (3) Contemporary Theory in Anthropology

Key theoretical orientations and debates since the 1980s with emphasis on questions of representation, globalization, and the application of anthropological theory and research to contemporary social issues. Credit will be granted for only one of ANTH 300 or ANTH 401. [3-0-0]

Prerequisite: ANTH 100 and third-year standing.

ANTH 409 (3) Topics in Applied Anthropology



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Advanced study of the theory and practice of applied, action, and consultancy anthropology; application of anthropology to questions of Aboriginal rights and title, education, medicine, development, women and development, tourism, and other social issues. [3-0-0]

Prerequisite: ANTH 100 and third-year standing.

ANTH 410 (3) Theory in Archaeology

Traces major trends, debates, and schools of thought in archaeology, emphasizing the entanglement of theory, practice, and method. Explores the emergence of different approaches in archaeology, from its roots in antiquarianism and cultural history to contemporary theoretical currents. Contemplates the interdisciplinary and collaborative aspects of archaeology as well as the ethical and political implications. Credit will be granted for only one of ANTH 310 or ANTH 410. [3-0-0]

Prerequisite: ANTH 103 and third-year standing.

ANTH 412 (3) Religion in a Changing World

A critical examination of selected topics on religion and society drawing on contemporary ethnography and current issues. [3-0-0]

Prerequisite: ANTH 100 and third-year standing. ANTH 312 is recommended.

ANTH 414 (3) Love, Marriage, and Family: New Kinship Studies

An anthropological exploration of kinship as a symbolic ordering of human relationships and reproduction. Emphasis is on the naturalization of nuclear family and marriage forms such as monogamy, and on changes in relatedness through new technologies, socio-legal processes, and mobility. [3-0-0]

Prerequisite: ANTH 100. Third-year standing recommended.

ANTH 418 (3) Travel, Migration and the Politics of Mobility

A critical examination of selected topics in the field of tourism, migration and mobility studies drawing on contemporary ethnography and current issues. [3-0-0]

Prerequisite: ANTH 100 and third-year standing. ANTH 218 is recommended.

ANTH 425 (3) Seminar in Medical Anthropology

Critical exploration of health, illness, and healing from the perspective of contemporary theory, and methods in medical anthropology and cross-cultural contexts. [0-0-3]

Prerequisite: Third-year standing.

ANTH 427 (3) (In)Visible Histories: Heritage and the Politics of Memory

Critical look at the politics of heritage (both tangible and intangible) and how it shapes the construction and deconstruction of social memory. How the ownership of the past is shaped by colonial practices, state formation and international conventions. [3-0-0]

Prerequisite: One of ANTH 100, ANTH 103. And third-year standing.

ANTH 429 (3) Medical Anthropology and International Development

Focus on international health and development from the perspective of critical medical anthropology. Effect of globalization, technology, and development on world health systems and international health. Populations studied will range from pre-capitalist Indigenous cultures to post-industrial societies. [3-0-0]

Prerequisite: ANTH 100 and third-year standing.

ANTH 445 (3) Political Ecology

Study of the ways in which political processes shape the relationships of human societies to other species and the physical environment. Resource conflict, environmental degradation, inequality, marginalization, environmental movements, environmental discourse and other topics are analyzed using a combination of ethnographic case studies and theoretical materials. Credit will be granted for only one of ANTH 445 and ANTH 455. [3-0-0]

Prerequisite: ANTH 100 and third-year standing.

ANTH 452 (3) Advanced Topics in Visual Anthropology

Explorations of the intersections of art and anthropology, with a focus on the social processes that create art objects and experiences. Application of key theories and methods in visual anthropology to cross-cultural case studies. Emphasis on the role of aesthetics, politics, and economics in creating art worlds and sensory practices. [3-0-0]

Prerequisite: ANTH 100 and third-year standing. ANTH 252 is recommended.

ANTH 473 (3) Living Languages: Critical Approaches to Endangered Languages

Study of language shift, including local and global factors affecting language loss, endangerment, retention, and revival. Practical strategies for sustaining and reviving languages, including language documentation and revitalization. Credit will only be granted for one of ANTH 473 and INGL 480. [3-0-0]

Prerequisite: Either (a) ANTH 100 or (b) ANTH 170. And 6 credits of ANTH at the 300 or 400 level required. ANTH 170 is



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preferred.

ANTH 474 (3) Language Emergence: From Contact to Constructed Languages

Anthropological approaches to the study of contact languages, new sign languages, and constructed languages, including how they are formed, their linguistic features, the social context in which they are used, whether or not they can ever be considered real and/or standard languages; some reasons for their development, including trade, unity, education, media, secrecy, and solidarity. [3-0-0]

Prerequisite: Either (a) ANTH 100 or (b) ANTH 170. Third-year standing. ANTH 170 is preferred.

ANTH 475 (3) Anthropology, History, and Tradition

Surveys contemporary anthropological thinking about how the construction of history and tradition shapes present cultural practices. Critical look at history-making by social scientists and by people themselves. [0-0-3]

Prerequisite: ANTH 100. 6 credits of ANTH at the 200-level or beyond; and third-year standing.

ANTH 480 (3) Directed Studies

Individualized directed reading or research project in anthropology under the supervision of a faculty member. Students can complete no more than 6 credits of ANTH 480.

Prerequisite: Third-year standing. Permission of the department head and faculty supervisor also required.

ANTH 490 (3/9) d Topics in Anthropology

Intensive examination of selected topics in anthropology. Consult the department for this year's offerings and prerequisites. [3-0-0]

Prerequisite: ANTH 100. 6 credits of ANTH at the 300 or 400 level; and third-year standing.

Applied Science, Faculty of Applied Science

APSC: Applied Science

APSC 107 (0) Introduction to Engineering Co-op

An introduction to Engineering Co-op including: completion of preemployment workshops, career skills toolkits, networking opportunities, interview training, individual coaching sessions, and job search skills. Restricted to students meeting the requirements of the Faculty of Applied Science Co-operative Education Program.

APSC 110 (6) Co-operative Education Work Term I

Supervised, integrated learning experience in a public or private organization for a minimum of three months. Formal co-op assignments required. Restricted to students meeting the requirements of the Faculty of Applied Science and the Co-operative Education Program.

APSC 169 (3) Fundamentals of Sustainable Engineering Design

Theory and practice of sustainable engineering. Awareness and risk analysis of potential impacts on society and the environment over the lifecycle of engineering projects. Engineering design process, project lifecycle, and professional responsibility.

Team-based design project. [3-2-0]

APSC 171 (3) Engineering Drawing and CAD/CAM

Orthographic projections, axonometric and perspective projections, dimensioning and tolerances, computer-aided design and modelling, introduction to rapid prototyping, team-based design project. [3-0-2]

APSC 172 (3) Engineering Analysis I

Functions, limits, differentiation, applications of derivatives, integration, applications of definite integrals. [3-0-1]

APSC 173 (3) Engineering Analysis II

Integrals and transcendental functions, techniques of integration, applications of integration, polar coordinates, infinite sequences and series, vectors and the geometry of space, and partial derivatives. [3-0-1]

Prerequisite: APSC 172.

APSC 176 (3) Engineering Communication

Written and oral presentations, formal and informal. Purpose, audience, content, format, and tone are studied, as are team-based report writings and presentations. [3-0-0]

APSC 177 (3) Engineering Computation and Instrumentation

Computer systems, software development, operating systems, compilers, programming in a high-level language, selection and loop structures, functions, arrays, pointers, files, data acquisition, solving engineering problems with computer programs. [3-2*-0]



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APSC 178 (4) Electricity, Magnetism, and Waves

Coulomb's law, electric field, Gauss' law, electric potential, conductors, capacitance, electric currents, resistance, DC circuits, magnetic fields and forces, sources of magnetic fields, electromagnetic induction, mechanical waves, electromagnetic waves, light propagation, geometrical optics. [4-0-2]

Prerequisite: APSC 172.

Corequisite: APSC 173.

APSC 179 (3) Linear Algebra for Engineers

Systems of linear equations, Gaussian elimination, engineering application of linear algebra, matrix operations, special matrices, determinants, vector space, orthogonality, eigenvalues and eigenvectors, linear transformation. [3-0-0]

APSC 180 (3) Statics

Force vectors, Cartesian coordinate system, free body diagram, dot and cross products, forces equilibrium of particles, force and moment equilibrium of rigid bodies, analysis of trusses, frames and machines, friction, wedges, pulleys, and belts. Applications of linear algebra in statics. [3-0-2]

Corequisite: APSC 179.

APSC 181 (3) Dynamics

Kinematics of particles, curvilinear motion, normal-tangential, polar, cylindrical coordinates, force and acceleration, equation of motions, work and energy, conservation of energy. Introduction to rigid body dynamics. [3-0-2]

Prerequisite: All of APSC 172, APSC 180.

Corequisite: APSC 173.

APSC 182 (3) Matter and Energy I

Thermometry, states of matter and phase change, ideal and real gases, 1st law of thermodynamics, 2nd law of thermodynamics, liquids, solutions, solid crystals, atomic structures and bonding. [2-2*-2*]

APSC 183 (3) Matter and Energy II

Chemical equilibrium, reactions in gas phase and in aqueous solutions, acid-base and redox reactions, kinetics of chemical reactions, thermochemistry, electrochemistry, and organic chemistry. [2-2*-2*]

APSC 193 (3) Anatomy and Physiology for Engineers

Structure and function of the neuromuscular, skeletal, digestive, endocrine, urinary, circulatory, and respiratory systems of the human body. Special emphasis on interfacing with biomedical devices. [3-2-0]

APSC 201 (3) Technical Communication

Written and oral communication in engineering. Report preparation, business correspondence, and oral presentation of technical material. Principles of communication with Indigenous communities. [3-0-0]

Prerequisite: APSC 176.

APSC 210 (6) Co-operative Education Work Term II

Supervised, integrated learning experience in a public or private organization for a minimum of three months. Formal co-op assignments required. Restricted to students meeting the requirements of the Faculty of Applied Science and the Co-operative Education Program.

Prerequisite: APSC 110.

APSC 246 (3) System Dynamics

Introduction to the Fourier series. Linear time invariant system, impulse response function, operator, convolution, system characterization, complex numbers, solution of linear ordinary differential equations, Laplace transform and its applications, transfer function, frequency response, solution to system of linear differential equations. Fourier series and transform. [3-0-1]

Prerequisite: All of APSC 173, APSC 178, APSC 179, APSC 181.

APSC 248 (3) Engineering Analysis III

Multivariable functions, Lagrange multipliers; line integrals, surface integrals, volume integrals; divergence, curl, gradient; divergence and Stokes' theorems; engineering applications of vector field theory. Introduction to partial differential equations. [3-0-1]

Prerequisite: All of APSC 173, APSC 178.

APSC 252 (3) Thermodynamics

First and second laws of thermodynamics. Applications to simple thermodynamic processes and cycles. Introduction to heat transfer modes. [3-0-1]

Prerequisite: All of APSC 173, APSC 182.



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APSC 253 (3) Fluid Mechanics I

Fluid properties and fluid statics; principles of conservation of mass, momentum, and energy; laminar and turbulent flow; dimensional analysis; pipe flow; valves and fittings, flow measurements. [3-2*-1]

Prerequisite: All of APSC 180, APSC 181, APSC 248.

APSC 254 (3) Instrumentation and Data Analysis

Data acquisition, sensors, instrumentation, measurement techniques and their limitations, experimental design, and data analysis; statistics, basic probability; application of statistics to data analysis. [3-2*-1]

Prerequisite: All of APSC 173, APSC 178.

APSC 255 (3) Electric Circuits and Power

Circuit analysis techniques for steady-state AC and DC circuits containing independent and dependent voltage and current sources, resistance, capacitance and inductance. DC maximum power transfer. AC power including real, reactive, apparent and complex power and power factor. AC power analysis using phasors. Three-phase AC power systems. [3-2*-1]

Prerequisite: APSC 178.

APSC 256 (3) Numerical Methods for Analysis

Partial differential equations, and numerical methods. Engineering applications to the design and analysis of networks, structures, and hydraulic systems. [3-1-0]

Prerequisite: All of APSC 173, APSC 177.

APSC 258 (3) Applications of Engineering Design

Principles of engineering design, applied to a team-based design project. Use of probability, programming, decision making, economic principles, systems theory, and technical communication in design projects. [3-1-1]

Prerequisite: All of APSC 169, APSC 171, APSC 177, APSC 179, APSC 254.

APSC 259 (3) Materials Science I

Atomic bonding, crystallographic characteristics of materials, stress-strain curve, strengthening mechanisms, failure of materials, Eutectic and Eutectoid phase transformations, Fe-C phase diagram, composite materials, corrosion, electrical properties of materials. [3-2*-0]

Prerequisite: All of APSC 182, APSC 183.

APSC 260 (3) Mechanics of Materials I

Concepts of stress and strain. Axial, shear forces and bending moment diagrams for statically determinate structures, torsion in shafts. Axial and shear stresses and deformations. Transformation of plane stress, Mohr's circle. [3-0-1]

Prerequisite: APSC 180 and APSC 173.

APSC 261 (3) Theory of Structures

Types of structures and structural elements. Loads and load path. Design objectives, philosophy and limit states. Static determinacy and stability. Analysis of statically determinate structures. Deflection using energy and geometrical methods. Influence lines. [3-0-2]

Prerequisite: All of APSC 259, APSC 173, APSC 180.

Corequisite: APSC 260.

APSC 262 (3) Digital Logic Design

Logic design methods, hardware description language (HDL), number representation and arithmetic circuits, combinational circuits, flip-flops, registers, programmable logic devices (FPGAs), counters, finite state machines, digital system designs. [3-2*-0]

Prerequisite: APSC 178.

APSC 310 (6) Co-operative Education Work Term III

Supervised, integrated learning experience in a public or private organization for a minimum of three months. Formal co-op assignments required. Restricted to students meeting the requirements of the Faculty of Applied Science and the Co-operative Education Program.

Prerequisite: APSC 210.

APSC 410 (6) Co-operative Education Work Term IV

Supervised, integrated learning experience in a public or private organization for a minimum of three months. Formal co-op assignments required. Restricted to students meeting the requirements of the Faculty of Applied Science and the Co-operative Education Program.

Prerequisite: APSC 310.

APSC 411 (6) Co-operative Education Work Term V

Supervised, integrated learning experience in a public or private organization for a minimum of three months. Formal co-op



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assignments required. Restricted to students meeting the requirements of the Faculty of Applied Science and the Co-operative Education Program.

Prerequisite: APSC 410.

APSC 412 (6) Co-operative Education Work Term VI

Supervised, integrated learning experience in a public or private organization for a minimum of three months. Formal co-op assignments required. Restricted to students meeting the requirements of the Faculty of Applied Science and the Co-operative Education Program.

Prerequisite: APSC 411.

APSC 501 (3) Professional Communication for Engineering Leaders

Advanced workplace communication. Audience and purpose. Proposals and reports. Equity and diversity. Social media. Oral presentations (face-to-face and video conferencing) and visual aids. Listening skills. This course is restricted to students in the M.Eng. program.

APSC 504 (3) Solar Cell Engineering

Climate change and renewable energy sources, operational principles of solar cells and review of leading technologies, deposition and characterization tools for thin film layers, environmental and economic considerations of solar energy, and latest developments in academic research.

APSC 505 (3) Engineering Leadership

Knowledge and application of Engineering Leadership through reflective practices, including the introduction of various leadership styles, with particular attention to leadership skills within engineering teams that foster equitable, diverse and inclusive team building. Credit will be granted for only one of APSC 505 or ENGR 405.

APSC 519 (3) System Identification

Identification of dynamical systems by considering input signals, sensor measurements, noise, and disturbance, as well as using parameter estimation, model selection and validation, and practical considerations. Credit will only be granted to one of ENGR 419 or APSC 519

APSC 520 (3) Demand Side Energy Management

Socio-economic and environmental considerations of energy demand and management, building energy performance improvements, building and community level energy policies and regulations, renewable and alternative energy integration.

APSC 530 (3) Earth Dams and Dikes

Understand design criteria and regulatory requirements and apply failure consequence classification; evaluate embankment stability, deformation and seepage; seepage control, erosion protection and filter design; techniques for deficiency identification; maintenance and repair strategies; dam safety management systems.

APSC 541 (3) Distributed Power Generation

Overview of distributed power generation technologies; impacts of distributed generation on power system operation and planning; wind and PV resources in the electrical grid; energy storage technologies in the electrical grid; demand response and advanced metering infrastructure.

APSC 547 (3) Advanced Drinking Water Treatment

Theory and design of advanced drinking water treatment processes used for challenging source water conditions. Risk-based treatment approaches, removal of emerging contaminants, regulated and unregulated disinfection by-products, and other current issues in potable water treatment and quality.

Art History and Visual Culture, Faculty of Creative and Critical Studies

ARTH: Art History and Visual Culture

ARTH 101 (3) Art and Visual Cultures of the World I

Introduction to art and visual cultures of major world regions from prehistory to the early modern period. [3-0-0]

ARTH 102 (3) Art and Visual Cultures of the World II

Introduction to art and visual cultures of major world regions from the early modern period to the present. [3-0-0]

ARTH 115 (3) Popular Music and Visual Cultures

A survey of changing attitudes toward class, ethnicity, gender, and ideology as reflected in folk, blues, jazz, rock and hip-hop music and their accompanying visual cultures from the early 20th century to the early 21st century. Credit will be granted for only



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one of ARTH 115 or MUSC 115. [3-0-0]

Equivalency: MUSC 115.

ARTH 202 (3) The Critical Viewer

Critical thinking about art and visual cultures of the world, past and present, and how visual works can be viewed closely, creatively analyzed, and interpreted. [3-0-0]

Prerequisite: 3 credits of 100-level English.

ARTH 203 (3) Global Contemporary Art

The contemporary global art scene with an emphasis on strategies for understanding the complexity of art production from 1985 to the present. Credit will be granted for only one of ARTH 203 or ARTH 302. [3-0-0]

ARTH 301 (3) Critical Viewing - Advanced Studies

Key ideas influencing art theory, art practice, and visual culture studies and topics relating to the emergence and globalization of Euro-American art ideologies and practices. [3-0-0]

Prerequisite: Third-year standing.

ARTH 309 (3) Performance Art: Global Perspectives

History, theory, and practice of performance art as a visual medium, a global language, and a political force. Explores a wide range of experimental and interdisciplinary performance art practices, including key contributions by Indigenous artists. Credit will be granted for only one of THTR 309, ARTH 309 or CULT 380.

Prerequisite: Third-year standing.

Equivalency: CULT 380, THTR 309.

ARTH 315 (3) History of 20th-Century Art

Examination of the visual arts of North America and Europe from 1900-1960; pivotal artists and artistic movements; theoretical and critical study of the interrelationship between art production and consumption since the advent of modernism; the changing role of the artist as the bearer of cultural values. [3-0-0]

Prerequisite: Third-year standing.

ARTH 316 (3) History of 20th-Century Art II

Examination of the visual arts of North America and Europe from 1960 to the present; pivotal artists and artistic movements; theoretical and critical study of the interrelationship between art production and consumption since advent of postmodernism; changing role of the artist as the bearer of cultural values. [3-0-0]

Prerequisite: Third-year standing.

ARTH 320 (3) Art in Canada 1900-1970

Artistic practice in Canada from the beginning of the twentieth century to 1970. Developments in film, video, photography, performance, painting, and sculpture are considered. Emphasis on art's relationship to the changing political, economic, and social arenas in Canada during this time. [3-0-0]

Prerequisite: Third-year standing.

ARTH 321 (3) Art in Canada 1970 to the Present

Artistic practice in Canada from 1970 to the present. Video, film, and photography will be considered along with visual artists' continuing engagement with painting and sculpture. Emphasis on art's relationship to the changing political, economic, and social arenas during this time. [3-0-0]

Prerequisite: Third-year standing.

ARTH 323 (3) Creative Activism: Art, Media, and Social Justice

Examination of the convergence between social justice movements, activist media, and artistic practice. Credit will be granted for only one of ARTH 323 or CULT 320. [3-0-0]

Prerequisite: 3 credits of ARTH or CULT, or permission of the instructor. ARTH 101, ARTH 102 or CULT 100, CULT 101 strongly recommended.

Equivalency: CULT 320.

ARTH 370 (3) Story and Image Across the Islamic World

Selections from the arts of the book across the Islamic world (8th to 19th C) showing how literature inspired painters and calligraphers to weave together word and image. Digital art historical approaches will normally be used, though no computing experience is required. Credit will be granted for only one of ARTH 370, DIHU 370, or WRLD 370.

Prerequisite: Third-year standing.

Equivalency: DIHU 370, WRLD 370.

ARTH 375 (3) Encountering India: The Age of the Mughals



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An examination of interrelated arts, visual cultures and texts in South Asia (15th to 19th C) within their historical and cultural contexts. Topics include the rise of the multicultural Mughal Empire, the roles of Hinduism, Islam, and Sikhism, and encounters with Renaissance and Colonial Europe. Digital art historical approaches will normally be used, though no computing experience is required. Credit will be granted for only one of ARTH 375, DIHU 375, or WRLD 375.

Prerequisite: Third-year standing.

Equivalency: DIHU 375, WRLD 375.

ARTH 378 (3) The Arts of Medieval Spain: Three Religions, One Culture

Medieval Iberia's Christian, Muslim, and Jewish communities and their shared visual cultures, literatures, and religious traditions. [3-0-0]

Prerequisite: Third-year standing.

ARTH 380 (3) African Art and Visual Culture

Historic and contemporary sub-Saharan African art and visual culture with emphasis on socio-historical contexts. [3-0-0]

Prerequisite: Third-year standing.

ARTH 385 (3) African Dress and Fashion

An examination of historical and contemporary African dress and fashion emphasizing sociocultural and political contexts, transculturalism, and global identities. [3-0-0]

Prerequisite: Third-year standing.

ARTH 390 (3) Indigenous Art and Visual Culture

Historic and contemporary North American Indigenous art and visual culture with emphasis on socio-historical contexts and cultural identity. [3-0-0]

Prerequisite: Third-year standing.

ARTH 395 (3) Renaissance Europe in a Global Context

A re-evaluation of conventional Renaissance art history facilitated by intercultural perspectives, gender studies, cognitive science, and cultural theory. [3-0-0]

Prerequisite: Third-year standing.

ARTH 396 (3) Seventeenth-Century European Art in a Global Context

Studies of seventeenth-century European visual cultures during a period of rapid global expansion. [3-0-0]

Prerequisite: Third-year standing.

ARTH 397 (3) Latin American Art and Visual Culture Since 1521

Latin American art and visual cultures from the colonial period to the present. [3-0-0]

Prerequisite: Third-year standing.

ARTH 403 (3) Global Surrealism

The development of Surrealism from its roots in 20th-century French thought to its global proliferation in film, literature, visual culture and contemporary theories. Credit will be granted for only one of ARTH 403 or WRLD 403.

Prerequisite: Third-year standing.

Equivalency: WRLD 403.

ARTH 410 (3) Gender, Art, and Space in the Islamic World

Critical perspectives on the stereotypes of Muslim gender relations and how gender can be used to analyze the art and architecture of various parts of the Islamic world. [3-0-0]

Prerequisite: Third-year standing.

ARTH 420 (3) Curating Contemporary Art

Approaches to researching Contemporary Art in a global context, and the practice of curating exhibitions.

Prerequisite: Third-year standing.

ARTH 450 (3) Performance in Africa

Examination of performance in sub-Saharan Africa addressing theoretical issues and a range of performance practices in context. [3-0-0]

Prerequisite: Third-year standing.

ARTH 451 (3) Politics of Exhibition and Representation

Politics of exhibition and representation of world arts and visual cultures in contexts of colonialism and postcolonial activism.

Prerequisite: Third-year standing.

ARTH 460 (3-12) Selected Topics



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Topics vary each time the course is offered. [3-0-0]

Prerequisite: Third-year standing.

ARTH 470 (3-9) c Directed Studies

Directed readings and written assignments taken under the supervision of a faculty member for students pursuing an advanced investigation of an area of interest. Normally available to students majoring in Art History and Visual Culture.

Prerequisite: Third-year standing and permission of the Department of Creative Studies and the instructor.

Astronomy, Faculty of Science

ASTR: Astronomy

ASTR 110 (3) Astrophysics I

Physical principles of the celestial sphere, laws of motion, light, and optics; observational techniques using earth-based telescopes, artificial satellites, and inter-planetary probes; planets, moons, and smaller bodies in our solar system. Three-hour biweekly lab; satisfies 3 credits of science lab requirement for B.A. graduation. Credit will be granted for only one of ASTR 110, 111, 112. [3-3*-1]

Prerequisite: One of Foundations of Mathematics 12, Pre-Calculus 12, Principles of Mathematics 11; and Physics 11.

ASTR 111 (3) Astronomy I

General principles of the celestial sphere, laws of motion, light, and optics; observational techniques using earth-based telescopes, artificial satellites, and interplanetary probes; planets, moons, and smaller bodies; some observational work. Three-hour biweekly lab; satisfies 3 credits of science lab requirement for B.A. graduation. Credit will be granted for only one of ASTR 110, ASTR 111, ASTR 112. [3-3*-0]

Prerequisite: Foundations of Mathematics 11 is strongly recommended.

ASTR 112 (3) Astronomy I (Non Lab)

General principles of the celestial sphere, laws of motion, light, and optics; observational techniques using earth-based telescopes, artificial satellites, and interplanetary probes; planets, moons, and smaller bodies. Does not satisfy science lab requirement for B.A. graduation. Credit will be granted for only one of ASTR 110, 111, 112. [3-0-0]

Prerequisite: Foundations of Mathematics 11 is strongly recommended.

ASTR 120 (3) Astrophysics II

Modern stellar, galactic, and extragalactic astrophysics, emphasizing stars and stellar evolution from protostars to black holes; galaxies, clusters of galaxies, and quasars; large-scale Universe and cosmology structure; special and general relativity. Three-hour biweekly lab; satisfies 3 credits of science lab requirement for B.A. graduation. Credit will be granted for only one of ASTR 120, 121, 122. [3-3*-1]

Prerequisite: One of Foundations of Mathematics 12, Pre-Calculus 11, Principles of Mathematics 11; and Physics 11.

ASTR 121 (3) Astronomy II

Emphasizes modern stellar, galactic, and extragalactic astronomy; stars and stellar evolution from protostars to black holes; galaxies, clusters of galaxies, and quasars; large-scale structure of the Universe and cosmology. Three-hour biweekly lab; satisfies 3 credits of science lab requirement for B.A. graduation. Credit will be granted for only one of ASTR 120, ASTR 121, ASTR 122. [3-3*-0]

Prerequisite: Foundations of Mathematics 11 is strongly recommended.

ASTR 122 (3) Astronomy II (Non Lab)

Emphasizes modern stellar, galactic, and extragalactic astronomy; stars and stellar evolution from protostars to black holes; galaxies, clusters of galaxies, and quasars; large-scale structure of the Universe and cosmology. Does not satisfy science lab requirement for B.A. graduation. Credit will be granted for only one of ASTR 120, 121, 122. [3-0-0]

Prerequisite: Foundations of Mathematics 11 is strongly recommended.

ASTR 210 (3) Physical Processes in the Universe

Introduction to observational conventions. Applications of physics to astronomical systems, including orbital mechanics, radiative processes. Introduction to stellar properties and atmospheres, accretion, and general relativity including black holes and modern cosmology. [3-0-0]

Prerequisite: MATH 101 and one of PHYS 121, PHYS 122.

Biochemistry, Faculty of Science

**BIOC: Biochemistry****BIOC 304 (3) Molecular Biochemistry I**

Principles of thermodynamics and reaction kinetics in biochemistry. Acid/base biochemistry. Structure and function of lipids, amino acids, proteins, carbohydrates, nucleotides, and nucleic acids. Enzyme kinetics. Credit will only be granted for one of BIOC 304 or BIOL 311. [3-0-0]

Prerequisite: One of CHEM 204, CHEM 214.

BIOC 305 (3) Molecular Biochemistry II

Metabolic pathways with a mechanistic perspective including regulation and control of carbohydrate, lipid, amino acid, and nucleotide catabolism and anabolism. Oxidative- and photo-phosphorylation. The biochemistry and molecular biology of signal transduction, replication, DNA repair, transcription, translation, and gene regulation. Credit will only be granted for one of BIOC 305 or BIOL 319. [3-0-0]

Prerequisite: All of BIOC 304, BIOL 200.

BIOC 307 (3) Enology I

Chemistry and biochemistry of winemaking (enology) and grape-growing (viticulture) including development of the important major constituents of a wine; ethanol, acids, sugars, and colour; the subtle aspects of the aroma; odour-active compounds and how they form; and the effects of storing a wine in oak barrels. [3-0-0]

Prerequisite: One of CHEM 204, CHEM 214.

BIOC 308 (3) Pharmacology I

Principles of pharmacology, including pharmacokinetics and pharmacodynamics of drug action, pharmacology associated with the autonomic nervous system (sympathetic and parasympathetic branches), the neuromuscular junction, the inflammatory response, chronic obstructive pulmonary diseases, peptic ulcers, and general and local anesthesia. [3-0-0]

Prerequisite: BIOL 200 and one of CHEM 204, CHEM 214.

BIOC 309 (3) Pharmacology II

Continuation of Pharmacology I. Expands on topics including pharmacokinetics and pharmacodynamics of drug action, interaction of drugs with the autonomic nervous system (ANS), the inflammatory response, and the treatment of chronic diseases. [3-0-0]

Prerequisite: BIOC 308.

BIOC 310 (3) Plant Chemistry

Chemical constituents of plants, their synthesis, their contribution to key metabolic processes, and the regulation of their biosynthesis. Synthesis of alkaloids, secondary metabolites, nutrients, and bioactive compounds. Discovery of new phytochemicals and human uses of plants. [3-0-0]

Prerequisite: One of CHEM 204, CHEM 214 and one of BIOL 200, BIOL 210, BIOL 319, BIOC 305.

BIOC 393 (3) Biochemistry Laboratory

Topics include protein separation, enzyme kinetics, ELISA, DNA Ligation and Transformation, PCR, RFLP analysis, Agarose gel electrophoresis, STR and VNTR analysis, and gene regulation. Credit will be granted for only one of BIOC 393 or BIOL 393. [0-4-0]

Prerequisite: BIOC 304 and one of BIOL 200, BIOL 228, CHEM 204, CHEM 214.

Corequisite: BIOL 366.

Equivalency: BIOL 393.

BIOC 402 (3) Proteins: Structure and Function

Structural components of proteins; classification by primary, secondary, and tertiary structure; protein chemistry and purification; peptide and protein synthesis by chemical means; and three-dimensional structure determination using X-ray diffraction and NMR. [3-0-0]

Prerequisite: One of BIOC 304, BIOL 311.

BIOC 403 (3) Enzymology

Enzyme kinetics: steady-state kinetic analyses, fast-reaction methods, kinetic isotope effects. Catalytic mechanisms: coenzymology, radical-mediated reactions, catalytic rate enhancements. Special topics: enzyme evolution, multifunctional enzymes, biocatalysis, protein engineering. Credit will be granted for only one of BIOC 403, CHEM 403, CHEM 413, CHEM 569. [3-0-0]

Prerequisite: One of BIOC 304, BIOL 311.

Equivalency: CHEM 403.



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BIOC 405 (3) Lipids and Biomembranes

Review of recent research on the structure, dynamics, and function of membranes, membrane lipids, and proteins. [3-0-0]
Prerequisite: One of BIOC 304, BIOL 311.

BIOC 407 (3) The Biochemical Basis of Disease

Draws on foundational knowledge of normal biochemistry. Inborn errors of metabolism, abnormal growth and metabolism, neurodegeneration and inappropriate protein folding, deficiency diseases, endocrine disorders, and cardiovascular and hematological disorders. Credit will be granted for only one of BIOC 407 or BIOL 507. [3-0-0]
Prerequisite: One of BIOC 305, BIOL 319.

BIOC 410 (3) Nucleic Acids - Structure and Function

Chemical, physical, and biological properties of nucleic acids and their role in replication, transcription, translation, and regulation of expression of genetic material. [3-0-0]
Prerequisite: BIOL 366.

BIOC 420 (3-9) d Special Topics in Biochemistry

Advanced or specialized biochemistry topic. Seminar presentation required using original literature in the field. Repeatable for up to 9 credits with different topics. [3-0-1]
Prerequisite: Third-year standing in any B.Sc. program and permission of the department head.

BIOC 425 (3) Biocatalysis

Biotechnological application of enzymes and whole cell catalysts for the synthesis of biofuels, pharmaceuticals, and other fine chemicals. Emphasis on enzymes used for organic synthesis, protein and metabolic engineering, and immobilization strategies. [3-0-0]
Prerequisite: Either (a) BIOC 304 or (b) BIOL 311.

BIOC 448 (3/6) c Directed Studies in Biochemistry

Library (3 credits) or laboratory project with written report (3 or 6 credits) allowing a student to undertake an investigation on a specific topic as agreed upon by the faculty and student.
Prerequisite: Permission of the BIOC Management Committee.

BIOC 449 (6) Honours Thesis

Original research work under the direction of a faculty member. A written thesis with a public presentation of the thesis in the form of a poster or a seminar is required.
Prerequisite: Fourth-year standing in the Major in Biochemistry and Molecular Biology program with a minimum overall grade average of 76% (in all courses taken applicable to the Biochemistry and Molecular Biology Major), a research project, and approval of both the faculty supervisor and either the Chemistry or Biology Department Head.

BIOC 494 (3) Biotechnology Laboratory I: DNA Manipulation

Current techniques in DNA manipulation and analysis will be presented, relevant to such areas as molecular biology, microbiology, and biochemistry. Topics include site-directed mutagenesis, variations in cloning techniques, sequence analysis, Southern blotting, plus maintenance of a research lab notebook. [0-4-0]
Prerequisite: One of BIOC 393, BIOL 393. BIOL 366 is strongly recommended.

BIOC 495 (3) Biotechnology Laboratory II: Gene Expression

Current methods in gene expression will be presented, relevant to such areas as molecular biology, microbiology, and biochemistry. Topics include extraction, handling and manipulation of RNA, analysis of gene expression (transcriptional), production of recombinant proteins, and genetic transformation of eukaryotes. [0-4-0]
Prerequisite: BIOL 366 and one of BIOC 393, BIOL 393.

BIOC 530 (3) Biochemistry Seminar

Course designed to enhance oral and written communication of scientific concepts. Each student will present two seminars and write an NSERC-style grant related to their research. Credit will be granted for only one of BIOC 530 or BIOC 630.
Prerequisite: Admission to the Biochemistry and Molecular Biology graduate program.

BIOC 549 (21) M.Sc. Thesis

Pass/Fail.

BIOC 649 (0) Ph.D. Thesis

Pass/Fail.

Biology, Faculty of Science

**BIOL: Biology****BIOL 116 (3) Biology for Science Majors I**

First of a pair of courses that introduce students to the biological concepts necessary to continue into second-year biology. Covers evolutionary theory and its underlying genetic basis, basic cell biology, plant and animal nutrition, and energy acquisition. Credit will be granted for only BIOL 116/125 or BIOL 117/122. [3-3-0]

Prerequisite: Either (a) CHEM 11 and one of Life Science 11, Anatomy and Physiology 12; or (b) CHEM 11 and one of BIOL 11, BIOL 12.

Corequisite: One of CHEM 111, CHEM 121 is recommended.

BIOL 117 (3) Evolution and Ecology

Evolutionary theory and its underlying genetic basis; population, community, ecosystem, and behavioural ecology. Specific case studies and current environmental concerns. Recommended for Arts or Education students, in conjunction with BIOL 122. BIOL 117/122 cannot be used in place of BIOL 116/125 for those degree programs that require BIOL 116/125. Credit will be granted for only one of BIOL 117/122 or BIOL 116/125. [3-0-0]

BIOL 122 (3) Physiology of Multicellular Organisms

Physiological adaptations of plants and animals to their environments. Structure/function relationships of human organ systems. Recommended for Arts or Education students, in conjunction with BIOL 117. BIOL 117/122 cannot be used in place of BIOL 116/125 for those degree programs that require BIOL 116/125. Credit will be granted for either BIOL 117/122 or BIOL 116/125. Credit will be granted for only one of BIOL 122 or both of HMKN 190 and HMKN 191. [3-0-0]

Prerequisite: BIOL 117 is recommended.

BIOL 125 (3) Biology for Science Majors II

Continuation of BIOL 116. Introduction to biological concepts necessary for second-year biology. Physiology of reproduction, gas exchange, inter-organ transport, inter-organ coordination in plants and animals, and excretion and movement in animals. Ecosystem, population, community, and behavioural ecology are discussed. Credit will be granted for only one of BIOL 116/125 or BIOL 117/122. [3-3-0]

Prerequisite: BIOL 116.

Corequisite: One of CHEM 113, CHEM 123 is recommended.

BIOL 131 (3) Human Anatomy and Physiology I

Introduction to human structures and functions, emphasizing basic physiological principles, plus cell and tissue structure. Laboratory work will include gross and microscopic anatomy, and will demonstrate underlying physiological processes. This course is for students planning to enrol in BIOL 133 in their second term. Credit will be granted for only one of BIOL 131 or HMKN 190. [3-3-0]

Prerequisite: Either (a) BIOL 122 or (b) all of Life Science 11 or Anatomy and Physiology 12, Chemistry 11 or (c) all of Biology 11 or 12, Chemistry 11.

BIOL 133 (3) Human Anatomy and Physiology II

Continuation and completion of the comprehensive survey of human structures and functions started in BIOL 131. Credit will be granted for only one of BIOL 133 or HMKN 191. [3-3-0]

Prerequisite: BIOL 131.

BIOL 200 (3) Cell Biology

Structure and function of plant and animal cells; membrane models, cytoplasmic organelles, biological information from gene to protein, the endomembrane system, secretion, intracellular digestion, endocytosis, transport processes, cytoskeleton and cell motility. [3-0-0]

Prerequisite: BIOL 125 and one of CHEM 113, CHEM 123.

BIOL 201 (3) Introduction to Evolution and Ecology

Fundamental processes underlying adaptive evolution, speciation, and extinction. Methods used to reconstruct the evolutionary histories of, and relationships among, groups of organisms. Factors determining the distribution and abundance of organisms. Competition, predation, and an exploration of processes that promote species coexistence and lead to the maintenance of species diversity. [3-0-0]

Prerequisite: BIOL 125.

BIOL 202 (3) Introduction to Biostatistics

Data analysis methods for biologists including sampling and experimental design, visualizing and describing data, probability, hypothesis testing, comparisons of proportions and means, correlation and regression analysis, analysis of variance,



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non-parametric, permutation-based tests, and the central roles that statistical analyses and reproducibility play in scientific research. R and RMarkdown are used to visualize and analyze data, and to communicate findings using literate programming. [3-2]
Prerequisite: MATH 100 and second-year standing.

BIOL 204 (3) Vertebrate Structure and Function

Introduction to the vertebrate phyla and their evolution; comparative study of vertebrate structure and function, with dissection of representative forms. [3-3-0]

Prerequisite: Either (a) BIOL 125 or (b) all of BIOL 117, BIOL 122.

BIOL 205 (3) Comparative Invertebrate Zoology

Introduction to the invertebrate phyla. [3-3-0]

Prerequisite: Either (a) BIOL 125 or (b) all of BIOL 117, BIOL 122.

BIOL 209 (3) Algae, Fungi, and Bryophytes

Biology of fungi, algae, lichens, and bryophytes, with emphasis on eukaryote evolution, symbiosis, life history adaptation, and importance to humans. [3-3-0]

Prerequisite: Either (a) BIOL 125 or (b) all of BIOL 117, BIOL 122.

BIOL 210 (3) Vascular Plants

Comparative study of pteridophytes, gymnosperms, and angiosperms, integrating form, function, and ecology. [3-3-0]

Prerequisite: Either (a) BIOL 125 or (b) all of BIOL 117, BIOL 122.

BIOL 228 (3) Introductory Microbiology

An introductory course providing a broad background in microbiology. Topics include structure, metabolism, diversity of micro-organisms, microbial genetics, virology, and immunology. Laboratory work will include techniques and experiments relevant to lectures. [3-3-0]

Prerequisite: BIOL 125.

Corequisite: One of CHEM 203, CHEM 213.

BIOL 232 (3) Human Infectious Disease

Agents of infectious disease in humans. Physiology and structure, mechanisms of pathogenesis, immunological response, clinical disease caused, laboratory diagnosis, treatment, prevention, and control. Properties and uses of antimicrobial agents, resistance, vaccines, and bioterrorism. Credit will be granted for only one of BIOL 232 or BIOL 314. [3-0-0]

Prerequisite: Either (a) BIOL 235 or (b) HINT 231.

BIOL 265 (3) Principles of Genetics

Mendelian genetics, gene expression, recombination, mutation, evolution, and molecular techniques. Examples will be drawn from both eukaryotic and prokaryotic systems. Credit will be granted for only one of BIOL 265 or BIOL 365. [3-0-0]

Prerequisite: BIOL 125.

BIOL 301 (3) Evolutionary Principles and Methods

An exploration of the field of Evolutionary Biology as an ongoing scientific endeavour. Current research methodology and development of concepts relating to the study of evolutionary change, adaptation, and the history of life will be examined. [3-0-0]

Prerequisite: BIOL 201.

BIOL 306 (3) Ecology of Animals

Integrates recent advances in the study of animal ecology. Principles of animal community, population, and individual ecology are covered. [3-0-0]

Prerequisite: BIOL 201 and BIOL 202.

BIOL 307 (3) Limnology

Integrated approaches to freshwater science and its place in environmental science. Ecosystem ecology of inland waters, relating aquatic organisms with their physical and chemical environment. Participation in a one-day weekend field trip in September or early October is required. Credit will be granted for only one of BIOL 307 or EESC 301. [3-3-0]

Prerequisite: All of BIOL 116, BIOL 125. Third-year standing in Biology, Earth and Environmental Sciences, Environmental Chemistry, or Freshwater Science. One of BIOL 201 or BIOL 375 is recommended.

Equivalency: EESC 301.

BIOL 308 (3) Population Biology

Introduction to the study of plant and animal populations. Demography, single species growth, competition, predation, and natural selection. [3-0-1]

Prerequisite: MATH 101 and one of BIOL 201, GEOG 207.



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BIOL 309 (3) Field Ecology of Plants and Soil

Applies concepts of community ecology to plants and soils. Important processes that influence plant community composition and structure; plant autecology; soil ecology; ecosystem processes. Labs provide experience in techniques commonly used by plant and soil ecologists. One full-day field trip required. [3-3-0]

Prerequisite: BIOL 201 and one of BIOL 202, STAT 230.

BIOL 311 (3) Biochemistry I

Structure and function of proteins, carbohydrates, lipids, and nucleic acids. Principles of thermodynamics and enzyme reaction mechanisms. Enzyme kinetics. Credit will only be granted for one of BIOL 311 or BIOC 304. [3-0-0]

Prerequisite: BIOL 116 and one of CHEM 204, CHEM 214.

BIOL 312 (3) Virology

Study of viral agents of infectious disease in eukaryotes. Viral pathogens investigated with respect to classification, structure, replication, mechanisms of pathogenesis, clinical disease caused, epidemiology, laboratory diagnosis, treatment, prevention, and control. Topics include properties and uses of antiviral agents, production and use of vaccines, and bioterrorism. [3-0-0]

Prerequisite: BIOL 228.

BIOL 313 (3) Science Writing

Develop strong and efficient writing skills in the biological sciences. Improve quality of written work; develop techniques for writing, editing, evaluating, and critiquing writing; and learn attributes unique to science writing and methods for writing fluent scientific prose. [3-0-0]

BIOL 314 (3) Medical Microbiology

Bacterial and fungal agents of infectious animal diseases. Physiology and structure, mechanisms of pathogenesis, immunological response, clinical disease caused, epidemiology, laboratory diagnosis, treatment, prevention, and control. Properties and uses of antibacterial and antifungal agents, resistance, vaccines, and bioterrorism. [3-0-0]

Prerequisite: BIOL 228.

BIOL 318 (3) Immunology

Introduction to concepts of immunology. Immune system, innate immunity and complement, adaptive immunity, cellular and humoral immune response, cytokines, T-cell activation, the major histocompatibility complex, antibody structure and genetics, immune system and cancer, AIDS, autoimmunity, hypersensitivity. [3-0-0]

Prerequisite: BIOL 228.

BIOL 319 (3) Biochemistry II

Continuation of BIOL 311. Energy production via glycolysis, oxidative phosphorylation, and photosynthesis. Integration and control of carbohydrate, lipid, and protein metabolism. Synthesis, and metabolism of nucleic acids and the biochemistry of gene function. Credit will only be granted for one of BIOL 319 or BIOC 305. [3-0-0]

Prerequisite: BIOL 311.

BIOL 341 (3) Neurobiology

The nervous system control of animal behavior. Examples include: sensory processing and communication, predator-prey interactions, migration, motor-coordination, daily and seasonal changes in activity, cellular mechanisms of learning and memory. [3-0-0]

Prerequisite: BIOL 200.

BIOL 350 (3) Clinical Neuroscience

The structural, biochemical, and functional changes that characterize clinically-important diseases of the nervous system, including: brain and spinal cord trauma; developmental disorders, memory, and memory dysfunction; neurodegenerative diseases; mood and anxiety disorders; epilepsy; and maintenance of homeostasis. [3-0-0]

Prerequisite: One of BIOL 200, BIOL 341, PSYO 230, PSYO 331 and third-year standing.

BIOL 354 (3) Cell Physiology

Analysis of cellular function common to diverse organisms with an emphasis on ion transport in excitable and non-excitable cells, signaling via second messengers, cellular pH regulation, and epithelial transport. [3-0-1*]

Prerequisite: BIOL 200 and one of BIOL 202, STAT 230 and one of PHYS 102, PHYS 121, PHYS 122.

BIOL 356 (3) Comparative Animal Physiology

Comparative course concerning the evolution and advantage of systems design in a variety of animals. Two underlying themes include the principles of homeostasis - the regulation of a constant internal state - and the systems involved in maintaining a constant internal environment: cardiovascular, respiratory, osmoregulatory, and endocrine. [3-0-0]

Prerequisite: BIOL 354.



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BIOL 357 (3) Introduction to Entomology

General survey of the evolution, classification, and biology of insects, with a special emphasis on their functional ecology. Experiments using insect systems as well as master techniques for collecting and curating insect specimens will be conducted in the lab. A properly-curated collection is a requirement for this course. [3-3-0]

Prerequisite: BIOL 201 and one of BIOL 202, STAT 230. BIOL 205 is recommended.

BIOL 358 (3) Plant Ecophysiology

How plants respond to their environment; the physiological mechanisms that underlie adaptations to different physical environments. Water relations, gas exchange, and mineral nutrition; temperature and energy budgets; stress tolerance. [3-0-1.5]

Prerequisite: BIOL 210 and one of BIOL 202, STAT 230.

BIOL 359 (3) Physiology Laboratory

Experimental cellular and animal physiology. Topics include cell volume regulation, membrane transport, pH regulation, neuronal physiology, respiratory physiology, cardiac physiology, muscle physiology and renal physiology. Restricted to students in the Zoology Major or Honours program. [1-4-0]

Prerequisite: BIOL 354.

Corequisite: BIOL 356.

BIOL 363 (3) Developmental Biology

Principles of animal development. Embryonic development of key invertebrates is compared to vertebrates at the morphological, genetic, and epigenetic levels. Differential gene expression and cell signaling responsible for the specification of embryonic cell fates and pattern formation will be compared in various animals. Credit will be granted for only one of BIOL 363 or BIOL 263. [3-3-0]

Prerequisite: BIOL 200.

BIOL 366 (3) Molecular Genetics

Stresses the principles of molecular biology techniques and their relevance to the study of all areas of biology. Gene expression, gene regulation, and development genetics. [3-0-0]

Prerequisite: One of BIOL 265, BIOL 365.

BIOL 370 (3) African Savannah Biology

Analysis of the ecological, developmental, and evolutionary mechanisms responsible for the diversity of African savannah life including early hominins. [3-0-0]

Prerequisite: BIOL 201.

BIOL 371 (3) Flora of British Columbia

Flora of BC, plant identification, and biogeoclimatic zones. Two-week (10-day) course; daily field exercises; equivalent to a one-term lecture and laboratory course. Usually offered at the start of first term in the summer. Students must arrange their own transportation to and from local field locations. Additional fees may apply.

Prerequisite: BIOL 201 and successful completion of 48 academic credits.

BIOL 372 (3) Field Ornithology

Field study of birds. Two-week (10 day) course; daily field exercises; equivalent to a one-term lecture and laboratory course. Usually offered first term in the summer. Students must arrange their own transportation to and from local field locations.

Additional fees may apply.

Prerequisite: One of BIOL 201, BIOL 204 and successful completion of 48 academic credits.

BIOL 375 (3) Flora and Fauna of Inland Waters

Introduction to major groups of organisms in inland waters. Cyanobacteria, algae, plants, and animals; their ecology, evolution; conservation and their use in biomonitoring. This course requires students to collect specimens from the field, both in and outside of supervised lab sessions. [3-3-0]

Prerequisite: Either (a) BIOL 125 or (b) all of BIOL 117, BIOL 122. Third-year standing in Biology, Freshwater Science, or Earth and Environmental Sciences.

BIOL 380 (3) Food and Industrial Microbiology

A detailed examination of the microbes that play a role in the manufacturing of beverages (e.g., beer and wine), solid foods (e.g., cheese), and industrial processes (e.g., waste water treatment). [3-0-0]

Prerequisite: BIOL 228.

BIOL 381 (3) Environmental Microbiology

Introduction to the diverse roles of microbes in natural and artificial environments. Topics range from community interactions to biogeochemical cycles to biodegradation and will introduce principles, practical applications such as waste water treatment, and implications of environmental microbiology. [3-0-0]



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Prerequisite: BIOL 228 and one of CHEM 203, CHEM 213.

BIOL 382 (3) Prokaryotic Physiology

Physiology and molecular biology of prokaryotic organisms. Molecular structure and functional aspects of prokaryotic cells including: bacterial and archaeal metabolism; energy production and use by aerobes and anaerobes; cellular growth and biosynthesis; and molecular genetics. Credit will be granted for only one of BIOL 382 or BIOL 420V when the subject matter is of the same nature. [3-0-0]

Prerequisite: BIOL 228 and one of CHEM 204, CHEM 214.

BIOL 393 (3) Biochemistry Laboratory

Topics include protein separation, enzyme kinetics, ELISA, DNA Ligation and Transformation, PCR, RFLP analysis, Agarose gel electrophoresis, STR and VNTR analysis, and gene regulation. Credit will be granted for only one of BIOL 393 or BIOC 393. [0-4-0]

Prerequisite: BIOL 311.

Corequisite: BIOL 366.

Equivalency: BIOC 393.

BIOL 401 (3) Spatial Ecology

Spatial patterns in ecology, exploring ways to describe variation and mechanisms that give rise to patterns. Dispersal, metapopulation and source-sink dynamics, connectivity and fragmentation, heterogeneity, disturbance, edges, and dynamics of geographical ranges. Credit will be granted for only one of BIOL 401 or BIOL 512. [3-0-0]

Prerequisite: One of BIOL 202, STAT 230.

BIOL 410 (3) Plant-Microbe Interactions

Ecological, physiological, and molecular perspectives will be covered on root-associated micro-organisms with the potential to benefit plants. Implications for agriculture, forestry, bioremediation, and conservation. Credit will be granted for only one of BIOL 410 or BIOL 510. [3-0-0]

Prerequisite: BIOL 228.

BIOL 414 (3) Advanced Field Ecology

Independent research projects in the field, while considering application of methods to solving problems in ecology. Study design, hypothesis development, primary data collection, analysis, and interpretation; formal manuscripts for publication. Credit will be granted for only one of BIOL 414 or BIOL 514. [3-0-1]

Prerequisite: One of BIOL 202, GEOG 271 and one of BIOL 201, GEOG 207.

BIOL 417 (3) Evolutionary Ecology

Advanced survey of the field of evolutionary ecology: the study of the ecological basis for the evolution of life histories, sex, mating strategies, and foraging strategies. [3-0-0]

Prerequisite: BIOL 308 and one of BIOL 202, STAT 230.

BIOL 420 (3-9) d Special Topics in Biology

With permission of the department head, this course may be taken more than once with a different topic. Credit will be granted for only one of BIOL 420 and BIOL 520 when the subject matter is of the same nature.

BIOL 422 (3) Conservation Biology

Scientific basis of conservation biology. Analysis of demographic data, population models, and extinction risks. Examine complex habitat, landscape, genetic, and trophic interactions that affect populations. Conservation approaches including habitat planning, reserve design, surrogacy, and policy. Credit will be granted for only one of BIOL 422 or BIOL 513. [3-0-0]

Prerequisite: BIOL 308.

BIOL 424 (3) Global Food Systems: Society, Ecology, Sustainability

Evaluating food system sustainability issues, including management and technology alternatives, through the lenses of (1) systems-analytic (i.e., life cycle) thinking and tools; and (2) sustainable scale (relative to ecological carrying capacity), distributive justice, and efficient allocation. Credit will be granted for only one of BIOL 424 or MGMT 470. [3-0-0]

Prerequisite: Third-year standing.

Equivalency: MGMT 470.

BIOL 426 (3) Cancer Biology

The molecular and cellular basis of cancer. Introduction to principles of oncology including prevention, diagnosis and treatment. [3-0-0]

Prerequisite: One of BIOL 311, BIOC 304 and all of BIOL 200, BIOL 265, BIOL 318.

BIOL 440 (6) Honours Thesis

Students undertake a research project on a specific topic as agreed upon by the faculty member and the student. A written



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thesis is required, with a public presentation of the thesis in the form of a poster or a seminar.

Prerequisite: Permission of the department head and course supervisor.

BIOL 444 (3) Dynamic Modelling of Human-Environment Systems

Design and use of dynamic models of complex systems; spatial modelling of the environment; agent- and individual-based models; applications to biodiversity conservation, environmental management, land use change and natural resource management. Credit will be granted for only one of BIOL 444, BIOL 544, EESC 444, or EESC 544. [3-3-0]

Prerequisite: One of MATH 100, MATH 101 and one of APSC 254, BIOL 202, GEOG 271, PSYO 271, STAT 121, STAT 230. Third-year standing. At least three credits of second-year BIOL/EESC and three credits of third-year BIOL/EESC are strongly recommended.

Equivalency: EESC 444.

BIOL 452 (3-12) Directed Studies in Biology

Allows investigation on a specific topic as agreed upon by the faculty member and the student. Permission of the Biology department head required. No more than 6 credits with the same supervisor. No more than 9 credits per academic year.

BIOL 459 (3) Behavioural Ecology

Ecological and evolutionary basis for behaviour, the role of behaviour in enabling an organism to adapt to its environment. Topics include optimization and game theoretic approaches, foraging, sociality, mating, and parental care. [3-0-0]

Prerequisite: BIOL 201.

BIOL 460 (3) Population Genetics

Concepts in empirical and theoretical population genetics. Primary processes shaping genetic variation within and among populations. Methodologies for measuring genetic variation in nature, and practical applications of population genetic principles to genomics, molecular evolution, human evolution, and conservation biology. Credit will be granted for only one of BIOL 460 or BIOL 560. [3-0-0]

Prerequisite: BIOL 201.

BIOL 461 (3) Cell Signaling

Signal transduction mechanisms of cells as mediators of responses to their environments. Interplay between signaling pathways, and relationships between signaling defects, disease, and therapeutic agents, with a focus on eukaryotic cells. Credit will be granted for only one of BIOL 461 or BIOL 420A when the subject matter is of the same nature. [3-0-0]

Prerequisite: BIOL 200 and one of BIOL 311, BIOC 304.

BIOL 468 (3) Molecular Approaches in Ecology and Evolution

Techniques for collecting molecular and population genetic data. Applications in ecology, evolution, and conservation. Characteristics of molecular markers, associated analytical approaches, emerging genomic technologies, and case studies. Credit will be granted for only one of BIOL 468 or BIOL 568. [3-0-0]

Prerequisite: BIOL 201.

BIOL 477 (3) Bioinformatics

Analysis of nucleic acid sequences using command-line computer programs. Use of biological databases. Structure and evolution of genomes. Credit will be granted for only one of BIOL 477, BIOL 577, or BIOL 420Y (Bioinformatics). [3-0-0]

Prerequisite: BIOL 265 and at least 6 credits of 300-level BIOL or BIOC courses.

BIOL 480 (3) Mycology

A detailed examination of the fungi. Emphasis is on taxonomy, evolution, genetics, ecology, and physiology of the Chytridiomycota, Zygomycota, Glomeromycota, Ascomycota, and Basidiomycota. The seminar emphasizes discussion and interpretation of primary literature, and quantitative data. [3-0-1.5]

Prerequisite: BIOL 311.

BIOL 501 (3) Biology Seminar

Required for all Biology M.Sc. students. Based on Biology seminar speakers and their research programs. Students will attend the seminars and learn skills required to critically evaluate the underlying research.

BIOL 507 (3) The Biochemical Basis of Disease

Draws on foundational knowledge of normal biochemistry. Inborn errors of metabolism, abnormal growth and metabolism, neurodegeneration and inappropriate protein folding, deficiency diseases, endocrine disorders, and cardiovascular and hematological disorders. Credit will be granted for only one of BIOL 507 or BIOC 407.

Prerequisite: Permission of instructor.

BIOL 510 (3) Plant-Microbe Interactions

Ecological, physiological, and molecular perspectives will be covered on root-associated micro-organisms with the potential to



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benefit plants. Implications for agriculture, forestry, bioremediation, and conservation. Credit will be granted for only one of BIOL 510 or BIOL 410.

BIOL 512 (3) Spatial Ecology

Examination of major spatial patterns in ecology, exploring ways to describe variation and the mechanisms that give rise to patterns. Dispersal, metapopulation and source-sink dynamics, connectivity and fragmentation, heterogeneity, disturbance, edges, and dynamics of geographical ranges. Credit will be granted for only one of BIOL 512 or BIOL 401. [3-0-0]

BIOL 513 (3) Conservation Biology

Scientific basis of conservation biology. Obtain and analyze demographic data, develop population models, and project extinction risks. Complex habitat, landscape, genetic, and trophic interactions that affect population dynamics. Conservation approaches including habitat planning, reserve design, surrogacy, and policy. Credit will be granted for only one of BIOL 422 or BIOL 513. [3-0-0]

BIOL 514 (3) Advanced Field Ecology

Independent research projects in the field, while considering application of methods to solving problems in ecology. Study design, hypothesis development, primary data collection, analysis, and interpretation; formal manuscripts for publication. Credit will be granted for only one of BIOL 514 or BIOL 414.

BIOL 520 (1-9) d Special Topics in Biology

With permission of the department head, this course may be taken more than once with a different topic. Credit will be granted for only one of BIOL 520 or BIOL 420 when the subject matter is of the same nature.

BIOL 544 (3) Dynamic Modelling of Human-Environment Systems

Design and use of dynamic models of complex systems; spatial modelling of the environment; agent- and individual-based models; applications to biodiversity conservation, environmental management, land use change and natural resource management. Credit will be granted for only one of EESC 544, EESC 444, BIOL 444 or BIOL 544.

Equivalency: EESC 544.

BIOL 552 (3-9) d Directed Studies in Biology

Allows investigation on a specific topic as agreed upon by the supervisory committee and the student. This course may be taken more than once with a different topic. No more than 6 credits may be completed with the same instructor.

Prerequisite: Permission of the graduate program advisor and the course instructor.

BIOL 560 (3) Population Genetics

Concepts in empirical and theoretical population genetics. Primary processes shaping genetic variation within and among populations. Methodologies for measuring genetic variation in nature, and practical applications of population genetic principles to genomics, molecular evolution, human evolution, and conservation biology. Credit will be granted for only one of BIOL 560 or BIOL 460. [3-0-0]

BIOL 568 (3) Molecular Approaches in Ecology and Evolution

Techniques for collecting molecular and population genetic data. Applications in ecology, evolution, and conservation.

Characteristics of molecular markers, associated analytical approaches, emerging genomic technologies, and case studies.

Credit will be granted for only one of BIOL 568 or BIOL 468. [3-0-0]

BIOL 577 (3) Bioinformatics

Analysis of nucleic acid sequences using command-line computer programs. Use of biological databases. Structure and evolution of genomes. Credit will be granted for only one of BIOL 477, BIOL 577 or BIOL 420Y (Bioinformatics). [3-0-0]

BIOL 599 (21) M.Sc. Thesis

Pass/Fail.

BIOL 699 (0) Ph.D. Thesis

Pass/Fail.

Creative and Critical Studies, Faculty of Creative and Critical Studies

CCS: Creative and Critical Studies

CCS 150 (3) Creative and Critical Art Theory I

Introduction to Western, Indigenous, and global art practices and theoretical discourses through the discussion and examination of forms, context, and ideas that contribute to cultural and contemporary art practices. [3-0-1]



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CCS 250 (3) Creative and Critical Art Theory II

The continued study of Western, Indigenous, and global art practices and the theoretical discourses that contribute to the development of contemporary art. [3-0-1]

Prerequisite: CCS 150.

CCS 320 (3) Interdisciplinary Ecological Art

An interdisciplinary practice-based course that introduces students to artistic methods and processes for engagement in environmental issues. Restricted to students with at least third-year standing.

Prerequisite: SUST 204 or any 6 credits of CCS, VISA, ARTH, CRWR, THTR, INDG.

CCS 506 (3) M.F.A. Graduate Colloquium I

Multi-disciplinary seminar dealing with various approaches and issues in contemporary creative research methods as relating to the disciplines of Visual Arts, Media Arts, Creative Writing, and Performance. Restricted to students in the M.F.A. program.

Prerequisite: Restricted to students in the MFA program or permission of the Department of Creative Studies.

CCS 507 (3) M.F.A. Graduate Colloquium II

Multi-disciplinary seminar dealing with various approaches and issues in contemporary creative research methods as relating to the disciplines of Visual Arts, Media Arts, Creative Writing, and Performance. Students will be expected to develop creative work and a thesis plan.

Prerequisite: CCS 506 or permission of the Department of Creative Studies.

CCS 510 (3/6) d Curation as Creative Practice

Examination of curation as a form of creative practice and the tradition of artist-led curation. Topics in a given year may include one or more of the following: Indigeneity and Curation, Decolonizing Curation, Curating Live Performance, Curating New Media and Curating with Artists. With different topics this course may be taken more than once for credit.

Prerequisite: Restricted to students in the MFA program or permission of the Department of Creative Studies.

CCS 511 (3) d Digital Media for Interpretive Centres

The art and practice of using digital media for cultural institutions like art galleries, museums, botanic gardens, science centres, heritage sites and parks. Critical perspectives will be employed and approaches may include project-based learning, working with cultural institutions and digital art history methods. Credit will be granted for only one of CCS 511, ARTH 411, DIHU 411.

Prerequisite: Restricted to students in the MFA program or permission of the Department of Creative Studies.

CCS 512 (3) d Politics of Exhibition and Representation

Politics of exhibition and representation of world arts and visual cultures in contexts of colonialism and postcolonial activism. Credit will be granted for only one of CCS 512 or ARTH 451.

Prerequisite: Restricted to students in the MFA program or permission of the Department of Creative Studies.

CCS 599 (15) Master's Thesis

Pass/Fail.

Chemistry, Faculty of Science

CHEM: Chemistry

CHEM 111 (3) Principles of Chemistry I

Stoichiometry, atomic and molecular structure, chemical periodicity, gases, liquids, solids, and solutions. Not open to students with Chemistry 12. Credit will be granted for only one of CHEM 111 or CHEM 121. [3-3-1]

Prerequisite: Chemistry 11. Principles of Mathematics 12 or Pre-Calculus 12 is strongly recommended.

CHEM 113 (3) Principles of Chemistry II

General and ionic equilibrium, solubility, thermodynamics. Introductory organic chemistry: stereochemistry; substitution, elimination, and oxidation-reduction reactions. Not open to students with CHEM 121. This course or CHEM 123 is prerequisite to all subsequent courses in Chemistry. Credit will be granted for only one of CHEM 113 or CHEM 123. [3-3-1]

Prerequisite: CHEM 111.

CHEM 121 (3) Atomic and Molecular Chemistry

Stoichiometry, atomic and molecular structure, chemical periodicity, gases, liquids, solids, and solutions. Required course for all students needing a first-year Chemistry course who have Chemistry 12. Credit will be granted for only one of CHEM 121 or CHEM 111. [3-3-0]

Prerequisite: CHEM 12 and one of MATH 12, PREC 12. Chemistry 12 and one of Principles of Mathematics 12, Pre-Calculus 12.



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CHEM 123 (3) Physical and Organic Chemistry

Principles of equilibrium and chemical thermodynamics. Introductory organic chemistry: stereochemistry; substitution, elimination, and oxidation-reduction reactions. This course or CHEM 113 is prerequisite to all subsequent courses in Chemistry. Credit will be granted for only one of CHEM 123 or CHEM 113. [3-3-0]

Prerequisite: CHEM 121.

CHEM 201 (3) Introduction to Physical Chemistry

Principles of chemical kinetics, reaction mechanisms, and chemical thermodynamics. Credit will be granted for only one of CHEM 201 or 210. [3-3-1*]

Prerequisite: MATH 101 and one of PHYS 102, PHYS 121, PHYS 122 and one of CHEM 113, CHEM 123. A minimum grade of 65% in CHEM 113 is strongly recommended. MATH 200 is also strongly recommended.

CHEM 203 (3) Introduction to Organic Chemistry

Structure, bonding, and physical properties of aliphatic and aromatic compounds; conformational analysis, stereochemistry, and NMR spectroscopy; substitution and elimination reactions of alkyl halides; ethers, epoxides, aldehydes, ketones. Credit will be granted for only one of CHEM 203 or CHEM 213. [3-3-0]

Prerequisite: One of CHEM 113, CHEM 123. A minimum grade of 65% in CHEM 113 is strongly recommended. For Chemistry, Biochemistry, and Environmental Chemistry majors. Other students should enrol in CHEM 213.

CHEM 204 (3) Organic Chemistry

Mechanistic analysis of chemical reactivity of common functional groups, with focus on carbonyl chemistry; aromaticity and aromatic substitution; functional group transformations in organic synthesis; carbohydrates, amino acids, proteins, heterocycles. Credit will be granted for only one of CHEM 204 or CHEM 214. [3-3-0]

Prerequisite: CHEM 203. For Chemistry, Biochemistry, and Environmental Chemistry majors. Other students should enrol in CHEM 214.

CHEM 210 (3) Physical Chemistry for Earth, Environmental, and Life Sciences

Intended for students in earth, environmental, and life sciences. Thermodynamics and kinetics as they apply to natural systems. This course cannot be used for credit by Chemistry Majors. Credit will be granted for only one of CHEM 201 or 210. [3-3-1*]

Prerequisite: MATH 101 and one of PHYS 102, PHYS 121, PHYS 122 and one of CHEM 113, CHEM 123. A minimum grade of 65% in CHEM 113 is strongly recommended.

CHEM 211 (3) Analytical Chemistry

Statistical analysis and errors of measurement, method development and validation, solution equilibria as applied to analysis, analysis of acids and bases, analytical electrochemistry, chemical separation, introduction to gas and liquid chromatography. [3-3-0]

Prerequisite: One of CHEM 113, CHEM 123 and one of PHYS 102, PHYS 121, PHYS 122.

CHEM 213 (3) Organic Chemistry for Biological Sciences I

Structure, bonding, and physical properties of organic compounds; conformational analysis, stereochemistry, and chirality; reactions of alkenes, alkyl halides, and alcohols. Emphasis will be placed on biological applications. Credit will be granted for only one of CHEM 203 or CHEM 213. [3-3*-0]

Prerequisite: One of CHEM 113, CHEM 123. Not for Chemistry, Biochemistry, or Environmental Chemistry majors. Such students should enrol in CHEM 203.

CHEM 214 (3) Organic Chemistry for Biological Sciences II

Mechanistic description of aromatic substitution, reactions of carbonyl compounds and amines, oxidation/reduction reactions. Chemistry of carbohydrates, amino acids, vitamins, lipids, nucleotides. Chemical principles of biological catalysis and metabolism. Credit will be granted for only one of CHEM 204 or CHEM 214. [3-3*-0]

Prerequisite: One of CHEM 203, CHEM 213. Not for Chemistry, Biochemistry, or Environmental Chemistry majors. Such students should enrol in CHEM 204.

CHEM 220 (3) Atomic Structure and Molecular Bonding

Examination of various theories of atomic structure and molecular bonding, and their use to explain chemical and physical properties of atoms and molecules. Atomic wave mechanics, Lewis theory, valence bond theory, crystal field theory, symmetry and group theory, and molecular orbital theory of diatomic and polyatomic molecules and extended solids. [3-3-0]

Prerequisite: One of CHEM 113, CHEM 123. A minimum grade of 65% in CHEM 113 is strongly recommended.

CHEM 301 (3) Aqueous Environmental Chemistry

Properties of natural waters, including gas and solid equilibria, pH, redox, complexation analysis, corrosion treatment, ion exchange, colloids, and microbial transformations. [3-0-0]



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Prerequisite: MATH 101 and one of CHEM 201, CHEM 210.

CHEM 302 (3) Atmospheric Environmental Chemistry

Introduction to structure, composition, and chemical processes occurring in Earth's atmosphere including interactions with solar radiation, stratospheric ozone layer, photochemical smog, and acid rain. [3-0-0]

Prerequisite: MATH 101 and one of CHEM 113, CHEM 123 and one of PHYS 102, PHYS 121, PHYS 122. One of CHEM 210, 211 is recommended.

CHEM 304 (3) Advanced Physical Chemistry

Review of thermodynamics concepts; solution thermodynamics; electrochemistry; chemical equilibria, phase equilibria, colloid science. Emphasis on applications of thermodynamics to both chemical and biochemical systems. [3-4*-0]

Prerequisite: CHEM 201. MATH 200 is recommended.

CHEM 305 (3) Biophysical Chemistry

Diffusion and transport phenomena of biomolecules. Interaction of radiation and matter in biochemical systems. Methods to determine molar mass, size, and shape of biomolecules in solution. [3-4*-0]

Prerequisite: One of CHEM 201, CHEM 210. Third-year standing. MATH 200 is strongly recommended.

CHEM 311 (3) Instrumental Analytical Chemistry

Overview of instrumental methods of chemical analysis, including spectroscopic methods, mass spectrometry, electrophoresis and chromatography. [3-3-0]

Prerequisite: CHEM 211. One of BIOL 202, STAT 230 is strongly recommended.

CHEM 312 (3) Introduction to Quantum Mechanics and Spectroscopy

Principles of quantum mechanics, atomic wavefunctions, angular momentum, spin, atomic term symbols. [3-4*-0]

Prerequisite: CHEM 201.

Corequisite: MATH 200 is strongly recommended.

CHEM 317 (3) Environmental Physical Organic Chemistry

Basic physiochemical processes governing the fate, transport, distribution, properties, and reactions of anthropogenic organic compounds in the environment including pesticides and herbicides. Includes aspects of the photochemistry, structure-activity relationships, detection, toxicology, remediation, and social impact of such compounds. [3-0-0]

Prerequisite: MATH 101 and one of CHEM 204, CHEM 214 and one of PHYS 102, PHYS 121, PHYS 122.

CHEM 319 (3) Topics in Computerized Instrumentation

Computerized data acquisition and analysis in chemistry instrumentation, development of new instruments to collect and analyze experimental data: Digital acquisition systems, optical systems, electrical circuits, and coding. [3-4*-2*]

Prerequisite: All of CHEM 201, MATH 200.

CHEM 322 (3) Methods in Forensic Chemical Analysis

Concepts in the forensic chemical analysis of materials. Sampling protocols, sample preparation and clean up, instrumental techniques, chemical tracers, chemical fingerprinting, drug and toxin analysis, complex statistical analysis. Specific case studies with emphasis on environmental forensic issues will be presented. [3-0-0]

Prerequisite: One of CHEM 211, CHEM 123 and one of BIOL 202, PSYO 271, STAT 230.

CHEM 330 (3) Advanced Organic Chemistry

Application of carbonyl group chemistry, cyclisation reactions, conformational analysis, and rearrangement reactions in organic synthesis. [3-4*-0]

Prerequisite: One of CHEM 204, CHEM 214.

CHEM 333 (3) Spectroscopic Techniques in Organic Chemistry

Application of mass spectrometry, NMR, and IR spectroscopies to organic chemical problems. [3-0-0]

Prerequisite: One of CHEM 204, CHEM 214.

CHEM 334 (3) Green Organic Chemistry

More sustainable and less hazardous methods in synthetic chemistry. Topics include feedstocks for chemical synthesis, alternative solvents, polymers, atom and step economy, design of safer chemicals. [3-4*-0]

Prerequisite: CHEM 204.

CHEM 335 (3) Bioinorganic Chemistry

Examination of the involvement of inorganic chemistry in biological systems; structure and chemistry of metalloproteins and metalloenzymes. Nature of proteins, biomolecules, and simple bonding models of d-block compounds; iron and copper proteins involved with electron and oxygen transport and oxygen and nitrogen activation, various proteins of zinc and nickel. [3-0-0]



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Prerequisite: One of CHEM 204, CHEM 214 and one of CHEM 201, CHEM 210.

CHEM 336 (3) Green Inorganic Chemistry

Use of inorganic and organometallic catalysts for sustainable synthesis. Renewable feedstock conversion, selective carbon-hydrogen bond functionalization, biodegradable polymer synthesis, photoredox catalysis, solar fuels. [3-4*-0]

Prerequisite: CHEM 220 and one of CHEM 204, CHEM 214.

CHEM 337 (3) Coordination Chemistry

Analysis of the coordination chemistry of *d*- and *f*-block metals including structure, bonding descriptions, spectroscopic and magnetic properties, and kinetics and mechanism of substitution and redox reactions. [3-4*-0]

Prerequisite: CHEM 220 and one of CHEM 204, CHEM 214.

CHEM 338 (3) Organometallic Chemistry

Examination of the structure, bonding, reactivity, and catalysis of organometallic compounds of the *d*-block metals. A survey of ligands unique to organometallic chemistry is followed by an examination of the mechanisms of common reactions and important catalytic cycles. [3-4*-0]

Prerequisite: CHEM 220 and one of CHEM 204, CHEM 214.

CHEM 403 (3) Enzymology

Enzyme kinetics: steady-state kinetic analyses, fast-reaction methods, kinetic isotope effects. Catalytic mechanisms: coenzymology, radical-mediated reactions, catalytic rate enhancements. Special topics: enzyme evolution, multifunctional enzymes, biocatalysis, protein engineering. Credit will be granted for only one of CHEM 403, BIOC 403, CHEM 413 or CHEM 569. [3-0-0]

Prerequisite: One of BIOC 304, BIOL 311.

Equivalency: BIOC 403.

CHEM 412 (3) Methods in Bioanalytical Chemistry

Chemical analysis of biological samples including: solid and liquid phase solvent extraction protocols, bioassay-guided fractionation, analytical method development and validation, complex separations and matrix effects, bioinformatics, metabolomics, and proteomics. Credit will be granted for only one of CHEM 412 or CHEM 533. [3-0-0]

Prerequisite: Fourth-year standing in Chemistry, Biochemistry, or Environmental Chemistry.

CHEM 422 (3/12) d Special Topics in Chemistry

An advanced or specialized topic in chemistry, generally with an emphasis on recent literature. Topics will usually vary with each course offering. With different topics, the course can be taken more than once for credit. Each offering will normally be 3 credits. [3-0-0]

Prerequisite: To be determined by special topic; third-year standing in Science; and permission of the department head.

CHEM 424 (3) Organometallic Catalysts

An advanced course describing selected recent developments in catalytic applications of organo-transition metal chemistry.

Credit will be granted for only one of CHEM 424 or CHEM 524. [3-0-0]

Prerequisite: CHEM 338.

CHEM 426 (3) Advanced Inorganic Synthesis

New synthetic techniques and strategies in transition-metal chemistry and frontiers of stoichiometric activation reactions, as illustrated with recent literature examples. Credit will be granted for only one of CHEM 426 or CHEM 525. [3-0-0]

Prerequisite: CHEM 338.

CHEM 429 (3) Main Group Chemistry

Principles, patterns, and trends of the characteristic structures, bonding, and reactivity of compounds of the *s*- and *p*-block elements, including aspects relevant to polymer chemistry, materials chemistry, industrial chemistry, and advanced main group synthesis. [3-0-0]

Prerequisite: CHEM 220 and one of CHEM 204, CHEM 214.

CHEM 434 (3) Chromatography and Mass Spectrometry

Gas, liquid, and supercritical fluid chromatography. Mass spectrometry: ionization processes, mass analyses, ion molecule reactions, fragmentation processes. Credit will be granted for only one of CHEM 434 or CHEM 411. [3-0-0]

Prerequisite: CHEM 311.

CHEM 447 (3) Directed Studies in Chemistry Literature and Data Analysis

Comprehensive survey, analysis, and critical evaluation of a topic selected in consultation with a faculty member. May involve comprehensive review of a literature topic or hypothesis-driven data analysis. Sources may include published research literature and information databases relevant to chemistry. Includes both a written manuscript and either an oral or poster presentation



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summarizing the survey findings. It is recommended that CHEM 447 not be taken until a student's final year of study.

Prerequisite: Fourth year standing in the Chemistry or Environmental Chemistry Major with a minimum overall grade average of 72%, and approval of both the Chemistry Curriculum Committee and a faculty supervisor.

CHEM 448 (3/6) d Directed Studies in Chemistry

Original research under the direction of a faculty member for either one (3 credits) or two (6 credits) semesters. Includes a written thesis and poster presentation. It is recommended that CHEM 448 not be taken until a student's final year of study.

Prerequisite: Fourth year standing in the Chemistry or Environmental Chemistry Major with a minimum overall grade average of 72%, and approval of both the Chemistry Curriculum Committee and a faculty supervisor.

CHEM 449 (6) Honours Thesis

Original research work under the direction of a faculty member. A written thesis, public poster presentation, and public thesis defence is required. It is recommended that CHEM 449 not be taken until a student's final year of study.

Prerequisite: Fourth-year standing in the Chemistry or Environmental Chemistry Major with a minimum overall grade average of 76% (in all courses taken applicable to the Chemistry Major) and approval of the Chemistry Curriculum Committee.

CHEM 461 (3) Advanced Analytical Chemistry Laboratory

Integrated laboratory course designed to illustrate principles of modern analytical chemistry. [0-6-0]

Prerequisite: CHEM 311.

CHEM 462 (3) Advanced Inorganic Chemistry Laboratory

Integrated laboratory course designed to illustrate principles of modern inorganic chemistry. [0-6-0]

Prerequisite: Two of CHEM 335, CHEM 336, CHEM 337, CHEM 338.

CHEM 463 (3) Advanced Organic Chemistry Laboratory

Integrated laboratory course designed to illustrate principles of modern organic chemistry. [0-6-0]

Prerequisite: CHEM 330 and one of CHEM 317, CHEM 333, CHEM 413.

CHEM 464 (3) Advanced Physical and Biophysical Chemistry Laboratory

Integrated laboratory course designed to illustrate principles of modern physical and biophysical chemistry. [0-6-0]

Prerequisite: Two of CHEM 304, CHEM 305, CHEM 312.

CHEM 465 (3) Advanced Chemistry Laboratory in Special Topics

Integrated laboratory course designed to illustrate principles of a selected aspect of modern chemistry. The exact topic of investigation will be determined with each course offering. [0-6-0]

Prerequisite: To be determined based on the topic offered.

CHEM 507 (3) Topics in Physical Chemistry

Seminar presentation required based on current literature in the field. Credit will be granted for only one of CHEM 507 or CHEM 422 when the subject matter is of the same nature. [3-0-0]

CHEM 521 (3) Topics in Inorganic Chemistry

Seminar presentation required based on current literature in the field. Credit will be granted for only one of CHEM 521 or CHEM 422 when the subject matter is of the same nature. [3-0-0]

CHEM 524 (3) Organometallic Catalysts

An advanced course describing selected recent developments in catalytic applications of organo-transition metal chemistry. Credit will be granted for only one of CHEM 524 or CHEM 424. [3-0-0]

CHEM 525 (3) Advanced Inorganic Synthesis

New synthetic techniques and strategies in transition-metal chemistry and frontiers of stoichiometric activation reactions, as illustrated with recent literature examples. Credit will be granted for only one of CHEM 525 or CHEM 426. [3-0-0]

CHEM 533 (3) Bioanalytical Chemistry

Chemical analysis of biological samples. Metabolomics, proteomics, sample interactions, and matrix effects. Credit will be granted for only one of CHEM 533 or CHEM 412. [3-0-0]

CHEM 534 (3) Chromatography and Mass Spectrometry

Gas, liquid, and supercritical fluid chromatography. Mass spectrometry: ionization processes, mass analyses, ion molecule reactions, fragmentation processes. [3-0-0]

CHEM 535 (3) Topics in Analytical Chemistry

Seminar presentation required based on current literature in the field. [3-0-0]

CHEM 540 (1) Graduate Seminar in Chemistry



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Students present a one-hour lecture on a topic agreed upon jointly with the instructor, but unrelated to their previous or current research projects. Students will be assessed on their seminar and a related written paper. [2-0-0]

CHEM 549 (23) M.Sc. Thesis

Pass/Fail.

CHEM 568 (3) Topics in Organic Chemistry

Seminar presentation required based on current literature in the field. Credit will be granted for only one of CHEM 568 or CHEM 422 when the subject matter is of the same nature. [3-0-0]

CHEM 569 (3) Advanced Mechanistic Enzymology

The chemistry of enzyme active sites, cofactors, and inhibitors. Enzyme kinetics, thermodynamics, kinetic isotope effects, and other physical methods. Credit will be granted for only one of CHEM 569, CHEM 403, CHEM 413 or BIOC 403. [3-0-0]

CHEM 649 (0) Ph.D. Thesis

Chinese, Faculty of Creative and Critical Studies

CHIN: Chinese

Students cannot take language courses out of sequence. Once a student successfully completes a Chinese language course, they can no longer enroll in a course that is below the level of the last course that has been completed. Students should consult an advisor to ensure that they are enrolling in a level-appropriate Chinese language course.

CHIN 100 (3) Basic Chinese I

An introduction to the grammar, syntax, and function of modern spoken and written Mandarin Chinese. For absolute beginners; not available to students who have obtained the equivalent of CEFR Level A1 in any Chinese language.

Faculty of Management

*COOP: Cooperative Education***COOP 401 (3) Co-op Education Work Experience I**

Approved and supervised paid work experience with a public or private organization for a minimum of 455 hours full time. Pre-employment training workshops and co-op assignments are required. Course is restricted to students who have completed all third-year requirements and have secured a work-term with an appropriate employer either independently or through the 'Co-op Office'.

COOP 402 (3) Co-op Education Work Experience II

Approved and supervised paid work experience with a public or private organization for a minimum of 455 hours full time. Pre-employment training workshops and co-op assignments are required. Course is restricted to students who have completed all third-year requirements and have secured a work-term with an appropriate employer either independently or through the 'Co-op Office'.

Prerequisite: COOP 401.

COOP 403 (3) Co-op Education Work Experience III

Approved and supervised paid work experience with a public or private organization for a minimum of 455 hours full time. Pre-employment training workshops and co-op assignments are required. Course is restricted to students who have completed all third-year requirements and have secured a work-term with an appropriate employer either independently or through the 'Co-op Office'.

Prerequisite: COOP 402.

COOP 404 (3) Co-op Education Work Experience IV

Approved and supervised paid work experience with a public or private organization for a minimum of 455 hours full time. Pre-employment training workshops and co-op assignments are required. Course is restricted to students who have completed all third-year requirements and have secured a work-term with an appropriate employer either independently or through the 'Co-op Office'.



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Prerequisite: COOP 403.

COOP 405 (3) Co-op Education Work Experience V

Approved and supervised paid work experience with a public or private organization for a minimum of 455 hours full time. Pre-employment training workshops and co-op assignments are required. Course is restricted to students who have completed all third-year requirements and have secured a work-term with an appropriate employer either independently or through the 'Co-op Office'.

Prerequisite: COOP 404.

COOP 406 (3) Co-op Education Work Experience VI

Approved and supervised paid work experience with a public or private organization for a minimum of 455 hours full time. Pre-employment training workshops and co-op assignments are required. Course is restricted to students who have completed all third-year requirements and have secured a work-term with an appropriate employer either independently or through the 'Co-op Office'.

Prerequisite: COOP 405.

Faculty of Creative and Critical Studies*CORH: Communications and Rhetoric***CORH 203 (3) Communication in the Sciences**

Practice-based course that develops intermediate level communication skills in the sciences. Emphasis on analysis of scientific literature and communicating science to experts in the discipline and lay audiences, in written, visual, oral, and digital modes.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 155, ENGL 156, APSC 176.

CORH 204 (3) Communications in the Humanities

Practice-based course that develops intermediate level communication skills in the humanities. Emphasis on analysis of humanities literature and communicating the humanities to experts in the discipline and lay audiences, in written, visual, oral, and digital modes.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156, APSC 176.

CORH 205 (3) Communication in the Social Sciences

Practice-based course that develops intermediate level communication in the social sciences. Emphasis on analysis of social science literature and communicating the social sciences to experts in the discipline and lay audiences, in written, visual, oral, and digital modes.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156, APSC 176.

CORH 206 (3) Communicating Indigeneity

Language, concepts, and contexts of Indigeneity communicated historically and contemporarily in popular and academic discourse, with a focus on critical discourse analysis conducted through engagements with Indigenous Peoples' perspectives and Indigenist methodologies.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156, APSC 176.

CORH 216 (3) Communication and Media

Theory and practice of communication about, in and for various media, including digital, textual, audio and/or visual forms.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156, APSC 176.

CORH 321 (3) Personal and Professional Identity and Interpersonal Communication

Multidisciplinary concepts of and approaches to identity and agency in personal and professional interpersonal communication settings, face-to-face and online. Fosters application of communication skills and enactments of agency in dyadic and collaborative contexts.

Prerequisite: Third-year standing or permission of the instructor.

CORH 331 (3) Social Writing: Studies in Multimodal Communication

Practice-based approach to social media through writing studies' scholarship, with a focus on rhetorical analysis of social writing in digital platforms that inform self-representation and connect with groups/communities.



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Prerequisite: Third-year standing or permission of the instructor.

CORH 360 (3) Public Memory, Commemoration, and Identity

Critical examination of commemoration practices, including museums, monuments, and heritage sites, specifically in terms of the construction of place, community, and identity. Credit will be granted for only one of CORH 360 OR CULT 360.

Prerequisite: 3 credits of 200 level CULT, CORH 204, or CORH 205.

Equivalency: CULT 360.

CORH 499 (3) Communication Capstone

Team-conducted project that identifies and addresses a professional, community, or academic topic, demonstrating an awareness of audience and context. Integrates knowledge and skills acquired throughout the certificate program.

Prerequisite: 9 credits of CORH certificate courses and third-year standing.

Computer Science, Faculty of Science

COSC: Computer Science

COSC 101 (3) Digital Citizenship

Provides knowledge and skills to navigate the digital society. The importance of digital participation will be investigated by studying issues surrounding digital access, skills, and utilization. Digital literacy is emphasized through the exploration of computer applications, the use of converging technologies, and online resources. This course does not assume students have any Computer Science background. Credit will be granted for only one of COSC 101 or COSC 132. [3-2-0]

COSC 111 (3) Computer Programming I

Introduction to the design, implementation, and understanding of computer programs. Topics include problem solving, algorithm design, and data and procedural abstraction, with emphasis on the development of working programs. This course should be followed by COSC 121. [3-2-0]

Prerequisite: A score of 70% or higher in one of PREC 12, MATH 12, MATH 125.

COSC 114 (3) Vector Graphics and Animations

Foundation and applications of 2D /3D Euclidean geometry necessary for the computer manipulation of curves and surfaces; decomposition of a picture into basic objects; planar and spatial linear transformations; automatic picture generation and introduction to algorithmic art. [3-2-0]

Prerequisite: One of MATH 12, PREC 12, CALC 12.

COSC 121 (3) Computer Programming II

Advanced programming in the application of software engineering techniques to the design and implementation of programs manipulating complex data structures. [3-2-0]

Prerequisite: A score of 60% or higher in one of COSC 111, COSC 123.

COSC 122 (3) Computer Fluency

Introduction to computer skills (electronic communication, websites, Internet, document editing, programming, data analysis using spreadsheets/databases) and concepts (information representation, abstraction, algorithmic thinking). Course objectives are lifelong productivity and understanding of technology in society. [3-2-0]

COSC 123 (3) Computer Creativity

A hands-on introduction to programming and computer-based problem solving and creativity. Experience with application development including storytelling, graphics, games, and networking. [3-2-0]

Prerequisite: One of COSC 111, COSC 122.

COSC 150 (3) Physical Computing

Physical computing is the design and building of hardware and software systems for sensing, processing, and affecting the analog world. Principles of physical computing, including basic electricity, digital logic, and analogue and digital electronics. Systems design for interfacing with microprocessors, sensors, and actuators using analogue and digital elements and signals. Programming for embedded systems. [3-2-0]

Corequisite: One of COSC 111, COSC 122, APSC 177.

COSC 210 (4) Software Construction

Design, and implementation of software components. Data structures, object-oriented design, debugging, testing. Credits will only be granted for one of COSC 210 or COSC 222. [3-2-2*]

Prerequisite: One of APSC 177, COSC 111.



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COSC 211 (3) Machine Architecture

Organization and design of computer systems and their impact on the practice of software development. Instruction set architecture and assembly programming languages, design of central processing units (CPU), memory hierarchy and cache organization, input and output programming. [3-2-0]

Prerequisite: COSC 121.

COSC 221 (3) Introduction to Discrete Structures

Introduction to sets, logic, combinatorics, and graph theory, as applied in computing: sets and propositions, permutations and combinations, graphs and trees, Boolean algebra, algorithms, and applications. [3-0-1]

Prerequisite: One of MATH 101, MATH 142, APSC 173.

Corequisite: COSC 121.

COSC 222 (3) Data Structures

Introduction to the design, implementation and analysis of data structures. Topics will include lists, stacks, queues, trees, and graphs. Credit will only be granted for one of COSC 210 or COSC 222. [3-2-0]

Prerequisite: A score of 60% or higher in COSC 121.

COSC 223 (3) Principle of Computing: Logic, Discrete Structure, and Data Structure

Propositional logic and logic inference, problem-solving techniques (recursion, induction, and mathematical proof), models of computation (theory of finite automata), graph theory, data structures (linear data structures, dictionaries, and graphs), basic algorithmic techniques. [3-2-0]

Prerequisite: One of COSC 114, APSC 171 and one of COSC 123, COSC 111.

COSC 247 (3) Networks and Social Media

Online social networks and digital social media. Social media platforms, channels, and software tools. Graph-theoretic and game-theoretic foundation of network analysis and network science. Network metrics and evaluation. Computational, economic, and social aspects of social media. [3-2-0]

Prerequisite: COSC 223.

COSC 264 (3) Introduction to Web Development and Databases

Construction of simple database-driven websites. Introduction to web programming: client-side, server-side; database design, implementation, and query. [3-2-0]

Prerequisite: One of COSC 121, COSC 223.

COSC 301 (3) Introduction to Data Analytics

Techniques for computation, analysis, and visualization of data using software. Manipulation of small and large data sets. Automation using scripting. Real-world applications from life sciences, physical sciences, economics, engineering, or psychology. No prior computing background is required. Credit will be granted for only one of COSC 301, DATA 301 or DATA 501. [3-2-0]

Prerequisite: Either (a) third-year standing, or (b) one of COSC 111 or COSC 122

Equivalency: DATA 301.

COSC 303 (3) Numerical Analysis

Numerical techniques for basic mathematical processes and their analysis. Taylor polynomials, root-finding, linear systems, eigenvalues, approximating derivatives, locating minimizers, approximating integrals, solving differential equations. Credit will be granted for only one of COSC 303 or MATH 303. [3-1-0]

Prerequisite: All of MATH 200, MATH 221 and either (a) COSC 111 or (b) DATA 301.

Equivalency: MATH 303.

COSC 304 (3) Introduction to Databases

Databases from a user's perspective: querying with SQL, designing with UML, and using programs to analyze data. Construction of database-driven applications and websites and experience with current database technologies. Completion of COSC 121 is recommended. [3-0-0]

Prerequisite: One of COSC 111, COSC 123, COSC 210. Third-year standing.

COSC 305 (3) Project Management

Examine tools and techniques to complete projects successfully, and within budget. Topics include Program Evaluation and Review Technique (PERT) and Critical Path Methods (CPM), and project management software. [3-2-0]

Corequisite: COSC 310.

COSC 310 (3) Software Engineering

Techniques to construct large systems using fundamental activities of specification, design, implementation, testing, and maintenance. Various life cycle models, exposure to software development tools, modelling techniques, good development



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practices, and project management. [3-2-0]

Prerequisite: One of COSC 210, COSC 222, COSC 223 and third-year standing.

COSC 315 (3) Introduction to Operating Systems

Introduction to batch, multiprogramming, and time-sharing systems. Process synchronization and communication. Main memory allocation techniques including virtual memory; process scheduling; deadlock avoidance and prevention; file organization and device management. [3-2-0]

Prerequisite: All of COSC 221, COSC 222.

COSC 320 (3) Analysis of Algorithms

Design and analysis of algorithms, illustrated from various problem areas. Models of computation, choice of data structures, space and time efficiency, computation complexity, algorithms for searching, sorting and graph-theoretic problems, NP-complete problems. [3-0-0]

Prerequisite: All of COSC 221, COSC 222 and one of MATH 221, APSC 179.

COSC 322 (3) Introduction to Artificial Intelligence

AI and intelligent agents; state space search; game playing agents; logic and knowledge-based agents; constraint programming; planning; reasoning and decision making under uncertainty; machine learning; natural language understanding. Credit will be granted for only one of COSC 322 or COSC 522. [3-2-0]

Prerequisite: All of COSC 221, COSC 222.

COSC 328 (3) Introduction to Networks

The five-layer Internet architecture using TCP/IP: application, transport, network, link, and physical. Topics include web protocols, network programming, routing, addressing, congestion control, error handling, Ethernet, wireless networks, security, multimedia transmission, and network management. [3-2-0]

Prerequisite: All of COSC 211, COSC 222.

COSC 329 (3) Learning Analytics

Introduction to data analytics and machine learning techniques in the context of educational data. Focuses on user profiling, collaborative filtering, clustering, Bayesian user modeling, preference elicitation, and plagiarism detection. Credit will be granted for only one of COSC 329, COSC 419C, or COSC 519C. [3-0-0]

Prerequisite: COSC 222 and one of STAT 121, STAT 230.

COSC 335 (3) Introduction to Medical Imaging and Imaging Informatics

Fundamental image analysis techniques. Image creation, manipulation, optimization, and analysis to aid in the diagnosis and treatment of human health conditions. Generation and display of X-ray, CT, MRI, Ultrasound and Nuclear Medicine images. Imaging Informatics and its place in the Electronic Medical Record. Credit will be granted for only one of COSC 335 or PHYS 336. [3-2-0]

Prerequisite: A score more than 60% in COSC 222 and a score more than 60% in one of PHYS 102, PHYS 121, PHYS 122. PHYS 102 or PHYS 121 preferred.

COSC 341 (3) Human Computer Interaction

Examines the basic principles behind interaction design; how humans interact with computers, as well as the user-centered design cycle; user task analysis, task models, graphical interface design, prototyping, and evaluation. Credit will be granted for only one of COSC 341 or COSC 541. [3-2-0]

Prerequisite: One of COSC 111, COSC 121, COSC 123, DATA 301 and Third-year standing.

COSC 360 (3) Web Programming

Design and implementation of web-based information systems and app development. Rich user interfaces, asynchronous updates, client-side and server-side scripting using standard technologies such as HTML, CSS, SVG, JavaScript, PHP. Data manipulation with SQL, JSON, XML. Modern scripting frameworks and libraries. [3-2-0]

Prerequisite: All of COSC 121, COSC 304 and third-year standing.

COSC 404 (3) Database System Implementation

Fundamental concepts in constructing database systems including file organizations, storage management, system architectures, query processing/optimization, transaction management, recovery, and concurrency control. Additional topics may include distributed databases, mobile databases, and integration. Credit will be granted for only one of COSC 404 or COSC 504. [3-2-0]

Prerequisite: COSC 304 and third-year standing.

COSC 405 (3) Modelling and Simulation

Numeric dynamic systems models and emphasis on discrete stochastic systems. State description of models, common model



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components, entities. Common simulation language. Simulation using algebraic languages. Simulation methodology: data collection, model design, output analysis, optimization, validation. Elements of queuing theory, relationship to simulation. Applications to computer systems models. Credit will be granted for only one of COSC 405, DATA 405, COSC 505, or DATA 505. [3-2-0]

Prerequisite: All of COSC 221, COSC 222.

Equivalency: DATA 405.

COSC 406 (3) Numerical Optimization

Formulation and analysis of algorithms for continuous optimization problems; linear, quadratic, semi-definite, nonlinear (constrained and unconstrained), convex (smooth and non-smooth) optimization; large-scale problems; software packages and their implementation; elements of duality theory. Credit will not be granted for both COSC 406 and COSC 506. [3-2-0]

Prerequisite: One of MATH 200, APSC 248 and one of MATH 221, APSC 179.

COSC 407 (3) Introduction to Parallel Computing

Design and implementation of parallel programs including theoretical computer models, parallel architectures (distributed, multicore, GPU), and standard parallel libraries. Credit will be granted for only one of COSC 407 or COSC 507. [3-2-0]

Prerequisite: Either (a) COSC 111 or (b) APSC 177. Third-year standing is required.

COSC 414 (3) Computer Graphics

Human vision and colour, modelling, geometric transformations, algorithms for 2-D and 3-D graphics, hardware and system architectures, shading and lighting, animation. [3-2-0]

Prerequisite: All of COSC 221, COSC 222 and one of MATH 221, APSC 179.

COSC 416 (3-9) d Special Topics in Databases

Advanced or specialized topics in database design, modelling, and implementation. This course may be taken more than once for credit. Credit will be granted for only one of COSC 416 or COSC 516 when the subject matter is of the same nature.

Prerequisite: COSC 304 and third-year standing.

COSC 417 (3/6) d Topics in Computer Networks

Advanced or specialized topics in emerging network technologies. With different topics, this course may be taken twice for credit. [3-2-0]

Prerequisite: All of COSC 315, COSC 328.

COSC 419 (3-9) d Topics in Computer Science

Advanced or specialized topics in computer science. Consult the department for the specific topic to be offered in any given year. Credit will be granted for only one of COSC 419 or COSC 519 when the subject matter is of the same nature.

Prerequisite: Fourth-year standing.

COSC 421 (3) Network Science

Graphs and complex networks in scientific research. Probabilistic and statistical models. Structures, patterns, and behaviors in networks. Algorithmic and statistical methods (online/mobile), social networks, and social media platforms. Social influence, information diffusion, and viral marketing. Sentiment analysis and opinion mining. Data privacy. Search engines and recommendation systems. Credit will be granted for only one of COSC 421, DATA 421 or DATA 521. [3-2-0]

Prerequisite: STAT 230.

Equivalency: DATA 421.

COSC 435 (3) Computer-Based Image Analysis

Digital processing of remotely sensed image data. Techniques for acquiring, calibrating, registering, enhancing, and interpreting digital images are included. [2-0-2]

Prerequisite: COSC 222.

COSC 442 (3) Mobile Educational Game Development

Game design and development on a mobile platform with special attention to educational games. Topics may include: educational frameworks, storytelling techniques, game design, iterative prototyping, evaluation methodology, learner modelling, and learning analytics. Credit will be granted for only one of COSC 442 or COSC 542. [3-0-0]

Prerequisite: All of COSC 341, COSC 310.

COSC 445 (3) Computer Vision

Processing and interpretation of images: image sensing, filtering, morphological image operations, texture description, image segmentation, and object recognition. Credit will be granted for only one of COSC 445 or COSC 545. [3-2-0]

Prerequisite: COSC 222 and one of MATH 200, APSC 248 and one of MATH 221, APSC 179.

COSC 447 (3) Directed Studies in Software Maintenance



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Maintenance of a large software system including prioritizing requests, modifying the design, implementing new features, fixing bugs, and regression testing. The student will undertake the maintenance of an existing project.

Prerequisite: Third-year standing and permission of the department head.

COSC 448 (3/6) d Directed Studies in Computer Science

Supervised reading, participation in a seminar, and one or more programming projects. With different topics, this course may be taken twice for credit.

Prerequisite: Third-year standing and permission of the department head.

COSC 449 (6) Honours Thesis

Students will undertake a research project as agreed upon by the student, supervising faculty member, and department head. A written thesis and a public presentation (poster or seminar) are required.

Prerequisite: Fourth-year standing; admission to the B.A. or B.Sc. Computer Science Honours Program; and permission of the department head.

COSC 490 (3) Student-Directed Seminar

Self-directed, collaborative studies, in a group-learning environment, initiated and coordinated by senior undergraduate or graduate students with the supervision of a faculty advisor. Course structure, enrolment and delivery methods will comply with the "Handbook for Student-Directed Seminars".

Prerequisite: Third-year standing and permission of the Department Head.

COSC 499 (6) Capstone Software Engineering Project

A capstone project requiring team software development for an actual client. Students must produce a comprehensive report and deliver a formal presentation. [0-3-0; 0-3-0]

Prerequisite: All of COSC 304, COSC 310, COSC 341.

COSC 504 (3) Database System Implementation

Fundamental concepts in constructing database systems including file organizations, storage management, system architectures, query processing/optimization, transaction management, recovery, and concurrency control. Additional topics may include distributed databases, mobile databases, and integration. Credit will be granted for only one of COSC 404 or COSC 504.

COSC 505 (3) Modelling and Simulation

Simulation methodology: data collection, model design, output analysis, optimization, validation. Credit will be granted for only one of COSC 405, DATA 405, COSC 505, or DATA 505.

COSC 506 (3) Numerical Optimization

Formulation and analysis of algorithms for continuous optimization problems; linear, quadratic, semi-definite, nonlinear (constrained and unconstrained); large-scale problems. Credit will be granted for only one of COSC 406 or COSC 506.

COSC 507 (3) Parallel Computing

Design and implementation of parallel programs including theoretical computer models, parallel architectures, and standard parallel libraries. Performance analysis of parallel programs. Credit will be granted for only one of COSC 407 or COSC 507.

COSC 516 (3/6) d Special Topics in Databases

Advanced or specialized topics in database design, modelling, and implementation. This course may be taken more than once for credit. Credit will be granted for only one of COSC 416 or COSC 516 when the subject matter is of the same nature.

COSC 519 (3/6) d Topics in Computer Science

Advanced or specialized topics in computer science. Credit will be granted for only one of COSC 419 or COSC 519 when the subject matter is of the same nature.

COSC 520 (3) Advanced Algorithms

Algorithm design and analysis with applications in scientific research. Fundamental design and analysis techniques. Basics of algorithmic graph theory. Parameterization, approximation, and randomization techniques. Algorithms for computational-hard problems and problems involving large-scale networks and/or massive datasets. Credit will be granted for only one of COSC 320 or COSC 520.

COSC 522 (3) Advanced Topics in Artificial Intelligence

Artificial intelligence and intelligent systems. Problem solving techniques, state-space search, game-tree search, and constraint programming. Topics in logic reasoning, multiagent systems, and game theory. Probabilistic reasoning, machine learning, and applications in digital games/arts, data mining, and natural language processing. Credit will be granted for only one of COSC 322 or COSC 522.

COSC 541 (3) Advanced Human Computer Interaction



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Principles of design and interaction, novel interfaces and platforms, prototyping, evaluation methodology, quantitative analysis. Credit will be granted for only one of COSC 341 or COSC 541.

COSC 545 (3) Computer Vision

Processing and interpretation of images: image sensing, filtering, morphological image operations, texture description, image segmentation, and object recognition. Credit will be granted for only one of COSC 545 or COSC 445.

COSC 548 (3) Directed Studies**COSC 549 (12) Master's Thesis**

Pass/Fail.

COSC 550 (6) Master's Project

Pass/Fail.

COSC 590 (1-3) d Graduate Seminar

Presentation and discussion of recent results in the Computer Science literature. Pass/Fail.

COSC 649 (0) Doctoral Dissertation

Pass/Fail.

COSC 690 (3) Research Skills

Completion of a small research project that generates original results. Written and oral presentation required. Pass/Fail.

Creative Writing, Faculty of Creative and Critical Studies

CRWR: Creative Writing

CRWR 150 (3) Introduction to Writing Poetry and Non-Fiction

Introduction to composition and experimentation in the genres of poetry and creative non-fiction. Students will develop a working knowledge of modern aesthetics in poetry and creative nonfiction, as well as an objective appreciation of their own "voice" in the context of those aesthetics. No more than 6 credits in total will be granted for CRWR 116, CRWR 126, CRWR 150, CRWR 160. [3-0-0] or [1-0-2]

CRWR 160 (3) Introduction to Writing Fiction and Drama

Introduction to composition and experimentation in the genres of fiction and drama. Students will develop a working knowledge of modern aesthetics in fiction and drama, as well as an objective appreciation of their own "voice" in the context of those aesthetics. No more than 6 credits in total will be granted for CRWR 116, CRWR 126, CRWR 150, CRWR 160. [3-0-0] or [1-0-2]

CRWR 205 (3) Writing Popular Fiction

Introduction to writing genre fiction, such as fantasy, science fiction, horror, vampire, zombie, mystery, thriller, young adult and other genre fiction. Genres will change annually. [3-0-0]

Prerequisite: 6 credits first-year English

CRWR 210 (3) The Power of Story

An interdisciplinary survey on story designed to assist students in the analysis and construction of narratives, exploring how story structure, character, and action create meaning. [3-0-0]

Prerequisite: 6 credits of First-Year English.

CRWR 216 (3) Intermediate Workshop in Creative Writing: Poetry

Intermediate creative writing course. Students are instructed and guided in the writing of poetry, are encouraged to pursue experimentation in poetry, and will participate in the feedback and critique sessions that constitute the workshop method. [3-0-0]

Prerequisite: One of CRWR 126, CRWR 150.

CRWR 217 (3) Intermediate Workshop in Creative Writing: Fiction

Intermediate creative writing course. Students are instructed and guided in the writing of fiction, are encouraged to pursue experimentation in fiction, and will participate in the feedback and critique sessions that constitute the workshop method. [3-0-0]

Prerequisite: One of CRWR 126, CRWR 160.

CRWR 218 (3) Intermediate Workshop in Creative Writing: Playwriting

Intermediate creative writing course. Students are instructed and guided in the writing of plays, are encouraged to pursue experimentation in drama, and will participate in the feedback and critique sessions that constitute the workshop method. [3-0-0]

Prerequisite: One of CRWR 160, THTR 103.



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CRWR 219 (3) Intermediate Workshop in Creative Writing: Non-Fiction

Intermediate creative writing course. Students are instructed and guided in the writing of creative non-fiction, are encouraged to pursue experimentation in creative non-fiction, and will participate in the feedback and critique sessions that constitute the workshop method. [3-0-0]

Prerequisite: One of CRWR 150, ENGL 113, ENGL 114.

CRWR 250 (3) Workshop in Creative Writing: Screenwriting

Students are instructed and guided in the writing of screenplays, are encouraged to pursue experimentation in screenwriting, and will participate in the feedback and critique sessions that constitute the workshop method. Credit will be granted for only one of CRWR 250 or FILM 250. [3-0-0]

Prerequisite: One of CRWR 150, CRWR 160, VISA 104, VISA 105, VISA 106, VISA 108, THTR 101, THTR 102.

Equivalency: FILM 250.

CRWR 260 (3) Theory and Practice of Creative Writing

Recommended for students taking Creative Writing, English, Visual Arts, or Performance courses. Introduces students to the history of contemporary forms of creative writing. Students will write on problems of aesthetics and practice various forms. [3-0-0]

Prerequisite: Two of ENGL 112, ENGL 113, ENGL 150, ENGL 151, ENGL 153, CRWR 150, CRWR 160.

CRWR 310 (3) The Power of Metaphor

An interdisciplinary survey of metaphor, focusing on use and understanding of metaphor in thinking, writing and communication across disciplines, including art, health, science, politics, literature, and technology. [3-0-0]

Prerequisite: Third-year standing, or permission of the Department of Creative Studies.

CRWR 360 (3) Creative Writing and the Racialized Writer

Engages with non-dominant aspects of craft in order to understand the publishing and craft-related decisions made by people of colour (POC) because of their backgrounds. Issues normally discussed as asides in creative writing classes, such as representation, diversity, and appropriation, will be highlighted. Restricted to students with at least third-year standing.

Prerequisite: 3 credits of CRWR.

CRWR 380 (3) Writing of the Short Story

Advanced workshop in the writing of short fiction. [3-0-0]

Prerequisite: 6 credits of 200-level Creative Writing. Third-year standing. For non-majors and non-minors: portfolio submission also required (deadline: May 1). Note: only students whose portfolios are of superior quality will be admitted.

CRWR 381 (3/6) Writing of Poetry

Advanced workshop in the writing of poetry. [3-0-0]

Prerequisite: 6 credits of 200-level CRWR courses. Third-year standing. For non-majors and non-minors: portfolio submission also required (deadline: May 1). Note: only students whose portfolios are of superior quality will be admitted.

CRWR 382 (3/6) Topics in Creative Writing

Special course in advanced creative writing for senior students in Creative Writing or other Creative Studies programs who wish to work on a special topic not normally covered in other classes. With different topics, this course may be taken more than once for credit. [3-0-0]

Prerequisite: 6 credits of 200-level Creative Writing or third-year standing and permission of Department.

CRWR 384 (3) Spoken Word

Advanced workshop in writing and performing Spoken Word texts. Credit will be granted for only one of CRWR 384 or THTR 384 or CULT 308. [3-0-0]

Prerequisite: 6 credits of Creative Writing and/or Theatre. Third-year standing.

Equivalency: THTR 384, CULT 308.

CRWR 470 (3/6) Portfolio

Intensive manuscript production in one or two major genres: fiction, poetry, drama, or creative non-fiction. As students begin to shape their portfolios, they will be asked to place their work in a contemporary aesthetic context. Credit will be granted for only one of CRWR 470 or CRWR 480. [3-0-0] or [1-0-2]

Prerequisite: 6 credits from CRWR 380, CRWR 381, CRWR 382, or CRWR 471 with a minimum grade of 72% in each of these two courses. For non-majors and non-minors: portfolio submission also required (deadline: May 1).

CRWR 471 (6) Writing of the Novel

Advanced workshop in the writing of the novel or novella. [1-0-2]

Prerequisite: Third-year standing. For non-majors and non-minors: portfolio submission also required (deadline: May 1). Note: only students whose portfolios are of superior quality will be admitted.



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CRWR 472 (3) Editing and Publishing

For Creative Writing majors. Develops specialized skills in editing and publishing for success in professional practice. Coursework includes experiential learning with solo and group projects. [0-2-2]

Prerequisite: Third-year standing.

CRWR 473 (3) Writing and Community Learning

Applied community learning aspects of creative writing. Develops specialized skills for success in professional practice by working in interdisciplinary and collaborative teams with community partners. Field trips will be required. [0-2-2]

Prerequisite: Third-year standing.

CRWR 474 (3) Writing with Media

Applied and theoretical aspects of writing with media. Develops specialized skills for working with media such as audio installations, broadcast, recordings, live performance, and video. Students will be encouraged to work in interdisciplinary and collaborative modes. [0-2-2]

Prerequisite: Third-year standing.

CRWR 475 (3) Preparing for a Career as a Writer

Developing professional skills such as sustainable writing practices, preparing work for submission, marketing and promotion. Careers that are within and adjacent to creative writing will also be discussed. Restricted to CRWR Majors except with permission from instructor. [2-2-0]

CRWR 485 (3/6) c Directed Studies

Students will investigate a creative writing practice and will complete a significant writing project. [3-0-0]

Prerequisite: Third-year standing; permission of the Creative Studies department; and permission of the supervising faculty member.

CRWR 520 (3) Special Topics in Creative Writing

Prerequisite: Admission into the M.F.A. program with specialization in Creative Writing, or permission of the Department of Creative Studies.

CRWR 530 (3) Directed Studies in Creative Writing

Prerequisite: Admission into the M.F.A. program with specialization in Creative Writing, or permission of the Department of Creative Studies.

CRWR 581 (3/6) d Graduate Workshop in Creative Writing - Lyric

Manuscript production course for in-depth discussion and workshoping of lyric forms. No more than 6 credits in total will be granted for CRWR 581, CRWR 580, or any combination thereof.

Prerequisite: Admission into the MFA CRWR program, or submission of a portfolio and permission of the Department of Creative Studies.

CRWR 582 (3/6) d Graduate Workshop in Creative Writing- Narrative

Manuscript production course for in-depth discussion and workshoping of narrative forms. No more than 6 credits in total will be granted for CRWR 582, CRWR 580, or any combination thereof.

Prerequisite: Admission into the MFA CRWR program, or submission of a portfolio and permission of the Department of Creative Studies

Cultural Studies, Faculty of Creative and Critical Studies

CULT: Cultural Studies

CULT 100 (3) Media and Popular Cultures in Global Context

Introduction to media and cultural studies in a global context, specifically the critical analysis of cultural texts, cultural industries, and media audiences. [3-0-0]

CULT 101 (3) Cultural Studies Practices

Key concepts and methods across the history of cultural studies including analysis of consumer society, identity, space, and memory. [3-0-0]

CULT 201 (3) Reading Popular Culture

Introduction to the critical analysis of contemporary popular culture forms such as architecture, video games, television, and popular fiction and cultural practices such as consumerism, participation in subcultures and social networking, from within the



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context of modernity. Credit will be granted for only one of CULT 201 or ENGL 232. [3-0-0]

Prerequisite: 3 credits of first-year CULT and 3 credits of first-year ENGL.

Equivalency: ENGL 232.

CULT 205 (3) Introduction to Contemporary Japan Through Pop Culture

Contemporary Japanese society through topics in popular culture, such as gender performativity, forms of play, manga, anime and film. In English. Credit will be granted for only one of CULT 205 or JPST 215. [3-0-0]

Prerequisite: 3 credits of first-year ENGL.

Equivalency: JPST 215.

CULT 210 (3) Reading Screens

Introduction to film and other screen-based media as narrative, with a focus on both formal and ideological elements. Credit will be granted for only one of CULT 210 or ENGL 215. [3-0-3]

Prerequisite: 3 credits of first-year CULT and 3 credits of first-year ENGL.

Equivalency: ENGL 215.

CULT 215 (3) Cultural Industries

An introductory critical study of cultural industries such as television and popular music. [3-0-0]

Prerequisite: Second-year standing.

CULT 230 (3) Foundations: Reading Across Borders

Critical intercultural reading approaches, focusing on literature and film from the global South. Emphasis upon ideas of culture, difference, and the relations between reader and text. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research. Credit will be granted for only one of CULT 230 or ENGL 224.

Prerequisite: 3 credits of first-year CULT and 3 credits of first-year ENGL.

Equivalency: ENGL 224.

CULT 250 (3) Foundations: Indigenous Literature

Survey of Indigenous-authored poetry, drama, fiction, non-fiction prose, and orature in North America, with attention to Indigenous methodologies and major critical trends. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research. Credit will be granted for only one of ENGL 234 or CULT 250. [3-0-0]

Prerequisite: 3 credits of first-year CULT and 3 credits of first-year ENGL.

Equivalency: ENGL 234.

CULT 275 (3) Foundations: Interdisciplinary Theory and Method in Literary Research

Study of the major trends in critical theory. Attention will be given to applications of theory in literary research. Credit will be granted for only one of CULT 275 or ENGL 250. [3-0-0]

Prerequisite: 3 credits of first-year CULT and 3 credits of first-year ENGL.

Equivalency: ENGL 250.

CULT 300 (3) Documentary and Docudrama

Investigation of reality effect of film by tracing its origins in the dramatic genres of melodrama, realism, and naturalism into filmic genres of documentary and docudrama. Surveys modern and postmodern examples of these genres. Credit will be granted for only one of CULT 300 or ENGL 378. [3-0-3]

Prerequisite: 3 credits of 200-level CULT. CULT 210 or CULT 215 is recommended.

Equivalency: ENGL 378.

CULT 305 (3) English-Canadian Screen Culture

Development of English-Canadian screen culture studied by concentrating on various movements, the political economy of Anglo-Canadian screen culture, and televisual and cinematic forms and genres. Focus of the survey is on identity, nationhood, and representation. Credit will be granted for only one of CULT 305 or ENGL 377. [3-0-3]

Prerequisite: 3 credits of 200-level CULT. CULT 210 or CULT 215 is recommended.

Equivalency: ENGL 377.

CULT 308 (3) Spoken Word

Advanced workshop in writing and performing Spoken Word texts. Credit will be granted for only one of CULT 308 or CRWR 384 or THTR 384. [0-3-0]

Prerequisite: 6 credits of Creative Writing and/or Theatre. Third-year standing.

Equivalency: THTR 384, CRWR 384.

CULT 310 (3/6) d Advanced Practice in Photography

Advanced studio course in digital- and film-based photography. Emphasis on photography as an artistic tool. This course may



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be taken twice for a maximum of 6 credits. No more than 6 credits in total will be granted for CULT 310, VISA 362, or any combination thereof.

Prerequisite: VISA 244 and 256. Note: for VISA 244, CULT students require permission of instructor.

Equivalency: VISA 362.

CULT 311 (3/6) d Advanced Practice in Media Arts

Advanced interdisciplinary course addressing the importance of technology-based approaches in contemporary art, with emphasis placed upon the formation of an idea and the media most appropriate to its expression. No more than 6 credits in total will be granted for CULT 311, VISA 382, or any combination thereof.

Prerequisite: One of VISA 206, VISA 266, VISA 268, VISA 269, VISA 271.

Equivalency: VISA 382.

CULT 312 (3/9) d Internet Culture

A critical study of the cultural influence of the Internet on everyday life. [3-0-0]

Prerequisite: 3 credits of 200 level CULT.

CULT 313 (3/9) d Topics in Transnational Asian Pop Culture

A critical study of Asian pop culture's transnational flows in and beyond Asia. With different topics, this course may be taken more than once for credit.

Prerequisite: 3 credits of 200-level CULT

CULT 315 (3) Television Studies

The medium of television from a global perspective, and the investigation of how genres in different television broadcast regimes shape content and reception. Credit will be granted for only one of CULT 315 or ENGL 376. [3-2-0]

Prerequisite: 3 credits of 200 level CULT.

Equivalency: ENGL 376.

CULT 316 (3) Narrative Film Production

The theory and practice of producing a short narrative motion picture for the purpose of developing narrative film literacy. Credit will be granted for only one of CULT 316, FILM 303, or THTR 303. VISA 106, VISA 261, VISA 271, CULT 210, THTR 103, CRWR 250, or FILM 100 recommended.

Prerequisite: Third-year standing.

Equivalency: FILM 303; THTR 303.

CULT 317 (3) Digital Documentary Production

Theory and practice from the point of view of producer/writer/director. Course culminates in the creation of a short-form documentary. Credit will be granted for only one of CULT 317 or FILM 371. [2-2-0]

Prerequisite: Third Year standing.

Equivalency: FILM 371.

CULT 320 (3) Creative Activism: Art, Media, and Social Justice

Examination of the convergence between social justice movements, activist media, and artistic practice. Credit will be granted for only one of CULT 320 or ARTH 323.

Prerequisite: 3 credits of 200 level CULT. ARTH 101, ARTH 102 or CULT 100, CULT 101 recommended.

Equivalency: ARTH 323.

CULT 325 (3) Media and the Politics of Identity

Examination of how cultural texts, including visual art, performance, literature, film, television, and social media, constitute modes of subjectivity and identity in modern Western contexts. [3-0-0]

Prerequisite: 3 credits of 200 level CULT. CULT 100/101 recommended.

CULT 340 (3) Colonialism and Decolonization

Comparative analysis of the cultural project of European colonialism, including colonial discourse, resistance, and decolonization in Africa, the Caribbean, South and Southeast Asia, and North America. Credit will be granted for only one of CULT 340 or ENGL 379. CULT 230, CULT 250, or CULT 275 recommended.

Prerequisite: 3 credits of 100 or 200-level Cultural Studies.

Equivalency: ENGL 379.

CULT 346 (3) Human Rights, Literature, and Culture

Critical analysis of representational practices within humanitarian and human rights discourses, including literature, life writing, film, journalism, and marketing. Credit will be granted for only one of CULT 346 or ENGL 384. CULT 230, CULT 250, or CULT 275 recommended.



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Prerequisite: 3 credits of 100 or 200-level CULT.

Equivalency: ENGL 384.

CULT 350 (3) Indigenous Literature: Intellectual Traditions

Approaches to Indigenous literary and cultural studies in North America. Consideration will be given to a range of literary movements, intellectual traditions, and critical approaches. Credit will be granted for only one of ENGL 387 or CULT 350.

Prerequisite: 3 credits of 200-level CULT. CULT 250 or ENGL 234 is recommended.

Equivalency: ENGL 387.

CULT 351 (3) Settler Studies, Literature, and Culture

Approaches to the interdisciplinary field of settler colonial studies in Canadian and comparative contexts in relation to literature, film, and other forms of cultural production. Examines the role of representation, narrative, and discourse in settlement, colonization, and decolonization. Credit will be granted for only one of ENGL 385 or CULT 351.

Prerequisite: 3 credits of 200-level CULT. CULT 250 or ENGL 234 is recommended.

Equivalency: ENGL 385.

CULT 360 (3) Public Memory, Commemoration, and Identity

Critical examination of commemoration practices, including museums, monuments, and heritage sites, specifically in terms of the construction of place, community, and identity. Credit will be granted for only one of CULT 360 or CORH 360.

Prerequisite: 3 credits of 200 level CULT, CORH 204, or CORH 205.

Equivalency: CORH 360.

CULT 371 (3/6) d Modern Critical Theory and Interdisciplinary Methods

Advanced survey of major trends within critical theory, with attention to issues such as subjectivity and power, the body, culture and imperialism, and social discourse. No more than 6 credits in total will be granted for CULT 371, ENGL 309 or any combination thereof. [3-0-0]

Prerequisite: 3 credits of 200-level CULT or 200-level ENGL. One of CULT 270, CULT 275 recommended.

Equivalency: ENGL 309.

CULT 380 (3) Performance Art: Global Perspectives

History, theory, and practice of performance art as a visual medium, a global language, and a political force. Explores a wide range of experimental and interdisciplinary performance art practices, including key contributions by Indigenous artists. Credit will be granted for only one of THTR 309, ARTH 309 or CULT 380.

Prerequisite: Third-year standing.

Equivalency: ARTH 309, THTR 309.

CULT 400 (3/9) d Topics in Popular Culture

Focus on media such as music, film, music video, television, advertising, and the Internet. No more than 9 credits in total will be granted for CULT 400, ENGL 493, or any combination thereof. [3-0-0]

Prerequisite: 3 credits of 200-level CULT. CULT 210, CULT 211, and/or CULT 270 recommended.

Equivalency: ENGL 493.

CULT 401 (3/9) d Topics in Media Studies

In-depth study of contemporary media phenomena and practices. With different topics, this course may be taken more than once for credit.

Prerequisite: 3 credits of 200 level CULT.

CULT 405 (3) Reading Gothic Film

The gothic/horror film as a genre that provides insight into cultural narratives regarding gender, sexuality, race, and class. Films may be approached from a number of critical perspectives, including psychoanalytic, feminist, and cultural theories. Credit will be granted for only one of CULT 405 or ENGL 455. [3-0-3]

Prerequisite: 3 credits of 200-level CULT; CULT 210, CULT 215, and/or CULT 270 recommended.

Equivalency: ENGL 455.

CULT 410 (3/9) d Asian Cinema

Specific Asian directors, genres, and/or cross-regional topics in film studies. In English. [3-0-3]

Prerequisite: 3 credits of 200 level CULT.

CULT 437 (3/9) d Postcolonial Studies

Examines colonialism, decolonization, and globalization, as they relate to literature and other modes of cultural production, using a cross-cultural framework. Topics vary from year to year. With different topics this course may be taken more than once for credit. No more than 9 credits in total will be granted for CULT 437, ENGL 437, or any combination thereof. [3-0-0]



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Prerequisite: 3 credits of 200-level CULT. CULT 230 is recommended.

Equivalency: ENGL 437.

CULT 450 (3) Studies in Indigenous Literature and Criticism

Topics in Indigenous literature and criticism in North America, including particular periods and individual authors. Credit will be granted for only one of ENGL 473 or CULT 450. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.

Equivalency: ENGL 473.

CULT 460 (3) Posthumanism and Critical Animal Studies

Contemporary theories in the field of critical animal studies via ecofeminism, literary studies, philosophy and history with the aim of considering the interconnectedness of speciesism, racism and sexism. Particular attention will be paid to ecofeminism and the "ethics of care" in regards to the treatment of animals. Credit will be granted for only one of CULT 460 or ENGL 457. [3-0-0]

Prerequisite: Third-year standing.

Equivalency: ENGL 457.

CULT 470 (3/9) d Interdisciplinary Studies in Critical Theory

Advanced study of a particular area within critical theory. Topics may include queer theory, critical animal studies, ethics, post-humanism, and nationalism. No more than 9 credits in total will be granted for CULT 470, ENGL 412 or any combination thereof. [3-0-0]

Prerequisite: 3 credits of 200-level CULT. One of CULT 270, CULT 275 recommended.

Equivalency: ENGL 412.

CULT 475 (3) Topics in Auto/Biography

Study of a particular topic in or genre of auto/biographical discourse. Credit will be granted for only one of CULT 475 or ENGL 456. [3-0-0]

Prerequisite: 3 credits of 200-level CULT. CULT 375 is recommended.

Equivalency: ENGL 456.

CULT 480 (3) Performance Studies

Seminar in the interdisciplinary field of performance studies, broadly conceived as the investigation of aesthetic, ritual, and everyday life performance practices. Credit will be granted for only one of CULT 480 or THTR 411. [3-0-0]

Prerequisite: Third-year standing.

Equivalency: THTR 411.

CULT 485 (3) Masculinities, Media, and Performance

Examination of the social construction of masculinities through the lens of queer and feminist theory. [3-0-0]

Prerequisite: Third-year standing and CULT 100 or permission of the instructor.

CULT 490 (3/9) d Topics in Identities and Power

Advanced study of an area of identities and power. With different topics this course may be taken more than once for credit. [3-0-0]

Prerequisite: 3 credits of 200-level CULT

CULT 495 (3/9) c Directed Studies

Major research paper required.

Prerequisite: Third-year standing and declared CULT major.

CULT 499 (3) Community-Engaged Research in Cultural Studies

Develops professional skills in research, collaboration, and communication. Students work in collaborative teams to complete projects that support the work of community partners. Projects vary from year to year. Students must arrange own transportation to/from Kelowna-area required off-campus meetings. 65 contact hours of class and community partner interaction.

Prerequisite: Third-year standing; students must complete an application; permission granted by the Cultural Studies program. Preference will be given to students enrolled as Major, Combined Major, or Minor in CULT.

Curriculum Studies, Faculty of Education

CUST: Curriculum Studies

CUST 562 (3) Curriculum Issues and Theories

Curriculum theories and issues are explored through a review of literature (historical and contemporary) and critical reflection on



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existing practices. Provides a basis for examining knowledge claims, beliefs and assumptions underpinning contemporary understandings and practices of curriculum.

CUST 563 (3) Conceptualizing Curriculum Studies: Theory and Research

Facilitates an understanding of curriculum from a historical and contemporary perspective. Epistemological and ontological dimensions will be considered with a focus on discourses within the Canadian context.

CUST 564 (3) Curriculum for Sustainability

Focus on curriculum discourse central to ecological and social justice.

CUST 565 (3) Curriculum Studies in Diverse Settings

Explores curriculum study in design, implementation, and evaluation for contemporary pedagogical settings. Among other topics, focus will be on curriculum that addresses diverse learning and diverse settings.

Data, Faculty of Science

DATA: Data Science

DATA 101 (3) Making Predictions with Data

Introduction to the techniques and software for handling real-world data. Topics include data cleaning, visualization, simulation, basic modelling, and prediction making. [3-1-0]

DATA 301 (3) Introduction to Data Analytics

Techniques for computation, analysis, and visualization of data using software. Manipulation of small and large data sets. Automation using scripting. Real-world applications from life sciences, physical sciences, economics, engineering, or psychology. No prior computing background is required. Credit will be granted for only one of COSC 301, DATA 301 or DATA 501. [3-2-0]
Prerequisite: Either (a) third-year standing, or (b) one of COSC 111 or COSC 122
Equivalency: COSC 301.

DATA 311 (3) Machine Learning

Regression, classification, resampling, model selection and validation, fundamental properties of matrices, dimension reduction, tree-based methods, unsupervised learning. Credit will be granted for only one of STAT 311 or DATA 311. [3-2-0]
Prerequisite: Either (a) STAT 230 or (b) a score more than 75% in one of APSC 254, BIOL 202, PSYO 373; and one of COSC 111, APSC 177.

DATA 315 (3) Applied Time Series and Forecasting

Trends, stationary and nonstationary time series models, forecasting, seasonal models. [3-1-0]
Prerequisite: STAT 230.

DATA 405 (3) Modelling and Simulation

Numeric dynamic systems models and emphasis on discrete stochastic systems. State description of models, common model components, entities. Common simulation language. Simulation using algebraic languages. Simulation methodology: data collection, model design, output analysis, optimization, validation. Elements of queuing theory, relationship to simulation. Applications to computer systems models. Credit will be granted for only one of COSC 405, DATA 405, COSC 505, or DATA 505. [3-2-0]
Prerequisite: A score of 60% or higher in COSC 221 and a score of 60% or higher in COSC 222.
Equivalency: COSC 405.

DATA 407 (3) Sampling and Design

Planning/practice of data collection. Pros/cons of both observational and experimental data. Survey samples: random sampling; bias and variance; unequal probability sampling; systematic, multistage, and stratified sampling; ratio and regression estimators. Experimental design: simple one-way comparisons; designs with randomization restrictions including blocking, split-plots, nested and repeated measures designs. Credit will be granted for only one of DATA 407, STAT 405, STAT 407, or STAT 507. [3-1-0]
Prerequisite: One of STAT 230, PSYO 372, BIOL 202, ECON 327.

DATA 410 (3) Regression and Generalized Linear Models

Regression, linear models, generalized linear models, additive models, generalized additive models, mixed models. Theory and numerical performance. Credit will be granted for only one of DATA 410, STAT 310, STAT 410, or STAT 538. [3-2-0]
Prerequisite: All of MATH 221, STAT 303, DATA 311.

DATA 419 (3-9) d Topics in Data Science



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Advanced or specialized topics in data science. Consult the department for the specific topic to be offered in any given year. This course may be taken more than once for credit with different topics. [3-2-0]

Prerequisite: Fourth-year standing.

DATA 421 (3) Network Science

Graphs and complex networks in scientific research. Probabilistic and statistical models. Structures, patterns, and behaviors in networks. Algorithmic and statistical methods. (online/mobile) social networks and social media platforms. Social influence, information diffusion, and viral marketing. Sentiment analysis and opinion mining. Data privacy. Search engines and recommendation systems. Credit will be granted for only one of COSC 421, DATA 421 or DATA 521. [3-2-0]

Prerequisite: STAT 230.

Equivalency: COSC 421.

DATA 448 (3/6) Directed Studies in Data Science

Investigation of a specific topic as agreed upon by the student and the faculty supervisor. Completion of a project and an oral presentation are required.

Prerequisite: Third-year standing in the Data Science major or Honours, and permission of the department head.

DATA 449 (6) Honours Thesis

Students will undertake a research project as agreed upon by the student, supervising faculty member, and unit head. A written thesis and a public presentation (poster or seminar) are required. Restricted to students in the B.Sc. Data Science Honours Program.

Prerequisite: Fourth-year standing and permission of the department head.

DATA 500 (3) Communication and Consulting in Data Science

Effective consulting practices, ethical considerations, methodology selection, data preparation, effective software development. Credit will be granted for only one of DATA 500 or STAT 400 when the subject matter is of the same nature.

DATA 501 (3) Data Analytics

Techniques for computation, analysis, and visualization of data using software. Manipulation of small and large data sets. Automation using scripting. Real-world applications from life sciences, physical sciences, engineering, or psychology. Credit will be granted for only one of COSC 301, DATA 301 or DATA 501.

DATA 505 (3) Modelling and Simulation

Simulation methodology: data collection, model design, output analysis, optimization, validation. Credit will be granted for only one of COSC 405, DATA 405, COSC 505, or DATA 505.

DATA 521 (3) Network Science

Graphs and complex networks in scientific research. Probabilistic and statistical models. Structures, patterns, and behaviors in networks. Algorithmic and statistical methods. (online/mobile) social networks and social media platforms. Social influence, information diffusion, and viral marketing. Sentiment analysis and opinion mining. Data privacy. Search engines and recommendation systems. Credit will be granted for only one of COSC 421, DATA 421 or DATA 521.

DATA 530 (1) Computing Platforms for Data Science

Introduction to software and tools for Data Science. Setup process. Credit will be granted for only one of DATA 301 or DATA 530. Restricted to students in the MDS program.

DATA 531 (1) Programming for Data Science

Programming including decisions, loops, functions, and using data structures and libraries. Credit will be granted for only one of DATA 301 or DATA 531. Restricted to students in the MDS program.

DATA 532 (1) Algorithms and Data Structure

Data structures including lists, queues, stacks, hash tables, trees and graphs. Recursion. Searching and sorting. Asymptotic complexity. Restricted to students in the MDS program.

DATA 533 (1) Collaborative Software Development

Software life cycle. Licensing. Packaging. Testing and quality control. Version control. Collaborative environments. Restricted to students in the MDS program.

Prerequisite: DATA 532.

DATA 534 (1) Web and Cloud Computing

Parallel and cloud computing architectures and program deployment. Restricted to students in the MDS program.

DATA 540 (1) Databases and Data Retrieval

Using and querying relational and NoSQL databases for analysis. Experience with SQL, JSON, and programs that use



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databases. Restricted to students in the MDS program.

Prerequisite: DATA 531.

DATA 541 (1) Scripting and Reporting

Scripting engines for data science. Reporting tools. Automation. Restricted to students in the MDS program.

DATA 542 (1) Data Wrangling

Manipulation of data using software tools. Data conversion, filtering, sorting, grouping, cleaning, parsing. Automation. Restricted to students in the MDS program.

Prerequisite: All of DATA 532, DATA 540, DATA 541.

DATA 543 (1) Data Collection

Fundamental techniques in the collection of data. Focus will be devoted to understanding the effects of randomization, restrictions on randomization, repeated measures and blocking on the model fitting. Restricted to students in the MDS program.

Prerequisite: All of DATA 540, DATA 570.

DATA 550 (1) Dataviz I

Data visualization to produce graphs and images. Advanced data analysis on spreadsheets. Credit will be granted for only one of DATA 301 or DATA 550. Restricted to students in the MDS program.

Prerequisite: All of DATA 530, DATA 531.

DATA 551 (1) Dataviz II

Data visualization using business intelligence and data analysis software. Interactive visualization. Production of visualizations for mobile and web. Restricted to students in the MDS program.

Prerequisite: All of DATA 534, DATA 543, DATA 550.

DATA 552 (1) Communication and Argumentation

Interpretation of data. Argumentation: hypothesis, claim, evidence and inference. Model limitations: bias, validity, reliability, sensitive analysis. Communication of recommendations to decision-makers. Restricted to students in the MDS program.

DATA 553 (1) Privacy, Security and Professional Ethics

Data privacy laws and expectations. Freedom of information. Ethics board. Licensing. Data security. Restricted to students in the MDS program.

DATA 570 (1) Predictive Modelling

Introduction to regression for Data Science. Simple linear regression, multiple linear regression, interactions, mixed variable types, model assessment, simple variable selection, k-nearest-neighbours regression. Credit will be granted for only one of DATA 311 or DATA 570. Restricted to students in the MDS program.

Prerequisite: DATA 580.

DATA 571 (1) Resampling and Regularization

Resampling techniques and regularization for linear models. Bootstrap, jackknife, cross-validation, ridge regression, lasso, discussion of tuning parameters. Credit will be granted for only one of DATA 311 or DATA 571. Restricted to students in the MDS program.

Prerequisite: DATA 570.

DATA 572 (1) Supervised Learning

Analysis of data with categorical responses. Logistic regression, k-nearest-neighbours classification, discriminant analysis, decision trees and random forests. Credit will be granted for only one of DATA 311 or DATA 572. Restricted to students in the MDS program.

Prerequisite: DATA 571.

DATA 573 (1) Unsupervised and Semi-supervised Learning

Analyses for data with unknown responses. Distance measures, hierarchical clustering, k-means, mixture models. Restricted to students in the MDS program.

Prerequisite: DATA 572.

DATA 580 (1) Modelling and Simulation I

Pseudorandom number generation, testing and transformation to other discrete and continuous data types. Introduction to Poisson processes and the simulation of data from predictive models, as well as temporal and spatial models. Credit will be granted for only one of DATA 405 or DATA 583. Restricted to students in the MDS program.

DATA 581 (1) Modelling and Simulation II

Markov chains and their applications, for example, queueing and Markov Chain Monte Carlo. Credit will be granted for only one



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of DATA 405 or DATA 581. Restricted to students in the MDS program.

Prerequisite: DATA 580.

DATA 582 (1) Bayesian Inference

Introduction to Bayesian paradigm and tools for Data Science. Topics include Bayes theorem, prior, likelihood and posterior. A detailed analysis of the cases of binomial, normal samples, normal linear regression models. A significant focus will be on computational aspects of Bayesian problems using software packages. Restricted to students in the MDS program.

Prerequisite: All of DATA 572, DATA 581.

DATA 583 (1) Advanced Predictive Modelling

Splines. Smoothing. Generalized linear models. Generalized additive models. An introduction to mixed models. Restricted to students in the MDS program.

Prerequisite: All of DATA 572, DATA 581.

DATA 585 (1) Optimization

Modelling using mathematical programming. Fundamental continuous and discrete optimization algorithms. Optimization software for small to medium scale problems. Optimization algorithms for data science. Restricted to students in the MDS program.

Prerequisite: DATA 580.

DATA 586 (1) Advanced Machine Learning

Neural networks, backpropagation, deep learning. Restricted to students in the MDS program.

Prerequisite: DATA 580.

DATA 589 (1) Special Topic

Advanced or specialized topic in Data Science with applications to specific data sets. Restricted to students in the MDS program.

Prerequisite: DATA 543.

DATA 599 (6) Capstone

A capstone design project designed to give students experience in performing data science on a complex multi-disciplinary project. Restricted to students in the MDS program.

Prerequisite: All of DATA 583, DATA 586.

Faculty of Applied Science

DICE: Design, Innovation, Creativity, Entrepreneurship

DICE 501 (3) Design and Innovation

Design thinking within the history of innovation; cultural theory; contemporary local and global challenges. Management of the design process drawing on principles of creativity, design and engineering.

DICE 502 (3) Innovation and Participatory Research

Undertake participatory and community-based approaches to design, and develop reflective practice as socially responsible entrepreneurs. Participatory research, Indigenous Ways of Knowing and community-based creative approaches contribute to problem finding and project design.

DICE 503 (3) Visualization and Virtualization of Design and Production Cycle

Visualization and virtualization for creativity and innovation. Develop advanced design thinking, focusing on ideation and preparing for prototyping and presentation.

DICE 504 (6) Entrepreneurship and Social Innovation

Develop skills in customer-orientated design and innovation through project-based learning. Situate entrepreneurship and social innovation within diverse work settings, including small businesses, social enterprises, First Nations, NGOs, and non-profits.

DICE 505 (6) Studio Experience

Design work is implemented in a facilitated studio environment. Uses integral methods of working with creative technologies and connections with mentors and peers to refine projects.

Prerequisite: All of DICE 501, DICE 502, DICE 503, DICE 504.

DICE 507 (6) Showcase

Product design and development synthesised in a project output and pitch presentation.



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Prerequisite: All of DICE 501, DICE 502, DICE 503, DICE 504.

Digital Humanities, Faculty of Creative and Critical Studies

DIHU: Digital Humanities

DIHU 155 (3) Writing and Making with Technology in the Humanities

Introduction to digital and technological cultures with a focus on humanities methods, drawing on a range of periods in technological development and critical approaches to studying technology. At least 35% of class involves practice-based instruction in humanities criticism, prototyping, writing and research.

Equivalency: ENGL 155.

DIHU 200 (3) Introduction to the Digital Humanities

Addresses the construction of digital resources in the context of humanities research. No Digital Humanities or computing experience required. Credit will be granted for only one of DIHU 200 or ENGL 200.

Prerequisite: Two of ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153 or 6 credits of 100-level English. ENGL 112 and ENGL 114 may not both be taken for credit.

Equivalency: ENGL 200.

DIHU 210 (3) Digital Detection

Being able to detect the technological, social, and financial infrastructures that underpin digital resources is a key skill for all savvy users and creators in a digital context. In addition to introducing digital detection techniques, the course introduces elementary project planning.

Prerequisite: 3 credits of ENGL

DIHU 220 (3) Research with Media in the Humanities

Working in the context of fine arts and humanities research, students develop methods for multimedia research. No digital humanities or computing experience required. DIHU 155 or ENGL 155 strongly recommended.

Prerequisite: DIHU 155. Or 3 credits of ENGL.

DIHU 301 (3) The Self-Conscious Text

Addresses computational methods for student-led humanities research, including visualizing, mapping, and encoding. No Digital Humanities or computing experience required. Credit will be granted for only one of DIHU 301 or ENGL 305.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156, FILM 100, CULT 100. Third-year standing or permission of the instructor.

Equivalency: ENGL 305.

DIHU 302 (3) The Programmed World

Working in the context of fine arts and humanities research, students study and apply programming principles in physical and virtual environments. No Digital Humanities or computing experience required. Credit will be granted for only one of DIHU 302 or ENGL 306.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156, FILM 100, CULT 100. Third-year standing or permission of the instructor.

Equivalency: ENGL 306.

DIHU 320 (3) Digital Archives, Cultural Heritage, and Public History

Interdisciplinary introduction to digital archiving, exhibition, and preservation of cultural heritage and public history. Deals with collective memory, politics of commemoration and collecting, and future of digital collection and museum interfaces. Credit will be granted for only one of DIHU 320 or HIST 380.

Prerequisite: COSC 264 and 3 credits of ENGL

Equivalency: HIST 380.

DIHU 370 (3) Story and Image Across the Islamic World

Selections from the arts of the book across the Islamic world (8th to 19th C) showing how literature inspired painters and calligraphers to weave together word and image. Digital art historical approaches will normally be used, though no computing experience is required. Credit will be granted for only one of DIHU 370, ARTH 370, or WRLD 370.

Prerequisite: Third-year standing.

Equivalency: ARTH 370, WRLD 370.

DIHU 375 (3) Encountering India: The Age of the Mughals



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An examination of interrelated arts, visual cultures and texts in South Asia (15th to 19th C) within their historical and cultural contexts. Topics include the rise of the multicultural Mughal Empire, the roles of Hinduism, Islam, and Sikhism, and encounters with Renaissance and Colonial Europe. Digital art historical approaches will normally be used, though no computing experience is required. Credit will be granted for only one of DIHU 375, ARTH 375, or WRLD 375.

Prerequisite: Third-year standing.

Equivalency: ARTH 375, WRLD 375.

DIHU 407 (3) Media and Contemporary Readers

Trends in reading over the 20th and 21st centuries, focusing on reading communities and constructions of the reader as an identity category in face-to-face and online clubs, groups, and social networks. Includes literary and non-literary texts, images, platforms, and data. No Digital Humanities or computing experience required. Credit will be granted for only one of DIHU 407 or ENGL 407. Equivalent: ENGL 407

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156, FILM 100, CULT 100. Third-year standing.

Equivalency: ENGL 407.

DIHU 411 (3) Digital Media for Interpretive Centres

The art and practice of using digital media for cultural institutions like art galleries, museums, botanic gardens, science centres, heritage sites and parks. Critical perspectives will be employed and approaches may include project-based learning, working with cultural institutions and digital art history methods. Credit will be granted for only one of DIHU 411 or ARTH 411.

Prerequisite: Third-year standing.

Equivalency: ARTH 411.

Educational Administration, Faculty of Education

EADM: Educational Administration

EADM 554 (3) Policy and Education

Overview of the social, political, and legal influences on the role of educational leaders in schools. Policy development and analysis are examined in relation to contemporary issues in education.

EADM 556 (3) Conceptualizing Leadership

Broad conceptualization of leadership for learning organizations, communities, and enterprises through an examination of the historical, philosophical, theoretical, and ethical foundations of leadership.

EADM 557 (3) Leadership for Inclusion and Social Justice

An overview of the theoretical and practical elements of leadership for inclusive education, social justice, and other associated topics.

EADM 558 (3) Leadership for Sustainability

Applies the theoretical elements of sustainability through a focus on the practical aspects of leadership for sustainability in education and the broader society.

EADM 582 (3) Leadership for Change: Systems, Innovation, and Reform

Broad overview of the study of systems, innovation, and reform in organizations by examining a range of theories and models of change.

Faculty of Education

EAP: English for Academic Purposes

EAP 103 (3) English for Academic Purposes Level III

Practice and refinement of academic communication and composition skills: writing and grammar; reading comprehension and proficiency; listening comprehension and oral fluency; intercultural communication. Students participate in an increasingly complex variety of academic activities and situations involving multiple purposes and participants. Twelve weeks (240 hours).

Prerequisite: Minimum English language competence level (see English Language Proficiency Tests at

<http://www.calendar.ubc.ca/okanagan/index.cfm?tree=2,19,1040,0>). Registration limited to students in the English Foundation Program.



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EAP 104 (3) English for Academic Purposes Level IV

Development of advanced academic communication and composition skills: writing and grammar; reading comprehension and proficiency; comprehension and oral fluency; intercultural communication. Students participate in a variety of complex academic activities and situations involving multiple purposes and participants. Twelve weeks (240 hours).

Prerequisite: Successful completion of EAP 103 or minimum English language competence level (see English Language Proficiency Tests at <http://www.calendar.ubc.ca/okanagan/index.cfm?tree=2,19,1040,0>). Registration limited to students in the English Foundation Program.

Early Childhood Education, Faculty of Education*ECED: Early Childhood Education***ECED 421 (3) Supporting Young Children through Home, School, and Community Relationships**

Examine the issues and opportunities around supporting young children through the development of effective cooperation between home, school, and community. Pass/Fail. [3-0-0]

ECED 438 (3) Observation and Documentation in Early Childhood Settings

Methods of observing, recording, and interpreting children's behaviour in early childhood settings and in using data for educational guidance following developmentally appropriate practices. Pass/Fail. [3-0-0]

ECED 440 (3) Play and Early Childhood Education

Examines the key issues, practices, philosophies, and research findings that explore childhood play as it is integrated into formal learning. Pass/Fail. [3-0-0]

ECED 441 (3) Indigenous Language Nests in Early Learning

Examines research in education, linguistics, anthropology, and cognitive psychology that pertains to children entering school with particular attention to Indigenous children's language realities. Pass/Fail. [3-0-0]

ECED 444 (3) Early Numeracy

Early learners need mathematical activities that nurture numeracy through children's literature, songs, poetry, play, and games. Influences of the family and the environment will be explored. Research and practice will be explored to identify best practices for early numeracy. Pass/Fail. [3-0-0]

ECED 445 (3) Social Equality and Early Learning

Examines socio-economic and community factors in early child development and learning that influence healthy child development. Pass/Fail. [3-0-0]

ECED 463 (3) Early Language and Literacy Development

The influences of language, emergent literacy, and growth are examined. How reading and writing develop as integrated processes within oral language acquisition is also explored. Credit will be granted for only one of ECED 463 or LLED 463. Pass/Fail. [3-0-0]

Equivalency: LLED 463.

ECED 480 (3/6) d Special Topics in Early Childhood Education

A study of innovative practices, ideas, and theories in early childhood education. The specific topics may change yearly to reflect changing priorities and interests in early childhood education and the specific interests and competencies of visiting and regular faculty. Pass/Fail. [3-0-0]

Economics, Faculty of Arts and Social Sciences*ECON: Economics***ECON 101 (3) Principles of Microeconomics**

Elements of theory and Canadian policy and institutions concerning the economics of markets and market behaviour, prices and costs, exchange and trade, competition and monopoly, distribution of income. [3-0-0]

ECON 102 (3) Principles of Macroeconomics

Elements of theory and Canadian policy and institutions concerning the economics of growth and business cycles, national income accounting, interest and exchange rates, money and banking, the balance of trade. [3-0-0]



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ECON 204 (3) Intermediate Microeconomic Analysis

Microtheory course at the post-principles level. Analysis of consumer behaviour, production, exchange, equilibrium of the firm under varying market structures, factor markets, economic efficiency, and welfare. [3-0-1]

Prerequisite: ECON 101 and one of MATH 100, MATH 116.

ECON 205 (3) Intermediate Macroeconomic Analysis

Macrotheory course at the post-principles level. Income and employment theory, monetary and fiscal policies, the impact of international trade and finance on the domestic economy, economic growth and fluctuations. [3-0-1]

Prerequisite: ECON 102 and one of MATH 100, MATH 116.

ECON 221 (3) Introduction to Strategic Thinking

Game theory with applications drawn from many disciplines and the principles of strategic interactions. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 232 (3) History of Economic Thought

Evolution of economic thinking from ancient to present times. The Greek, Islamic, and Medieval scholars; the Physiocrats, Adam Smith, Malthus, Bentham, Ricardo, Mill, Marx, Keynes, and other major economic thinkers. Development of fundamental economic ideas and conflicting perspectives are studied within their social and economic context. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 260 (3) Poverty and Inequality

Economic analysis of poverty and inequality in Canada and other countries. Measurement and definition of poverty and inequality; demographic analysis of poverty and inequality, and distribution by age, sex, and region in Canada. Public policy issues of welfare, workfare, and social assistance. No economics background needed. [3-0-0]

ECON 295 (3) Managerial Economics

Economic foundations of managerial decision-making. Demand theory, cost and production, market structure, competitive strategy, organization of the firm, welfare-economic foundations of business regulation. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 297 (3) Economics of Sports

Application of economic analysis to sports. Credit will be granted for only one of ECON 297 or ECON 391 when the subject matter is of the same nature. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 308 (3) Intermediate Microeconomics II

Factor markets, general equilibrium, uncertainty and information, contract theory, externalities, public goods, and welfare. [3-0-0]

Prerequisite: ECON 204.

ECON 309 (3) Intermediate Macroeconomics II

Intermediate Macroeconomic theory and empirics. Macroeconomic fundamentals in the short and long run, monetary theory, open economy macroeconomics, financial markets, and sovereign debt. [3-0-0]

Prerequisite: All of ECON 204, ECON 205.

ECON 310 (3) Writing Economics for the Media

Develop clear and effective writing skills for communicating economic concepts to the general public. Credit will be granted for only one of ECON 310 or ECON 391Q. [3-0-0]

Prerequisite: 6 credits of ENGL, and a minimum of 6 credits of upper-level ECON courses.

ECON 320 (3) Introduction to Mathematical Economics

Application of single and multivariable calculus to economics. Includes comparative static analysis of household and firm behaviour as well as simple dynamic models. Credit will be granted for only one of ECON 320 or ECON 391 when the subject matter is of the same nature. [3-0-0]

Prerequisite: All of ECON 101, ECON 102 and one of MATH 101, MATH 142.

ECON 321 (3) Experimental Economics

Methodology, design and techniques of experimental economics. Participation in various in-class experiments and market simulations. [3-0-0]

Prerequisite: One of ECON 204, ECON 205, ECON 221, ECON 295.

ECON 327 (3) Introduction to Empirical Economics

The essentials of probability and statistics for applied work in economics. Topics include descriptive statistics, probability, estimation, hypothesis testing, and analysis of variance. [3-0-1]



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Prerequisite: All of ECON 101, ECON 102 and one of MATH 101, MATH 142.

Corequisite: STAT 230.

ECON 328 (3) Methods of Empirical Research

Techniques of empirical economic research. Simple and multiple regression, time series analysis, and simultaneous equation estimation. Students are required to undertake applied work. [3-0-1]

Prerequisite: ECON 327.

ECON 330 (3) World Economy to 1800

Development of the world economy, from ancient times to the onset of the Industrial Revolution around 1800 and the unique influence of Western Europe. Provides a long-term historical perspective and an opportunity to apply economic analysis. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 331 (3) World Economy since 1800

Development of the world economy, from the onset of the Industrial Revolution around 1800 to the present. Broad causes of world economic development, interaction between economic forces and social institutions, and development of particular national economies. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 338 (3) Introduction to the Austrian School of Economics

Introductory analysis of the Austrian School of Economics - known for its systematic defence of private property rights, sound money, free enterprise, and free markets. Credit will be granted for only one of ECON 338 or PHIL 361. [3-0-0]

Prerequisite: All of ECON 101, ECON 102. Or 3 credits of PHIL. Third-year standing.

Equivalency: PHIL 361.

ECON 339 (3) Economics of Technological Change

Application of economic analysis to technological change; impact of technological change on the growth and distribution of income; economic influences on the invention and diffusion of technology; interaction between technology, work, skills, and education; public policy toward technological change. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 340 (3) Financial Economics

Fundamental topics in financial economics, including net present value, risk and expected return, valuing bonds and equities, the capital asset pricing model, futures and options, and international investing. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 345 (3) Money and Banking

Financial markets and financial institutions in theory and practice; structure and development of the Canadian financial system; development and theory of the regulation of the financial system; process of monetary control; theory and history of central banking and monetary policy. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 351 (3) Women in the Economy

Economic analysis of markets and policies particularly affecting women. Economic discrimination; educational, occupational, and work choices; pay and employment equity; allocation of work time; household and market consumption; economics of marriage and fertility; poverty; taxation; income security and pension policies; and historical perspectives. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 352 (3) Public Sector Economics

The government plays a pervasive role in the Canadian economy. The powerful tools of government policy - taxation, spending, borrowing, and regulation - affect the economic life of every Canadian. This course applies the tools of economic analysis to the study of some of the most important aspects of public policy in these areas. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 355 (3) International Trade

The determinants of trade patterns, trade policy, tariff and non-tariff barriers to trade, political economy of protectionism, bilateral and multilateral trade disputes, trade liberalization, trade and development. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 356 (3) International Finance

Exchange rate policy regimes; international financial organizations; the interaction between monetary policy and exchange rate regimes; financial crises. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.



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ECON 358 (3) Competitiveness in the International Economy

Emphasis on the major economies in North America, Europe, and East Asia. Determinants of competitiveness in nations and corporations, industrial and strategic trade policies of governments, importance of high-technology industries, role of multinational corporations. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 360 (3) Labour Economics

Canadian labour market. Labour supply, allocation of time among work and non-market activity, labour force participation, education and training. Determination of and effect of unions on wages and employment. Wage structure and differentials. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 361 (3) Economics of Industrial Relations

Economic aspects of industrial relations in Canada; why workers join unions; theory of trade union behaviour; labour movement in Canada; wage determination under collective bargaining; causes of strikes and lockouts; unions and wage structure. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 370 (3) Benefit-Cost Analysis and the Economics of Project Evaluation

Techniques and problems in benefit-cost analysis of public projects. Examination of alternative approaches to public decision-making such as cost-effectiveness analysis and multiple-objective frameworks. Case studies of projects in the areas of natural resources, the environment, human resources, public services, and transportation. [3-0-0]

Prerequisite: Either (a) all of ECON 101, ECON 102 or (b) ENGR 305.

ECON 371 (3) Economics of the Environment

Economic analysis applied to various environmental issues, including sustainable development, quality of life, and environmental impacts of specific industrial and consumption activities. The design and implementation of government policies. Global environmental effects of human economic activity. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 372 (3) Natural Resource Economics

Application of economic analysis to the management of renewable and nonrenewable natural resources. Optimal use of depletable resources such as forests and water; public policy with regard to conservation and outdoor recreation; mineral economics and the economics of alternative energy sources. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 386 (3) Industrial Organization and Regulation

Survey of the behaviour and performance of firms. Determinants and measures of market structure, oligopoly theory, strategic behaviour, predation, entry deterrence, advertising, regulation, and competition policy. [3-0-0]

Prerequisite: All of ECON 101, ECON 102, ECON 204.

ECON 391 (3/9) d Topics in Economics

Examination of selected topics in current economic theory and/or policy. Topics vary each time the course is offered. With different topics, the course can be taken more than once for credit. [3-0-0]

Prerequisite: All of ECON 101, ECON 102.

ECON 401 (3) Applied Microeconomic Analysis

Advanced analysis of consumer theory, market supply and demand, competition, general equilibrium, the theory of the firm, and the economics of information and uncertainty. [3-0-0]

Prerequisite: ECON 204 and one of MATH 100, MATH 116 and one of MATH 101, MATH 142 and third-year standing.

ECON 402 (3) Applied Macroeconomic Analysis

Advanced treatment of the core topics in macroeconomics such as the business cycle, inflation, unemployment, growth, alternative exchange rate regimes, and fiscal and monetary policy. [3-0-0]

Prerequisite: ECON 205 and one of MATH 100, MATH 116 and one of MATH 101, MATH 142 and third-year standing.

ECON 409 (3) Economic Growth Theory

Advanced topics in economic growth theory and their applications to Real Business Cycle theory. Topics include exogenous and endogenous growth theory, Neoclassical and New Classical growth theory. Credits will be granted for only one of ECON 409 or ECON 491 when the subject matter is of the same nature. [3-0-0]

Prerequisite: All of ECON 204, ECON 205 and one of MATH 100, MATH 116 and third-year standing.

ECON 427 (3) Econometrics

Advanced treatment of estimation, inference, and econometric problems and techniques with focus on both theoretical and applied methods and with application to a variety of economic models. Credit will be granted for only one of ECON 427 or ECON



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491 when the subject matter is of the same nature. [3-0-0]

Prerequisite: ECON 328 or 3 credits of ECON and 3 credits of upper-level STAT.

ECON 452 (3) Urban Economics

Economic analysis of urban economies and urban problems. Agglomeration economies, public goods, taxation, local political economy, housing, and development. [3-0-0]

Prerequisite: ECON 328 and one of ECON 308, ECON 386.

ECON 491 (3) Advanced Topics in Economics

Advanced examination of selected topics in current economic theory and/or policy. Topics vary each time the course is offered. [3-0-0]

Prerequisite: All of ECON 204, ECON 205 and one of MATH 100, MATH 116 and one of MATH 101, MATH 142 and third-year standing.

ECON 493 (3/6) c Directed Studies

Examines a specific topic in economics under the supervision of an Economics faculty member. With agreement of the dean of the faculty, and the supervising faculty member, a student may take and receive credit for this course more than once.

Prerequisite: All of ECON 204, ECON 205 and permission of the department.

ECON 495 (3) Honours Seminar

Reports and group discussions of selected topics for fourth-year Honours students. Development of a research proposal. [0-0-3]

Prerequisite: Admission to the B.A. or B.Sc. Economics Honours Program

ECON 497 (3) Directed Studies for PPE Major

Supervised investigation of an assigned topic in public policy. Requires a significant amount of independent reading and analysis, and production of a major term paper at the end of the course.

Prerequisite: Fourth-year standing in the PPE Major program with an emphasis in Economics (option A) and permission of the instructor.

ECON 499 (3) Honours Essay

Essay on some theoretical, applied, or institutional problem and a formal presentation of the findings.

Prerequisite: ECON 495.

Educational Studies, Faculty of Education

EDST: Educational Studies

EDST 497 (1-15) d Contemporary Educational Issues

Seminar that examines special topics and current issues within education. Pass/Fail. [1-0-0]

EDST 498 (1-15) d Contemporary Educational Practice

Seminar that explores various approaches, projects, methodologies, and teaching applications. Pass/Fail. [1-0-0]

EDST 499 (1-15) d Studies in Educational Leadership

Seminar that investigates effective educational programs, leadership, and practice. Pass/Fail. [1-0-0]

EDST 588 (3) Environmental Philosophy and Environmental Education

[3-0-0]

EDST 592 (3/6) d Conceptions of Teaching and Learning

Examines the philosophical foundations of teaching and learning in local/global contexts. Emphasis is on pedagogical knowledge relating to teaching, learning, and learner differences, and how educators can work productively in relation to curriculum, assessment and instructional media.

Education, Faculty of Education

EDUC: Education

EDUC 100 (3) Controversial Issues in Education

Students will examine basic and fundamental questions about educational policy and practice by critically examining a variety of



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controversial issues including, but not limited to, issues of equality, community, and individual rights and freedoms. [3-0-0]

Prerequisite: Students must have one of a) 70% in English 12 or English 12 First Peoples; b) a 5 on the LPI; c) a passing grade in ENGL 009; d) or an acceptable equivalent. For a list of equivalency options consult the Current Students website at students.ok.ubc.ca/courses-money-enrolment/registration/first-year-english/.

EDUC 104 (3) Introduction to Academic Pedagogy: An Aboriginal Perspective

Using an Aboriginal approach to the cycle of learning, this developmental course provides an opportunity for first-year students to learn essential skills needed for academic success. [3-0-0]

EDUC 160 (3) Mathematical Reasoning for Arts and Education

For Arts and prospective Education students who wish to gain a deeper understanding of mathematics. Using the approach of problem solving and logical reasoning throughout, topics are chosen from discrete mathematics, elementary number theory, probability and statistics, measurement and geometry, linear algebra, and applications. Credit will only be granted for one of MATH 160 or EDUC 160. Cannot be used for credit toward a B.Sc. or B.M.S. degree, or for the B.A. Major in Mathematics program. [3-0-0]

Prerequisite: Foundations of Mathematics 11 or Pre-calculus 11

Equivalency: MATH 160.

EDUC 300 (3) Inquiry in Education

An introduction to the distinctive manner in which core concepts and methods of scholarly inquiry are applied to education as a field of inquiry. Through a variety of hands-on learning activities, readings, seminars, discussions, and personal reflection students will explore the processes and products of inquiry. [3-0-0]

Prerequisite: EDUC 100. Or third-year standing

EDUC 400 (3) Designing and Facilitating Effective Learning Experiences

Leverage evidence based principles, approaches, methods, and strategies to design and facilitate effective learning experiences. [3-0-0]

Prerequisite: EDUC 100. Or third-year standing

EDUC 403 (6) Becoming a Scholar-Practitioner

The cultivation of knowledge and understanding regarding the interdisciplinary foundations of educational principles, policies and practices, all of which are examined through large group contexts, seminars and field experiences. Pass/Fail.

Prerequisite: Restricted to students in the Bachelor of Education Program

EDUC 405 (8) Concept Studies Module I: Culture of Education

Introduction to education through seminars and colloquia that provide foundational knowledge in the psychological, socio-cultural, philosophical, and historical underpinnings of education. Pass/Fail. [8-0-0]

Prerequisite: Admission to the B.Ed. program, ETEP or STEP.

EDUC 406 (6) Indigenous Language Teacher Education Module, Culture of Education

Integrated studies module consisting of the following seminars: The Developing Learner (2); Social and Cultural Issues in Education (2); Learning Difficulties (2). Introduction to education through seminars and colloquia that provide foundational knowledge in the psychological, socio-cultural, philosophical, and historical underpinnings of education. Pass/Fail. [6-0-0]

Prerequisite: Registration limited to students in the B.Ed. DSTC program.

EDUC 407 (8) Content Studies Module I: Developing Instructional Strategies

Development of instructional strategies. Content specialists who comprise the module team provide methodology in specified disciplines of the BC elementary curricula. Pass/Fail. [8-0-0]

Prerequisite: Admission to the B.Ed. program, ETEP.

EDUC 410 (4) Concept Studies Module II: Culture of the School

School operations including the legislative and administrative aspects of the school and the overall school culture. Seminar work in instructional design is provided to prepare students for their first practicum experience. Pass/Fail. [4-0-0]

Prerequisite: EDUC 405.

EDUC 411 (6) Content Studies Module II: Designing Learning Experiences

Design and development of appropriate materials, lessons, and units for instruction. Content specialists who comprise the module team provide methodology in specified disciplines of the British Columbia elementary curriculum. Pass/Fail. [6-0-0]

Prerequisite: EDUC 407.

EDUC 412 (4) Indigenous Language Teacher Education Module: Culture of the School

Integrated studies module consisting of the following seminars: Educational Policy and Administration (2); Instructional Design Planning and Evaluation (2). School operations, including the legislative and administrative aspects of the school and the overall



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school culture. Seminar work in instructional design is provided to prepare students for their practicum teaching experience. Pass/Fail. [4-0-0]

Prerequisite: Registration limited to students in the B.Ed. DSTC program.

EDUC 415 (7) Concept Studies Module III: Culture of the Classroom

Organization, classroom management, and the overall operations of teaching in heterogeneous and integrated classrooms. Pass/Fail. [7-0-0]

Prerequisite: EDUC 410.

EDUC 417 (8) Content Studies Module III: Integrating, Assessing, and Reporting

Integration of lessons and units across discipline areas of the British Columbia elementary curriculum. Instruction will provide students with strategies for assessing and reporting student achievement. Content specialists who comprise the module team provide methodology in specified disciplines of the British Columbia elementary curriculum. Pass/Fail. [8-0-0]

Prerequisite: EDUC 411.

EDUC 420 (2) Context Studies I: Learning Communities, the Attributes of Professional Practice

The attributes of professional practice explored through school observational experience. Students will become involved in classroom activities and familiarize themselves with sponsor teacher expectations. Reflections and documentation will be by assigned faculty supervisors. Students will spend one day per week for seven weeks on school visits. Pass/Fail.

Prerequisite: Admission to the B.Ed. program, ETEP.

EDUC 421 (5) Context Studies II: Learning Communities, Professional Practice in the School Community

Professional practice in the school community explored through school observation and practice teaching experience. Observations and reflections lead up to a four-week practicum experience which is assessed by faculty supervisors. This course is observation and four weeks of practice teaching. Pass/Fail.

Prerequisite: EDUC 420.

EDUC 422 (10) Context Studies: Learning Communities Practicum

Becoming a practicing professional is explored in this practice teaching experience. An eight-week practice teaching experience will take place in an Aboriginal language context. The practicum follows one week of conferring and preparing with sponsor teachers and supervisors. Pass/Fail.

Prerequisite: Registration limited to students in the B.Ed. DSTC program.

EDUC 424 (2) Context Studies III: Learning Communities, Professional Practice in the Classroom

Through classroom activities, students learn sponsor teacher expectations, and acquire resources necessary to teach and manage classroom activities in preparation for the following term's practicum experience. Pass/Fail.

Prerequisite: EDUC 421.

EDUC 425 (10) Context Studies IV: Learning Communities, Becoming a Practicing Professional

Becoming a practicing professional is explored in this practice teaching experience. An eight-week practice teaching experience follows one week of conferring and preparing with sponsor teachers and supervisors. Pass/Fail.

Prerequisite: EDUC 424.

EDUC 426 (3) Practicum Classroom Instruction

Explores the practical realities of the practicum classroom that enable the development of a positive classroom environment. Topics include: teachers' mental set; student/teacher relationships; rules and procedures; disciplinary interventions; lesson design for active learning. [3-0-0]

Prerequisite: Admission to the B.Ed. program, STEP.

EDUC 427 (3) Learning Communities Seminar: Secondary Education

Comprised of professional seminars and periods of school observation and classroom participation. The seminar focuses on professional practice. The first four meetings of the seminar are pre-observational and pertain to the roles and responsibilities of the practicing professional. Pass/Fail.

Prerequisite: Admission to the B.Ed. program, STEP.

EDUC 428 (15) Learning Communities Practicum: Secondary Education

Week one is spent in assigned schools in preparation for the 12-week practicum experience. Teaching load begins at 10%, progressing to 80% by week five. Teaching load is reduced to 50% in week 12 so students can reflect and confer with their supervisor. Pass/Fail.

Prerequisite: EDUC 427.

EDUC 430 (4) Guided Reflective Inquiry Project

Guided independent research project in reflective practice. Examination of a question or issue of pedagogical interest that arose



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in previous studies, readings, or field experiences. Students conduct independent research and present their findings. This is a condensed course offered within a four-week period. Pass/Fail. [4-0-0]

Prerequisite: ETEP students: EDUC 425. STEP students: one of EDUC 428, 429.

EDUC 431 (6) Developing a Pedagogical Stance

Foundational pedagogical knowledge and practice explored through seminars, colloquia and site-based learning where teacher candidates develop their practice and understandings related to diversity, literacies, numeracy and learning theories. Pass/Fail.

Prerequisite: EDUC 403.

EDUC 432 (3) Assessment for Learning in the Secondary Classroom

Assessment approaches, methods, and strategies and their applications to teaching practice in the secondary classroom.

Assessment as part of the learning process and related decision-making when doing instructional planning. Pass/Fail. [3-0-0]

Prerequisite: Admission to the B.Ed. program, STEP.

EDUC 434 (3) Physical Education in the Secondary Classroom

Examines theory and practice of the British Columbia 8-12 physical education curricula. Teaching to enhance development of physical literacy skills and concepts and develop practical applications in school settings. Planning units, lessons, and activities related to teaching physical education. Pass/Fail. [3-0-0]

Prerequisite: Admission to Physical Education specialty of the STEP.

EDUC 436 (5) Developing Curricular Vision for a Democratic Society: Educational Purposes, Policies, and Practices, Part I

Examines the nature of curriculum focusing on the humanities and languages. Opportunities and challenges of developing curriculum for schooling are considered within contemporary political, legal, moral, administrative, and policy contexts. Pass/Fail.

Prerequisite: All of EDUC 431, EDUC 440.

EDUC 437 (5) Developing Curricular Vision for a Democratic Society: Educational Purposes, Policies, and Practices, Part 2

Invites students to consider ways of embodying interdisciplinary learning in an advanced democracy focusing on the disciplines of Science, Technology, Engineering, Arts, and Mathematics. The roles of inquiry, critical reflection, creativity and innovation in teaching and learning will be foregrounded. Pass/Fail.

Prerequisite: All of EDUC 436, EDUC 441.

EDUC 438 (4) Educating for the Whole Person

Teaching and learning theory and practice relating to a holistic approach to well-being. Examining and interpreting the research on philosophical, psychological, physiological and political aspects of wellbeing. Pass/Fail.

Prerequisite: EDUC 442.

EDUC 440 (3) Field Experience: Literacies and Numeracies in Action

Foundational pedagogical knowledge and practice will be explored through school-based inquiry. With a focus on literacies and numeracies in action, teacher candidates will work with mentor teachers in weekly school visits and then complete a minor practicum. Mentor teachers will take the lead in planning and curriculum enactment while the teacher candidate observes, works with individuals or small groups, and conducts teaching responsibilities as deemed fitting. Pass/Fail.

Prerequisite: Restricted to students in the Bachelor of Education Program

Corequisite: All of EDUC 403, EDUC 431.

EDUC 441 (5) Field Experience: Formative Practicum

Working collaboratively in a school context, mentor teachers and teacher candidates co-plan, co-teach and co-assess. Insight into the significance of personal practical knowledge by engaging in dialogue, observation, and reflection concerning why the mentor teacher orients practices in particular ways, using specific strategies, resources, and lesson sequences. Pass/Fail.

Prerequisite: All of EDUC 440, EDUC 431.

Corequisite: EDUC 436.

EDUC 442 (5) Community Field Experience

Alternate field experience to broaden the teacher candidate's concept of educational spaces and opportunities. Pass/Fail.

Prerequisite: EDUC 437.

EDUC 444 (15) Field Experience: Final Practicum/Internship

Extended immersion in a school community, co-planning/co-teaching/co-assessing with mentors and other colleagues and, with demonstrated competency, assume the lead in planning and curricular enactment with the support of mentor teachers.

Pass/Fail.

Prerequisite: EDUC 438, 6 credits of electives or equivalent approved by the Faculty of Education.

EDUC 447 (3) The Adolescent in the Classroom

Contemporary theory and research in dealing with adolescent intelligence, development, and the dynamics of interpersonal



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behaviour during adolescence. Peer group and school life; identity formation and identity crises; cognitive abilities during adolescence; behaviour management issues for the secondary teacher; contributing factors to schooling success and schooling failure; causes and consequences of adolescent employment and of dropping out of school. Pass/Fail. [3-0-0]

Prerequisite: Admission to the B.Ed. program, STEP.

EDUC 450 (3) Policy and Organization: School, Community, and Society

Provides an overview of organizational, administrative, and legal concepts related to the work of the teacher in BC schools, and opportunities to discuss educational issues in a supportive setting. Pass/Fail. [3-0-0]

Prerequisite: Admission to the B.Ed. program, STEP.

EDUC 453 (3) Information Communication Technology for Secondary Teachers

Provides knowledge and skills to incorporate a variety of information and instructional technologies into teaching practice. Introduces educational technologies and instructional learning resources. Technological literacy is emphasized through explorations in computer applications, utilization of digital technologies (computers, video, and telecommunications), and implementation of traditional educational media. Pass/Fail. [3-0-0]

Prerequisite: Admission to the B.Ed. program, STEP.

EDUC 456 (3) Special Needs in Secondary Education

Focuses on working with adolescent students who have special needs associated with learning difficulties. Current learning theories and related research, cognitive and neurological aspects of learning processes, and social and cultural factors that may influence learning opportunities will be examined. Strategies for individualized instruction and instructional support from assistive technologies will be explored. Pass/Fail. [3-0-0]

Prerequisite: Admission to the B.Ed. program, STEP.

EDUC 459 (3) ESL in Secondary Education

Provides knowledge and skills to teach content specialization to students for whom English is an alternate language. Communicative language method used to focus on general second language acquisition. Educational discipline as cultural artifact, "language" of education in cultural context, role of teacher in integrating language and culture. Pass/Fail. [3-0-0]

Prerequisite: Admission to the B.Ed. program, STEP.

EDUC 462 (1-12) d Special Topics in Education

With the consent of the Faculty of Education, this course may be taken by upgrading or continuing students who wish to undertake further studies in special areas of curricula. Pass/Fail.

EDUC 474 (3) Methods in Aboriginal Language Education

Examines theory and practice of teaching a language. Instructional strategies, evaluation requirements and processes, curriculum planning, classroom management, and other factors related to teaching a language in a classroom setting. Pass/Fail. [3-0-0]

Prerequisite: Registration limited to students in the B.Ed. DSTC program.

EDUC 480 (3) Curriculum Instruction: Secondary Mathematics

Examines theory and practice of the Provincial 8-12 mathematics curricula. Teaching to enhance development of numeracy skills and concepts, and practical applications in higher education and workplaces. Integrative understandings/connections between math and art, music, design, and structure used to motivate students and encourage mathematical explorations. Pass/Fail. [3-0-0]

Prerequisite: Admission to Math-Science Education specialty of the STEP.

EDUC 482 (3) Curriculum Instruction: Secondary Science

Examines theory and practice of the provincial 8-12 science curricula. Teaching to enhance development of scientific literacy skills and concepts, and practical applications in higher education and workplaces. Contemporary research in science education. Planning units, lessons, and activities related to teaching science. Pass/Fail. [3-0-0]

Prerequisite: Admission to the Math-Science Education specialty of the STEP.

EDUC 488 (3) Curriculum and Instruction: French Immersion

Examines theory and practice of teaching in a French immersion setting. Teaching of subjects in the French language. Instructional strategies, evaluation requirements and processes, curriculum planning. Communication with parents, and other factors significant to French immersion programs. Pass/Fail. [3-0-0]

Prerequisite: Admission to the French Education specialty of the STEP.

EDUC 491 (3) Curriculum and Instruction: French as a Second Language

Examines theory and practice as applied to the BC Provincial 8-12 French Curriculum. Teaching to enhance skills in the French language, including components in grammar, composition, literature, and culture. Instructional and evaluation strategies, planning and development of units, lessons, and activities. Pass/Fail. [3-0-0]



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Prerequisite: Admission to the French Education specialty of the STEP.

EDUC 493 (3) Curriculum and Instruction: Middle School Education, Philosophy, Structure, and Methods

Foundation methods unique to middle school teaching and learning. Collaborative/team investigations of important issues addressing middle schools. Practical and theoretical overview of teaching methods appropriate to the social and academic developmental needs of early adolescents. Middle school philosophy and values, interactive learning, interdisciplinary teaching, advisory methods, and resource assessment. Pass/Fail. [3-0-0]

Prerequisite: Admission to the Middle School Education specialty of the STEP.

EDUC 494 (3) Curriculum and Instruction: Middle School Education, Integrated Methods

Integrated strategies for translating middle school pedagogy and methods to curriculum content areas. Specific instructional methods in content areas combined with the interdisciplinary and integrated approach that is unique to middle school. Team teaching, guest speakers, field trips, and visits to content areas methods classes from within the STEP. Pass/Fail. [3-0-0]

Prerequisite: Admission to the Middle School Education specialty of the STEP.

EDUC 495 (3) Curriculum and Instruction, Humanities: English

Introduction to the theory and methodology of teaching English to secondary students. The course examines teaching strategies and classroom practices as they relate to oral/written/visual communication. Course emphasis will be on the practical application of curricular guidelines and theoretical ideas explored in class. Pass/Fail. [3-0-0]

EDUC 496 (3) Curriculum and Instruction, Humanities: Social Studies

Introduction to the theory and methodology of teaching social studies to secondary students. The course will provide students with the knowledge, understandings, and dispositions to take an active role in discussion of the political, economic, environmental, and social challenges facing their communities and the world through the disciplines of history, geography, and other social sciences. Pass/Fail. [3-0-0]

EDUC 500 (3) Research Methodology in Education Part I

An introductory course examining various issues, methods and techniques used in educational research. Consideration is given to research strategies and techniques and the selection of research questions appropriate to a range of issues facing educators.

EDUC 501 (3) Research Methodology in Education Part II

Seminar examining specific issues, methods, and techniques used in educational research. Consideration is given to individual student's research interests. Research strategies and techniques and the selection of research questions appropriate to thesis topics will guide the course design.

Prerequisite: EDUC 500 recommended.

EDUC 517 (3/6) d Contemporary Issues in Education

Examination of a range of issues impacting education in provincial, national, and global perspectives. Socio/cultural issues, politics and educational policy, violence and safety, impact of technology on teaching and learning, and preparation of educators in a changing culture.

EDUC 521 (3) Readings and Discourse in Education

Provides an opportunity to undertake inquiry into literature of specialized areas/disciplines, narrowing the focus of readings and discourse in development of the thesis or project. Explores the importance of a theoretical framework to guide/support inquiry.

EDUC 524 (3) Language Teaching and Learning

Intended for a broad cross-section of educators with varying experiences in language teaching and learning, this course conceptualizes additional and official language acquisition from multiple angles in child, adolescent, and adult contexts. Key issues, concepts, and theoretical perspectives are evaluated and explored with emphasis on current empirical research.

EDUC 526 (3) Education and Diversity

Overview of current diversity theory and practice. Focuses on the social construction of differences, the theoretical underpinnings of diversity, and oppression theory/practice in a Canadian and world educational context with an emphasis on language, culture, and society.

EDUC 527 (3) Global Education, Citizenship, and Cross-Cultural Conceptions of Teaching and Learning

Enables learners to explore the inherent values, assumptions, and ideologies that inform the spectrum of global educations and cross-cultural conceptions of teaching and learning, and examines understandings of these complex and contested notions.

EDUC 528 (3) Theory and Practice in Inclusive Education

An inquiry-oriented course designed for educators interested in inclusive aspects of special education. Participants will explore pedagogical, attitudinal, and systemic barriers to inclusion. Related theory and research-based inclusive approaches will serve as resources for individual and group inquiries.



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EDUC 529 (3) Building Communities: Education Beyond the Classroom

The intent of this course is to explore the systemic factors of education in conjunction with its communities and other organizations so that the student will be well versed, practically and theoretically, to engage in education as a "whole."

EDUC 560 (3/6) d Directed Studies in Education**EDUC 562 (3-9) d Special Topics in Education****EDUC 598 (3) M.Ed. Seminar with Project**

Building on coursework completed during the master's program, this course supports students in the development of their M.Ed. exit projects. It provides scaffolding for the conceptualization, development, and completion of projects that will meet or exceed the requirements for both graduate programs and teacher qualification standards. Pass/Fail.

EDUC 599 (6) Senior Seminar with Thesis

Pass/Fail.

Earth and Environmental Sciences, Faculty of Science*EESC: Earth & Environmental Sciences***EESC 101 (3) Environmental Science**

A quantitative and scientific approach to the understanding of global energy, water and nutrient cycling; growth of human populations and their effects on the environment and ecosystem function. Functional understanding of modern environmental issues, and the requirements of, and opportunities for, sustainability. [3-0-0]

EESC 104 (3) Four Billion Years and Counting

The geological history of what is now Canada from the formation of Earth to the present day. Practical applications of geology to Canadian society and the economy. [3-0-0]

EESC 106 (3) The Catastrophic Earth

The causes, physical characteristics, and consequences of natural disasters such as earthquakes, volcanic eruptions, severe weather, landslides, tsunamis, floods, meteor impact, and mass extinctions. [3-0-0]

EESC 111 (3) Earth Science

Origin, structure and composition of Earth. Plate tectonics as the unifying mechanism for mountain building, formation of ocean basins, and assembly and break-up of continents. Minerals, rocks, Earth surface processes, geological maps, natural resources and hazards. [3-2-0]

EESC 121 (3) Earth History

Origin of rocks, oceans, atmosphere and the record of life on Earth. Scientific methods of studying Earth history. Geologic time, dating methods, the stratigraphic record. Organic evolution, the fossil record, and extinctions. [3-2-0]

Prerequisite: EESC 111 recommended.

EESC 200 (3) Mineralogy

Crystallography and the physical and chemical properties of minerals. Recognition and identification of common minerals. [2-3-0]

Prerequisite: EESC 111 and one of CHEM 111, CHEM 121.

EESC 201 (3) Optical Mineralogy and Petrology

Identification of common rock-forming minerals using the polarizing microscope. Use of minerals and rock textures as a means of determining the classification and petrogenesis of igneous and metamorphic rocks. [2-3-0]

Prerequisite: One of EESC 111, EESC 200.

EESC 205 (3) Introduction to Hydrology

Principles of hydrology at site, watershed, and regional scales. Techniques of measurement and analysis. Emphasizes surface water hydrology of western North America. Credit will be granted for only one of EESC 205 or GEOG 205. [3-3-0]

Prerequisite: Either (a) two of EESC 101, EESC 111, EESC 121 or (b) all of GEOG 108, GEOG 109 or (c) successful completion of first-year Science.

Equivalency: GEOG 205.

EESC 212 (3) Atmospheric Environments

Physical principles underlying weather and climates. Thermal, moisture, and wind climates at scales from valleys to the globe. Daily weather, air pollution, global change. Credit will be granted for only one of EESC 212 or GEOG 200. [3-3-0]



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Prerequisite: Either (a) GEOG 108 and GEOG 109; or (b) two of EESC 101, EESC 111, EESC 121 or (c) successful completion of first-year Science.

Equivalency: GEOG 200.

EESC 213 (3) Introductory Forest Science and Management

Global forests, classification, silviculture, forest tenure systems, forest policy evolution, forest regulations, and the profession. Overview of forest disturbance impacts, eco-forestry, sustainable forest management, eco-certification, the role of information technologies and research. [3-0-0]

Prerequisite: Either (a) two of BIOL 125, EESC 101, EESC 111, GEOG 108 or (b) one of BIOL 201, BIOL 210, GEOG 207.

EESC 222 (3) Geomorphology

Landform assemblages and processes of landscape evolution on Earth. Fundamental concepts, including system equilibrium, thresholds, complex response to external forces, and scale dependency, with application to mountains, rivers, coasts, and glaciated terrain. Laboratory exercises require field work in lab time. Required one-day, weekend trip. Credit will be granted for only one of EESC 222 or GEOG 222. [3-3-0]

Prerequisite: Either (a) GEOG 108 and GEOG 109; or (b) MATH 100 and EESC 111 or (c) MATH 100 and 6 credits of first-year lab science.

Equivalency: GEOG 222.

EESC 301 (3) Limnology

Integrated approaches to freshwater science and its place in environmental science. Ecosystem ecology of inland waters relating to aquatic organisms with their physical and chemical environment. Participation in a one-day weekend field trip in September or early October is required. Credit will be granted for only one of EESC 301 or BIOL 307. [3-3-0]

Prerequisite: All of BIOL 116, BIOL 125. Third-year standing in Biology, Earth and Environmental Sciences, Environmental Chemistry, or Freshwater Science. One of BIOL 201 or BIOL 375 is recommended.

Equivalency: BIOL 307.

EESC 303 (3) Oceanography

Geological, chemical, physical and biological oceanography using a multi-disciplinary approach. Origins of oceans, plate tectonics and ocean basins, marine sediments, physical properties and composition of seawater, ocean-atmosphere interactions, surface and deep currents, waves, tides, primary productivity, pelagic and benthic ecosystems, methods of ocean investigation. [3-0-0]

Prerequisite: Either (a) two of EESC 101, EESC 111, EESC 121, GEOG 108, GEOG 109 or (b) one of EESC 301, BIOL 307, CHEM 301, EESC 309. Third-year standing.

EESC 304 (3) Anthropogenic Climate Change

Mechanisms of anthropogenic climate change and its impact on the atmosphere, hydrosphere, cryosphere, and oceans since the Industrial Revolution. Use of computer models to forecast 21st century climate changes. Credit will be granted for only one of GEOG 304 or EESC 304. [3-0-0]

Prerequisite: One of GEOG 108, GEOG 200, EESC 212. Third-year standing.

Equivalency: GEOG 304.

EESC 305 (3) Land-Use Hydrology

Interaction between vegetation and water. Effects of land use on the hydrology of watersheds. A range of topical aspects of land-use hydrology. Specific practices such as the hydrological effects of clearfelling, regrowth of forest (tree planting), grazing, cultivation, irrigation, and wildland fire. [3-3-0]

Prerequisite: Third-year standing.

Corequisite: One of EESC 205, GEOG 205.

EESC 309 (3) Global Biogeochemistry

Functional processes and reactions of our living planet. Cycles of materials and energy among the atmosphere, lithosphere, and terrestrial and aquatic ecosystems. Case studies on the degradation of ecosystem function from anthropogenic alterations of natural cycles. [3-0-0]

Prerequisite: Either (a) two of EESC 101, EESC 111, EESC 121 or (b) all of GEOG 108, GEOG 109 or (c) one of BIOL 201, BIOL 203 or (d) one of CHEM 301, CHEM 302.

EESC 313 (3) Management of Forested Watersheds

Effects of watershed management on water quality and quantity, channel morphology, in-stream wood, and aquatic habitat. Emphasizing integrated land use management and the maintenance of critical watershed functions and services. [2-2-0]

Prerequisite: One of EESC 111, EESC 213, GEOG 108, GEOG 109. Third-year standing.

EESC 314 (3) Environmental Impact Assessment: Process, Regulation and Administration



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Legal, administrative and project management aspects of environmental impact assessment (EIA). EIA regulations, processes and systems. Assessment approaches and methods for cumulative effects, social/economic impacts, strategic and regional assessment, risk assessment and public participation. Canadian federal, territorial and provincial EIA systems. Credit will be granted for only one of EESC 314 or GEOG 314 [3-0-0]

Prerequisite: Either (a) 6 credits of EESC or (b) 6 credits of GEOG. Third-year standing.

Equivalency: GEOG 314.

EESC 315 (3) Environmental Impact Assessment: Techniques and practice

Practical techniques and methods for environmental impact assessment. Technical approaches, evaluation and estimation tools, and project management skills used for environmental assessment work. [3-2-0]

Prerequisite: Either (a) 6 credits of EESC or (b) 6 credits of GEOG. Third-year standing. EESC/GEOG 314 is recommended.

EESC 322 (3) Igneous and Metamorphic Petrology

Description, classification, and petrogenesis of igneous and metamorphic rocks. Igneous and metamorphic processes. Past and present plate tectonic implications. [3-3-0]

Prerequisite: EESC 201.

EESC 323 (3) Geochemistry

Origin, distribution, and cycles of elements in Earth. Low-temperature aqueous solution chemistry, fluid-rock interaction, mineral stability, isotopes. [2-2-0]

Prerequisite: One of EESC 111, EESC 200, GEOG 109, CHEM 201, CHEM 210 and either (a) CHEM 113 or (b) CHEM 123.

EESC 325 (3) Structural Geology

Description and classification of geologic structures. Stress, strain and their relationship to deformation processes. Mechanics of faulting, folding, and shear zone development. Interpretation of physical deformation processes and the resulting geologic structures. [3-3-0]

Prerequisite: EESC 111 and Third-year standing in EESc Major or EESc Minor.

EESC 333 (3) Analytical Geochemistry

Application of chemical and instrumental methods to the analysis of water, silicate rocks, sediments, soils, and minerals. Sampling problems in geochemistry. [3-3-0]

Prerequisite: One of CHEM 113, CHEM 123 and one of EESC 111, EESC 200, EESC 201. Third-year standing in Earth and Environmental Sciences or Freshwater Science.

EESC 335 (3) Field Techniques

Techniques of geological mapping; acquisition/interpretation of environmental field data. Begins after Winter Session Term 2, ends before Summer Session Term 1, and includes 12 field days. Students must arrange their own transportation to and from field locations. A special fee must be paid in advance.

Prerequisite: EESC 111 and 6 credits of 200-level or higher EESC or of GEOG designated as science. Third-year standing. Permission of the Department Head.

EESC 341 (3) Quaternary Paleocology and Environmental Change

Recent natural and anthropogenic environmental changes interpreted from paleoecological records, with an emphasis on Quaternary micropaleontology. Impacts of environmental changes on North American terrestrial and aquatic communities. Students are expected to participate in a one-day weekend field trip. Credit will be granted for only one of EESC 341 or GEOG 341. [3-3*-0]

Prerequisite: One of CHEM 111, CHEM 121. Third-year standing.

Equivalency: GEOG 341.

EESC 342 (3) Hydrogeology

Introduction to the theory of groundwater flow; flow nets; regional groundwater resource evaluation; well hydraulics. [3-3-0]

Prerequisite: Either (a) MATH 100 and one of PHYS 111, PHYS 112 and one of EESC 111, EESC 121, GEOG 109, EESC 205, GEOG 205; or (b) one of ENGR 340, ENGR 341. Third-year standing.

EESC 350 (3) Exploration Geophysics

Instrumentation, application, and limitations of gravity, magnetic, electromagnetic, electrical, acoustic, and seismic methods in the exploration for mineral and energy resources and in engineering applications. [3-3-0]

Prerequisite: Either (a) MATH 101 and one of EESC 111, EESC 121 and one of PHYS 102, PHYS 121, PHYS 122; or (b) ENGR 340. Third-year standing.

EESC 356 (3) Stratigraphy and Sedimentology

Origin, classification and interpretation of sediments and sedimentary rocks. Weathering, erosion, transportation, sedimentation,



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and lithification of clastic materials. Non-clastic sediments. Sedimentary environments, facies and stratigraphic methods. Credit will be granted for only one of EESC 356 or GEOG 356. [3-3-0]

Prerequisite: One of EESC 121, EESC 222, GEOG 222.

Equivalency: GEOG 356.

EESC 360 (3) Geologic Resources

Mineral deposits, their geologic settings, genetic classification and models of formation. Metalliferous, non-metalliferous and industrial materials deposits. [2-2-0]

Prerequisite: EESC 200 and EESC 201.

EESC 367 (3) Energy Resources Management

Key energy systems and resources management from both global and Canadian perspectives. Supplies, distribution, consumption, resilience and sustainability of energy resources. Alternative energy sources, conventional and unconventional fossil fuels, energy production and delivery systems. Credit will be granted for only one of EESC 367 or GEOG 367. [3-0-0]

Prerequisite: One of GEOG 108, GEOG 129, EESC 101, EESC 111. Third-year standing

Equivalency: GEOG 367.

EESC 390 (3) Geological Field Mapping

Collection, interpretation, and presentation of geological data in the field. Typically held in the two weeks preceding the start of Winter Term 1. A special fee must be paid in advance.

Prerequisite: EESC 200 and EESC 325 and one of EESC 356, GEOG 356. Permission of the Department Head.

EESC 395 (1-6) d Special Topics in Earth and Environmental Sciences

Specialized topics in Earth and environmental sciences. May include required field trips. Course may be taken more than once with a different topic. [3-1-0]

Prerequisite: Third-year standing and permission of the department head.

EESC 396 (1-6) Special Topics in Earth and Environmental Sciences II

Specialized topics in Earth and environmental sciences. Format includes required labs. May include required field trips. Course may be taken more than once with a different topic. [3-1-0]

Prerequisite: Third-year standing and permission of the department head.

EESC 398 (3) Technical Communication

Written and oral communication. Report preparation, business correspondence, and oral presentation of technical material.

Advanced grammar and writing styles. Logical writing; referencing; and editing. Presenting technical information to scientists and non-scientists. [3-0-2]

Prerequisite: Three credits of APSC 176, CORH 203, ENGL 109,112, 113, 114, 150, 151, 153, 154, 155, or 156.

EESC 402 (3) Freshwater Resources

Integrated approach to freshwater resources and their place in environmental science. Topical issues with emphasis on management options and consequences. Required field trips during lab times. [2-4-0]

Prerequisite: 3 credits of 200-level courses in BIOL, CHEM, EESC or GEOG courses cross listed with EESC, and third-year standing.

EESC 413 (3) Analytical Methods in Hydrology

Application of advanced analytical methods to hydrological data for watershed or water resource planning and management. Frequency analysis, storm design, regionalization, flow routing, geographic information systems (GIS) application, time series analysis and modelling. [2-3-0]

Prerequisite: One of GEOG 271, ENGR 360, BIOL 202, STAT 230 and one of EESC 205, GEOG 205, ENGR 341, ENGR 342 and third-year standing.

EESC 422 (3) Fluvial Geomorphology

Geomorphic forms and processes within and along streams and rivers; flow hydraulics; sediment transport and bedform mechanics; hydraulic geometry; channel and floodplain dynamics; sediment yield; river habitat and stream rehabilitation. Credit will be granted for only one of EESC 422 or GEOG 422. [3-0-2]

Prerequisite: One of EESC 222, GEOG 222, APSC 253.

Equivalency: GEOG 422.

EESC 423 (3) Tracers of Natural Processes

Stable and radiogenic isotopes in the lithosphere, hydrosphere, atmosphere and biosphere. Fractionation processes, dating methods. Selected topics in the use of isotopic tracers. [3-0-0]

Prerequisite: EESC 111 and one of CHEM 113, CHEM 123. Third year standing.



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EESC 425 (3) Tectonics and Orogenesis

Large-scale Earth structure, tectonic environments, Archean geology and the initiation of plate tectonics. Analytical toolsets. Orogenesis within the Canadian Cordillera, the Andes, the Alps, and the Himalaya. [3-0-0]

Prerequisite: EESC 323 and EESC 325.

EESC 429 (3) Contaminant Transport

Chemical and biological processes in groundwater systems: water quality; fluid-sediment interactions; contaminant transport and dispersal; remediation of contamination; numerical modelling; case studies. [3-3-0]

Prerequisite: EESC 342 and one of EESC 323, CHEM 301, ENGR 347.

EESC 431 (3) Quaternary Glacial Environments

Origin, nature, and distribution of glacial landforms and landform assemblages. Evaluation of hypotheses and theories on formation of glacial landforms and sediments, glacial mechanics, hydrology, and Quaternary stratigraphy. Students are required to attend several field trips on weekends. [3-1-0]

Prerequisite: One of EESC 222, EESC 356, GEOG 222, GEOG 356.

EESC 434 (3) Sediment Transport Mechanics

Fundamental concepts and theories describing fluid flow and sediment transport; particle settling; particle entrainment; transport modes (suspension, saltation, bedload); mass flux prediction; transport in fluvial, coastal, aeolian, and engineered environments. [3-2*-0]

Prerequisite: Either (a) one of EESC 422, EESC 222, GEOG 222 or (b) APSC 253.

EESC 435 (3) Fluvial Field Techniques

Field measurement and analysis techniques for assessment of fluvial systems. Channel morphology, flow hydraulics, sediment transport, flooding potential, habitat considerations, restoration methods. Twelve days of field instruction over a two week period following Winter Session Term 2 (spring) exams. Students must arrange their own transportation to/from field sites. A special fee must be paid in advance.

Prerequisite: One of EESC 205, EESC 222, EESC 305, EESC 422, EESC 434, GEOG 205, GEOG 222, GEOG 422, ENGR 341, ENGR 342. Third-year standing. Permission of the Department Head.

EESC 436 (3) Coastal Geomorphology

Geomorphic forms and processes along coasts; waves and currents; sediment transport mechanics; beach and nearshore morphodynamics; aeolian forms and processes. May include one or more required one-day weekend field trips. Credit will be granted for only one of EESC 436 or GEOG 436. [3-3-0]

Prerequisite: One of EESC 222, GEOG 222, APSC 253.

Equivalency: GEOG 436.

EESC 437 (3) Terrain Analysis

Identification, mapping, and quantification of terrain morphologies in the field and from remote sensing following professional codes of practice. Twelve days of field instruction over a two week period following spring exams. Students must arrange own transportation to/from field locations. Credit will be granted for only one of EESC 437 or GEOG 437.

Prerequisite: One of EESC 222, GEOG 222, GEOG 317, ENGR 340. Third-year standing. A special fee must be paid in advance. Permission of the Department Head.

Equivalency: GEOG 437.

EESC 444 (3) Dynamic Modelling of Human-Environment Systems

Design and use of dynamic models of complex systems; spatial modelling of the environment; agent- and individual-based models; applications to biodiversity conservation, environmental management, land use change and natural resource management. Credit will be granted for only one of EESC 444, EESC 544, BIOL 444, or BIOL 544. [3-3-0]

Prerequisite: One of MATH 100, MATH 101 and one of APSC 254, BIOL 202, GEOG 271, PSYO 271, STAT 121, STAT 230. Third-year standing. At least three credits of second-year BIOL/EESC and three credits of third-year BIOL/EESC are strongly recommended.

Equivalency: BIOL 444.

EESC 448 (3-6) Directed Studies in Earth and Environmental Sciences

Investigation of a specific topic as agreed upon by the student and a faculty supervisor.

Prerequisite: Third-year standing and permission of the department head and faculty supervisor.

EESC 449 (6) Honours Thesis

Students undertake an individual research project as agreed upon by the student and the supervising faculty member. A written thesis is required and the research must be publicly presented as a seminar or poster.

Prerequisite: Admission to the Earth and Environmental Sciences or Freshwater Sciences Honours program.



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EESC 456 (3) Soil Science

Physical, chemical, and biological properties of soils, soil formation and classification. Soil physics and water movement. Soil productivity, conservation, and sustainability. The application of soil science to land use, environmental quality, global change, and sustainable development. Credit will be granted for only one of EESC 456 or GEOG 466. [3-3-0]

Prerequisite: One of EESC 111, EESC 200, GEOG 109, CHEM 111, CHEM 121, PHYS 111, PHYS 112. Third-year standing.
Equivalency: GEOG 466.

EESC 495 (1-6) d Advanced Special Topics in Earth and Environmental Sciences

Specialized topics in Earth and environmental sciences. May include required field trips. Course may be taken more than once with a different topic.

Prerequisite: Third-year standing and permission of the department head.

EESC 496 (1-6) d Advanced Special Topics in Earth and Environmental Sciences II

Specialized topics in Earth and environmental sciences. Format includes required labs. May include required field trips. Course may be taken more than once with a different topic.

Prerequisite: Third-year standing and permission of the department head.

EESC 502 (3) Environmetrics

Foundation for the use of statistical concepts/methods in environmental sciences (ES) and management. Overview of methodology relevant to ES, followed by the study of specific topics drawn from current or classical environmental problems. Emphasis on scientific problem solving using statistical methods. Integration of the formulation of objectives, study design, and quantitative methods will guide the study of chosen topics. Key component: the role and use of statistical software packages. [3-0-0]

EESC 512 (3) Applied Data Analysis in Geosciences

Quantitative analytical methods used in data-rich branches of geosciences including: data acquisition, mining and quality assessment; data transformation strategies; data representation and pattern discovery; and alternative data models. Practical problem solving.

EESC 544 (3) Dynamic Modelling of Human-Environment Systems

Design and use of dynamic models of complex systems; spatial modelling of the environment; agent- and individual-based models; applications to biodiversity conservation, environmental management, land use change and natural resource management. Credit will be granted for only one of EESC 544, EESC 444, BIOL 444 or BIOL 544.

Equivalency: BIOL 544.

EESC 550 (3) Research Seminar in Earth and Environmental Sciences

Practical and theoretical grounding in professional research. Critical assessment of the logic, reasoning, and structure of research ideas. Research proposal development. Presentation of scientific ideas in written and oral forms. Seminar presentations by faculty and external speakers, as available.

EESC 551 (1-6) d Special Topics in Earth and Environmental Sciences

Explores aspects of earth and environmental sciences outside of the core offerings.

EESC 552 (1-6) d Directed Readings in Earth and Environmental Sciences

Individual exploration of aspects of earth and environmental sciences outside of the lecture course offerings.

EESC 599 (12/18) d M.Sc. Thesis

Pass/Fail.

EESC 699 (0) Ph.D. Dissertation

Pass/Fail.

English, Faculty of Creative and Critical Studies

ENGL: English

ENGL 009 (3) Preparation for University Writing

Practice-based course in communication skills. Develops university-level skills in composition, critical analysis, grammar, and documentation. Can be taken to fulfill the prerequisite for UBC Okanagan first-year ENGL courses. Cannot be taken after successful completion of any first-year ENGL course. Cannot be counted for credit toward the B.A., B.A.Sc., B.Ed., B.F.A., B.H.K., B.Mgt., B.M.S., B.Sc., or B.S.N. degrees. Pass/Fail. [3-1-0]



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ENGL 109 (6) Studies in Composition (Enhanced)

A two-semester practice-based course that gives learners an extended opportunity to develop university-level writing skills. Advances communication abilities in rhetoric, critical analysis, grammar, and documentation, with emphasis on research-based writing and academic literacy. Essays and exercises are required. Credit will be granted for only one of ENGL 109, ENGL 112 or ENGL 114.

ENGL 112 (3) Studies in Composition

Practice-based approach to writing at the university level. Emphasis is placed on the processes of research-based writing. Credit will be granted for only one of ENGL 112, ENGL 109, or ENGL 114.

ENGL 113 (3) Reading and Writing Across the Curriculum

Non-fictional prose; focus on rhetorical analysis and critical evaluation of academic essays chosen from the humanities, social sciences, and sciences. Characteristics of the academic essay (strategies of argument, organization, style, incorporation of research, and documentation) and assessing essays in terms of persuasiveness, accuracy, fairness, and significance. Emphasis on processes of research-based writing. [3-0-0]

ENGL 114 (3) Studies in Composition: Indigenous Perspectives

Practice-based approach to writing at the university level in relation to Indigenous perspectives. Emphasis is placed on the processes of research-based writing. Credit will be granted for only one of ENGL 114, ENGL 109, or ENGL 112.

ENGL 150 (3) Introduction to Literary Genre

Introduction to literature focusing on genres such as poetry, drama, and fiction. Develops skills in interpretation of texts. At least 35% of class time involves practice-based instruction in essay writing and research.

ENGL 151 (3) Critical Studies in Literature

Ways of reading, interpreting, and writing about literature using selected critical approaches, such as formalist, feminist, postcolonial, and psychoanalytical. At least 35% of class time involves practice-based instruction in essay writing and research.

ENGL 153 (3) Readings in Narrative

Study of narrative forms such as life-writing, films, histories, myths, narrative poems, novels, short stories, and songs. At least 35% of class time involves practice-based instruction in essay writing and research.

ENGL 154 (3) Indigenous Narrative

Introduces students to Indigenous narrative forms, including textual and oral storytelling in anecdotes, life-writing, films, histories, narrative poems, novels, performances, and songs. At least 35% of class time is dedicated to instruction in university-level essay writing and research.

ENGL 155 (3) Writing and Making Technology in the Humanities

Introduction to digital and technological cultures with a focus on humanities methods, drawing on a range of periods in technological development and critical approaches to studying technology. At least 35% of class time involves practice-based instruction in humanities criticism, prototyping, writing, and research.

Equivalency: DIHU 155.

ENGL 156 (3) Environmental Literature

Introduction to literature and criticism on the environment. Develops skills in interpretation of texts. At least 35% of class time involves practice-based instruction in essay writing and research.

ENGL 200 (3) Introduction to the Digital Humanities

Addresses the construction of digital resources in the context of humanities research. No Digital Humanities or computing experience required. Credit will be granted for only one of ENGL 200 or DIHU 200.

Prerequisite: Two of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

Equivalency: DIHU 200.

ENGL 201 (6) Children's Literature and Publishing

Two terms. An interdisciplinary examination of the intersections of children's literature with print and online publishing, paying close attention to the social, historical, and cultural forces shaping assumptions about childhood and the production of literature for young readers across a range of historical periods. [1.5-1.5-0; 1.5-1.5-0]

Prerequisite: Two of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 202 (3) Okanagan Syilx Literatures: Concepts and Frameworks

Indigenous perspectives as demonstrated through oral story; Okanagan theory and philosophy through oral story; a systems-based Indigenous Peoples story approach to connection to land, ecology and society. Credit will be granted for only one of ENGL 202 or INDG 202.



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Prerequisite: One of INDG 100, INDG 102.

Equivalency: INDG 202.

ENGL 203 (3/6) d Topics in Composition

Examination of published research on a special topic with emphasis on rhetorical features and social contexts. Students will produce a final project that demonstrates their ability to reason, develop ideas, organize, write in an effective style, incorporate research, and revise their work.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 212 (3) Children's Literature

Historical survey of literature written for and about children, in genres such as poems, short stories, fairy tales, novels, and treatises, covering a full range of modes from didactic to realistic to fantasy. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 213 (3) British Literature, 1900 to the present

Major trends in modern and contemporary British literature. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 215 (3) Reading Screens

Film and other screen-based media as narrative, with a focus on both formal and ideological elements. Credit will be granted for only one of ENGL 215 or CULT 210.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

Equivalency: CULT 210.

ENGL 220 (3) Foundations: Literature in Historical Context 1

Poetry, drama, fiction, and non-fiction prose to the eighteenth century, with attention to the importance of history and changes in form for literary analysis.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 221 (3) Foundations: Literature in Historical Context 2

Poetry, drama, fiction, and non-fiction prose from the eighteenth century to the present, with attention to the importance of history and changes in form for literary analysis.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 222 (3) Literature in Canada

Canadian poetry, fiction, non-fiction prose, and drama. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 224 (3) Foundations: Reading Across Borders

Critical intercultural reading approaches, focusing on literature and film from the global South. Emphasis upon ideas of culture, difference, and the relations between reader and text. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research. Credit will be granted for only one of ENGL 224 or CULT 230.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

Equivalency: CULT 230.

ENGL 226 (3) Drama

Plays from different genres, historical periods, nations, and cultures. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 231 (3/9) d Introduction to Popular Narrative

One or more popular literary genres, such as detective fiction, science fiction, romance, gothic fiction, horror fiction, and fantasy, with a focus on narrative methods, fictional techniques and the relationship between socio-political formations and genre. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 232 (3) Reading Popular Culture

Critical analysis of contemporary popular culture forms such as architecture, video games, television, and popular fiction and cultural practices such as consumerism, participation in subcultures and social networking, from within the context of modernity. Credit will be granted for only one of ENGL 232 or CULT 201.



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Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.
Equivalency: CULT 201.

ENGL 233 (3) American Literature

Major figures and themes in American literature, with emphasis on the nineteenth and twentieth centuries. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 234 (3) Foundations: Indigenous Literature

Survey of Indigenous-authored poetry, drama, fiction, non-fiction prose, and orature in North America, with attention to Indigenous methodologies and major critical trends. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research. Credit will be granted for only one of ENGL 234 or CULT 250.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.
Equivalency: CULT 250.

ENGL 239 (3) The Bible in English Literature

Biblical themes, figures, and images in English literature, with attention to English versions of the Bible. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 250 (3) Foundations: Interdisciplinary Theory and Method in Literary Research

Major trends in critical theory, with attention to the applications of theory in literary research. Credit will be granted for only one of ENGL 250 or CULT 275.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.
Equivalency: CULT 275.

ENGL 270 (3) Topics in Women's Literature

Women's representations in and contributions to the literary tradition through their writing in historical, national, cultural, political and/or regional contexts. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research. Students can elect to transfer this course as English or Women's Studies credit.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 294 (3/6) d Interdisciplinarity and English Literature

The practices of literary interpretation through interdisciplinary perspectives, from areas such as medicine, science, psychology and the visual arts. This course may involve cross-discipline pedagogies, cross-cultural approaches, experiential learning, and/or undergraduate research opportunities. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 297 (3) Reading Animals

Representations of animals in contemporary culture. At least 35% of class time involves practice-based instruction in critical analysis, essay writing and research.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

ENGL 304 (3) Advanced Composition

Special emphasis on rhetoric, with a focus on audience, authorial voice, and range of style.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 305 (3) The Self-Conscious Text

Addresses computational methods for student-led humanities research, including visualizing, mapping, and encoding. No Digital Humanities or computing experience required. Credit will be granted for only one of ENGL 305 or DIHU 301.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156, FILM 100, CULT 100 and third-year standing or permission of the instructor.

Equivalency: DIHU 301.

ENGL 306 (3) The Programmed World

Working in the context of fine arts and humanities research, students study and apply programming principles in physical and virtual environments. No Digital Humanities or computing experience required. Credit will be granted for only one of ENGL 306 or DIHU 302.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156, FILM 100, CULT 100 and third-year standing or permission of the instructor.



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Equivalency: DIHU 302.

ENGL 309 (3/6) d Modern Critical Theory and Interdisciplinary Methods

Advanced survey of major trends within critical theory, with attention to issues such as subjectivity and power, the body, culture and imperialism, and social discourse. Recommended for all English Majors. No more than 6 credits in total will be granted for ENGL 309, CULT 371 or any combination thereof.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

Equivalency: CULT 371.

ENGL 315 (3/9) d Studies in Backgrounds to 16th-Century Literature

Backgrounds to sixteenth-century literature. Consideration will be given to a range of literary, political, philosophical, religious, and social topics.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 319 (3/9) d Studies in Romanticism

Consideration will be given to Romantic-era literature and culture, including a range of literary, political, philosophical, and social topics.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 327 (3/6) d Canadian Poetry

One or more major themes and/or movements in Canadian poetry.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 330 (3/9) d Regionalism in Canadian Literature

Canadian literature in a variety of genres from a particular region.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 333 (3/6) d Canadian Fiction

One or more major themes and/or movements in Canadian fiction.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 336 (3/9) d Studies in Backgrounds to American Literature

Backgrounds to American literature. Consideration will be given to a range of literary, political, religious, and social topics.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 337 (3) American Literature between the Wars

Major movements and writers.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing. Recommended: One of ENGL 221 or ENGL 233.

ENGL 338 (3) American Literature after World War II

A continuation of ENGL 337

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing. Recommended: One of ENGL 221 or ENGL 233.

ENGL 339 (3) American Literature from the Civil War to WWI

The movement from the literature of the Gilded Age to the Progressive Era, paying close attention to the cultural work done by realism and naturalism.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing. Recommended: One of ENGL 221 or ENGL 233.

ENGL 340 (3) Introduction to Old English

Old English vocabulary, grammar, and translation, with readings in poetry and prose.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.



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ENGL 342 (3) Auto/Biography Survey

Histories and genres of auto/biography. Credit will be granted for only one of ENGL 342 and CULT 375.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

Equivalency: CULT 375.

ENGL 344 (3/9) d Topics in Medieval Studies

Addresses a range of topics in medieval texts, from genres in medieval literature (such as lyric poetry, romance, and fabliaux) to topics dealing with cultural issues.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 345 (3/9) d Studies in Backgrounds to International Literature in English

Backgrounds to international literature in English. Consideration will be given to a range of literary, political, religious, and social topics.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 346 (3) Introduction to Middle English

An introduction to Middle English language and a survey of major genres and authors in Middle English literature.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 347 (3/9) d 16th-Century Studies

Examines sixteenth-century works using a thematic focus across a range of authors, forms, and genres.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 349 (3/9) d 17th-Century Literature

Study of how literary works reflect and respond to social, political, and religious change in the context of revolution. Popular and polemical works, including advice literature, polemical pamphlets, or political tracts, will inform critical debates on gender, religion, and/or liberty. With different topics this course may be taken more than once for credit.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 350 (3/9) d 16th- and 17th-Century Studies

Examines sixteenth and seventeenth century works across a range of authors, forms, and genres with a thematic focus.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 351 (3) 16th- and 17th-Century Drama

English drama from the reign of Henry VIII to the closing of the theatres in 1642; emphasis on Elizabethan and Jacobean playwrights.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 352 (3) Shakespeare: Earlier Works

Examines Shakespeare's works before 1599.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 353 (3) Shakespeare: Later Works

Examines Shakespeare's works after 1599.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 355 (3/9) d Studies in Backgrounds to Literature: Special Topics

Specific movements, themes, and systems of thought. Consideration will be given to a range of literary, political, religious, and social topics.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 357 (3) Restoration Drama and Culture



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Examines the religious, social, and political crises of the Restoration period, 1660-1700, and innovations in dramatic form and style on the page and stage.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 358 (3) Eighteenth-Century Drama and Censorship

Examines drama in the decades before and after the Licensing Act of 1737.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 364 (3/9) d 19th-Century Studies

Examines 19th-century literary works across a range of authors, forms, and genres with a thematic focus. With different topics this course may be taken more than once for credit.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 365 (3/9) d Major Authors of the 19th Century

The works of no more than three significant authors will be examined. Specific topics will be announced.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 374 (3/9) d British Literature in the Age of Enlightenment

Examines literary engagements, 1660-1832, with a variety of topics relevant to the advent of modernity. With different topics, this course may be taken more than once for credit.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 376 (3) Television Studies

The medium of television from a global perspective, and the investigation of how genres in different television broadcast regimes shape content and reception. Credit will be granted for only one of ENGL 376 or CULT 315.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing. Recommended: ENGL 215.

Equivalency: CULT 315.

ENGL 377 (3) English-Canadian Screen Culture

Development of English-Canadian screen culture studied by concentrating on various movements, the political economy of Anglo-Canadian screen culture, and televisual and cinematic forms and genres. Focus of the survey is on identity, nationhood, and representation. Credit will be granted for only one of ENGL 377 or CULT 305.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing. Recommended: ENGL 215.

Equivalency: CULT 305.

ENGL 378 (3) Documentary and Docudrama

Investigation of reality effect of film by tracing its origins in the dramatic genres of melodrama, realism, and naturalism into filmic genres of documentary and docudrama. Surveys modern and postmodern examples of these genres. Credit will be granted for only one of ENGL 378 or CULT 300.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing. Recommended: ENGL 215.

Equivalency: CULT 300.

ENGL 379 (3) Colonialism and Decolonization

Comparative analysis of the cultural project of European colonialism, including colonial discourse, resistance, and decolonization in Africa, the Caribbean, South and Southeast Asia, and North America. Credit will be granted for only one of ENGL 379 or CULT 340. ENGL 224 and/or ENGL 250 recommended.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156. And third-year standing.

Equivalency: CULT 340.

ENGL 383 (3) Contemporary British Novel

The novel from World War II to the present.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.



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ENGL 384 (3) Human Rights, Literature, and Culture

Critical analysis of representational practices within humanitarian and human rights discourses, including literature, life writing, film, journalism, and marketing. Credit will be granted for only one of ENGL 384 or CULT 346. ENGL 250 and/or ENGL 379 recommended.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156. And third-year standing.

Equivalency: CULT 346.

ENGL 385 (3) Settler Studies, Literature, and Culture

Approaches to the interdisciplinary field of settler colonial studies in Canadian and comparative contexts in relation to literature, film, and other forms of cultural production. Examines the role of representation, narrative, and discourse in settlement, colonization, and decolonization. Credit will be granted for only one of ENGL 385 or CULT 351.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing. Recommended: ENGL 234.

Equivalency: CULT 351.

ENGL 386 (3) Studies in Transatlantic Modernism

Major figures and trends in twentieth-century Modernism before WWII.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 387 (3) Indigenous Literature: Intellectual Traditions

Approaches to Indigenous literary and cultural studies in North America. Consideration will be given to a range of literary movements, intellectual traditions, and critical approaches. Credit will be granted for only one of ENGL 387 or CULT 350.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing. Recommended: ENGL 234.

Equivalency: CULT 350.

ENGL 388 (3/6) d Beyond Anthropocentrism

Focuses on a specific aspect of the representation of animals in contemporary culture, such as intersections of species difference with gender/race, or representation of a particular species/genus. It combines detailed cultural analysis with theoretical and philosophical reflection on the relationship between the categories human and animal.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 394 (3/6) d Interdisciplinary Studies in English Literature

Addresses English literature through interdisciplinary perspectives and practices, ranging from performance, to visual arts, to creative writing and comparative literature. This course may involve cross-discipline pedagogies, experiential learning, community-based learning and/or undergraduate research opportunities.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 395 (3/9) d Popular Literature

An examination of one or more genres, writers, forms, themes, or major trends in popular literature. May not be taken for credit toward the English major, minor, honours or combined major.

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156, APSC 176 and third-year standing.

ENGL 397 (3) Contemporary Environmental Writing

An introduction to the theory and practice of ecocriticism alongside exploration of a specific aspect of contemporary environmental writing.

Prerequisite: Two of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156 and third-year standing.

ENGL 407 (3) Media and Contemporary Readers

Trends in reading over the 20th and 21st centuries, focusing on reading communities and constructions of the reader as an identity category in face-to-face and online clubs, groups, and social networks. Includes literary and non-literary texts, images, platforms, and data. No Digital Humanities or computing experience required. Credit will be granted for only one of DIHU 407 or ENGL 407. Equivalent DIHU 407

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156, FILM 100, CULT 100. Third-year standing.



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Equivalency: DIHU 407.

ENGL 412 (3/9) d Interdisciplinary Studies in Critical Theory

Advanced study of a particular area within critical theory. Topics may include queer theory, critical animal studies, ethics, post-humanism, nationalism. No more than 9 credits in total will be granted for ENGL 412, CULT 470 or any combination thereof. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.

ENGL 416 (3/12) d Studies in 16th- and 17th-Century Literature: Special Topics

Advanced topics in sixteenth- and seventeenth-century literature and culture. 3-0-0

Prerequisite: 3 credits of 300-level English.

ENGL 423 (3/9) d Approaches to 17th-Century Literature: Special Topics

Advanced topics in seventeenth-century literature and culture. 3-0-0

Prerequisite: 3 credits of 300-level ENGL.

ENGL 427 (3) Chaucer's Earlier Poetry

A detailed study of Chaucer's early works including *The Book of the Duchess*, *The House of Fame*, *The Parliament of Fowls*, *Troilus and Crisyde*, and *The Legend of Good Women*. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.

ENGL 428 (3) Chaucer's Canterbury Tales

A detailed study of Chaucer's *Canterbury Tales*. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.

ENGL 429 (3/12) d Topics in Middle English Literature

Special topics which may focus on specific genres, authors, or themes. 3-0-0

Prerequisite: 3 credits of 300-level ENGL.

ENGL 430 (3) Feminist Forerunners: Early Modern Women's Literature and Contemporary Theory

Advanced study of feminist social and political thought, investigating the relationship between early modern women's writing and contemporary theory. Areas of inquiry include the politics of literary and theoretical canons, the representation of female subjectivity, sexuality, race, and class, and the responses of women and women writers to restrictive cultural and behavioural codes.

Prerequisite: Third-year standing.

ENGL 433 (3) English Novel in the 18th Century

Prose narrative from John Bunyan to Jane Austen. Study of the conventions of romance and realism, the rise of the professional author, and the culture wars staged in and around the novel. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.

ENGL 434 (3/9) d Special Topics in 18th-Century Literature

Special topics may address one or more of the following: individual genres, forms, themes, major trends in eighteenth-century writing, or select groups of writers during the period between 1660 and 1800. 3-0-0

Prerequisite: 3 credits of 300-level ENGL.

ENGL 437 (3/9) d Postcolonial Studies

Examines colonialism, decolonization, and globalization, as they relate to literature and other modes of cultural production, using a cross-cultural framework. Topics vary from year to year. With different topics this course may be taken more than once for credit. No more than 9 credits in total will be granted for ENGL 437, CULT 437, or any combination thereof. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.

Equivalency: CULT 437.

ENGL 443 (3) Studies in 18th-Century Women's Writing

Examines women's writing from the Restoration to the late eighteenth-century across a variety of forms and genres. 3-0-0

Prerequisite: 3 credits of 300-level ENGL.

ENGL 445 (3) The Victorian Novel

Developments in the novel from Dickens to Thomas Hardy.

Prerequisite: 3 credits of 300-level ENGL.

ENGL 451 (3) Postcolonialism and British Literature

Major figures and trends in British literature after World War II. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.



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ENGL 455 (3) Reading Gothic Film

The gothic/horror film as a genre that provides insight into cultural narratives regarding gender, sexuality, race, and class. Films may be approached from a number of critical perspectives, including psychoanalytic, feminist, and cultural theories. Credit will be granted for only one of ENGL 455 or CULT 405. [3-0-3]

Prerequisite: 3 credits of 300-level ENGL.

Equivalency: CULT 405.

ENGL 456 (3/9) d Topics in Auto/Biography

Study of a particular topic in or genre of auto/biographical discourse. Credit will be granted for only one of ENGL 456 or CULT 475. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.

Equivalency: CULT 475.

ENGL 457 (3) Posthumanism and Critical Animal Studies

Contemporary theories in the field of critical animal studies via ecofeminism, literary studies, philosophy and history with the aim of considering the interconnectedness of speciesism, racism and sexism. Particular attention will be paid to ecofeminism and the "ethics of care" in regards to the treatment of animals. Credit will be granted for only one of ENGL 457 or CULT 460. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.

Equivalency: CULT 460.

ENGL 458 (3) Canadian Environmental Writing

Offers advanced study of ecocritical theory and its application to Canadian literature, including Indigenous authors. [3-0-0]

Prerequisite: 3 credits of 300-level English.

ENGL 459 (3/9) d Major Authors of the 20th and 21st Centuries

The works of no more than three significant authors will be examined. Specific topics will be announced. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.

ENGL 462 (3/9) d 20th- and 21st-Century British Studies

Selected topics in British Studies. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.

ENGL 470 (3/9) d Canadian Studies

Examines Canadian cultural production and reception in relation to nationhood. Variations may focus on one or more of the following: genre, archives, region, period, cultural institutions, and criticism. With different topics this course may be taken more than once for credit.

Prerequisite: 3 credits of 300-level ENGL.

ENGL 472 (3/9) d American Studies

What makes literature "American"? Is there a distinctive literary voice, style, author, or perspective that captures something unique and compelling about the American experience? Topics will vary from year to year. With different topics this course may be taken more than once for credit.

Prerequisite: 3 credits of 300-level ENGL.

ENGL 473 (3) Studies in Indigenous Literature and Criticism

Topics in Indigenous literature and criticism in North America, including particular periods and individual authors. Credit will be granted for only one of ENGL 473 or CULT 450. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.

Equivalency: CULT 450.

ENGL 475 (3/6) d Topics in American Poetry

Study of particular topics, authors, and/or movements in American poetry.

Prerequisite: 3 credits of 300-level ENGL.

ENGL 477 (3/9) d Literature and Science

Advanced critical analysis of engagement with science in contemporary literary texts. Focusing on a specific area of science, such as climate change, complexity theory, cognitive psychology, or genetic modification, the course seeks to build constructively critical relationships between disciplines. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.

ENGL 480 (3/9) d Studies in International Literature in English

Special topics, varying from year to year, including studies of individual authors, genres, and nations.

Prerequisite: 3 credits of 300-level ENGL.



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ENGL 493 (3/9) d Topics in Popular Culture

Focus on media such as music, film, music video, television, advertising, and the Internet. No more than 9 credits in total will be granted for ENGL 493, CULT 400, or any combination thereof. [3-0-0]

Prerequisite: 3 credits of 300-level ENGL.

Equivalency: CULT 400.

ENGL 495 (3/6) d Directed Studies

Students will undertake supervised research in a clearly-defined area. This research will lead to a major research paper.

Prerequisite: Fourth-year standing. Students must have a 72% average in all upper-level ENGL courses and a minimum of 15 credits of upper-level ENGL.

ENGL 497 (3/9) d Fourth-Year Seminar

A seminar in which students will research aspects of an assigned topic. Enrolment is limited to 15 students, and preference will be given to Honours English students. [3-0-0]

Prerequisite: Acceptance into the English Honours or Major program; a minimum grade average of 76% in at least 15 credits of upper-level ENGL courses; and permission of the unit.

ENGL 499 (6) Honours Essay

Prerequisite: Entry into the English Honours program.

ENGL 501 (3) Methodologies: Critical Theory

Examines critical and cultural theory and how it informs current practices of research.

ENGL 503 (3) Practices in the Profession of Literary Studies and Related Disciplines

Introduction to the profession's expectations, practices, and responsibilities. Pass/Fail.

ENGL 521 (3/9) d Topics in Historical Periods and Movements**ENGL 522 (3/9) d Topics in Genre Studies****ENGL 523 (3/9) d Topics in National/International Literatures and Culture****ENGL 524 (3/9) d Individual Author Studies****ENGL 525 (3/9) d Studies in Diversity and Identity****ENGL 531 (3/9) d Place and Power****ENGL 532 (3/9) d Culture and Location****ENGL 533 (3/9) d Narrating Place****ENGL 590 (9) Independent Research Paper**

Under the direction of a qualified supervisor, the student will propose and write a publishable, article-length research paper (7,500 words) on a subject and body of texts of interest to the student. Required for all M.A. coursework students.

ENGL 599 (12) Master's Thesis

Under the direction of a qualified supervisor, the student will propose and write a 15,000 to 20,000-word thesis of publishable quality, addressing a subject and body of texts of interest to the student and supervisor. Required for all M.A. thesis students. Pass/Fail.

Engineering, Faculty of Applied Science

ENGR: Engineering

ENGR 303 (3) Engineering Project Management

Project management including initiating, planning, executing, controlling, and closing engineering projects. Managing the scope, costs, schedule, risks, and human resources in engineering projects. External party engagement, including Indigenous communities. [3-0-0]

Prerequisite: All of APSC 169, APSC 201.

ENGR 305 (3) Engineering Economic Analysis

Cost concepts, accounting, time value of money; depreciation and taxes; public sector projects; economic evaluation techniques; handling uncertainty; sustainability in economic evaluation; societal context; infrastructure management needs; project impacts,



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mitigating risk. Case studies. [3-0-0]

Prerequisite: Second-year standing in the B.A.Sc. program.

ENGR 310 (3) Fluid Mechanics II

Differential conservation, equations and solutions, boundary layers, compressible flows, and introduction to turbomachinery. [3-2*-1]

Prerequisite: APSC 253.

ENGR 315 (3) Systems and Control

Dynamic systems, linear systems, control concepts, block diagrams, transient response, root locus, frequency response, Bode and Nyquist plots, and controller design. Credit will be granted for only one of ENGR 315 or MANF 386. [3-2*-1]

Prerequisite: APSC 246.

ENGR 320 (3) Electromechanical Devices

DC and AC magnetic circuits, transformers, DC machines, principles of electromagnetic devices, synchronous machines, induction motors, and brushless DC motors. [3-2*-1]

Prerequisite: APSC 255.

ENGR 325 (3) Civil Engineering Materials

Structures and properties of common materials: aggregates, Portland cement, concrete, asphalt, timber, composites, and metals. Relationships between materials structures and mechanical properties. [3-2*-0]

Prerequisite: APSC 259.

ENGR 327 (3) Reinforced Concrete Design I

Analysis of reinforced concrete members subjected to flexure, shear, and combined bending and axial forces. Design of one-way slabs, beams, and short columns. Serviceability analysis. Bond and anchorage. [3-0-1]

Prerequisite: All of APSC 259, APSC 260, APSC 261.

Corequisite: ENGR 325.

ENGR 330 (3) Reliability and Risk Analysis for Civil Engineering

Applied probability and simulation for civil engineering infrastructure. Methods for probabilistic risk and reliability analysis. Risk-based decision making. [3-0-0]

Prerequisite: All of APSC 254, APSC 258.

ENGR 331 (3) Infrastructure Management I

Introduction to asset management, municipal infrastructure systems, performance and prioritization measures, data management, life cycle costing, decision support tools, integrated approach. [3-0-0]

Corequisite: All of ENGR 305, ENGR 330.

ENGR 332 (3) Surveying and GIS Analysis

Theory and application methods for measuring and representing objects of interest on, below, and over the earth's surface, and for analyzing data to meet engineering design and operational objectives driven by socio-economic or environmental concerns of natural and engineered systems. [3-2*-0]

Prerequisite: All of APSC 169, APSC 254.

ENGR 335 (3) Transportation Engineering

Analysis, planning, design, and operation of transportation systems, including: governance, economics, land use, transport modes, users, roads, freeways, end-of-trip facilities, public transit, and intersection controls. [3-2*-0]

Prerequisite: APSC 254.

ENGR 340 (3) Soil Mechanics

Geological processes, soil classification, principle of effective stress, seepage analysis, shear strength, soil compaction, consolidation, and slope stability analysis. [3-2*-0]

Prerequisite: All of APSC 253, APSC 260.

ENGR 341 (3) Engineering Hydrology

Hydrologic processes - weather, precipitation, infiltration, evaporation, snowmelt and runoff generation. Emphasis on quantitative techniques including: hydrograph analysis, reservoir and channel routing, statistical methods and design floods, hydrologic modelling. [3-0-0]

Prerequisite: APSC 253.

ENGR 342 (3) Open Channel Flow

Channel characteristics, flow classification, specific energy and momentum, uniform flow, critical flow, hydraulic jump, flow



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control structures, channel design, unsteady flow, contaminant transport. [3-2*-0]

Prerequisite: APSC 253.

ENGR 347 (3) Environmental Engineering

Air, water, environmental pollutants, and treatment design concepts. [3-0-0]

Prerequisite: All of APSC 182, APSC 183, APSC 253.

ENGR 350 (3) Linear Circuit Theory

Transient and steady-state analysis of linear circuits, Laplace transform analysis, mutual inductance and ideal transformers, frequency response and Bode plots, passive and active filters, introduction to synthesis of passive networks, two-port network models for linear systems, and circuit simulation. [3-0-0]

Prerequisite: All of APSC 246, APSC 255.

ENGR 351 (3) Microelectronics I

Signals and amplifier fundamentals, the operational amplifier, diodes, metal-oxide-semiconductor field effect transistor amplifier circuits, and bipolar junction transistor amplifier circuits. [3-2*-0]

Prerequisite: APSC 255.

ENGR 353 (3) Semiconductor Devices

Semiconductor materials, carrier transport phenomena, P-N diode, metal-semiconductor junction, light-emitting diode, semiconductor lasers and photodiodes, bipolar junction transistors, MOSFET, and other semiconductor devices. [3-0-0]

Prerequisite: APSC 255.

ENGR 359 (3) Microcomputer Engineering

Microcomputer architecture, number representation, assembly language, parallel and serial input/output, interrupts, memory, peripherals. [3-2*-0]

Prerequisite: APSC 255.

ENGR 360 (3) Engineering Probability and Statistics

Set theory, conditional probability, distribution function, functions of random variables, central limit theorem, sample distributions, confidence intervals, elements of parameter estimation and hypothesis testing, testing the fit of a distribution. Applications of probability and statistics in engineering. Credit will be granted for only one of ENGR 360 or ENGR 460. [3-0-1]

Prerequisite: All of APSC 248, APSC 254.

ENGR 361 (3) Signals and Communication Systems

Fourier series and Fourier transform analysis of signals, sampling theorem, amplitude, phase, and frequency modulation, baseband digital transmission, pulse code modulation and quantization, Nyquist pulses, inter-symbol interference. [3-2*-0]

Prerequisite: APSC 246.

ENGR 362 (3) Digital Signal Processing I

Discrete-time signals and systems, difference equations, sampling and aliasing, decimation and interpolation, quantization errors, z-transform, discrete Fourier transform, fast Fourier transform, implementation of discrete-time systems, finite and infinite impulse response filter design. [3-0-1]

Prerequisite: APSC 246.

ENGR 365 (3) Engineering Electromagnetics

Review of vector calculus and coordinate systems, electrostatic fields, electric dipoles and polarization, magnetostatic fields, magnetic dipoles and magnetization, boundary conditions, electromagnetic induction, Maxwell's equations. [3-0-1]

Prerequisite: All of APSC 178, APSC 248.

ENGR 375 (3) Energy System Design

Primary energy sources and carriers. Energy conversion. Analysis of thermal systems. Reacting systems and combustion.

Thermal systems design including steam power plants, gas turbines, internal combustion engines, and refrigeration systems. [3-0-1]

Prerequisite: All of APSC 252, APSC 253.

ENGR 376 (3) Materials Science II

Review comprehensive study of phase diagrams, phase transformations, TTT diagrams, heat treatment, ferrous and nonferrous alloys, composite and concrete materials, and materials selection. [3-0-0]

Prerequisite: APSC 259.

ENGR 377 (3) Manufacturing Processes

Metrology, metal forming processes, plastic deformation, rolling, forging, drawing, extrusion, sheet metal forming. Machining



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processes and machine tools, turning, milling, drilling, grinding. Metal fabrication, welding, casting. [2 -3*-2*]

Prerequisite: All of APSC 259, APSC 260.

ENGR 380 (3) Design of Machine Elements

Product design methodology; static and fatigue failure theory; design/selection of components including shafts, springs, bearings, gears, brakes, and clutches; design of bolted joints, power screws, and welds; design evaluation and optimization. [3-0-1]

Prerequisite: APSC 260.

ENGR 381 (3) Kinematics and Dynamics of Machinery

The design, analysis, and synthesis of mechanisms, linkages, cams, and gear trains; dynamic force analysis; balancing of rotating and reciprocating masses. [3-0-1]

Prerequisite: All of APSC 180, APSC 181.

ENGR 385 (3) Heat Transfer Applications

Steady and transient conduction heat transfer, radiation heat transfer, convection heat transfer, introduction to heat exchanger. [3-2*-1]

Prerequisite: All of APSC 248, APSC 252.

ENGR 387 (3) Vibration of Mechanical Systems

Vibration of mechanical systems. Single and multiple degree of freedom systems. Undamped, damped vibrations. Forced vibrations and resonance. Modal analysis, modelling vibrating systems. Spectral analysis. Measurement and control of vibrating mechanical systems. [3-0-1]

Prerequisite: APSC 246.

ENGR 401 (3) Bioinstrumentation

Bioinstruments used for tracking vitals, diagnosis, and treatment of disease in the vascular, muscular, nervous, and respiratory systems. Introduction to the fundamentals of each body system, electrical safety, signal acquisition, biosensors, transducers, amplifiers, and analysis of human physiological measurements. Hands on experience with sensors, biomedical devices, and design through labs. [3-2*-0]

Prerequisite: All of APSC 193, APSC 254.

ENGR 402 (3) Biotechnology: Fundamentals and Applications

Basics of biotechnology, DNA and RNA technologies, nanobiotechnology, medical biotechnology, and ethics in biotechnology. [3-0-0]

Prerequisite: Third-year standing

ENGR 405 (3) Engineering Leadership

Introduction to Engineering Leadership. Leadership styles. Understanding persuasion and influence. Goal setting and accountability within an engineering team, team building and team dynamics, including issues of equity, diversity and inclusion in teams. Credit will be granted for only one of APSC 505 or ENGR 405. [3-0-0]

Prerequisite: Fourth year B.A.Sc. standing.

ENGR 406 (3) Microelectromechanical Systems

Mechanisms, design, fabrication, and testing of microsensors, actuators, and MicroElectroMechanical systems (MEMS). Credit will not be granted for both ENGR 406 and ENGR 506 [3-2*-0]

Prerequisite: Fourth-year standing in the B.A.Sc. Program

ENGR 408 (3) Energy System Transition

GHG emission reductions, examination of the sources and use of energy, practical potential transition strategies. Participation in a one-day weekend field trip in March is required. [3-0-0]

Prerequisite: ENGR 320.

ENGR 410 (3) Technology Innovation for Engineers

An introduction to the concept of Innovation, with particular focus on technological innovation, and its impact on economic, social, health, legal, and cultural aspects of society. Technological innovations are explored using creative, design and entrepreneurial thinking. Causes for acceptance or rejection of technological innovations are examined using behavioural economic theories. [3-0-0]

ENGR 411 (3) Technology Entrepreneurship for Engineers

Engineering and innovation, business models, customer development, intellectual property, product development, customer validation, hypothesis testing, company positioning. Credit will be granted for only one of ENGR 411 or ENGR 511. [3-0-0]

Prerequisite: Fourth-year standing in the B.A.Sc. program.



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ENGR 412 (3) Signals, Systems, and Inference

Review of signals and systems basics; LTI state-space methods; probabilistic models and estimation of random variable; hypothesis testing rules; random processes and power spectral density; signal estimation based on linear minimum mean square error principle; signal detection in i.i.d. Gaussian noise and coloured noise. Credit will be granted for only one of ENGR 412 or ENGR 512. [3-0-0]

Prerequisite: All of ENGR 360, ENGR 361, ENGR 362. Fourth-year standing in Electrical Engineering

ENGR 413 (3) Law and Ethics for Engineers

Ethical theories and their application. The Canadian legal system. Companies, partnerships, independent contractors. Contract documents, specifications, liability, torts and liens. Intellectual property. Agency; evidence; role of an expert witness. Employment law. Professional Governance Act, Code of Ethics, consultation and engagement with Indigenous communities. [3-0-0]

Prerequisite: Fourth-year standing.

ENGR 415 (3) Reliability Engineering and System Safety

Reliability, maintainability, and availability of systems, failures models and probabilistic risk analysis, failure mode effect analysis, fault tree analysis and event tree analysis, reliability and system improvement using design of experiments, Taguchi-based methods, quality function deployment. Credit will be granted for only one of ENGR 415, ENGR 515 or APPP 515. [3-0-0]

ENGR 416 (3) CAD/CAM/CAE

CNC machining, Rapid prototyping, G-code, Computer Aided: Design, Manufacturing and Engineering, parametric design and analysis for optimization. [3-2-0]

Prerequisite: ENGR 377.

ENGR 417 (3) Pipeline Integrity Management

Pipeline regulation codes, pipeline integrity management, pipeline operations, materials and fabrication, examination techniques, corrosion protection, and geohazards evaluation. [3-0-0]

Prerequisite: Fourth-year standing in a B.A.Sc. program

ENGR 418 (3) Applied Machine Learning for Engineers

Fundamentals of machine learning, toolboxes in machine learning, supervised learning, unsupervised learning, applications of machine learning in various engineering disciplines. Credit will be granted for only one of ENGR 418 or ENGR 518. [3-0-0]

Prerequisite: Fourth-year standing in the B.A.Sc. program.

ENGR 419 (3) System Identification

Identification of dynamical systems by considering input signals, sensor measurements, noise, and disturbance, as well as using parameter estimation, model selection and validation, and practical considerations. Credit will only be granted to one of ENGR 419 or APSC 519 [3-2*-0]

Prerequisite: ENGR 480.

ENGR 420 (3) Fundamentals of Healthy Buildings

Building biology, bio-house design, health effects of building materials, construction techniques, temperature, light, ventilation, plumbing, ergonomics, and psychological factors. [3-0-0]

Prerequisite: Third-year standing

ENGR 421 (3) Public Transit Planning, Design, and Operations

History of public transit and its relationship to urban development, transit systems planning and modelling, transit service design and operations, transit performance and capacity analysis, transit lines and networks design, and Intelligence Transportation System (ITS) applications with emphasis on Advanced Public Transportation Systems (APTS). Credit will be granted for only one of ENGR 421 or ENGR 521. [3-2*-0]

Prerequisite: ENGR 335.

ENGR 422 (3) Surface Engineering

Surface energy, surface tension, contact angles, superhydrophobic surfaces, adhesion, roughness and texture, surface chemistry, and solid/liquid interactions. [3-0-0]

Prerequisite: APSC 252.

ENGR 423 (3) Wearable Devices

Design and prototyping including textiles, hardware, software, data storage, miniaturization, wireless communication, power, environment, and fabrication. Analysis of wearable technologies and challenges of mass adoption. [3-1-0]

Prerequisite: ENGR 401.

ENGR 424 (3) Smart Cities

Smart city concept, smart city standardization, smart grid and energy management, Internet of Things and cloud computing for



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smart city, smart city lighting, intelligent transportation, technology enhanced infrastructure, water solutions, smart buildings and technology, data analytics in smart cities. [3-0-0]

Prerequisite: Fourth-year standing in a B.A.Sc. program

ENGR 425 (3) Design of Steel and Timber Structures

Introduction to limit states design of steel and timber structures: material properties, design of tension and compression members, beams, columns, and connections. [3-0-0]

Prerequisite: Either (a) APSC 261 or (b) ENGR 326; and ENGR 325.

ENGR 426 (3) Analysis of Indeterminate Structures

Analysis of statically indeterminate structures using flexibility and stiffness methods. Linear and non-linear analysis, introduction to finite element method. [3-0-0]

Prerequisite: All of APSC 179, ENGR 327.

ENGR 427 (3) Reinforced Concrete Design II

Design of reinforced concrete two-way slabs, slender columns, footings, and walls. Design for torsion. [3-0-0]

Prerequisite: All of ENGR 325, ENGR 327.

ENGR 428 (3) Earthquake Engineering

Strong ground motion; single-degree-of-freedom systems; earthquake response of linear and inelastic systems; subspace iteration; multi-degree-of-freedom systems; earthquake response and design; building design consideration. [3-0-0]

Prerequisite: ENGR 327.

ENGR 429 (3) Rehabilitation of Concrete Structures

Concrete damage and deterioration mechanisms, assessment and instrumentation; repair and strengthening materials and techniques; design of structural strengthening systems. Credit will be granted for only one of ENGR 429 or ENGR 529. [3-0-0]

Prerequisite: All of ENGR 325, ENGR 327.

ENGR 430 (3) System-Based Design and Construction

State-of-the-art conceptual design and construction techniques of civil engineering systems. Problem-based learning techniques using real life engineering project design and construction case studies - famous, infamous, large, small, failures. [3-0-0]

Prerequisite: Fourth-year standing in Civil Engineering.

ENGR 431 (3) Design of Timber Structures

Limit state design of timber structures; Material grade and properties of wood; Design criteria for axial, bending, shear and combined load design of structural lumber; Connection detailing and design; system design [3-0-0]

Prerequisite: ENGR 327.

ENGR 432 (3) Infrastructure Management II

Impact of climate change, integrated asset management, resilient infrastructure, condition assessment and performance modeling, in-service monitoring and risk-based evaluation, life cycle cost and benefits analysis, prioritization and optimization, advanced modelling and GIS implementation. [3-0-0]

Prerequisite: All of ENGR 303, ENGR 305, ENGR 330, ENGR 331.

ENGR 433 (3) Construction Engineering and Management

Management of the firm: strategic planning, designing, construction, productivity management, and project closure. Project delivery systems: traditional, construction management, and turnkey. Estimating, bidding, and bonding. Project control tools and procedures. Safety and quality control. Project Management. Credit will be granted for only one of ENGR 433 or ENGR 533. [3-0-0]

Prerequisite: ENGR 303.

ENGR 434 (3) Global Impact of Engineering

Investigation into the environmental, social, political and economic aspects of technology, including the analysis of social and environmental context of engineering activities. [3-0-0]

Prerequisite: 3rd Year Standing

ENGR 435 (3) Transportation Systems Engineering

Analysis, design, and operation of transport systems that support our urban and rural communities, including: traffic studies and field surveys; capacity and level of service analysis; simulation and optimization of networks; transportation demand management; and CAD optimization of horizontal and vertical corridor alignments. [3-2*-0]

Prerequisite: All of ENGR 335, ENGR 330.

ENGR 436 (3) Transportation Planning

Processes and techniques to facilitate properly integrated land use and transport systems, including: survey and data



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techniques; trip generation; trip distribution; modal choice; trip assignment; development traffic impact assessment; sustainable transportation strategies; and vulnerable road users. Credit will be granted for only one of ENGR 436 or ENGR 536. [3-2*-0]
Prerequisite: ENGR 335.

ENGR 437 (3) Railway Systems Engineering

Topics on the principles, data, specifications, plans and economics pertaining to the planning, design, construction, and operation of railways tracks, controls, running stock, facilities. Credit will be granted for only one of ENGR 437 or ENGR 537. [3-2*-0]
Prerequisite: ENGR 335.

ENGR 438 (3) Rock Mechanics and Rock Engineering

Mechanical properties of intact rock. Rock mass properties and classifications. Structural mapping and stereonet. Rock and rock mass strength criteria. Stresses in rock masses. Rock slope stability analysis. Empirical, analytical, and numerical analysis techniques for underground excavations. Rock support and stabilization. Credit will be granted for only one of ENGR 438 or ENGR 538. [3-2*-0]
Prerequisite: ENGR 340.

ENGR 439 (3) Advanced Manufacturing

Materials fabrication, forming, and joining: casting, rolling, forging, extrusion, and welding. Powder metallurgy and manufacture of metal alloys, metal matrix composites, and ceramics. Effect of fabrication process on evolution of crystallographic texture, residual stress, mechanical and service properties of materials. Process selection and technology development. [3-0-0]
Prerequisite: Either (a) ENGR 377 or (b) MANF 230.

ENGR 440 (3) Foundation Engineering

Empirical and analytical approaches for foundation engineering. Topics include site investigation, lateral earth pressure, ground improvement, design of shallow and deep foundations, and retaining structures. [3-0-1*]
Prerequisite: ENGR 340.
Corequisite: ENGR 327.

ENGR 441 (3) Advanced Water Treatment Processes

Theory and design of advanced drinking water treatment processes used for challenging source water conditions including advanced oxidation, membrane filtration, ultraviolet disinfection, and adsorption processes. Discussion of removal of emerging contaminants (e.g. pharmaceuticals), regulated and unregulated disinfection by-products, and current issues in potable water treatment and quality. [3-0-0]
Prerequisite: ENGR 447.

ENGR 442 (3) Water Quality Engineering

The physical, chemical, and biological properties of water with applications to human health, and engineering solutions. The chemical and biological reactions of contaminants as they move through surface and ground water. A brief introduction to corrective actions. [3-0-0]
Prerequisite: All of ENGR 342, ENGR 347.

ENGR 443 (3) Environmental Engineering Laboratory

Testing procedures used in water quality studies and in the operation of water and wastewater treatment plants. Credit will be granted for only one of ENGR 443 or ENGR 543. [1-4-0]
Prerequisite: ENGR 347.

ENGR 444 (3) Solid Waste Engineering

Applications of engineering principles and practices to land disposal of hazardous and non-hazardous wastes. [3-0-0]
Prerequisite: All of ENGR 340, ENGR 347.

ENGR 445 (3) Design of Water and Wastewater Conveyance Systems

Identification and evaluation of design solutions for providing a community with adequate water supply, collecting and disposing of stormwater and sewage, and managing excess stormwater flow. [3-0-0]
Prerequisite: ENGR 341.

ENGR 446 (3) Biological Treatment Processes

Theory and practice of biological wastewater treatment including aerobic and anaerobic processes in suspended and attached growth reactors, treatment models, advanced treatment, sludge handling, and treatment plant design. Credit will not be offered for both ENGR 446 and ENGR 546. [3-0-0]
Prerequisite: ENGR 347 and ENGR 447.
Equivalency: ENGR 546.



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ENGR 447 (3) Design of Processes for Water and Wastewater Treatment

Theory and design of fundamental physical, chemical, and biological unit operations for drinking water and municipal wastewater treatment. The design principles of coagulation, flocculation, sedimentation, filtration, biological treatment, solid handling, disinfection, and advanced treatment processes are presented. [3-0-1*]

Prerequisite: ENGR 347.

ENGR 448 (3) Air Quality and Pollution Control Engineering

Airborne contaminants classification, reactions, health issues, and their ecological effects. Meteorological considerations and air quality modeling. Control methods for particulate and gaseous pollutants. [3-0-0]

Prerequisite: Either (a) ENGR 347 or (b) all of CHEM 304, EESC 212.

ENGR 450 (3) Clinical Engineering

The clinical environment, clinical tools (for screening, diagnostics, treatment, monitoring, and rehabilitation) and regulatory requirements. [3-2*-0]

Prerequisite: APSC 193 and fourth-year BAsC standing.

ENGR 451 (3) Microelectronics II

Building blocks of integrated-circuit amplifiers, differential multistage amplifiers, frequency response, feedback, output stages and power amplifiers, and operational amplifier circuitry. [3-2*-0]

Prerequisite: ENGR 351.

ENGR 453 (3) Internet of Things

Sensing, actuation, sampling, analog-to-digital and digital-to-analog conversion, voice over IP, video codecs, audio codecs, multimedia communication protocols for IoT, wireless communication protocols for IoT. [3-2*-0]

Prerequisite: APSC 254.

ENGR 454 (3) Motor Drive Systems

Three-phase AC/DC PWM inverter, converter modulation techniques, abc/qd reference frame theory, brushed DC machine drives, induction motor drives, permanent magnet AC machines, brushless dc motors and drive circuits. [3-2*-0]

Prerequisite: ENGR 320.

ENGR 455 (3) Power System Analysis and Design

Principles of electric power systems, three-phase transformer, transmission line parameters, admittance model, impedance model, network work calculations, power-flow solution, symmetrical faults, symmetrical components and sequence network, unsymmetrical faults, economic dispatch. Design projects using power system simulator package. [3-2*-0]

Prerequisite: ENGR 320.

ENGR 456 (3) Electrochemical Energy Storage Systems

Thermodynamics and kinetics of electrochemical reactions, rechargeable batteries, Li-ion batteries, anode and cathode materials, nanostructured materials for batteries, liquid-solid and solid-solid interfaces in batteries, next-generation Naion and Li-S batteries, supercapacitors, and hybrid Li-ion supercapacitors. [3-0-0]

Prerequisite: All of APSC 252, APSC 259.

ENGR 458 (3) Power Electronics

Applications and roles of power electronics, power semiconductor devices, diode rectifiers, phase-controlled rectifiers, DC-DC converters, DC-AC converters, resonant converters. Examples drawn from residential and industrial applications. Credit will be granted for only one of ENGR 458 or ENGR 558. [3-2*-0]

Prerequisite: ENGR 320.

ENGR 459 (3) Advanced Electromagnetics

Electromagnetic waves; Maxwell equations; plane-wave propagation in homogeneous media; reflection, transmission, guidance, and resonance; radiation; scattering; and special relativity. Credit will be granted for only one of ENGR 459 or ENGR 559. [3-0-0]

Prerequisite: ENGR 365.

ENGR 461 (3) Digital Communications

Signal space concepts, baseband digital transmission on additive white Gaussian noise channel, optimum receiver design, transmission through bandlimited channels, coherent and non-coherent carrier modulations, elements of information theory, introduction to error control coding. [3-2*-0]

Prerequisite: All of ENGR 360, ENGR 361.

ENGR 462 (3) Digital Signal Processing II

Sampling of bandpass signals, oversampling, sigma-delta modulation, decimation and interpolation, sampling rate conversion and its implementation, linear prediction and optimum linear filters, power spectrum estimation. [3-0-0]



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Prerequisite: All of ENGR 360, ENGR 362.

ENGR 463 (3) Communication Networks

Layered architectures, digital transmission fundamentals, circuit-switching networks, packet-switching networks, TCP/IP, automatic repeat request, queueing theory, peer-to-peer protocols, scheduling algorithms, medium access control, local area networks. [3-2*-0]

Prerequisite: ENGR 360.

ENGR 464 (3) Distributed Ledger Technologies with Engineering Applications

Distributed ledgers, peer-to-peer communication networks, proof of work, proof of stake, consensus algorithms, legal and regulatory issues, applications in advanced manufacturing, power systems and clean energy. [3-0-0]

Prerequisite: Either (a) all of ENGR 359, ENGR 360 or (b) all of STAT 303, COSC 211.

ENGR 465 (3) Wireless Communications

Propagation path loss, shadowing, fading, Doppler spread, classification of wireless channels, modulations for wireless communications, diversity and equalization techniques for fading dispersive channels, multicarrier modulation, spread spectrum communications, cellular networks, practical wireless systems. Credit will be granted for only one of ENGR 465 or ENGR 565. [3-0-0]

Prerequisite: All of ENGR 360, ENGR 461.

ENGR 466 (3) Introduction to VLSI Systems

The chip design process using VLSI design styles in CMOS technology. Data path, control and register file design and layout. Clocking schemes, flip-flop and latch-based design. Design project using CAD tools. [3-2*-0]

Prerequisite: APSC 262.

ENGR 467 (3) Real-Time and Embedded System Design

Multi-tasking, interrupt-driven systems, RTOSs and programming environments, task scheduling, schedulability analysis, inter-process communication and synchronization, resource management, performance measurement. [3-2*-0]

Prerequisite: ENGR 359.

ENGR 468 (3) Advanced Digital System Design

Design flows, system-on-chip design practices, timing, clock domains, high-speed data links, intellectual property reuse and platform-based design, application specific computing, ASIC and FPGA technologies, and hardware/software co-design. Credit will be granted for only one of ENGR 468 or ENGR 568. [3-0-0]

Prerequisite: All of APSC 262, ENGR 359.

ENGR 469 (3) Polymer Engineering

Introduction to polymer science and technology, molecular structure of polymers, polymer synthesis, structure-property relationship in polymers, physical properties of polymers, reinforced polymers, polymer composites and nanocomposites, polymer characterization, polymer processing, and forming. [3-0-0]

Prerequisite: All of APSC 259, APSC 260.

ENGR 470 (3) Microwave Engineering

Review of electromagnetic principles, waveguides, transmission lines, impedance matching, Smith charts, network characterization, and microwave engineering applications. [3-2*-0]

Prerequisite: ENGR 365.

ENGR 471 (3) Radio Frequency Integrated Circuits

Introduction to radio communication systems, transmission line theory, network parameters, impedance matching, noise figure and sensitivity, RF transceiver architectures, CMOS technology, low noise amplifier, mixers, oscillators, and power amplifiers. Credit will be granted for only one of ENGR 471 or ENGR 571. [3-2*-0]

Prerequisite: All of ENGR 361, ENGR 451.

ENGR 472 (3) Fibre Optics and Photonics

Introduction to fibre optic transmission, single-mode and multimode fibre optics, dispersion and absorption design criteria, semiconductor diode lasers, LEDs, modulators, pn and p-i-n receivers, point-to-point and network implementations of fibre optic networks and integrated photonic systems. Credit will be granted for only one of ENGR 472 or ENGR 572. [3-2*-0]

Prerequisite: ENGR 365.

ENGR 473 (3) Antennas and Propagation

Wave propagation models, radiation patterns, directivity and gain, radiation resistance, Friis transmission equation, reciprocity, dipole antennas, image theory, loop antennas, uniform and non-uniform antenna arrays, broadband antennas, aperture antennas. Credit will be granted for only one of ENGR 473 or ENGR 574. [3-2*-0]



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Prerequisite: ENGR 365.

ENGR 474 (3) Analog Integrated Circuits

Design and analysis of analog integrated circuits with emphasis on CMOS technology. MOS device physics and models, processing technology and layout, differential amplifiers, current mirrors, noise, feedback, opamp design and compensation, two-stage CMOS opamp design, switched-capacitor filters. [3-0-0]

Prerequisite: ENGR 451.

ENGR 475 (3) Materials Selection and Design

Review of materials classifications, ASTM standard for ferrous materials and non-ferrous alloys. Material property charts. Materials selection and material indices. Introduction to various materials processing. Process selection and materials selection with multiple constraints and objectives, cost analysis. [3-0-1*]

Prerequisite: All of APSC 259, ENGR 376.

ENGR 476 (3) Mechanics of Materials II

Bending of curved beams; bending of beams with asymmetric cross-sections; shear flow and centre; review of beam deflections; column buckling; Castigliano's theorem; statically indeterminate beams, frames, and rings; Torsion of noncircular members. [3-0-0]

Prerequisite: APSC 260.

ENGR 478 (3) Alternative Energy Systems

Description of alternative sources of energy, electric vehicles, thermosolar energy, generation of electricity by photovoltaic effect, wind power energy, hydropower, geothermal, nuclear power, power plants with fuel cells, aspects of hydrogen as fuels, fuel from biomass, energy storage parameters, integration of alternative sources of energy. [3-0-0]

Prerequisite: All of ENGR 375, ENGR 385.

ENGR 479 (3) Measurement Principles in Thermal-Fluids

Instruments and methods of measuring fluid thermo-physical properties. Pressure-based velocity measurements. Thermal anemometry. Particle-based techniques for velocity measurement. Sonic anemometry/thermometry. Measurement of flow pressure and density. Measurement techniques for temperature and heat flux. Fundamentals of data processing and analysis. [3-0-0]

Prerequisite: All of ENGR 310, ENGR 385.

ENGR 480 (3) Modern Control

State-space modelling and design. Review of linear and matrix algebra, highlights of classical control theory, state-space modelling, continuous and discrete state equations, stability, controllability and observability, design of feedback systems. Credit will be granted for only one of ENGR 480 or ENGR 580. [3-2*-0]

Prerequisite: One of ENGR 315, MANF 386.

ENGR 481 (3) Mechatronics

Operating principles, analysis, modelling, and performance specifications of sensors, actuators, and mechatronic systems. Sensor selection, actuator sizing, and integration. Programmable logic control (PLC) systems and control techniques pertaining to actuators. Control system implementation. Credit will be granted for only one of ENGR 481 or ENGR 581. [3-2*-0]

Prerequisite: Either (a) all of ENGR 315, ENGR 320 or (b) all of MANF 386, ENGR 320.

ENGR 482 (3) Biomedical Engineering I

Introduction to the microcirculation; gas exchange in organs, including diffusion, perfusion and ventilation; surface energy in biological systems; principles of hemodynamics including vascular resistance and flow regimes at different levels of organs, tissues and cells; principles of tissue mechanics; introduction to tissue engineering; introduction to medical devices design and development. [3-0-0]

Prerequisite: Fourth-year standing

ENGR 483 (3) Advanced Vibrations: Simulation and Optimization

Generalized eigenvalue problems, experimental modal analysis; nonlinear systems; numerical simulation of time response, random vibrations; distributed parameter systems; dynamic finite element method; reduced order modelling; optimization problem formulation, single objective optimization algorithms; applications in vibrational systems. [3-2*-0]

Prerequisite: All of APSC 256, ENGR 387.

ENGR 484 (3) Heat and Mass Transfer

Heat exchanger design, heat transfer with phase change, radiation heat transfer, steady and transient mass diffusion, convective mass transfer, simultaneous heat and mass transfer. Credit will be granted for only one of ENGR 484 or ENGR 584. [3-0-0]

Prerequisite: All of ENGR 310, ENGR 385.

ENGR 485 (3) Heating, Ventilating, and Air Conditioning



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Properties of moist air, air conditioning systems, heat transmission in building systems, heating and cooling load, refrigeration, pumps and piping design, fans and building air distribution. [3-0-0]

Prerequisite: All of APSC 253, APSC 258, ENGR 385.

ENGR 486 (3) Robot Modelling and Control

Spatial description and homogeneous transformations, manipulator kinematics (forward and inverse), Jacobian, motion trajectories. Manipulator dynamics, Lagrange-Euler and Newton-Euler formulation. Linear and nonlinear control, force control. Industrial robotic system and programming. Credit will be granted for only one of ENGR 486 or ENGR 586. [3-0-0]

Prerequisite: One of ENGR 315, MANF 386.

ENGR 487 (3) Digital Control

Digital control theory and a brief review of classical control and its relationship to discrete systems. Discrete time systems, sampling, z-transform, pulse transfer function, stability in z-domain, pole-placement control design and state estimation, discrete linear quadratic optimal control, introduction to system identification and Kalman filter. Credit will be granted for only one of ENGR 487 or ENGR 587. [3-0-0]

Prerequisite: One of ENGR 315, MANF 386.

ENGR 489 (3) Multicriteria Optimization and Design of Experiments

Multiple attribute decision making, multiple objective decision making/optimization, fuzzy optimization, design and analysis of physical and computer experiments, uncertainty modelling, sensitivity analysis, weighting methods, computational tools and applications in multi-disciplinary design. Credit will be granted for only one of ENGR 489 or ENGR 589. [3-2*-0]

Prerequisite: Fourth-year B.A.Sc. standing.

ENGR 490 (3) Fluid Machinery

Principles and performance characteristics of turbomachinery, centrifugal and axial flow fans, compressors, pumps and turbines, and applications of dimensional analysis and similitude. [3-0-0]

Prerequisite: ENGR 310.

ENGR 491 (3) Computational Fluid Dynamics

Computational fluid dynamics theory and methods for the numerical simulation of heat and fluid flow. Governing equations, meshing strategies and mesh requirements, finite difference methods, finite volume methods, solution of algebraic systems of equations, compressible flows, turbulence modelling. [3-0-0]

Prerequisite: ENGR 310.

ENGR 492 (3) Finite Element Methods

Finite Element Discretization, Direct Stiffness Method, Numerical Solution of Large Deformations, Formulation of Finite Elements, Auxiliary Equations, Thermomechanical Analysis, Computer Implementation of the Finite Element Methods, Case Studies in Material Forming and Multi-Physics. Credit will be granted for only one of ENGR 492 or ENGR 582. [3-0-0]

Prerequisite: Fourth-year B.A.Sc. standing.

ENGR 493 (3) Introduction to Aerodynamics and Aircraft Design

Aircraft conceptual design: methods for estimating aircraft weight, fuel load, lift, thrust, airfoil and wing specification, engine selection and sizing, and structural loads. Introductory aerodynamics of airfoils and wings. [3-0-0]

Prerequisite: ENGR 310.

ENGR 494 (3) Autonomous Vehicle Technology

Autonomous navigation: perception, localization and mapping, motion planning, and motion control; and applications to unmanned aerial vehicles (UAVs), automated vehicles and self-driving cars. Credit will be granted for only one of ENGR 494 or ENGR 535. [3-1-0]

Prerequisite: ENGR 480.

ENGR 495 (3) Tissue Engineering

Fundamentals of cell biology; extracellular matrix, receptors, and cell-cell and cell-matrix interactions at both the theoretical and experimental levels; effects of physical, chemical, and electrical stimuli on cell function; tissue structure and function and the clinical need for tissue repair; scaffold design and processing for tissue engineering. Credit will be granted for only one of ENGR 495 or ENGR 519. [3-0-0]

Prerequisite: Fourth-year standing.

ENGR 496 (3) Aerospace Materials and Manufacturing Processes

Properties, behaviour, manufacturing, and advanced processes for materials used in aerospace applications. Materials include alloys, elastomers, composites, polymers, and ceramics. Special processes in the aerospace industry. Introduction to aerospace quality systems, inspection, and testing. [3-0-0]



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Prerequisite: All of ENGR 376, ENGR 377.

ENGR 497 (3) Combustion Processes

Combustion thermochemistry, fundamentals of mass transfer, chemical kinetics and combustion related chemical mechanisms, analysis of coupled thermal and chemical systems, laminar and turbulent flames, premixed and non-premixed flames, and combustion instabilities (e.g., thermoacoustics). 3-0-0

Prerequisite: All of ENGR 310, ENGR 375.

ENGR 498 (3/6) d Special Topics in Engineering

Topics in engineering not covered in other technical electives. Students should consult the School of Engineering for the particular topics offered in a given year. This course may not be offered every year. [3-0-0]

Prerequisite: Fourth-year standing in the B.A.Sc. Program and approval of the Associate Director of Undergraduate Studies.

ENGR 499 (6) Engineering Capstone Design Project

A capstone design project in response to an actual engineering problem. The project can be multi-disciplinary or in a specialized area of engineering. Students are required to submit a comprehensive project report and deliver a formal presentation. [2-3-0; 0-6-0]

Prerequisite: Fourth-year standing.

ENGR 500 (3) Advanced Coatings

Wettability, capillarity, surface energy and surface tension, interfacial mechanics, adhesion, surface texturing and roughness, surface modification, recent developments in adhesion and surface engineering.

ENGR 501 (3) Deep and Reinforcement Learning for Engineers

Foundations of neural networks and deep learning; techniques to improve neural networks; convolutional neural networks recurrent neural networks and their applications; reinforcement learning: basics, Q-learning, actor-critic algorithm; practical engineering applications of deep and reinforcement learning

ENGR 502 (3) Technical Communication for Engineering Research

Strategies for clear, effective, and ethical technical communication (both written and oral). Tools and formatting for graphics, technical reports, proposals, journal papers, theses. Pass/Fail.

ENGR 504 (3) Microfabrication Technology

Lithography (photo and soft), deposition and etching of thin films, electroplating, multilayer fabrication, monolithic integration, laminated structures, and packaging.

ENGR 505 (3) Social Cost-Benefit Analysis in Engineering Projects

Advanced topics in engineering economics, with emphasis on sustainability and social cost-benefit analyses.

ENGR 506 (3) Microelectromechanical Systems

Mechanisms, design, fabrication, and testing of microsensors, actuators, and MicroElectroMechanical systems (MEMS).

ENGR 507 (3) Bio-Microelectromechanical Systems

Techniques in patterning biomolecules, machining three-dimensional microstructures and building microfluidic devices; microfabrication technology.

ENGR 508 (3) Specialty Alloys: Fundamentals, Applications, and Development

Fundamentals of development of specialty metal alloys and manufacturing technologies for the most critical applications in automotive, aerospace, and marine industries. Modelling and physical phenomena controlling industrial casting, welding, forming and heat treatment processes, and custom fitness-for service characterization.

ENGR 509 (3) Intelligent Wireless Robotics

Basic artificial intelligence and machine learning, statistical decision processes, state estimation, localization, computer vision and multi-modal fusion, robot planning, multi-agent systems and distributed computing, networked multi-agent systems, security, ultra-reliable and low-latency mobile machine-to-machine networking.

ENGR 510 (3) Continuum Mechanics

Continuum concept. Introduction to tensor algebra and calculus. Kinematics of deformation and motion, stress and strain principles, fundamental laws and equations of continuum media. Linear elasticity. Classical fluids.

ENGR 511 (3) Technology Entrepreneurship for Engineers

Engineering and innovation, business models, customer development, intellectual property, product development, customer validation, hypothesis testing, company positioning. Credit will be granted for only one of ENGR 511 or ENGR 411. [3-0-0]

ENGR 512 (3) Signals, Systems, and Inference

Review of signals and systems basics; LTI state-space methods; probabilistic models and estimation of random variable;



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hypothesis testing rules; random processes and power spectral density; signal estimation based on linear minimum mean square error principle; signal detection in i.i.d. Gaussian noise and colored noise. Credit will be granted for only one of ENGR 412 or ENGR 512.

ENGR 513 (3) Nanomaterials and Nanomanufacturing

Classification of nanomaterials, top-down and bottom-up approaches for nanomaterials synthesis, characterization techniques for nanostructured materials, nanomaterials properties (chemical, optical, thermal, electrical, magnetic, mechanical, and electrochemical), nanomaterials applications.

ENGR 516 (3) Advanced Manufacturing

Product manufacturing, powder metallurgy, Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM), Computer Numeric Control (CNC) tools, process planning, micro and nano manufacturing, optical and electron measurement techniques.

ENGR 517 (3) Pipeline Integrity Assurance and Risk Assessment

Pipeline regulations and standards, data collection, risk assessment tools, hazards and threats to a pipeline system, pipeline risk management, pipeline defects and corrective actions, pipeline reliability assessment.

ENGR 518 (3) Applied Machine Learning for Engineers

Fundamentals of machine learning, toolboxes in machine learning, supervised learning, unsupervised learning, applications of machine learning in various engineering disciplines. Credit will be granted for only one of ENGR 518 or ENGR 418.

ENGR 519 (3) Tissue Engineering

Fundamentals of cell biology; extracellular matrix, receptors, and cell-cell and cell-matrix interactions at both the theoretical and experimental levels; effects of physical, chemical, and electrical stimuli on cell function; tissue structure and function and the clinical need for tissue repair; scaffold design and processing for tissue engineering. Credit will be granted for only one of ENGR 495 or ENGR 519. [3-0-0]

ENGR 521 (3) Public Transit Planning, Design, and Operations

History of public transit and its relationship to urban development, transit systems planning and modelling, transit service design and operations, transit performance and capacity analysis, transit lines and networks design, and Intelligence Transportation System (ITS) applications with emphasis on Advanced Public Transportation Systems (APTS). Credit will be granted for only one of ENGR 421 or ENGR 521.

ENGR 522 (3) Advanced Design of Steel Structures

Behaviour and design of steel structures, members, and cross sections in accordance with limit states principles. Behaviour and design of braced frames and moment resisting frames. Second-order analysis of frames. Load path concepts for detailing connections.

ENGR 523 (3) Seismic Design of Buildings

Review of structural dynamics and response spectra; seismic design of steel and masonry buildings; seismic design of reinforced concrete structures; design using simplified code procedures and computer tools.

ENGR 526 (3) Multi-Sensor Data Fusion: System Architecture and Applications

Sensor systems, data fusion algorithm and system architecture, Bayesian inference and decision theory, Dempster-Shafer theory, artificial neural networks and voting logic fusion, fusion with fuzzy logic, fusion of multiple classifiers, image fusion and performance assessment.

ENGR 527 (3) Prestressed Concrete

Principles of prestressing, material characteristics, prestress losses; behaviour and design of prestressed members subjected to flexure, shear and combined axial and flexural forces.

ENGR 528 (3) Earthquake Engineering

Strong ground motion, single and multiple degree-of-freedom systems, earthquake response of linear and inelastic systems, earthquake response and design, and building design considerations.

ENGR 529 (3) Rehabilitation of Concrete Structures

Concrete damage and deterioration mechanisms, assessment and instrumentation; repair and strengthening materials and techniques; design of structural strengthening systems. Credit will be granted for only one of ENGR 429 or ENGR 529.

ENGR 531 (3) Infrastructure Management

Asset management, municipal infrastructure systems, performance and prioritization measures, data management, life cycle costing, decision support tools, integrated approach. Credit will be granted for only one of ENGR 531 or ENGR 431.



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ENGR 532 (3) Project Planning and Control

Project planning and alignment, project control standards and deliverables, project selection process, project definition rating index, and risk management. Analytical hierarchical processes, and Monte-Carlo simulation in scheduling and costing.

ENGR 533 (3) Construction Engineering and Management

Management of the firm: strategic planning, marketing, organizational structure and behaviour. Project delivery systems: traditional, construction management, turnkey. Network planning methods. Activity planning, including construction methods selection. Estimating, bidding, and bonding. Project control tools and procedures. Safety and quality control. Credit will be granted for only one of ENGR 533 or ENGR 433.

ENGR 534 (3) Road Safety Planning and Engineering

Quantifying the link between built form (land use) and road safety levels; data extraction, stratification, and aggregation; micro and macro-level generalized linear regression modelling; and road safety applications.

ENGR 535 (3) Autonomous Vehicle Technology

Autonomous navigation: perception, localization and mapping, motion planning, and motion control; and applications to unmanned aerial vehicles (UAVs), automated vehicles and self-driving cars. Credit will be granted for only one of ENGR 494 or ENGR 535.

ENGR 536 (3) Sustainable Land Use and Transportation

Principles, data, and economics pertaining to the planning, design, and management of sustainable community land use and transportation systems. Credit will be granted for only one of ENGR 536 or ENGR 436.

ENGR 537 (3) Railway Systems Engineering

Topics on the principles, data, specifications, plans and economics pertaining to the planning, design, construction, and operation of railways ? tracks, controls, running stock, facilities. Credit will be granted for only one of ENGR 437, ENGR 535 or ENGR 537.

ENGR 538 (3) Rock Engineering

Rock and rock mass properties and classifications. Structural mapping and stereonet. Rock and rock mass strength criteria. In situ stresses and excavation-induced stresses in rock masses. Rock slope stability analysis. Empirical, analytical and numerical analysis techniques for underground excavations. Rock support and stabilization. Credit will be granted for only one of ENGR 538 or ENGR 438.

ENGR 539 (3) Terrain Modelling and Analysis

Digital terrain models. Photogrammetry and lidar principles. Extraction of geometric and geological data from digital terrain and 3D photogrammetry models. Surface and underground engineering applications of terrain modelling.

ENGR 540 (3) Unsaturated Soil Behaviour

Fundamental principles of unsaturated soil behaviour, stress-deformation, and flow mechanisms; laboratory measurement techniques of unsaturated soil parameters such as suction, suction-water content relationships, hydraulic conductivity, and shear strength; numerical modelling of unsaturated soils applications.

ENGR 541 (3) Water Resource Modelling

Water resources modelling as related to civil and environmental engineering applications. Physical and mathematical modelling of hydraulic systems. Water quality in estuaries, lakes, rivers, and distribution systems. Sedimentation and erosion processes.

ENGR 542 (3) Engineering and Society

Changing landscape of engineering: how technology functions within society and the environment; design and decision-making; societal issues; social and environmental aspects of engineering activities.

ENGR 543 (3) Environmental Engineering Laboratory

Testing procedures used in water quality studies and in the operation of water and wastewater treatment plants. Credit will be granted for only one of ENGR 543 or ENGR 443.

ENGR 544 (3) Life Cycle Assessment and Management

Practical and theoretical applications of life cycle thinking in engineering projects, products, and processes. Understand international standards and methods in Life Cycle Assessment (LCA), Life Cycle Costing (LCC). Interpret and provide critical feedback on LCA/LCC studies and analyze claims on sustainability.

ENGR 545 (3) Laser-Based Measurements for Fluid Flows

Governing equations of reacting and non-reacting flows, measurement uncertainties, particle image velocimetry, laser Rayleigh scattering, Mie scattering, planar laser induced fluorescence, chemiluminescence measurements, and simultaneous velocity and combustion species measurements.



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ENGR 546 (3) Biological Treatment Processes

Theory and practice of biological wastewater treatment including aerobic and anaerobic processes in suspended and attached growth reactors, treatment models, advanced treatment, sludge handling, and treatment plant design.

ENGR 548 (3) Engineering Microbiology

Engineering applications of microbiology and biochemistry. Topics include detection of organisms, energetics and kinetics of microbial growth, and the biological fate of pollutants. Course is designed for graduate students with little or no biology background.

ENGR 549 (3) Environmental Risk Analysis

Hazards, toxicity, exposure, vulnerability, and risk. Contaminant fate and transport, exposure and toxicity assessment, risk characterization. Risk assessment frameworks, uncertainty and sensitivity analyses, risk management and multi-criteria decision-making, risk communication, and case studies.

ENGR 550 (3) Random Processes for Engineers

Review of probability, convergence of a sequence of random variables and limit theorem; definition and classifications of random processes, Poisson and Gaussian processes; spectral representation of random processes and time series; Markov chains, hidden Markov models and applications; filtering and prediction of random processes; introduction to queueing theory.

ENGR 551 (3) High Power Electronic Converters for Power System Applications

General principles of basic high power electronic converter topologies, converter modulation and controls techniques using the dq reference frame, applications of converter modelling, and control methods for voltage source converters in flexible AC transmission system applications.

ENGR 552 (3) Electronic Materials and Devices

Review of elementary materials science concepts; electrical and thermal conduction in solids; elementary quantum physics; modern theory of solids; semiconductors; semiconductor devices. Credit will be granted for only one of ENGR 552 or ENGR 452. [3-0-1]

ENGR 553 (3) Signal Estimation Theory

Estimation theory applied in particular to communications, signal processing, and wireless location applications. Cramer-Rao lower bound, minimum variance unbiased estimators, maximum likelihood estimators, least squares, Bayesian estimation, Kalman filters, and subspace methods.

ENGR 557 (3) Advanced Switching Power Supplies

Fundamentals of power MOSFET gate drive. Fundamentals of loss-less switching techniques: zero-voltage switching, zero-current switching. Variable frequency resonant converters. Constant frequency resonant converters. Soft-switching converters: natural and auxiliary commutation converter topologies. Control techniques: voltage and current mode control methods. Power factor correction techniques in rectification applications. Special emphasis will be on design techniques using practical examples.

ENGR 558 (3) Power Electronics

Applications and roles of power electronics, power semiconductor devices, diode rectifiers, phase-controlled rectifiers, DC-DC converters, DC-AC converters, resonant converters. Examples drawn from residential and industrial applications. Credit will be granted for only one of ENGR 558 or ENGR 458.

ENGR 559 (3) Advanced Electromagnetics

Electromagnetic waves; Maxwell equations; plane-wave propagation in homogeneous media; reflection, transmission, guidance, and resonance; radiation; scattering; modern applications of electromagnetic theory in photonic devices such as lasers, electro-optics, and advanced materials. Credit will be granted for only one of ENGR 559 or ENGR 459.

Prerequisite: ENGR 365.

ENGR 560 (3) Probability and Random Processes for Engineers

Set theory, conditional probability, distribution function, functions of random variables, central limit theorem. Random processes and their spectral characteristics, linear system with random inputs. Applications in statistics and engineering. Credit will be granted for only one of ENGR 560 or ENGR 460.

ENGR 562 (3) Information Theory

Entropy, relative entropy, mutual information; entropy rates of a stochastic process; optimal codes and Huffman codes; channel capacity; channel coding theorem; differential entropy, Gaussian channel; rate distortion theory.

ENGR 563 (3) Advanced Polymer Science and Engineering

Introduction to polymer science, polymer chain architecture and configuration, thermodynamics of polymer solutions, amorphous



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and crystalline states of polymers, rubber elasticity, networks and gels, polymer viscoelasticity and rheology, mechanical properties of polymers, multicomponent polymer systems, polymer processing and forming.

ENGR 564 (3) Fundamentals of Digital Communications

Pulse-amplitude modulation, M-ary modulation, spectral efficiency, Nyquist pulse shaping, sequence detection, optimal coherent and incoherent receiver design, equalization, adaptive equalizer, receiver synchronization.

ENGR 565 (3) Wireless Communications

Wireless systems and wireless channel models, capacity of wireless channels, digital modulation techniques over wireless channels, fading mitigation techniques; equalization, diversity techniques, adaptive modulations and multicarrier modulation, multiple access techniques, and spread spectrum communications. Credit will be granted for only one of ENGR 565 or ENGR 465.

ENGR 566 (3) Advanced Communication Networks

Analysis and design of communication networks; network layered architecture; Internet protocols; IP routing; TCP congestion control; scheduling algorithms; medium access control; optimization techniques; Markov chains; discrete-time queuing theory; weighted fair queuing; distributed randomized algorithms; mean-field analysis.

ENGR 567 (3) Passive Microwave Circuits

Electromagnetic waves, transmission lines, waveguides, network parameters, Smith Charts, gain equations, even-odd mode analysis, matching networks, power dividers, couplers, metamaterials, and dispersion.

ENGR 568 (3) Advanced Digital System Design

Design flows, system-on-chip design practices, timing, clock domains, high-speed data links, intellectual property reuse and platform-based design, application-specific integrated circuit and field-programmable gate array technologies, and hardware/software co-design. Credit will be granted for only one of ENGR 568 or ENGR 468.

ENGR 571 (3) Radio Frequency Integrated Circuits

Introduction to radio frequency systems, RF transceiver architectures, analysis of gain, noise figure and linearity, monolithic active and passive components, low noise amplifiers, mixers, oscillators, and power amplifiers. Credit will be granted for only one of ENGR 571 or ENGR 471.

ENGR 572 (3) Fibre Optics and Photonics

Introduction to fibre optic transmission, single-mode and multimode fibre optics, dispersion and absorption design criteria, semiconductor diode lasers, LEDs, modulators, pn and p-i-n receivers, point-to-point and network implementations of fibre optic networks and integrated photonic systems. Credit will be granted for only one of ENGR 572 or ENGR 472.

ENGR 573 (3) Quantum Photonics

General principles and distinguishing characteristics of classical and quantum mechanics, analytical approaches to the Schrödinger wave equation, applications of the Schrödinger wave equation to quantum photonic systems (including semiconductor lattices, heterostructures, quantum wells and lasers).

ENGR 574 (3) Antennas and Propagation

Wave propagation models, radiation patterns, directivity and gain, radiation resistance, Friis transmission equation, reciprocity, dipole antennas, image theory, loop antennas, uniform and non-uniform antenna arrays, broadband antennas, aperture antennas. Credit will be granted for only one of ENGR 574 or ENGR 473.

ENGR 575 (3) Analytical Techniques in Materials Characterization

Analytical transmission electron microscopy, scanning electron microscopy, X-ray dispersive spectroscopy and diffraction, neutron diffraction, thermogravimetric analysis and differential thermal analysis.

ENGR 580 (3) Modern Control

Review of linear and matrix algebra, highlights of classical control theory; state-space modelling, continuous and discrete state equations, stability, controllability and observability; design of feedback systems. Credit will be granted for only one of ENGR 580 or ENGR 480.

ENGR 581 (3) Mechatronics

Operating principles, analysis, modelling, and performance specification of sensors and actuators such as analog/digital transducers, electric motors, hydraulic actuators, and smart actuators. Analog and digital filtering techniques. Control techniques pertaining to actuators. Credit will not be granted for both ENGR 581 and ENGR 481.

ENGR 582 (3) Finite Element Method

Finite element discretization, direct stiffness method, numerical solution of large deformations, formulation of finite elements, auxiliary equations, thermomechanical analysis. Computer implementation of finite element methods, case studies in metal



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forming, and multi-physics. Credit will be granted for only one of ENGR 492 or ENGR 582.

ENGR 583 (3) Multiphase Flows

Fundamentals of liquid instabilities, breakup of liquid sheets, breakup of liquid jets, droplet dynamics, bubble dynamics, atomization and spray, single particle motion, boiling, and condensation.

ENGR 584 (3) Heat and Mass Transfer

Heat exchanger design, heat transfer with phase change, radiation heat transfer, steady and transient mass diffusion, convective mass transfer, simultaneous heat and mass transfer. Credit will be granted for only one of ENGR 584 or ENGR 484.

ENGR 585 (3) Turbulence

Statistical descriptions of turbulence and its scales, mechanisms of turbulence generation and evolution, characteristics of common turbulent flows, turbulence modelling: direct numerical and large eddy simulations, and Reynolds average Navier-Stokes.

ENGR 586 (3) Robot Modelling and Control

Spatial description and homogeneous transformations, manipulator kinematics, Jacobian, motion trajectories. Manipulator dynamics, Lagrange-Euler and Newton-Euler formulation. Linear and nonlinear control, force control. Industrial robotic system and programming. Credit will be granted for only one of ENGR 586 or ENGR 486.

ENGR 587 (3) Digital Control

Review of classical control and its relationship to discrete systems, discrete-time systems, sampling, z-transform, pulse transfer function, stability in z-domain, pole-placement control design and state estimation, discrete linear quadratic optimal control, introduction to system identification and Kalman filter. Credit will be granted for only one of ENGR 587 or ENGR 487. [3-0-0]

ENGR 589 (3) Multicriteria Optimization and Design of Experiments

Multiple attribute decision-making, multiple objective decision-making/optimization, fuzzy optimization, design and analysis of physical and computer experiments, uncertainty modelling, sensitivity analysis, weighting methods, computational tools and applications in multi-disciplinary design. Credit will be granted for only one of ENGR 589 or ENGR 489.

ENGR 591 (3) Constitutive Modelling of Materials

Review of tensor notation, strain and stress formulations. Theories and procedures in developing constitutive models for elastic, plastic, viscoplastic, linear and nonlinear viscoelastic solids. Anisotropic and multiphysics constitutive models, internal variables, relation to experimental results, and inverse identification techniques.

ENGR 592 (3) Microfluidics

Lab-on-a-chip technology; hydrodynamics of microfluidic systems; fabrication of microfluidic devices; microfluidics for external and internal flow control; diffusion, mixing, and separation in microsystems; digital microfluidics; electrowetting theory; lab-on-a-chip applications in engineering, biomedical science, and chemistry.

ENGR 593 (3) Computational Fluid Dynamics

Partial differential equations applied to flow and heat mass transfer modelling. Discrete systems, grid generation, finite volume method for diffusion, convection-diffusion problems, solution algorithms, finite element formulation. Finite element method for diffusion, convection-diffusion problems, case studies.

ENGR 594 (3) Mechanics of Laminated and Textile Composites

Composite material classification, mechanical and hygrothermal loading of laminates, stiffness and strength design, non-linear material models of textile composites, homogenization and characterization, failure criteria, warpage, impact response. Introduction to multi-level modelling of nano-tube reinforced composites.

ENGR 597 (6) Engineering Project

Project on assigned topic of specialization.

ENGR 598 (1-6) d Topics in Engineering**ENGR 599 (12) Thesis**

For M.A.Sc. Pass/Fail.

ENGR 699 (0) Thesis

For Ph.D. Pass/Fail.

Educational Psychology and Special Education, Faculty of Education



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EPSE: Educational Psychology and Special Education**EPSE 406 (3) Typical and Atypical Development in Infants and Children**

A review of typical development, and primary focus on issues of atypical development in infants and young children, including fetal alcohol syndrome, Down syndrome, cerebral palsy, autism, and vision or hearing impairments. Pass/Fail. [3-0-0]

EPSE 407 (3) Developmental Disabilities

Development of Individualized Program Plans for children with mild, moderate, and severe intellectual delays. Topics covered include the diagnostic process for determining the severity of an intellectual delay, the interpretation of diagnostic information, and how to construct appropriate educational programs for children. Credit will be granted for only one of EPSE 407 and 470J when the subject matter is of the same nature. Pass/Fail. [3-0-0]

Prerequisite: EPSE 406.

EPSE 421 (3) Assessment of Learning Difficulties

Current research and best practices on the process of assessment for students with learning difficulties. Pass/Fail. [3-0-0]

EPSE 431 (3) Programming for Children with Specific Learning Disabilities

Current research and best practices in program development and planning interventions for children with learning disabilities. Pass/Fail. [3-0-0]

Prerequisite: EPSE 421.

EPSE 433 (3) Assessment and Positive Behavioural Support in School and Community Settings

Introduces students to the philosophy and methods of behavioural assessment and positive behavioural support with persons who engage in challenging behaviour in school and community contexts. Includes instructional and environmental strategies for preventing and responding effectively to behaviour challenges in educational contexts. Pass/Fail. [3-0-0]

EPSE 437 (3) Interventions for Children and Adolescents with Behaviour Disorders

Philosophy and methods of best inclusionary practices for meeting the social and emotional needs of students with complex behaviour disorders within the classroom, school context, and community. Pass/Fail. [3-0-0]

EPSE 464 (3) Literacy for Diverse Learners in the Elementary Grades

Key issues, research, and practice are examined to improve literacy achievement for primary students with a range of reading and writing difficulties. Credit will be granted for only one of EPSE 464 or LLED 464. Pass/Fail. [3-0-0]

Equivalency: LLED 464.

EPSE 465 (3) Literacy for Diverse Learners in Middle and Secondary Grades

Key issues, research, and practice are examined to improve literacy achievement for students (intermediate and above) with a range of reading and writing difficulties. Credit will be granted for only one of EPSE 465 or LLED 465. Pass/Fail. [3-0-0]

Equivalency: LLED 465.

EPSE 466 (3) Numeracy for Diverse Learners

Research and practical issues related to numeracy will be examined with the intent of improving numeracy for diverse students with a range of difficulties in mathematics. Pass/Fail. [3-0-0]

EPSE 467 (3) Social and Emotional Development of Diverse Learners

Research and best practices will be examined with the intent of improving supportive educational programs for children within inclusive classrooms. Emphasis will be placed on developing supportive behaviour plans for children with various social and emotional needs. Pass/Fail. [3-0-0]

EPSE 468 (3) Creating Positive Learning Environments for Inclusive Education

Focuses upon current research and practice that emphasize the inclusion of all students. Best practices in classroom management, social skill instruction, cooperative learning, and conflict resolution will be covered. Pass/Fail. [3-0-0]

EPSE 469 (3) Education for Students with Sensory Loss or Motor Impairments

The unique learning needs of children with sensory loss and motor impairments are examined. This course will cover best practices in planning individualized adaptations and modifications within an inclusive classroom setting. Pass/Fail. [3-0-0]

EPSE 470 (3/9) d Selected Topics in Inclusive Education

Course content focuses upon a single topic or competency in inclusive education (e.g., autism, gifted students, ADHD). Topics may differ in each offering to respond to new research or current needs in the field. This course may be repeated with new content. Pass/Fail. [3-0-0]

EPSE 471 (3/6) d Applied Project in Inclusive Education

Research and practice is undertaken in classroom settings. Participants are given opportunities to work with students with



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diverse needs. This course may be repeated with new content. Pass/Fail. [3-0-0]

Prerequisite: All of EPSE 421, EPSE 431, EPSE 406.

EPSE 472 (3) Issues in Inclusive Education

Foundational literature, research, practice, and policies are examined to provide recommendations for best practice and strategies for developing inclusive classrooms. Pass/Fail. [3-0-0]

EPSE 565 (3/6) d Special Topics in Inclusive Education

Designed to bring professionals up-to-date in recent developments in the field.

Educational Technology, Faculty of Education

ETEC: Educational Technology

ETEC 511 (3) Conceptualizing Educational Technology

Provides an overview of educational technology bridging theory and practice. Educational technology is conceptualized broadly as the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources.

ETEC 550 (3) Designing Instruction

Introduces instructional design from analysis through evaluation and implementation. Emphasizes contemporary issues of designing instruction for diverse settings and contexts.

ETEC 553 (3) Leading and Managing Educational Technology Innovation

Exploring the leadership issues that emerge as new technologies increasingly influence educational contexts. Leadership models and the administrative concerns of program implementation and resource/project management are examined. Staff development, security, and policies for ethical use are explored.

ETEC 557 (3) Instructional Strategies for Digital Learning

Advanced topics in instructional design and project management.

ETEC 559 (3) Creating Technology-Enhanced Learning Environments

Paradigm shifts in education have influenced significant change in learning environments. This course is an inquiry into learning environments (past, present, and future) and explores the learning theories, software, hardware, and instructional strategies that support them.

Faculty of Science

FDSY: Food Systems

FDSY 221 (3) Food Systems I: System Thinking

In-depth look at food systems, including food production, processing, distribution, consumption and waste. Required field trips will be organized that explore both the value chain of a farm and its related food industry; and the food system of a large institution. Students must arrange own transportation to/from Kelowna-area field location. Credit will be granted for only one of FDSY 221 and GEOG 221. (1.5-0-1.5)

Film, Faculty of Creative and Critical Studies

FILM: Film

FILM 100 (3) Introduction to Film Studies

Basic aesthetic, economic, sociological, and technological aspects of film.

FILM 103 (3) Acting for Stage and Screen

An introduction to acting techniques pertaining to the style of psychological realism for stage and screen. Credit will be granted for only one of FILM 103 or THTR 103. [5 hours/week studio] [5 hours/week studio]

Equivalency: THTR 103.



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FILM 261 (3) Video I

Introduction to organizational, technical, creative, and critical skills required in video production. Provides experience in all stages of the production process, including pre-production, production, and post-production. Considers a variety of approaches to video, such as artist videos, music videos, and television productions. Credit will be granted for only one of FILM 261 or VISA 261. [2-2-0]

Prerequisite: One of VISA 106, VISA 108.

Equivalency: VISA 261.

FILM 271 (3) Video II

Continuation of FILM 261. Further work on organizational, technical, creative, and critical skills required in video production. Provides experience in all stages of the production process, including pre-production, production, and post-production. Considers a variety of approaches to video, such as artist videos, music videos, and television productions. Credit will be granted for only one of FILM 271 or VISA 271. [2-2-0]

Prerequisite: One of VISA 261, FILM 261.

Equivalency: VISA 271.

FILM 303 (3) Narrative Film Production

The theory and practice of producing a short narrative motion picture for the purpose of developing narrative film literacy. Credit will be granted for only one of FILM 303, CULT 316, or THTR 303. VISA 106, VISA 261, VISA 271, CULT 210, THTR 103, CRWR 250, or FILM 100 recommended.

Prerequisite: Third-year standing.

Equivalency: CULT 316; THTR 303.

FILM 371 (3) Digital Documentary Production

Theory and practice from the point of view of producer/writer/director. Course culminates in the creation of a short-form documentary. Credit will be granted for only one of FILM 371 or CULT 317. [2-2-0]

Prerequisite: One of CULT 210, CULT 215, CRWR 250, ENGL 215, FILM 100, FILM 220, VISA 106, VISA 265, VISA 271, and third-year standing.

Equivalency: CULT 317.

French, Faculty of Creative and Critical Studies

FREN: French

Students cannot take language courses out of sequence. Once a student successfully completes a French language course, they can no longer enroll in a course that is below the level of the last course that has been completed. Students should consult an advisor to ensure that they are enrolling in a level-appropriate French language course.

FREN 101 (3) Elementary French I

For the beginner. Prepares students to understand and use familiar everyday expressions and to function in basic situations such as communicating personal details and responding in simple social settings. Corresponds to level A1 of the Common European Framework of Reference for Languages (CEFR).

FREN 102 (3) Elementary French II

Continuation of Elementary French I. Completes level A1 of the Common European Framework of Reference for Languages (CEFR).

Prerequisite: FREN 101 or prior introductory French course at CEFR Level A1.

FREN 103 (3) Upper Elementary French I

Prepares students to understand and use sentences and frequently used expressions related to their everyday life, such as simple and routine tasks requiring a direct exchange of information. Corresponds to level A2 of the Common European Framework of Reference for Languages (CEFR).

Prerequisite: French 11 or FREN 102 or CEFR Level A1.

FREN 104 (3) Upper Elementary French II

Continuation of Upper Elementary French I. Completes level A2 of the Common European Framework of Reference for Languages (CEFR).

Prerequisite: FREN 103 or prior introductory French course at CEFR Level A2.



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FREN 115 (3) First-Year Oral French Practice I

Emphasizes oral communicative proficiency in French. Students are required to give oral presentations and actively participate in various group activities designed to improve vocabulary as well as oral and aural fluency. Students are required to complete individual and group assignments outside of scheduled class hours. Not available to students who have completed French 12 Immersion or with CEFR level B1 or higher.

Prerequisite: One of FREN 104, French 12, CEFR level A2.

FREN 122 (3) Intermediate French I

Refinement of reading, writing and speaking skills through the study of contemporary literature and other authentic documents of the French-speaking world. Corresponds to level B1 of the Common European Framework of Reference for Languages (CEFR).

Prerequisite: One of FREN 104, French 12, or CEFR level A2.

FREN 123 (3) Intermediate French II

Continuation of FREN 122.

Prerequisite: FREN 122, or prior introductory French course at CEFR Level B1.

FREN 215 (3) Oral French Practice II

Consists of conversational and listening comprehension activities, review of grammar, and vocabulary expansion exercises. Students will be expected to participate actively in group activities and to give frequent oral presentations. Not available to students with CEFR level B2 or higher. [3-1-0]

Prerequisite: One of FREN 115, FREN 123 or French 12 Immersion.

FREN 221 (3) French Literature and Textual Analysis II

An introduction to literary analysis and academic writing through the study of representative works from the eighteenth century to the present.

Prerequisite: FREN 123.

FREN 222 (3) French Language and Style I

Grammar, vocabulary, composition, language in context.

Prerequisite: FREN 123.

FREN 223 (3) French Language and Style II

Grammar, vocabulary, composition, language in context.

Prerequisite: FREN 222.

FREN 327 (3/9) d Studies in Cinema

Thematic survey of Francophone film considered in a broad cultural context. Topics will vary. With different topics this course may be taken more than once for credit.

Prerequisite: FREN 223.

FREN 330 (3) Quebecois Literature

Study of Quebec literature through a number of characteristic works from the end of the nineteenth century to the present.

Prerequisite: FREN 223.

Corequisite: FREN 353.

FREN 338 (3) French Society and Culture

Critical approach to French society considered in a broad cultural context.

Prerequisite: FREN 223.

FREN 344 (3) Techniques of Oral Expression in French I

Training in formal oral presentation in French. Emphasis on structured expression and oral delivery.

Prerequisite: FREN 215 and FREN 223. Both FREN 215 and FREN 223, or CEFR level B2 or higher.

FREN 345 (3) Techniques of Oral Expression in French II

Further training in formal oral presentation in French. Emphasis on structured expression and oral delivery.

Prerequisite: FREN 215 and FREN 223. Both FREN 215 and FREN 223, or CEFR level B2 or higher.

FREN 353 (3) French Grammar

Systematic study of the fundamental principles of French grammar.

Prerequisite: A score more than 65% in FREN 223.

FREN 355 (3) Advanced Composition

Development of essay writing skills in French.



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Prerequisite: FREN 353.

FREN 357 (3) Translation I

Comparative study of French and English through translation.

Prerequisite: FREN 223.

FREN 360 (3) The Body in French Literature: 1100-1800

Representations of the body as a focus to the study of literary movements and genres in French literature. Selected works of fiction, drama, and poetry from the middle ages to the end of the eighteenth century are discussed in their historical and literary context.

Prerequisite: FREN 223.

Corequisite: FREN 353.

FREN 362 (3) Modernity in Words and Images

Studies specific literary movements and genres through the textual analysis of selected works (fiction, drama, and poetry) taken from the nineteenth, twentieth and twenty-first centuries. The historical and literary backgrounds of the works selected are discussed.

Prerequisite: FREN 223.

Corequisite: FREN 353.

FREN 380 (3/9) d Selected Studies in French

In English. Intensive examination of selected topics in French or French language, literature, culture, and linguistics. With different topics, this course may be taken more than once for credit. May be taken for credit toward the French Major or Minor, and the Languages Major if coursework is submitted in French.

Prerequisite: Third year standing.

FREN 419 (3) Studies in Women's Writing

Prerequisite: FREN 353 and one of FREN 330, FREN 360, FREN 362.

FREN 420 (3-9) d Selected Topics in French Literature and Culture

Topics vary each time the course is offered. May be taken up to three times for a total of 9 credits.

Prerequisite: FREN 353 and one of FREN 330, FREN 360, FREN 362.

FREN 421 (3) For Adults Only: Fairy Tales in 17th & 18th Century France

Examines some of the most popular fairy tales of seventeenth- and eighteenth-century France. It will focus on gendered constructions of the Merveilleux by comparing thematic and stylistic elements of Perrault's tales with those of the conteuses.

Prerequisite: FREN 353 and one of FREN 330, FREN 360, FREN 362.

FREN 430 (3) Quebecois Poetry

Examines works from selected Quebecois poets from the nineteenth century to the present.

Prerequisite: FREN 353 and one of FREN 330, FREN 360, FREN 362.

FREN 435 (3) Critical Approaches to French Studies

Examination of critical approaches crucial to the definition of French literature and culture from the late nineteenth century to the twenty-first century. Taught in French.

Prerequisite: FREN 353 and one of FREN 330, FREN 360, FREN 362.

FREN 439 (3) Female Voice in 17th & 18th Century French Novels

Examines women's narratives in epistolary texts drawn from seventeenth- and eighteenth-century France. It explores the ways by which women manipulate this genre to express their own voices.

Prerequisite: FREN 353 and one of FREN 330, FREN 360, FREN 362.

FREN 444 (3) French for Work: Professional Oral Performance

Oral expressions, such as academic and professional presentations, debates, and public speaking. Exposure to regional and foreign French accents through a selection of audiovisual material. Of use to students pursuing careers in teaching or international relations, or applying for graduate programs in French.

Prerequisite: Either (a) FREN 344 or (b) FREN 345; and one of FREN 330, FREN 360, FREN 362.

FREN 446 (3) French for Play: Creative Oral Performance

French vocabulary and pronunciation. Participation in creative and literary oral performances, works or segments taken from a selection of fables, fairytales, and comedies. Exposure to regional and foreign accents through a selection of audiovisual material. Of use to students pursuing teaching careers or contemplating graduate programs in French.

Prerequisite: Either (a) FREN 344 or (b) FREN 345; and one of FREN 330, FREN 360, FREN 362.



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FREN 453 (3) Advanced Grammar

Study of advanced grammatical structures and their applications in context.

Prerequisite: A score of 65% or higher in FREN 353.

FREN 457 (3) Translation II

Applied translation from French to English and from English to French. Different translation methods and intermediate to advanced terminology in comparative stylistics.

Prerequisite: FREN 357.

FREN 460 (3) 17th-Century French Tragedy

French classical tragedies through works of Corneille and Racine. Aesthetic and political forces that helped shape these plays will be examined as well as the relationship between theatre and political power. Works will be studied in their socio-historical context and using current literary criticism. This course takes an interdisciplinary approach, incorporating European visual representations of Baroque and Classical aesthetics to assist with comprehension and analysis of texts.

Prerequisite: FREN 353 and one of FREN 330, FREN 360, FREN 362.

FREN 461 (3) 17th- and 18th-Century French Comedy

Explores French comedies through a selection of works by authors such as Molière, Lesage, Marivaux, and Beaumarchais.

Examines the aesthetic and political forces that shaped these plays, as well as the relationships between comedy and the representation of class and gender. Plays will be studied in their socio-historical context and approached using current literary criticism.

Prerequisite: FREN 353 and one of FREN 330, FREN 360, FREN 362.

FREN 480 (3/6) c Directed Studies

Directed readings and/or research in a clearly defined area of French literature, culture, or language, and the writing of a substantive assignment. The student and the faculty member will work in French.

Prerequisite: Fourth-year standing. Students must have a minimum of 76% average in all upper-level FREN courses and a minimum of 15 credits of upper-level FREN. Permission of both the department and the supervising faculty member required.

Geography, Faculty of Arts and Social Sciences

GEOG: Geography

GEOG 108 (3) Earth Systems: Weather, Climate, and Life

Principles and processes that govern the functions of the atmosphere, hydrosphere, and biosphere. Interactions between these environmental systems and human activity. [3-2-0]

GEOG 109 (3) Earth Systems: Landscape Dynamics

Principles and processes that govern the functions of the Earth's lithosphere and terrestrial geomorphology. Interactions between the lithospheric system and human activity. [3-2-0]

GEOG 128 (3) Human Geography: Space, Place, and Community

Critical introduction to the study and application of the major themes of human geography, including historical, regional, urban, social, and cultural geographies. Draws upon a range of geographic research methods to investigate geographic phenomena, especially human-environment relations. Not for Science credit. [3-0-0]

GEOG 129 (3) Human Geography: Resources, Development, and Society

Introduction to concepts, methods, modes of explanation, and recent critical changes in the study of human geography.

Interpretation and explanation of geographic variations arising within contexts of rapidly changing cultural, demographic, economic, political, and social phenomena and their relationship to the environment. Not for Science credit. [3-0-0]

GEOG 200 (3) Atmospheric Environments

Physical principles underlying weather and climates. Thermal, moisture, and wind climates at scales from valleys to the globe.

Daily weather, air pollution, global change. Credit will be granted for only one of GEOG 200 or EESC 212. [3-3-0]

Prerequisite: Either (a) GEOG 108 and GEOG 109; or (b) two of EESC 101, EESC 111, EESC 121 or (c) successful completion of first-year Science.

Equivalency: EESC 212.

GEOG 201 (3) Introduction to Research in Sustainability and Geography

Introduces skills required to conduct, critically assess, and present research in geography and sustainability. Develops research skills from problem definition through to design and execution of research projects, including how to identify and categorize



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scholarly articles; identify research questions; and, collect, analyze, and present data and research findings. Credit will be granted for only one of GEOG 201, SUST 201, or GEOG 371. [2-0-1]

Equivalency: SUST 201.

GEOG 205 (3) Introduction to Hydrology

Principles of hydrology at site, watershed, and regional scales. Techniques of measurement and analysis. Emphasizes surface water hydrology of western North America. Credit will be granted for only one of GEOG 205 or EESC 205. [3-3-0]

Prerequisite: Either (a) GEOG 108 and GEOG 109; or (b) two of EESC 101, EESC 111, EESC 121 or (c) successful completion of first-year Science.

Equivalency: EESC 205.

GEOG 207 (3) Introduction to Biogeography

Geographical ecology emphasizing species distributions, abiotic-biotic interactions, disturbance and vegetation response, and human impacts across spatial scales. Vegetation sampling and analysis methods. [3-3-0]

Prerequisite: Either (a) GEOG 108 and GEOG 109; or (b) BIOL 116 and BIOL 125; or (c) BIOL 117 and BIOL 122; or (d) EESC 111 and EESC 121.

GEOG 213 (3) Introduction to Environmental Issues

Introduction to the major environmental issues facing this planet. [3-0-1]

Prerequisite: One of EESC 111, EESC 121, GEOG 108, GEOG 109, GEOG 128, GEOG 129.

GEOG 217 (3) Regional Geography of British Columbia

The development of a definition of contemporary regional geography; regional settlement patterns and their formative factors; the regional nature of resources; economic regions, networks, and communications; urban regions and regional districts in BC; an inquiry into the regional nature of the south central interior of BC. [3-0-0]

Prerequisite: GEOG 128.

GEOG 221 (3) Food Systems I: System Thinking

In-depth look at food systems, including food production, processing, distribution, consumption and waste. Required field trips will be organized that explore both the value chain of a farm and its related food industry; and the food system of a large institution. Students must arrange own transportation to/from Kelowna-area field location. Credit will be granted for only one of FDSY 221 and GEOG 221. (1.5-0-1.5)

GEOG 222 (3) Geomorphology

Landform assemblages and processes of landscape evolution on Earth. Fundamental concepts, including system equilibrium, thresholds, complex response to external forces, and scale dependency, with application to mountains, rivers, coasts, and glaciated terrain. Laboratory exercises require field work in lab time. Required one-day, weekend trip. Credit will be granted for only one of GEOG 222 or EESC 222. [3-3-0]

Prerequisite: Either (a) GEOG 108 and GEOG 109; or (b) MATH 100 and EESC 111 or (c) MATH 100 and 6 credits of first-year lab science.

Equivalency: EESC 222.

GEOG 250 (3) Introduction to Urban Geography

Examination of how cities emerge, function, and change. Introduces the city in its historical and geographical perspective, focusing on the complex relationship between economic, political, cultural, and environmental phenomena. Students will complete fieldwork projects examining these urban processes at work. [3-0-0]

Prerequisite: GEOG 128.

GEOG 255 (3) Space and Culture

Provides tools to undertake analyses of relationships between culture, politics, and everyday life. Themes will be selected from: a history of Anglo-American cultural geography, cultural studies and geography, cultural politics, sexuality and space, gender and geography, axes of power, and marginalization. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129.

GEOG 261 (3) Economic Geography

Analysis of structure/dynamics of economic landscapes; theories of location, distribution, and interactions associated with material production and consumption. Discussion themes selected from: distribution phenomena within context of social systems; agricultural systems and land use; industrial landscape formation; consumer behaviour, and spatial structure of service activities.

Prerequisite: All of GEOG 128, GEOG 129.

GEOG 265 (3) Tourism and Recreation Geography



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Regional analysis of geographic dimensions of tourism and recreation. Specific reference to the Canadian experience. Spatial distribution of activities and resources, interrelationships of tourism and recreation with the physical and human environment. Implications of existing and potential supplies/demands, challenges of planning and managing resources. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129.

GEOG 271 (3) Geographic Data Analysis

Introduction to descriptive and inferential statistical analysis in geography and Earth sciences. Topics include descriptive statistics, elementary probability, statistics for spatial analysis, hypotheses testing, analysis of variance, correlation, and regression. [3-3-0]

Prerequisite: 6 credits of 100- or 200-level courses in GEOG or EESC.

GEOG 272 (3) Cartography and Remote Sensing

Cartographic skills and interpretation of remotely-sensed data for geographical applications. Themes include: history of cartography; map scale; projections; types of maps; map interpretation; map making; manipulating cartographic data; interpreting aerial photographs and satellite imagery; integrating maps, remotely sensed data, and geographic information systems. [3-3-0]

Prerequisite: One of EESC 111, GEOG 109, GEOG 128.

GEOG 290 (3) Introduction to the Geography of Canada

Selected topics in human geography focusing on the regional distribution of natural resources, population, urban systems, and economic activities. [3-0-0]

Prerequisite: none.

GEOG 301 (3) Mechanisms of Global Change

Natural variability of climatic and environmental processes occurring at geological, historical, and contemporary timescales. Data derivation and analysis methods. Environmental changes affecting human activities. [3-0-0]

Prerequisite: Either (a) GEOG 108 and one of EESC 205, EESC 222, GEOG 205, GEOG 222; or (b) one of EESC 212, GEOG 200. Third-year standing.

GEOG 304 (3) Anthropogenic Climate Change

Mechanisms of anthropogenic climate change and its impact on the atmosphere, hydrosphere, cryosphere, and oceans since the Industrial Revolution. Use of computer models to forecast 21st century climate changes. Credit will be granted for only one of GEOG 304 or EESC 304. [3-0-0]

Prerequisite: One of GEOG 108, GEOG 200, EESC 212. Third-year standing.

Equivalency: EESC 304.

GEOG 307 (3) Advanced Biogeography

Present distribution and diversity of plants and animals; factors underlying the development of modern biogeographic realms; dispersal, colonization, and invasion; prehistoric and modern evolution and extinction; biodiversity; island biogeography; conservation biogeography. [3-0-1]

Prerequisite: Either (a) GEOG 207 or (b) BIOL 201.

GEOG 310 (3) Environment and Resources

Concepts of environment and resource; the role of physical geography in understanding the interaction of humans and the environment; introduction to the management of environment-resource systems. [3-0-0]

Prerequisite: Two of EESC 205, EESC 212, EESC 222, GEOG 108, GEOG 109, GEOG 200, GEOG 205, GEOG 222. Third-year standing.

GEOG 314 (3) Environmental Impact Assessment: Process, Regulation and Administration

Legal, administrative and project management aspects of environmental impact assessment (EIA). EIA regulations, processes and systems. Assessment approaches and methods for cumulative effects, social/economic impacts, strategic and regional assessment, risk assessment and public participation. Canadian federal, territorial and provincial EIA systems. Credit will be granted for only one of GEOG 314 or EESC 314 [3-0-0]

Prerequisite: Either (a) 6 credits of EESC or (b) 6 credits of GEOG. Third-year standing.

Equivalency: EESC 314.

GEOG 316 (3) Geography of Natural Hazards

The role of physical and biological hazards, human ecology, environmental perception and world social and political order in explaining the risk of natural disasters. Assessment of acceptable risk, disaster relief and reconstruction, and contrasts between developed and developing nations. [3-0-0]

Prerequisite: Either (a) GEOG 108 and GEOG 109; or (b) two of EESC 111, EESC 205, EESC 212, EESC 222, GEOG 200, GEOG 205, GEOG 222. Third-year standing.



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GEOG 317 (3) The Physical Environment of British Columbia

The biophysical processes that are shaping and have shaped B.C. Characteristic associations between landforms, climate, soil, and vegetation; biophysical constraints on air, land, and water use. [3-0-0]

Prerequisite: One of EESC 205, EESC 212, EESC 222, GEOG 200, GEOG 205, GEOG 222. Third-year standing.

GEOG 318 (3) Rural Geographies

Geographic perspectives in contemporary rural geography. Specific attention is given to social and environmental change, conflict and sustainability in Canadian and global contexts. Themes include transformations in the use of rural resources in agricultural, food, migration, and tourism production and consumption. Students are required to participate in short field trips and must arrange own transportation to/from sites within the Okanagan. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 341 (3) Quaternary Paleocology and Environmental Change

Recent natural and anthropogenic environmental changes interpreted from paleoecological records, with an emphasis on Quaternary micropaleontology. Impacts of environmental changes on North American terrestrial and aquatic communities. Students are expected to participate in a one-day weekend field trip. Credit will be granted for only one of EESC 341 or GEOG 341. [3-3*-0]

Prerequisite: One of CHEM 111, CHEM 121. Third-year standing.

Equivalency: EESC 341.

GEOG 351 (3) Urban Social Geography

Introduction to the social geographies of cities. Draws on critical social and cultural theories. Gentrification, racialization in the city, gendered spaces, class segregation, urban form, and cultural geographies of urban life. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 353 (3) Geographies of Migration and Settlement

Theoretical and applied perspectives on international migration and settlement. Analysis of international regimes regulating migration, changes in global demographics, immigration policies of nation states, international migration patterns, settlement policies and outcomes. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 354 (3) Urban Canada: Growth, Form, and Structure

Patterns and processes of urban growth, spatial structure and organization of the Canadian city, land development and suburbanization, urban core densification, inner city revitalization, consumption and production spheres, quality of life. Emphasis will be on medium-sized cities. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 356 (3) Stratigraphy and Sedimentology

Origin, classification and interpretation of sediments and sedimentary rocks. Weathering, erosion, transportation, sedimentation, and lithification of clastic materials. Non-clastic sediments. Sedimentary environments, facies and stratigraphic methods. Credit will be granted for only one of GEOG 356 or EESC 356. [3-3-0]

Prerequisite: One of EESC 121, EESC 222, GEOG 222.

Equivalency: EESC 356.

GEOG 358 (3) Gender, Place, and Culture

Examination of the ways in which genders and geographies are mutually constituted. Exploration of the relationship between socially constructed gender relations and geographic concepts of culture, space, place, nature, and landscape. Gendered nature of everyday space, work, education, and the natural environment. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 359 (3) Culture, Space, and Politics

Focuses on the cultural turn in geography. Draws upon recent critical theories from cultural studies and cultural geography.

Examines the cultural politics of everyday spaces and places. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 365 (3) Parks and Outdoor Recreation

Geographic dimensions of parks and outdoor recreation are examined in urban and rural environments. Understanding parks evolution includes focus on the location, distribution, and site capability of parks and recreational resources, including application of ecological, amenity resource, and management models of parks and outdoor recreational facilities. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 367 (3) Energy Resources Management



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Key energy systems and resources management from both global and Canadian perspectives. Supplies, distribution, consumption, resilience and sustainability of energy resources. Alternative energy sources, conventional and unconventional fossil fuels, energy production and delivery systems. Credit will be granted for only one of GEOG 367 or EESC 367. [3-0-0]

Prerequisite: One of GEOG 108, GEOG 129, EESC 101, EESC 111. Third-year standing

Equivalency: EESC 367.

GEOG 371 (3) Research Strategies in Human Geography

Formulating a research problem and selecting an appropriate research strategy. Research strategies range from social scientific survey methods to ethnography. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 377 (3) Research Strategies in Physical Geography

Theoretical frameworks and techniques. Formulation of research questions, research design, data collection, field observation and measurement, data analysis, sources of error, and presentation of results. [3-0-0]

Prerequisite: All of GEOG 108, GEOG 109 and one of EESC 205, EESC 212, EESC 222, GEOG 200, GEOG 205, GEOG 222, GEOG 271. Third-year standing.

GEOG 413 (3) Mountain Environments

Mountain environments from a geoecological perspective. Origins of mountains and their weather/climate, hydrology, geomorphology, and biogeography. Applications and limitations of geoecology for understanding mountain environments as human habitats. Case studies include mountain regions throughout the world. [3-0-0]

Prerequisite: One of EESC 205, EESC 212, EESC 222, GEOG 200, GEOG 205, GEOG 213, GEOG 222 and one of GEOG 310, GEOG 316, GEOG 317, GEOG 365, GEOG 377. Third-year standing.

GEOG 414 (3) Applied Climatology

Microclimatology and synoptic climatology, Earth-atmosphere interactions, and climatic impacts on human activities. Energy and mass transfers at Earth's surface; boundary layer climatology and its applications to airflow and pollution dispersion, climate modelling, general circulation models. [3-0-0]

Prerequisite: One of EESC 212, GEOG 200 and one of GEOG 301, GEOG 310, GEOG 377. Third-year standing.

GEOG 416 (3) Applied Management of Mountain Hazards

Develop an understanding of mountain hazards and approaches to their management, and foster a critical understanding of the contributions made to the field by other earth sciences. Hazards covered include snow avalanches, debris flows, floods, rock avalanches, and hazards of tectonically active mountains. The normal format of this course is as field course at a facility in the Canadian Cordillera. A special fee must be paid in advance. The alternative format is as a regular term course. [3-0-0]

Prerequisite: All of GEOG 108, GEOG 109, GEOG 316 and third-year standing. Permission of the Earth, Environmental and Geographic Sciences Department Head.

GEOG 421 (3) Geography of Food Systems

Contemporary issues in food systems, their relation to nutritional health, and social, cultural, economic, and environmental sustainability. Case studies illustrate different components (from production to consumption) and scales (from community to global). Field trip required. [2-0-1]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 422 (3) Fluvial Geomorphology

Geomorphic forms and processes within and along streams and rivers; flow hydraulics; sediment transport and bedform mechanics; hydraulic geometry; channel and floodplain dynamics; sediment yield; river habitat and stream rehabilitation. Credit will be granted for only one of GEOG 422 or EESC 422. [3-0-2]

Prerequisite: One of EESC 222, GEOG 222, APSC 253.

Equivalency: EESC 422.

GEOG 423 (3) Development of Environmental Thought

An examination of attitudes that have influenced land use and environmental change in the past and present. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 425 (3) Feminist Geographies of (Un)Belonging

Transnational and decolonizing feminist approaches to the geography of power as manifested through contemporary political identities. Focus on relationships between state-mediated categories of (un)belonging such as 'citizen', 'migrant', 'refugee', 'aboriginal', and 'illegal'. Emphasis on borders, border-identities, and multicultural/settler societies such as Australia, Israel, Canada and the United States. Credit will be granted for only one of GEOG 425 or GWST 425. [3-0-0]

Prerequisite: GEOG 358 or 6 credits of 100-level GWST. Third-year standing.

Equivalency: GWST 425.



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GEOG 427 (3) NeoGeography

Explores the development of NeoGeography and the geoweb: its relationship to geographic theories and concepts; its changing role in influencing the way in which we understand our relationship to space, place and the world around us. [2-0-1]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 431 (3) Resource Management Policy and Practice

Contemporary issues in resource and environmental management including decision-making theory and real-world processes at the policy and field levels. Case studies illustrate stakeholder behaviours from conflict to cooperation. Focus on the Okanagan. [1-0-2]

Prerequisite: One of GEOG 128, GEOG 129, GEOG 310 and third-year standing.

GEOG 434 (3) Geography of Tourism Development

Implications, character, and problems of existing and potential tourism resources. Concepts of tourism supply, demand, and impacts are considered and applied to the Okanagan Valley. Nature and significance of tourism; tourism resources; demands for tourism; economic, environmental, social, and cultural impacts of tourism. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 435 (3) Wine Geographies

Geographical expressions and processes of wine, viticulture, and viticulture. Appellation and terroir frame investigation of the nature-human interface in wine production and consumption. Geographic approaches include cultural history, global and localized political economies, cultural adaptation to climate, and physical geography. [3-0-0]

Prerequisite: All of GEOG 108, GEOG 109, GEOG 128, GEOG 129 and third-year standing.

GEOG 436 (3) Coastal Geomorphology

Geomorphic forms and processes along coasts; waves and currents; sediment transport mechanics; beach and nearshore morphodynamics; aeolian forms and processes. May include one or more required one-day weekend field trips. Credit will be granted for only one of GEOG 436 or EESC 436. [3-3-0]

Prerequisite: One of EESC 222, GEOG 222, APSC 253.

Equivalency: EESC 436.

GEOG 437 (3) Terrain Analysis

Identification, mapping, and quantification of terrain morphologies in the field and from remote sensing following professional codes of practice. Twelve days of field instruction over a two week period following spring exams. Students must arrange own transportation to/from field locations. Credit will be granted for only one of GEOG 437 or EESC 437. A special fee must be paid in advance.

Prerequisite: One of EESC 222, GEOG 222, GEOG 317, ENGR 340. Third-year standing. Permission of the Earth, Environmental and Geographic Sciences Department Head.

Equivalency: EESC 437.

GEOG 451 (3) Urban Planning

Urban and regional planning issues from a geographical perspective. Definition of community and its spatial expression in contemporary urban settings, institutional urban planning legislation, history of Canadian planning practice, contemporary urban and community planning practices, relationships between interests of community stakeholders and municipal decision-making process. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 454 (3) Geography of Housing

Topics focused on the Canadian city, including current housing markets, neighbourhood change, market failures and housing problems, social housing, and the role of government and policy. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 458 (3) Population Geography

The relationship between population growth, demographic changes, urbanization, and the environment. Demographic patterns, mortality, fertility and state policy, economic development, migration and immigration, planning, and policy issues. [3-0-0]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 466 (3) Soil Science

Physical, chemical, and biological properties of soils, soil formation and classification. Soil physics and water movement. Soil productivity, conservation, and sustainability. The application of soil science to land use, environmental quality, global change, and sustainable development. Credit will be granted for only one of GEOG 466 or EESC 456. [3-3-0]

Prerequisite: One of EESC 111, EESC 200, GEOG 109, CHEM 111, CHEM 121, PHYS 111, PHYS 112. Third-year standing.



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Equivalency: EESC 456.

GEOG 470 (3) Community Based Participatory Research: Theory and Practice

Theories, principles, and strategies of community engaged research. Advantages and limitations of this approach, and skills necessary for participating effectively in related projects. [3-0-0]

Prerequisite: One of GEOG 128, GEOG 129. And third-year standing.

GEOG 473 (3) Cartography and Society

A study of the art, science, politics, and application of maps and map-making. Lectures contain a core social-theory component that explores the critical cartography discourse - the creation of maps to address issues of location, representation, and power.

Seminars will debate contemporary issues in cartography. [2-0-1]

Prerequisite: All of GEOG 128, GEOG 129, GEOG 272 and third-year standing.

GEOG 474 (3) Qualitative Research in Human Geography

Theoretical aspects, principles, and methods of qualitative research in human geography. [1-0-2]

Prerequisite: Third-year standing. GEOG 371 highly recommended.

GEOG 480 (3) Advanced Seminar in Critical Geography

Surveys a range of approaches to critical theory in human geography. Topics include theoretical approaches to understanding geographies of everyday life: feminism, postcolonialism, postmodernism, poststructuralism, and socialism. [0-0-3]

Prerequisite: All of GEOG 128, GEOG 129 and third-year standing.

GEOG 491 (3/9) d Selected Topics in Geography

Intensive examination of a selected geographical theme or region. Contact the Department for more information. With different topics, the course can be taken more than once for credit.

Prerequisite: 6 credits of 300- or 400-level GEOG courses.

GEOG 498 (3-9) d Directed Studies in Geography

Students will undertake a supervised investigation which will result in a written report of the findings. The topic will be agreed upon by the supervising faculty member, the student, and the department head.

Prerequisite: Third-year standing, and permission of the relevant unit head and the supervising faculty member.

German, Faculty of Creative and Critical Studies

GERM: German

Students cannot take language courses out of sequence. Once a student successfully completes a German language course, they can no longer enroll in a course that is below the level of the last course that has been completed. Students should consult an advisor to ensure that they are enrolling in a level-appropriate German language course.

GERM 100 (3) Beginners' German I

Introduction to the language. Ability to communicate accurately in a variety of everyday situations. [3-0-0]

GERM 110 (3) Beginners' German II

Introduction to the language. Ability to communicate accurately in a variety of everyday situations, speak about past events, and express ideas and hypotheses in German. [3-0-0]

Prerequisite: GERM 100.

GERM 200 (3) Intermediate German I

Competence and fluency in everyday situations; ability to report and narrate past events fluently and to express opinions; familiarity with contemporary issues in the German-speaking societies. [3-0-0]

Prerequisite: One of German 12, GERM 110.

GERM 210 (3) Intermediate German II

Competence and fluency in everyday situations; ability to report and narrate past events fluently and to express opinions; familiarity with contemporary issues in the German-speaking societies; introduction to German for professional purposes. [3-0-0]

Prerequisite: GERM 200.

GERM 303 (3/9) d Topics in German Studies (in English)

Examining and interpreting different aspects of German culture, in particular the intersections between literature, film, and other



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manifestations of popular culture. [3-0-0]

Prerequisite: 3 credits of 100-level English.

GERM 349 (3) Franz Kafka in English Translation

Reading and discussion of the works of Franz Kafka in English translation. [3-0-0]

Prerequisite: 6 credits of first-year English.

Geospatial Information Science, Faculty of Science***GISC: Geospatial Information Science*****GISC 380 (3) Fundamentals of Geographic Information Science I**

Spatial data representation; raster and vector models; spatial database structure; coordinate reference frames and projections; spatial statistics; metadata and data standards; associated technologies and data sources. Laboratory exercises require ArcGIS. Credit will be granted for only one of GISC 380, GEOG 370, GEOG 380, or EESC 380. [3-3-0]

Prerequisite: Third-year standing.

GISC 381 (3) Fundamentals of Geographic Information Science II

GIS, remote sensing, GPS; geostatistics, spatial analysis, and neighbourhood analysis; visualization, 3D rendering, and animation; principles of geocoding; online mapping and open-source GIS; applied project and workflow management.

Laboratory exercises require ArcGIS. Credit will be granted for only one of GISC 381, GEOG 381, or EESC 381. [3-3-0]

Prerequisite: One of GISC 380, EESC 380, GEOG 380.

GISC 480 (3) Practical Applications in GIS

Application of GIS principles and tools in a problem solving context. Case studies are used as the basis for student projects, emphasising data sourcing, data analysis, decision-support, and project management skills. Laboratory and term projects require ArcGIS. [3-3-0]

Prerequisite: One of GISC 381, EESC 381, GEOG 381.

Gender, Women and Sexuality Studies, Faculty of Arts and Social Sciences***GWST: Gender, Women and Sexuality Studies*****GWST 100 (3) Gender, Race, Sexuality, and Power I: An Introduction**

Cross-cultural and historical antecedents to gender studies and feminist thought. The social construction of knowledge and inequality through gender, race, sexuality, and class; the cultural and structural forces that create the dynamic for change and resistance in the personal and political realms of gendered lives. [3-0-0]

GWST 110 (3) Gender, Race, Sexuality, and Power II: Everyday Life

Applying the conceptual frameworks learned in GWST 100, considers how gender, race, sexuality and power shape social inequalities in such realms as health, violence, poverty, and work. [3-0-0]

Prerequisite: GWST 100.

GWST 215 (3) Gender and Popular Culture

Examines how gender, sexuality and race intersect with representation in a variety of genres in popular culture. Considers the production, content, and reception of media texts. Ideological, institutional, social, and personal implications of these representations, and use of media to provoke change. [3-0-0]

GWST 216 (3) Critical Foundations: Feminism and Difference

History of feminist engagements with race, class, nation, and sexuality within an intersectional framework and in the wake of critiques of feminism's exclusivity. [3-0-0]

Prerequisite: GWST 100 and GWST 110.

GWST 223 (3) Critical Sexuality Studies

Overview of the historical emergence of critical sexuality studies. Sexological, psychoanalytic, Foucauldian, feminist, and queer theories of sexuality and gender will be examined. [3-0-0]

Prerequisite: 6 credits of 100-level GWST and second-year standing.

GWST 235 (3) Laughing Feminisms: Gender and Humour



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A survey of theory and humour from second-wave feminism to the contemporary moment, with special attention to women's comedy in literature, performance, and film. [3-0-0]

GWST 240 (3) Communication in Gender, Women and Sexuality Studies

Practice-based writing course designed to further develop communication skills in genres and media integral to Gender, Women and Sexuality Studies. Attentive to the dynamic relationship between knowledge and power, the course will focus on analysis and communication in written, visual, oral, mixed media, and digital modes. [3-0-0]

Prerequisite: One of ENGL 109, ENGL 112, ENGL 114, ENGL 150, ENGL 151, ENGL 153, ENGL 154, ENGL 155, ENGL 156.

GWST 272 (3) Feminism and Environment

Feminist theories and practice to understand and address environmental change. Role of decolonial, antiracist, disability justice and queer feminist perspectives in environmental justice, policy, art, and activism. [3-0-0]

Prerequisite: 6 credits of 100-level GWST.

GWST 323 (3) Feminist Epistemologies: Gender, Science, and Knowledge

Introduces foundations of feminist theories of knowledge. Examines critiques of the gendering of scientific knowledge and the relationship between scientific knowledge and social inequality. [3-0-0]

Prerequisite: 6 credits of 100-level GWST and third-year standing.

GWST 333 (3) Perspectives on Gendered Bodies

Interdisciplinary overview of approaches to gendered embodiment at the level of lived experience and of representation. Focus on the relationship of embodiment to social identity. [3-0-0]

Prerequisite: GWST 100 and GWST 110. Third-year standing.

GWST 334 (3) Feminist Research Methodologies

Involves the study of the literature of feminist scholarship from a variety of disciplines illustrating the plurality and complementarity of feminist methods. [3-0-0]

Prerequisite: One of GWST 323, GWST 335, and third-year standing.

GWST 335 (3) Feminist Theory in the Humanities

Examines feminist critiques of the history of Western thought and surveys the development of feminist cultural theory. [3-0-0]

Prerequisite: 6 credits of 100-level GWST and third-year standing.

GWST 340 (3) Writing the Self: Theory and Practice

Life writing with a focus on gender. Critical analysis and the production of narrative in such genres as memoir, autotheory, autoethnography, and critical poetics.

Prerequisite: Third-year standing or permission of the instructor.

GWST 419 (3) Gender, Dress, and Fashion: Histories and Theories

Overview of historical and theoretical perspectives on the gendered development of dress and the modern fashion system. Consideration of the relationship of identity and adornment. [3-0-0]

Prerequisite: 6 credits of 100-level GWST and third-year standing.

GWST 423 (3) Trans-(Gender) Feminisms

Overview of the historical emergence of trans-(gender) feminisms. Focus on debates across trans, queer, and feminist scholarship, methodology, and activism. Consideration of the politics of sex/gender transformation vis-a-vis 'race', 'culture', sexuality, class, and social justice. [3-0-0]

Prerequisite: One of GWST 216, GWST 223, and third-year standing.

GWST 425 (3) Feminist Geographies of (Un)Belonging

Transnational and decolonizing feminist approaches to the geography of power as manifested through contemporary political identities. Focus on relationships between state-mediated categories of (un)belonging such as 'citizen', 'migrant', 'refugee', 'aboriginal', and 'illegal'. Emphasis on borders, border-identities, and multicultural/settler societies such as Australia, Israel, Canada and the United States. Credit will be granted for only one of GWST 425 or GEOG 425. [3-0-0]

Prerequisite: GEOG 358 or 6 credits of 100-level GWST. Third-year standing.

Equivalency: GEOG 425.

GWST 430 (3) Femininities

Overview of theoretical and historical constructs of femininity in industrial and post-industrial society. Emphasis on multiple femininities and negotiations of feminine identity. [3-0-0]

Prerequisite: 6 credits of 100-level GWST and third-year standing.

GWST 435 (3) Women and Religion



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Overview of women's literary history and religion since the Middle Ages. Contemporary feminist theoretical engagements with religion and secularism, with an emphasis on race, ethnicity, and sexuality. [3-0-0]

Prerequisite: All of GWST 100, GWST 110 and third-year standing.

GWST 440 (3) Politics of Reproduction

Examination of feminist approaches to and theories of reproduction, including reproductive politics, technologies, and practices. Emphasis on queer, critical race, and science and technology studies perspectives. [3-0-0]

Prerequisite: All of GWST 100, GWST 110 and third-year standing.

GWST 491 (3/6) d Directed Studies

Individualized reading or research project on an assigned topic in Gender and Women's Studies, under the direction of a faculty member. Independent reading and analysis, and a major term paper.

Prerequisite: Third-year standing; 6 credits of Gender and Women's Studies; permission of the department.

GWST 495 (3/6) d Topics in Women's Studies

This course focuses on a selected topic in women's studies. Content will vary from year to year. Consult course listings for current year's offering. With permission of the Gender and Women's Studies program advisor, students may receive credit for this course more than once.

Prerequisite: Third-year standing and 6 credits of GWST.

Health Studies, Faculty of Health and Social Development

HEAL: Health Studies

HEAL 100 (3) Introduction and Principles of Health and Wellbeing

Broad introduction to health studies as it applies to principles of health and wellbeing with particular emphasis on student health. A review of education and research on a variety of student health issues, and their larger impact, will be investigated and discussed. Opportunities to develop skills and resources for optimal health as it relates to life and academic success are included. Credit will not be granted to use toward the Bachelor of Human Kinetics degree. [3-0-0]

HEAL 101 (3) Mental Health in Social Contexts

Social frameworks used to understand mental health and wellbeing of individuals, families and communities. [3-0-0]

HEAL 307 (3) Global Health Trends and Local Impacts

Global health trends within and across countries and regions and how these global realities affect health and health care locally. [3-0-0]

Prerequisite: HEAL 200 and one of HMKN 105, HEAL 201.

Hebrew, Faculty of Creative and Critical Studies

HEBR: Hebrew

Students cannot take language courses out of sequence. Once a student successfully completes a Hebrew language course, they can no longer enroll in a course that is below the level of the last course that has been completed. Students should consult an advisor to ensure that they are enrolling in a level-appropriate Hebrew language course.

HEBR 101 (3) Beginners' Modern Hebrew I

Development of listening, speaking, reading, and writing in Standard Modern Hebrew, with an emphasis on oral communication.

HEBR 102 (3) Beginners' Modern Hebrew II

Continuation of HEBR 101. Further development of listening, speaking, reading, and writing in Standard Modern Hebrew, with an emphasis on oral communication.

Prerequisite: HEBR 101.

Faculty of Health and Social Development

**HES: Health & Exercise Sciences****HES 100 (3) Health, Fitness, and Lifestyle**

The importance of exercise, fitness, physical activity, healthy eating, and other health behaviours across the lifespan. Principles of basic exercise prescription, fitness appraisal, behaviour change, and other positive health approaches; implications for personal health/quality of life, professional success, health care. Formerly offered as HMKN 100. Credit will be granted for only one of HES 100 or HMKN 100. [3-0-0]

Prerequisite: Registration limited to students in the B.H.E.S. program.

HES 101 (3) Human Physiology I

Human physiology from the cellular to the systemic level including cellular function, metabolism, the neuromuscular system, and the cardiorespiratory systems. Credit will only be granted for one of HES 101 or HMKN 190. [3-2-0]

Prerequisite: Registration limited to students in the B.H.E.S. program.

HES 102 (3) Biomechanics

Application of the elementary principles of physics and math to quantitative analysis of human movement. Analysis will also focus on the development of forces within muscles and their effect on initiating and controlling human movement (pertaining to exercise, physical activity, and rehabilitation). Formerly offered as HMKN 101. Credit will be granted for only one of HES 102 or HMKN 101. [3-0-0]

Prerequisite: Registration limited to students in the B.H.E.S. program.

HES 105 (3) Exercise Physiology I

Acute and chronic changes observed in physiological systems as a result of exercise and exercise training. Aerobic and anaerobic metabolism during exercise and cardiovascular, respiratory and muscular responses to physical activity. Formerly offered as HMKN 200. Credit will be granted for only one of HES 105 or HMKN 200. [3-2-0]

Prerequisite: Either (a) HES 100 or (b) HMKN 100; and either (a) HES 101 or (b) HMKN 190.

HES 108 (3) Canadian Health Care System

Medical, hospital, community health, and long-term care in Canada, including the evolution of health and hospital insurance policies, efforts to renew the Canadian health care system, innovations in primary health care, and current issues confronting health providers and policy makers. Formerly offered as HMKN 105. Credit will be granted for only one of HES 108 or HMKN 105. [3-0-0]

HES 111 (3) Human Physiology II

An introduction to human physiology from the cellular to the systemic level. This course will examine the gastrointestinal system, the neuroendocrine system, renal function, immune function, the integumentary system, reproduction and special senses. Credit will only be granted for one of HES 111 or HMKN 191. [3-2-0]

Prerequisite: HES 101.

HES 120 (3) Introduction to Human Anatomy

Introduce students to the basic structure and functional relationships of human anatomy in relation to movement. Specific structures include neural, muscular and skeletal systems. [3-2-0]

Prerequisite: Registration limited to students in the B.H.E.S. program.

HES 130 (3) Determinants of Health

Examining the relationships between biological, psychological, social, and economic factors to understand inequities in health outcomes for different individuals and populations. Formerly offered as HEAL 200. Credit will be granted for only one of HES 130 or HEAL 200. [3-0-0]

HES 131 (3) Exercise Psychology

Psychological theories and research related to exercise adoption, maintenance, and avoidance. Psychological antecedents and consequences of exercise behaviour. Formerly offered as HMKN 201. Credit will be granted for only one of HES 131 or HMKN 201. [3-0-0]

Prerequisite: Either (a) HES 100 or (b) HMKN 100.

HES 200 (3) Introduction to Nutrition

Application to health promotion and disease prevention including the study of macro- and micronutrients, their functions, absorption, and metabolism in the body. Examination of healthy food sources and eating habits to support health and wellbeing. Credit will only be granted for one of HES 200 or HMKN 323. [3-0-0]

Prerequisite: Either (a) HES 100 or (b) HMKN 100.

HES 201 (3) Exercise Prescription



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Exercise prescription and testing for both the healthy adult population and for special populations or persons with a disability. Credit will only be granted for HES 201 or HMKN 311. [3-0-0]

Prerequisite: Either (a) HES 105 or (b) either (a) HES 120 or (b) HMKN 200.

HES 202 (3) Human Motor Behaviour I

Processes and structures underlying the production human movement. Sensory, motor and cognitive factors influencing the learning, execution, and control of action will be addressed. Formerly offered as HMKN 202. Credit will be granted for only one of HES 202 or HMKN 202. [3-0-0]

Prerequisite: Either (a) HES 101 or (b) HMKN 190; and either (a) HES 102 or (b) HMKN 101; and either (a) HES 111 or (b) HMKN 191.

HES 203 (3) Lifespan Physical and Motor Development

Principles governing physical growth and motor development related to physical activity. Lifespan changes, including aging, and their impact on physical activity participation and performance. Formerly offered as HMKN 203. Credit will be granted for only one of HES 203 or HMKN 203. [3-0-0]

Prerequisite: Either (a) HES 100 or (b) HMKN 100; and either (a) HES 101 or (b) HMKN 190; and either (a) HES 111 or (b) HMKN 191.

HES 211 (3) Exercise Testing

The theory, practice and analysis of safe and effective health, fitness, physiological and lifestyle assessments, including the design, implementation and analysis of standard protocols. [3-2-0]

Prerequisite: HES 120.

HES 212 (3) Exercise Training, Conditioning and Rehabilitation for Health, Fitness and Performance

The theory, practice and analysis of safe and effective exercise training, including the design, implementation and analysis of exercise sessions, training and rehabilitation programs and ongoing monitoring strategies. [3-2-0]

Prerequisite: HES 120.

HES 220 (3) Introduction to Athletic Injury Management

Basic principles and concepts associated with the prevention, recognition and management of athletic injuries. Common athletic injuries will be studied along with the practical skills in basic prophylactic wrapping and taping associated with the care of these injuries. Credit will only be granted for one of HES 220 or HMKN 336. [3-2-0]

Prerequisite: HES 120.

HES 231 (3) Exercise Counseling and Behaviour Modification

Application of evidence-informed behavior change techniques to help individuals adopt and adhere to health behaviors. Credit will only be granted for one of HES 231 or HMKN 316. [3-2-0]

Prerequisite: Either (a) HES 131 or (b) HMKN 201.

HES 232 (3) Introduction to Community Programming

The theory and practice of designing community-based programs to promote behavior change based on recent advances in behavioural science. Credit will only be granted for HES 232 or HMKN 303. [3-0-0]

Prerequisite: Either (a) HES 231 or (b) HMKN 316. Registration limited to students in the Health Behavior Change concentration of the B.H.E.S program.

HES 240 (3) Health Research Methods

Introduction to the research methods commonly encountered in health research, including quantitative and qualitative designs; provides a basis for comprehending more fully the research literature relevant to health studies. Formerly offered as HMKN 206. Credit will be granted for only one of HES 340 or HMKN 206. [3-0-0]

Prerequisite: Either (a) HES 100 or (b) HMKN 100 and second-year standing in Human Kinetics.

HES 250 (3) Clinical Assessment

Key technical skills in conducting clinical evaluations by exercise practitioners, including client interviews and communication, physical examination, pharmacological considerations, health and fitness measures and appropriate data recording and documentation. [3-3-0]

Prerequisite: HES 211. Registration limited to students in the Clinical Exercise Physiology concentration of the B.H.E.S program.

HES 305 (3) Exercise Physiology II

Oxygen transport and vascular response during exercise in humans. Regulation and adaptation of the cardiovascular and respiratory systems during exercise. Formerly offered as HMKN 310. Credit will be granted for only one of HES 305 or HMKN 310. [3-2-0]

Prerequisite: Either (a) HMKN 200 or (b) HES 105.



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HES 311 (3) Pathophysiology

The physiological basis of selected cardiovascular, muscular, respiratory, and nervous system disorders, and their effects on health and exercise. Formerly offered as HMKN 335. Credit will be granted for only one of HES 311 or HMKN 335, BIOL 231, BIOL 235 or HINT 231. [3-0-0]

Prerequisite: Either (a) HES 105 or (b) HMKN 200; and either (a) HES 202 or (b) HMKN 202.

HES 320 (3) Functional Anatomy

Functional aspects of human anatomy with special attention to musculoskeletal, vascular, and neural systems that support integrated human movement. Credit will only be granted for one of HES 320 or HMKN 391. [3-2-0]

Prerequisite: HES 120.

HES 321 (3) Laboratory Techniques in Exercise Science

Current methods in exercise science will be demonstrated via modules presented by faculty in their areas of specialization including electrophysiological techniques and methods of assessing blood-flow, respiratory capacity, and muscle function. Formerly offered as HMKN 312. Credit will be granted for only one of HES 321 or HMKN 312. [2-3-0]

Prerequisite: One of HES 305, HMKN 310. Registration is limited to students in the Kinesiology & Allied Health Concentration in the B.H.E.S. Program.

HES 322 (3) Physical Activity and Health Promotion

Design and implementation of health promotion strategies in a variety of arenas, particularly health promotion/education strategies aimed at encouraging physical activity. Formerly offered as HMKN 322. Credit will be granted for only one of HES 322 or HMKN 322. [3-0-0]

Prerequisite: One of HMKN 100, HES 100 and one of HEAL 200, HES 130 and one of HMKN 201, HES 131.

HES 331 (3) Motivational Interviewing

Study of behaviour change techniques with a particular focus on motivational interviewing, used in one-to-one behavioural support interactions. The course will instill knowledge of theory as well as applied skills in behaviour change counselling. Credit will be only be granted for one of HES 331 or HMKN 495N. [1.5-1.5-0]

Prerequisite: All of HES 231, HES 232.

HES 332 (3) Advanced Theories of Health Behaviour Change

Advanced theories in health and exercise psychology and their critical evaluation regarding utility for instilling and sustaining health behaviour change. Formerly offered as HMKN 421. Credit will be granted for only one of HES 332 or HMKN 421. [3-0-0]

Prerequisite: Either (a) HES 232 or (b) HMKN 316. Registration is limited to students in the Health Behavior Change Concentration in the B.H.E.S. Program.

HES 333 (3) Health Program Evaluation

Introduction to the key concepts and methods used in evaluation of health programs. Formerly offered as HMKN 303. Credit will be granted for only one of HMKN 303 or HES 333. [3-0-0]

Prerequisite: Either (a) HES 100 or (b) HMKN 100; and either (a) HES 131 or (b) HMKN 201. Registration is limited to students in the Health Behavior Change Concentration in the B.H.E.S. Program.

HES 336 (3) Tissue Injury and Repair

The mechanics of both injury and repair of muscular, connective and nervous tissue in acute and chronic conditions. Formerly offered as HMKN 336. Credit will be granted for only one of HES 336 or HMKN 336. [3-2-0]

Prerequisite: One of HMKN 391, HES 320.

HES 340 (3) Methods of Data Analysis

Introduction to basic statistics and methods relevant to the analysis and interpretation of quantitative data pertaining to health and social well-being. Credit will be granted for only one of HES 340, HMKN 205, STAT 121 or STAT 230. [3-0-0]

Prerequisite: Either (a) HES 240 or (b) HMKN 206.

HES 351 (3) Clinical Exercise Physiology

Integrative approach to normal and abnormal responses to exercise as well as the physiological effects of chronic conditions and their clinical management in exercise physiology. [3-0-2]

Prerequisite: All of HES 250, HES 311. Registration limited to students in the Clinical Exercise Physiology concentration of the B.H.E.S. program.

HES 352 (3) Exercise Testing for Clinical Populations

Analysis of standard and specialized protocols, recommendations, equipment, personnel and parameters of exercise assessments for individuals living with clinical populations. [3-2-0]

Prerequisite: HES 250 and either (a) HES 311 or (b) HMKN 335. Registration limited to students in the Clinical Exercise



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Physiology concentration of the B.H.E.S program.

HES 353 (3) Clinical Exercise Prescription

Advanced exercise prescription considerations for individuals with chronic conditions and special populations (e.g., pediatric, aging). [3-2-0]

Prerequisite: HES 352. Registration limited to students in the Clinical Exercise Physiology concentration of the B.H.E.S program.

HES 354 (3) Clinical Exercise Physiology Applications in Chronic Conditions: Cardiovascular Disease

Clinical considerations of cardiovascular conditions and treatment for safe and effective implementation of exercise programs for people with cardiovascular disease. Critically review evidence, standards and recommendations for use of exercise in the management and prevention of cardiovascular disease. [3-0-0]

Prerequisite: HES 351. Registration limited to students in the Clinical Exercise Physiology concentration of the B.H.E.S program.

HES 355 (3) Clinical Exercise Physiology Applications in Chronic Conditions: Endocrinology and Metabolic Disorders

An overview of the clinical considerations of metabolic and endocrine pathologies and treatment for the safe and effective design and implementation of exercise programs for people with metabolic and/or endocrine disease. Students will critically review evidence and current standards and recommendations for the use of exercise in the management and prevention of metabolic and endocrine diseases and disorders. [3-0-0]

Prerequisite: HES 351. Registration limited to students in the Clinical Exercise Physiology concentration of the B.H.E.S program.

HES 356 (3) Health Behaviour Change for Chronic Disease Management

Overview of behaviour change theories and principles of behaviour change intervention design with a particular focus on individual and community-based programming for those living with a variety of chronic conditions. [3-0-0]

Prerequisite: Either (a) HES 231 or (b) HMKN 316. Registration limited to students in the Clinical Exercise Physiology concentration of the B.H.E.S program.

HES 371 (3) Professional Practice in Health & Exercise Sciences

Key considerations for safe, effective and professional practice for health and exercise specialists including legal, ethical and client-care standards. [3-0-0]

Prerequisite: All of HES 211, HES 212.

HES 380 (3) Exercise Metabolism

The underlying metabolic events associated with exercise and nutritional challenges. Substrate delivery and skeletal muscle metabolism with respect to exercise. Formerly offered as HMKN 313. Credit will be granted for only one of HES 380 or HMKN 313. [3-0-0]

Prerequisite: Either (a) HMKN 200 or (b) HES 105; and either (a) HES 200 or (b) HMKN 323.

HES 381 (3) Body Composition

Body composition, with particular emphasis on the influence of physical (in)activity. Techniques for measuring the amounts of adipose tissue, muscle, and bone in the body. Formerly offered as HMKN 314. Credit will be granted for only one of HES 381 or HMKN 314. [3-0-0]

Prerequisite: Either (a) HMKN 190 or (b) HES 120.

HES 382 (3) Sport Psychology

How psychological factors influence and are influenced by participation and performance in sport including personality, motivation, arousal, attitude, perception, aggression, competition, concentration, confidence, and goal setting as they pertain to sport. Formerly offered as HMKN 321. Credit will be granted for only one of HES 382 or HMKN 321. [3-0-0]

Prerequisite: Either (a) HMKN 201 or (b) HES 131.

HES 383 (3) Physical Dimensions of Aging

Changes in physiological function with age. For students planning to become health professionals. Various dimensions of life, including health and functional capacity, are addressed. Formerly offered as HMKN 331. Credit will be granted for only one of HES 383 or HMKN 331. [3-0-0]

Prerequisite: Either (a) HES 105 or (b) HMKN 200; and either (a) HES 203 or (b) HMKN 203.

HES 384 (3) Socio-Cultural Aspects of Healthy Aging

Health priorities for the elderly and intersectoral initiatives to positively influence physical, mental, and social well-being and functioning. [3-0-0]

Prerequisite: Second-year standing. Recommended: HES 130 or HEAL 200.

HES 401 (3) Community Placement Experience

Practical work experience in a supervised health/human kinetics related work setting with a cooperating agency, private business, or industry. No more than 9 credits in total will be granted for any combination of HMKN 401, HMKN 402, HMKN 499.



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Formerly offered as HMKN 401. Credit will be granted for only one of HES 401 or HMKN 401. Pass/Fail.

Prerequisite: One of HMKN 205, HES 240 and one of HMKN 206, HES 340 and fourth-year standing in Human Kinetics and permission of the Undergraduate Chair.

HES 402 (3) Advanced Community Placement Experience

Advanced 'hands-on' practical work experience in a supervised health-related work setting with a partnered organization.

Formerly offered as HMKN 402. Credit will be granted for only one of HES 402 or HMKN 402.

Prerequisite: One of HMKN 401, HES 401 and permission of both the Practicum Coordinator and the Undergraduate Chair.

HES 420 (3) Advanced Functional Anatomy

Advanced aspects of functional human movement, exercise and musculoskeletal pathology with special attention to developmental, evolutionary and clinical perspectives including movement analysis, design and implementation of exercises to address muscle imbalances and movement in healthy and clinical populations. [3-2-0]

Prerequisite: Either (a) HES 320 or (b) HMKN 391. Registration limited to students in the Kinesiology & Allied Health concentration of the B. H.E.S. program.

HES 433 (3) Knowledge Translation in Health and Exercise Sciences

Methods for knowledge mobilization, implementation, theory and practice in knowledge translation for healthcare professionals.

Formerly offered as HMKN 408. Credit will be granted for only one of HES 433 or HMKN 408. [3-0-0]

Prerequisite: Either (a) HMKN 206 or (b) HES 240.

HES 453 (3) Clinical Exercise Physiology Applications in Chronic Conditions: Musculoskeletal and Neurological Diseases and Disorders

Clinical considerations of musculoskeletal and neurological diseases/disorders including treatment for safe and effective implementation of exercise programs for people with musculoskeletal and neurological conditions. Critical review of evidence, standards and recommendations in exercise management for musculoskeletal and neurological diseases/disorders. [3-0-0]

Prerequisite: HES 351. Registration limited to students in the Clinical Exercise Physiology concentration of the B.H.E.S.

HES 454 (3) Clinical Exercise Physiology Applications in Chronic Conditions: Respiratory Disease

Clinical considerations of respiratory diseases. Safe and effective implementation of exercise programs for people with respiratory disease. Critical review of evidence, standards and recommendations for the use of exercise in the management and prevention of respiratory disease. [3-0-0]

Prerequisite: HES 351. Registration limited to students in the Clinical Exercise Physiology concentration of the B.H.E.S.

HES 455 (3) Clinical Exercise Physiology Applications in Chronic Conditions: Oncology

Clinical considerations of cancer pathology. Safe and effective design and implementation of exercise programs for people living with cancer. Critical review of evidence, standards and recommendations for the use of exercise in the management and prevention of cancer. [3-0-0]

Prerequisite: HES 351. Registration limited to students Clinical Exercise Physiology concentration of the B.H.E.S program.

HES 459 (3) Clinical Exercise Physiology: Advanced Practice

Guided comprehensive protocol testing to demonstrate mastery of program knowledge and skills, and readiness to practice in clinical exercise physiology. [0-3-0]

Prerequisite: HES 493. Registration limited to students in their final year of the Clinical Exercise Physiology concentration of the B.H.E.S program.

HES 471 (3) Professional Ethics in Health & Exercise Sciences

Ethical and legal responsibilities of allied health practitioners in care and service to clients, patients and public relating to codes of conduct, consent, trust, confidentiality, standards of care, negligence, record keeping, beneficence, least harm, dignity and scope of practice. [3-0-0]

Prerequisite: HES 371. Registration limited to students in the Clinical Exercise Physiology concentration of the B.H.E.S program.

HES 480 (3) Concussion

Investigation of the diagnosis, deficits and treatment of concussion, and the neurocognitive, biomechanical, cerebrovascular, and sensorimotor effects of the injury. Formerly offered as HMKN 404. Credit will be granted for only one of HES 480 or HMKN 404. [3-0-0]

Prerequisite: Either (a) HES 240 or (b) HMKN 206; and either (a) HES 311 or (b) HMKN 335; and HES 340 and HMKN 205.

HES 481 (3) Pediatric Exercise Physiology

Investigation into the physiological responses of children and adolescents to exercise. Formerly offered as HMKN 406. Credit will be granted for only one of HES 481 or HMKN 406. [3-0-0]

Prerequisite: Either (a) HES 105 or (b) HMKN 200; and either (a) HES 305 or (b) HMKN 310.



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HES 482 (3) Advanced Training Methods

Advanced theory and applications of exercise physiology and training methodology to the conditioning process for sport and physical activity. Formerly offered as HMKN 409. Credit will be granted for only one of HES 482 or HMKN 409. [3-0-0]

Prerequisite: Either (a) HES 340 or (b) HMKN 205; and either (a) HES 240 or (b) HMKN 206; and all of HES 211, HES 212.

HES 483 (3) Environmental Physiology

Regulation and adaptation of the cardiovascular, circulatory, and respiratory systems during environmental extremes. Formerly offered as HMKN 411. Credit will be granted for only one of HES 483 or HMKN 411. [3-0-0]

Prerequisite: One of HES 305, HMKN 310.

HES 484 (3) Neuromuscular Physiology

Integrated actions of the neural, somatosensory, and motor systems underlying human movement in healthy, diseased, and aged individuals. Emphasis will be placed upon motor unit physiology, reflexes, and the descending motor system. Formerly offered as HMKN 412. Credit will be granted for only one of HES 484 or HMKN 412. [3-0-0]

Prerequisite: Either (a) HES 240 or (b) HMKN 206; and either (a) HES 321 or (b) HMKN 315; and either (a) HES 340 or (b) HMKN 205.

HES 485 (3) Advanced Circulatory Physiology

Regulation and adaptation of the circulatory systems at rest, during exercise. Focus on adaptations and prescription implications following pathology. Formerly offered as HMKN 414. Credit will be granted for only one of HES 485 or HMKN 414. [0-0-3]

Prerequisite: Either (a) HES 240 or (b) HMKN 206; and either (a) HES 305 or (b) HMKN 310; and either (a) HES 311 or (b) HMKN 335; and either (a) HES 340 or (b) HMKN 205.

HES 486 (3) Muscle Fatigue

Physiological mechanisms within the central nervous system and muscle fibres which contribute to muscle fatigue. The influence of various factors (e.g., sex, age, disease) on muscle fatigue. Formerly offered as HMKN 415. Credit will be granted for only one of HES 486 or HMKN 415. [3-0-0]

Prerequisite: Either (a) HES 240 or (b) HMKN 206; and either (a) HES 305 or (b) HMKN 310; and either (a) HES 321 or (b) HMKN 315; and either (a) HES 340 or (b) HMKN 205.

HES 487 (3) Applied Nutrition: Exercise and Chronic Disease

Application of principles of nutrition to chronic disease and exercise. Practical considerations of prescription toward sport performance and disease prevention. Formerly offered as HMKN 423. Credit will be granted for only one of HES 332 or HMKN 423. [3-0-0]

Prerequisite: Either (a) HES 200 or (b) HMKN 323; and either (a) HES 311 or (b) HMKN 200.

HES 488 (3) Cortical Control of Movement

Cortical events associated with sensation and motor planning associated with goal-directed movement. Particular focus on plasticity associated with disease and injury. Formerly offered as HMKN 413. Credit will be granted for only one of HES 488 or HMKN 413. [3-0-0]

Prerequisite: Either (a) HES 202 or (b) HMKN 202; and either (a) HES 240 or (b) HMKN 206; and HES 340 and HMKN 205.

HES 490 (3/6) d Project in Human Kinetics

Provides opportunities to perform research pertaining to a chosen area of Human Kinetics as agreed upon by a faculty member and student. No more than 6 credits in total of HES 490.

Prerequisite: Either (a) HES 240 or (b) HMKN 206; and either (a) HES 340 or (b) HMKN 205. Permission of the School of Health and Exercise Sciences.

HES 491 (1) Undergraduate Honours Research Seminar

Seminar examining current topics, controversies, and arising research trends in health and exercise sciences. Pass/Fail. Formerly offered as HMKN 403. Credit will be granted for only one of HES 491 or HMKN 403. [0-0-1]

Prerequisite: Restricted to students in the B.H.E.S. Honours program.

HES 492 (6) Undergraduate Honours Thesis

A research problem in health and exercise sciences under the supervision of a Health and Exercise Sciences faculty member. Students engage in research requiring a written report with a public presentation of the findings. Formerly offered as HMKN 449. Credit will be granted for only one of HES 492 or HMKN 449.

Prerequisite: Restricted to students in the B.H.E.S. Honours Program.

HES 493 (6) Community Practicum

Practical work experience in a supervised health, fitness or performance work setting with a community-based partner.

Prerequisite: HES 212. Registration limited to students in the Clinical Exercise Physiology concentration of the B.H.E.S program.



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HES 494 (15) Advanced Community Practicum

Advanced practical work experience in a supervised clinical work setting with a community-based partner who serve individuals living with chronic disease conditions.

Prerequisite: HES 459. Registration limited to students in the Clinical Exercise Physiology concentration of the B.H.E.S program.

HES 495 (3/6) d Special Topics in Health and Exercise Sciences

Formerly offered as HMKN 495. Credit will be granted for only one of HES 495 or HMKN 495. [3-0-0]

Prerequisite: Either (a) HES 240 or (b) HMKN 206; and either (a) HES 340 or (b) HMKN 205. Permission of the School of Health and Exercise Sciences.

HES 505 (3) Quantitative Analyses: Decision Making Using Data in Health & Exercise Science

How to analyze and interpret statistical data commonly encountered in health and exercise science research. Content includes the choice of appropriate statistical analyses, cleaning data, correlation, linear regression, multiple and logistic regression, t-tests and analyses of variance.

HES 506 (3) Research Methods in Health and Exercise Sciences

Principles of research methods including philosophy of science, research designs, ethical considerations, critical analysis, qualitative and quantitative approaches, proposal development.

HES 515 (3) Advanced Neuromuscular Physiology and Sensorimotor Neuroscience

Neuromuscular and neuroanatomical processes involved in the control of muscle contraction and movement. Special emphasis on physiological adaptations within the nervous and muscular systems as a result of acute (e.g., exercise, fatigue, injury, hypoxia) and chronic (e.g., training, age, disease) perturbations.

HES 516 (3) Laboratory Techniques and Analysis in Neuromuscular Physiology and Sensorimotor Neuroscience

Practical experience with cutting-edge techniques and analyses used in the areas of neuromuscular physiology and sensorimotor neuroscience.

HES 525 (3) Behaviour Change Taxonomies and Theories of Health Behaviour Change: Overlap, Integration, and Application

An in-depth examination of behavior change taxonomies and associated techniques, and how these relate and compare to theories of health behaviour change. Critical analysis of how techniques and theories can be applied will occur through discussion, debate, article synopses, presentations, and written assignments.

HES 526 (3) Introduction to Narrative, Scoping, and Systematic Reviews in Health and Exercise Sciences

This course will provide an in-depth and applied learning experience on what narrative, scoping, and systematic reviews are, steps involved in conducting a rigorous review, how to interpret and evaluate the quality of reviews, and how to prepare a protocol for a review.

HES 535 (3) Advanced Integrative Human Physiology I

Human oxygen uptake, transport mechanisms and the coordination of physiological systems.

HES 536 (3) Advanced Integrative Human Physiology II

Muscle oxygen utilization and the integration of physiological systems across the lifespan and environmental stressors.

HES 545 (3/6) d Special Topics in Health and Exercise Sciences

Credit will be granted for only one of HMKN 495 or HMKN 545 when the subject matter is of the same nature.

HES 549 (18) M.Sc. Thesis

Pass/Fail.

HES 649 (0) Ph.D. Dissertation

Pass/Fail.

Health-Interprofessional, Faculty of Health and Social Development***HINT: Health-Interprofessional*****HINT 110 (3) Applied Research in Health**

Basic statistical concepts and procedures with the goal of developing statistical literacy in health care contexts. Includes the use of both descriptive and inferential statistical methods as well as an introduction to software used in quantitative data analysis. 3-0-0

HINT 231 (3) Pathophysiology for Health Sciences

Basic pathophysiology associated with selected diseases and disorders that are commonly encountered by health practitioners



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in Canada. Pathophysiology, etiology, as well as some of the signs and symptoms, diagnostic tests and treatments currently associated with each disorder. Credit will be granted for either HINT 231 or HKMN 335. [3-0-0]

Prerequisite: All of BIOL 131, BIOL 133.

HINT 331 (3) Nutrition for Health Sciences

Introduction to the dietary requirements of nutrients and their related sources, metabolism, and functions. Nutrition in the context promoting health, preventing disease, and managing illness will be the focus, incorporating tools and knowledge about healthy food choices and dietary habits based on scientific evidence. Current nutritional issues will also be discussed. [3-0-0]

Prerequisite: All of BIOL 131, BIOL 133.

HINT 408 (3) Cultural Safety in Health: Indigenous Perspectives

A critical exploration of cultural identity and racism (historical and contemporary) within health systems to help students develop competencies for improved sensitivity and responsiveness to Aboriginal people within health care, research, institutions, and community. Credit will be granted for only one of HINT 408 or HINT 508. [3-0-0]

Prerequisite: Third-year standing.

HINT 504 (3) Qualitative Methods: Interdisciplinary Health

Understanding the predominant approaches in qualitative health research. Knowledge and skills in conducting qualitative research, including methodology, research design, data collection, data analysis, and communication of findings.

HINT 508 (3) Cultural Safety in Health: Indigenous Perspectives

A critical exploration of cultural identity and racism (historical and contemporary) within health systems to help students develop competencies for improved sensitivity and responsiveness to Aboriginal people within health care, research, institutions, and community. Credit will be granted for only one of HINT 408 or HINT 508. [3-0-0]

Prerequisite: Permission of the instructor.

HINT 512 (3) Special Topics in Interprofessional Practice

Seminar in special topics relevant to interprofessional practice not covered by other courses. Topics will vary.

Prerequisite: Permission of instructor.

HINT 522 (3) Leadership in Human Service Organizations

Examines the theory and practice of leadership in human service organizations. Provides an in-depth understanding of the complex range of environmental, community, organizational, ethical, and professional contexts of managing or supervising in modern agencies.

HINT 524 (3) Interprofessional Practice Issues in Healthy Aging

Critical examination of multi-disciplinary theories, models, and concepts associated with healthy aging. Offers an understanding of the standards, roles, and contributions associated with various disciplines within interdisciplinary community-based health teams.

HINT 525 (3) Disabilities Studies and Interprofessional Health Care

Examination of disability studies and its relationship to clinical practice. Various theoretical frameworks used to understand disability and their implications for practice are critically examined.

History, Faculty of Arts and Social Sciences

HIST: History

HIST 106 (3) Global Environmental History

The impact of humans on the environment, and the ways in which the physical environment has shaped human history: climate, agriculture, energy use, and urbanization. [3-0-0]

HIST 110 (3) Survey of the Ancient World

Survey of ancient history from the first civilizations in the Near East to the fall of Rome. Includes examinations of the ancient civilizations of Mesopotamia, Egypt, Greece, and Rome. This course is intended as a basis for understanding the origins of Western civilization. [3-0-0]

HIST 111 (3) Modern United States History

Survey of the major economic, political, and social developments from the Civil War to the present. Credit will be granted for only one of HIST 111 or HIST 221. [3-0-0]

HIST 112 (3) Canada to 1867



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Contributions of the First Nations, French, English, and others to the social, economic, and political development of Canada. Also offered by distance education. [3-0-0]

HIST 115 (3) World History from First to Second World War

Study of the emergence of the contemporary world from the origins of World War I to the aftermath of World War II. [3-0-0]

HIST 116 (3) History of Western Civilization, 1450-1789

Survey of the major events, systems of thought, and human accomplishments that have contributed to Western civilization. Study includes events dating from approximately 1450, when developments in government, science, industry, art, and philosophy began to accelerate significantly. [3-0-0]

HIST 119 (3) Medieval Europe

Introduction to the changes in European society from the late Roman Empire to the Renaissance, with an emphasis on the Middle Ages as a dynamic era. The period saw the development of many of the institutions of modern civilization, including common law, parliament, and the university. Religion, family, and warfare in the Middle Ages are examined. [3-0-0]

HIST 122 (3) Canada Since 1867

Analysis of the social, economic, and political development of the Canadian nation since Confederation. Also offered by distance education. [3-0-0]

HIST 126 (3) History of Western Civilization, 1789 to Present

Survey of the development of Europe through the political, social, and industrial revolutions that ushered in the age of European supremacy. Examination of the World Wars and their impact on the decline of Europe. [3-0-0]

HIST 145 (3) Contemporary World History

Events and forces shaping the world since the mid-twentieth century. [3-0-0]

HIST 151 (3) Modern Latin American History

Survey of the major economic, political, and social currents in Latin America from independence to the present. Credit will be granted for only one of HIST 151 or HIST 241. [3-0-0]

HIST 201 (3) Religion in the West

History of Western religious traditions from the first civilizations to the present. Origins of and development in Judaism, Christianity, and Islam. [3-0-0]

Prerequisite: One of HIST 110, HIST 116, HIST 119, HIST 126.

HIST 211 (3) The United States to 1865

Study of themes of the major economic, political, and social developments in what would become the United States from the late fifteenth century through the Civil War. [3-0-0]

HIST 214 (3) Introduction to the History of Modern China, 1800 to Present

Overview of the economic, social, political, and intellectual dynamics of the modern history of China. The history of China from the Chinese perspective and the impact of the West and modernization on that history. [3-0-0]

HIST 215 (3) Technology in History

Introduction to the history of technology and society from antiquity to the present. [3-0-0]

Prerequisite: 3 credits of HIST, or MDST 101 and 3 credits of COSC.

HIST 218 (3) History of Science

Survey of important events in the history of science from ancient times to the present. [3-0-0]

Prerequisite: 3 credits of HIST.

HIST 240 (3) Pre-Contact and Colonial Latin American History

Study of themes of Latin American history from emergence of indigenous civilizations to the end of Spanish and Portuguese colonialism in the nineteenth century. [3-0-0]

HIST 300 (3) History of Indigenous Peoples of Canada to 1876

The Indigenous people (status and non-status) of Canada from contact to the passage of the Indian Act in 1876. Topics include government policies, environment, gender, religion, oral narratives, colonial frontiers, disease, fur trade. Credit will be granted for only one of HIST 300 or HIST 302. [3-0-0]

Prerequisite: 6 credits of HIST and third-year standing; or HIST 112, INDG 100, and third-year standing.

HIST 301 (3) History of Indigenous Peoples of Canada Since 1876

The Indigenous people (status and non-status) of Canada from the passage of the Indian Act in 1876 to the present. Topics include government policies, environment, gender, religion, oral narratives, activism, urbanization, identity. Credit will be granted



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for only one of HIST 301 or HIST 302. [3-0-0]

Prerequisite: 6 credits of HIST and third-year standing; or HIST 112, INDG 100, and third-year standing.

HIST 305 (3) British Imperial History up to 1783

Examines the rationales and criticisms of empire; mercantilism, industrial capitalism, and free trade; methods and systems that gave rise to the British Empire and the factors which explain the fall of the first British Empire. [2-0-1]

Prerequisite: 6 credits of HIST; or HIST 116 and third-year standing.

HIST 307 (6) French North America to 1803

Historical background for understanding the French-speaking peoples of North America: Acadians, Franco-Québécois, French-Canadians, and Cajuns. Deals extensively with French-Amerindian relations. Introduction to the historiography of French North America. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 112, HIST 211 and third-year standing.

HIST 308 (3) The Scientific Revolution

Study of the history of the natural sciences in early modern time. Science transformed from natural philosophy to technology; theories of nature and human nature; science and objectivity; the social role of the scientist; the intellectual authority of science. [3-0-0]

Prerequisite: 6 credits of HIST; or HIST 218 and third-year standing.

HIST 309 (3) The Rise of Modern Science

Study of the history of the natural sciences since the scientific revolution. This course may be taken separately or as a continuation of HIST 308. [3-0-0]

Prerequisite: 6 credits of HIST; or HIST 218 and third-year standing.

HIST 310 (3/6) d Topics in the History of Medicine and Disease

[3-0-0]

Prerequisite: Either one of (a) HIST 218 and third-year standing, or (b) 6 credits of HIST.

HIST 312 (3) British Imperial History, 1783-1950

Examines colonial policies and practices of imperial Britain in the nineteenth and twentieth centuries; the role of explorers, traders, missionaries, industrialists, and others in the growth of British imperialism; the emergence of organized colonial resistance and the decolonization movement; independence and the new Commonwealth of Nations. [2-0-1]

Prerequisite: 6 credits of HIST; or one of HIST 115, HIST 126, HIST 145 and third-year standing.

HIST 314 (3) Women in Canada and the US to 1867

History of women and women's experiences in Canada and the United States from European contact to the latter half of the nineteenth century. Women's experiences in the broader context of political, social, and economic events and changes. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 112, HIST 211 and third-year standing.

HIST 317 (3) History of Southern Africa

Pre-colonial, colonial, and contemporary history emphasizing South Africa. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 115, HIST 145 and third-year standing.

HIST 325 (3) Europe in 1215

Examines aspects of the Middle Ages such as popular religion, the feudal system, and courtly love, and the appearance of Parliament, common law, and the university. Focuses on the eventful year 1215. [3-0-0]

Prerequisite: 6 credits of HIST; or HIST 119 and third-year standing.

HIST 327 (3) American Colonial History, 1607-1763

Comparative study of the social, economic, and political characteristics of the 13 colonies as they changed from small European outposts to more mature societies. [3-0-0]

Prerequisite: 6 credits of HIST; or HIST 211 and third-year standing.

HIST 328 (3) The American Revolution and the Formation of the United States

Study of the revolutionary origins of the United States of America and the establishment of the American republic. [3-0-0]

Prerequisite: 6 credits of HIST; or HIST 211 and third-year standing.

HIST 329 (6) Canadian Social History

Study of selected topics in the history of Canadian society including frontier settlement, rural life, religion, social and institutional structures, immigration and ethnicity, social movements, ideology, family life and life cycles, demographic change, labour, industrialization, and urbanization. [3-0-0]

Prerequisite: 12 credits of HIST.



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HIST 331 (3) The United States, 1865-1896

Political and social development in Post-Civil War America with special emphasis on Reconstruction, industrialization, and the Gilded Age. [3-0-0]

Prerequisite: 6 credits of HIST; or HIST 211 and third-year standing.

HIST 334 (6) Europe in the 19th Century

Investigation of main themes in European history from the French Revolution to the beginning of the twentieth century. Domestic politics, the interaction of states, the formation of new states, social and economic transformations affecting the whole civilization, major cultural expressions of the century. [3-0-0]

Prerequisite: 6 credits of HIST; or HIST 126 and third-year standing.

HIST 336 (3) Eastern Europe During the Cold War

A political, social, and cultural history of Eastern Europe from the end of the Second World War to the fall of state socialism. [3-0-0]

Prerequisite: Either (a) one of HIST 115, HIST 126 and third-year standing or (b) 6 credits of HIST.

HIST 343 (3) Tudor England, 1485-1603

Study of the political, religious, and social changes in England from the late Middle Ages to the early seventeenth century. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 116, HIST 119 and third-year standing.

HIST 344 (3) Stuart England, 1603-1714

Study of the changes in politics, economics, and the empire from James I to Queen Anne and Robert Walpole. [3-0-0]

Prerequisite: 6 credits of HIST; or HIST 116 and third-year standing.

HIST 351 (3) History of Gender and Sexuality in Latin America

Role of gender and sexuality from colonial period to the present. Role of the family and community in reinforcing sexual and gendered roles. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 151, HIST 240, HIST 241 and third-year standing.

HIST 352 (3) Class and Culture in Latin America

Relationship between culture and class formation from the late-colonial period to the present. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 151, HIST 240, HIST 241, CULT 101 and third-year standing.

HIST 354 (3) Social Movements in 20th-Century Latin America

Social movements of Latin America since 1900 that have challenged the status quo. Role of ideology, culture, and identity in the struggles of marginalized peoples. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 151, HIST 240, HIST 241 and third-year standing.

HIST 380 (3) Digital Archives, Cultural Heritage, and Public History

Interdisciplinary introduction to digital archiving, exhibition, and preservation of cultural heritage and public history. Deals with collective memory, politics of commemoration and collecting, and future of digital collection and museum interfaces. Credit will be granted for only one of HIST 380 or DIHU 320. [3-0-0]

Prerequisite: COSC 264 and 3 credits of ENGL

Equivalency: DIHU 320.

HIST 381 (3/6) d Special Topics in Economic History

Students should consult the department for the particular topics offered in a given year. [3-0-0]

Prerequisite: 9 credits of HIST and third-year standing.

HIST 382 (3/6) d Special Topics in Political History

Students should consult the department for the particular topics offered in a given year. [3-0-0]

Prerequisite: 9 credits of HIST and third-year standing.

HIST 383 (3/6) d Special Topics in Social and Cultural History

Students should consult the department for the particular topics offered in a given year. [3-0-0]

Prerequisite: 9 credits of HIST and third-year standing.

HIST 395 (3) Environmental History of North America

A thematic overview of the social, economic, and political consequences of environmental change in Canada and the United States, focusing primarily on the nineteenth and twentieth centuries. [2-0-1]

Prerequisite: 3 credits of HIST and third-year standing.

HIST 396 (3) History of India, 1800-1914

Examines developments of Indian society and culture under the British Raj during the period of 1800-1914, the consolidation of



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British power in nineteenth-century India, and early Indian resistance to imperial rule. [2-0-1]

Prerequisite: 6 credits of HIST; or HIST 115 and third-year standing.

HIST 397 (3) History of India Since 1914

Examines the origins and growth of the freedom struggle in India, the emergence of independent states in the subcontinent, and the problems of nation building and modernization since 1947. [2-0-1]

Prerequisite: 6 credits of HIST; or one of HIST 115, HIST 145 and third-year standing.

HIST 402 (3) Problems in International Relations: Diplomacy and the Origins of Wars

Study of the relationship of the diplomatic factor to other factors in the origins of the First and Second World Wars. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 115, HIST 126 and third-year standing.

HIST 406 (3) British Columbia to 1900

Topics from the history of colonial British Columbia, Confederation, and subsequent provincial developments during the nineteenth century. Credit will be granted for only one of HIST 406 or HIST 404. [3-0-0]

Prerequisite: 6 credits of HIST and third-year standing; or HIST 112 and third-year standing.

HIST 407 (3) British Columbia Since 1900

Topics will emphasize changes in the economic, social, and institutional structures of the province during the twentieth and twenty-first centuries. Credit will be granted for only one of HIST 407 or HIST 404. [3-0-0]

Prerequisite: 6 credits of HIST and third-year standing; or HIST 122 and third-year standing.

HIST 412 (3/6) d Topics in the History of International Relations

Special topics such as the role of diplomacy and its relation to other factors in international affairs, Canadian external relations, third-world international politics, Cold-War historiography, and area studies. [3-0-0]

Prerequisite: 6 credits of HIST.

HIST 414 (3) Medieval England

Study of selected themes in the history of England from the eleventh to the fifteenth centuries. [1.5-0-1.5]

Prerequisite: 6 credits of HIST; or HIST 119 and third-year standing.

HIST 420 (3) Women in Early Modern Europe

Examination of the experiences of women in Western Europe from 1500-1750. [3-0-0]

Prerequisite: 6 credits of HIST; or HIST 116 and third-year standing.

HIST 424 (3) Women in the Middle Ages

Examination of women's experiences in Western Europe from about 900-1450. [3-0-0]

Prerequisite: 6 credits of HIST; or HIST 119 and third-year standing.

HIST 430 (3/6) d Topics in the History of Migration

[3-0-0]

Prerequisite: 12 credits of HIST.

HIST 443 (3) 20th-Century Russia, 1939 to Present

Examines the significance of the Great Patriotic War; the last years of Stalin, the tempering of Stalinism in the Khrushchev years; Gorbachev's failed revolution; the collapse of the Soviet Union; and Russia in transition. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 126, HIST 145 and third-year standing.

HIST 444 (3) Slave Societies in the Americas

Comparative analysis of the institution of chattel slavery, its growth, its effects on slaves and masters, its relation to the larger society, and the causes of its decline in the various cultures of the Americas. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 211, HIST 240 and third-year standing.

HIST 452 (3) History of Mexico Since 1810

Mexican history since independence including church-state relations, struggles for land and social justice, state formation, class and gender relations, and the role of popular culture. OUC equivalent: HIST 452. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 151, HIST 240, HIST 241 and third-year standing.

HIST 453 (3) History of Brazil Since 1822

Post-colonial history of Brazil with special attention to the politics of culture in state-building. OUC equivalent: HIST 453. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 151, HIST 240, HIST 241 and third-year standing.

HIST 460 (3/6) d Topics in Technology and Society in History

Historical dimensions of current debates about technology, focusing on a single, interdisciplinary theme. [3-0-0]



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Prerequisite: 6 credits of HIST; or HIST 215 and third-year standing.

HIST 461 (3/6) d Topics in Urban History

[3-0-0]

Prerequisite: Either (a) HIST 126 and third-year standing or (b) 6 credits of HIST.

HIST 466 (3) Canada, 1896 to World War II

Survey of the political, social, and economic developments that have shaped Canada from the election of Laurier to World War II.

[3-0-0]

Prerequisite: 6 credits of HIST including HIST 122; or HIST 122 and third-year standing.

HIST 468 (3) International Relations of the Great Powers of the 20th Century to 1939

International relations of Britain, France, Germany, Russia, and the United States from the beginning of the 20th century until 1939. Political and diplomatic settlements between the Paris Peace Conference of 1919 and the German invasion of Poland in 1939. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 115, HIST 126 and third-year standing; or 6 credits of POLI and third-year standing.

Equivalency: POLI 433.

HIST 469 (3) International Relations of the Great Powers of the 20th Century from 1939

International relations of Britain, France, Germany, Russia, and the United States since 1939. Emphasis upon the emergence, course, and end of the Cold War. Great Powers in decolonization and the end of empires. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 145, HIST 126 and third-year standing.

HIST 473 (3) War and Society from the 18th to 20th Centuries

Continuity and change in the relations of war and society, and the connections between the economy, society, the military, and government in peacetime and war; not a course in military history. [3-0-0]

Prerequisite: 6 credits of HIST; or one of HIST 115, HIST 116, HIST 126, HIST 145 and third-year standing.

HIST 489 (3) Directed Studies: Research

Students will undertake supervised investigation of an assigned topic in history. They will investigate a research problem that involves the generation of original data and present that data in an acceptable format. [0-0-3]

Prerequisite: Fourth-year standing, 6 credits of upper-level HIST, and permission of the instructor. A minimum of 72% in all completed upper-level HIST courses is required.

HIST 491 (3) Directed Studies: Readings

Students will undertake supervised investigation of an assigned topic in history. They will complete a significant amount of independent reading and analysis and produce a major term paper at the end of the course. [0-0-3]

Prerequisite: Fourth-year standing, 6 credits of upper-level HIST, and permission of the instructor. A minimum of 72% in all completed upper-level HIST courses is required.

HIST 492 (3) History, Theory, and Method

Explores selected problems and issues in the theory and practice of historical work. Credit will be granted for only one of HIST 492 or IGS 592. [2-0-1]

Prerequisite: 6 credits of HIST or third-year standing. Open to non-history majors with permission of the department head.

Equivalency: IGS 592.

HIST 494 (3) Decolonization and Africa

Overview and analysis of the internal and external factors that explain decolonization in sub-Saharan Africa in the twentieth century. Discussion will focus on the problems of nation-building in the aftermath of decolonization. [1.5-0-1.5]

Prerequisite: 6 credits of HIST; or one of HIST 115, HIST 145 and third-year standing.

HIST 495 (3/9) d Special Topics in History

Examination of selected topics and issues in history. With different topics, this course may be taken more than once for credit. [3-0-0]

Prerequisite: 12 credits of HIST.

HIST 497 (3) Digital Media and History

An introduction to digital media history and the application of digital methods to historical inquiry, interpretation, and communication. [3-3-0]

Prerequisite: Third-year standing.

HIST 499 (6) Undergraduate Honours Thesis

Research and writing of a thesis paper under the supervision of a History faculty member. Participation in scheduled colloquia



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and seminars is required. Restricted to students in the Honours Program (third-year standing; minimum 12 credits of History; minimum grade average of 76% in all attempted History courses; and minimum overall average of 72%).

Human Kinetics, Faculty of Health and Social Development

HMKN: Human Kinetics

HMKN 191 (3) Functional Anatomy and Applied Physiology II

Structure and function of the digestive, endocrine, urinary, circulatory, and respiratory systems. Special emphasis on the effects of exercise. Credit will be granted for only one of HMKN 191 or BIOL 122 and only one of HMKN 191 or BIOL 133. [3-2-0]

Prerequisite: HMKN 190. Registration limited to students in the B.H.K. program.

HMKN 302 (3) Social and Cultural Issues of Physical Activity

Social-cultural issues, principles, and controversies surrounding physical activity at the individual, community and population level and across the life-span in Canada. [3-0-0]

Prerequisite: All of HMKN 100, HMKN 105, HEAL 200.

HMKN 315 (3) Laboratory Techniques in Sensorimotor Neuroscience

Current methods in sensorimotor neuroscience will be demonstrated via modules presented by faculty in their areas of specialization including electromyography, electroencephalography, transcranial magnetic stimulation, and analysis of movement kinetics and kinematics. [2-3-0]

Prerequisite: All of HMKN 200, HMKN 310.

HMKN 316 (3) Laboratory Techniques in Exercise Psychology

Introduction to lab techniques and research methods used in the field of Exercise Psychology. [3-2-0]

Prerequisite: HMKN 201.

HMKN 323 (3) Introduction to Nutrition

Nutrients, nutrient food sources and their functions in the body, and application to healthy diets and eating practices. [3-0-0]

Prerequisite: HMKN 100 and either (a) all of HMKN 190, HMKN 191 or (b) all of BIOL 131, BIOL 133 or third-year standing in the B.S.N. program; or third-year standing in any program and completion of first-year human anatomy and physiology.

HMKN 410 (3) Respiratory Disease: Pathology to Prescription

Common respiratory diseases of the adult, including acute and chronic disorders. Respiratory diagnostics, therapeutics, and exercise interventions applied to these disorders. Credit will be granted for only one of HMKN 410 or HMKN 510. [3-0-0]

Prerequisite: HMKN 310.

HMKN 419 (3) Lifestyle and Metabolic Disease

The impact of exercise and nutritional interventions on metabolic health in obesity and type 2 diabetes will be explored through analyses of research articles, individual assignments, and a major group term project. [3-0-0]

Prerequisite: All of HMKN 205, HMKN 206, HMKN 313 and Either (a) HMKN 323 or (b) permission of instructor

HMKN 422 (3) Advanced Applications in Physical Activity and Health Promotion

Advanced strategies for health promotion in various arenas, particularly aimed at encouraging physical activity. [0-0-3]

Prerequisite: All of HMKN 322, HMKN 205, HMKN 206.

HMKN 431 (3) Exercise Rehabilitation for Clinical Disorders of Aging

Consideration of disabilities and pathologies associated with aging. Particular focus on physiological changes and how they affect quality of life and activities of daily living. [0-0-3]

Prerequisite: All of HMKN 311, HMKN 331.

Interdisciplinary Graduate Studies, College of Graduate Studies

IGS: Interdisciplinary Graduate Studies

IGS 501 (1-12) d Interdisciplinary Topics in Research Methods and Analysis

IGS 502 (3/6) d Seminar in Digital Arts and Humanities

IGS 503 (1-6) d Indigenous Research Methods



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IGS 509 (1-6) c Directed Studies in Interdisciplinary Research Methods**IGS 515 (3) Advanced Qualitative Methods****IGS 520 (1-12) d Special Topics in Interdisciplinary Studies****IGS 523 (1-6) d Special Topics in Indigenous Studies****IGS 524 (1-3) d Proseminar in Interdisciplinary Studies**

This seminar-based course prepares graduate students to excel in their academic, professional and scholarly pursuits by engaging topics related to professionalism and scholarly communication. May be offered for 1, 2 or 3 credits; program requirements for the IGS MA, MSc and PhD programs require completion of 3 credits in total. Restricted to students in the IGS MA, MSc, or PhD program. Pass/Fail.

IGS 529 (1-6) c Directed Studies in Indigenous Studies**IGS 530 (1-12) d Special Topics in Creative and Critical Studies****IGS 539 (1-6) c Directed Studies in Creative and Critical Studies****IGS 542 (1-6) c Directed Studies in Urban Studies****IGS 543 (1-12) d Special Topics in Sustainability****IGS 544 (1-6) c Directed Studies in Sustainability****IGS 550 (1-12) d Special Topics in Social Science Research****IGS 559 (1-6) c Directed Studies in Social Science Research****IGS 560 (1-9) d Special Topics in Latin American and Iberian Studies****IGS 561 (1-9) c Directed Readings in Latin American and Iberian Studies****IGS 583 (3) Urban and Regional Studies**

Theory and methodologies for understanding urban and regional studies. Topics include urban, regional and rural policy issues.

IGS 584 (3) Sustainability Theme Seminar

Introduction to the challenges and opportunities of interdisciplinary sustainability research, including problem framing, research methods and socio-ecological applications from contributing disciplines.

IGS 585 (3) Knowledge Mobilization and Sustainability Policy

Exploration of opportunities and constraints to translating interdisciplinary sustainability research into effective social action. Approaches to implementing sustainability to be considered include: political and legal frameworks; federal and provincial policy forums; corporate social responsibility; First Nations environmental stewardship challenges; and sustainability in education and the arts.

IGS 586 (3-6) d Community Engagement, Social Change, and Equity Theme Seminar

Will provide the necessary theoretical background on Community-Based Participatory Research (CBPR). Students will learn about a range of strategies and principles of CPBR; advantages and limitations of this approach; skills necessary for participating effectively in CBPR projects.

IGS 587 (3) Global Politics, Culture and Theory

Examination of conceptual approaches to Global Studies.

IGS 588 (3) Global Studies Panorama

Introduction to interdisciplinary and collaborative approaches to the field of Global Studies.

IGS 589 (3) Governance

Frameworks of governance systems and public policy. [0-0-3]

IGS 590 (3) Power and Ideas

Exploration of the complex relations between power, knowledge and ideas.

IGS 591 (3) Society and Conflict

Utilizing social theory to analyze conflict and inequality. [0-0-3]

IGS 592 (3) History, Theory, and Method

Explores selected problems and issues in the theory and practice of historical work. Credit will be granted for only one of IGS 592 or HIST 492.



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Equivalency: HIST 492.

IGS 599 (12-18) d Master's Thesis

Pass/Fail.

IGS 601 (1-12) d Advanced Topics in Research Methods and Analysis**IGS 620 (1-12) d Advanced Topics in Interdisciplinary Studies****IGS 699 (0) Doctoral Thesis**

Pass/Fail.

Indigenous Studies, Faculty of Arts and Social Sciences

INDG: Indigenous Studies

Some courses in Indigenous Studies are offered in relationship with the En'owkin Centre, as noted below. For more information on the Centre and the courses offered with the UBC Okanagan campus, please refer to www.enowkincentre.ca.

INDG 100 (3) Introduction to Decolonization: Indigenous Studies

Provides students with an overview of the discipline of Indigenous studies including the history, cultures, and experiences of Indigenous people. [2-0-1]

INDG 102 (3) Introduction to Indigeneity: Ways of Knowing

Introduces students to the concept of Indigenous Knowledge through a holistic and relational approach to land and people. Provides a foundation to key perspectives and traditions in the arts, health, social justice and governance. [3-0-0]

INDG 201 (3) Okanagan Indigenous Peoples' Historical Perspectives

Indigenous historiography as demonstrated through Okanagan traditional oral techniques for documentation of knowledge; an indigenous peoples' approach to orality and the maintenance of social, ecological, and land-based practice. Offered in relationship with the En'owkin Centre. [3-0-0]

Prerequisite: One of INDG 100, INDG 102.

INDG 202 (3) Okanagan Syilx Literatures: Concepts and Frameworks

Indigenous perspectives as demonstrated through oral story; Okanagan theory and philosophy through oral story; a systems-based Indigenous Peoples story approach to connection to land, ecology and society. Offered in relationship with the En'owkin Centre. Credit will be granted for only one of INDG 202 or ENGL 202. [3-0-0]

Prerequisite: One of INDG 100, INDG 102.

Equivalency: ENGL 202.

INDG 203 (3) Indigenous Peoples' Historical Perspectives

Overview of the historical and contemporary socio-economic, political, cultural, and ecological perspectives of indigenous peoples. [3-0-0]

Prerequisite: One of INDG 100, INDG 102.

INDG 204 (3) Métis Peoples and Perspectives

Examining the development of the Métis Nation from the fur trade to recent self-government agreements, the course surveys topics such as Métis acts of resistance against colonialism, Michif language and culture, customary law and legal rulings, land issues and mobility, as well as contemporary identity controversies. Credit will be granted for only one of INDG 204 or INDG 295H. [3-0-0]

Prerequisite: One of INDG 100, INDG 102.

INDG 210 (3) Indigenous Peoples of the Americas

Overview of the contemporary socio-economic, political, cultural, and environmental characteristics of the Indigenous peoples of the Americas. [3-0-0]

Prerequisite: One of INDG 100, INDG 102.

INDG 295 (3/6) d Indigenous Studies: Special Topics

An examination of selected topics in Indigenous studies. Consult the program brochure for this year's offerings and specific prerequisites. Credit will be granted for only one of INDG 295 or INDG 395.



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Prerequisite: One of INDG 100, INDG 102.

INDG 301 (3) Examining an Indigenous Methodology: En'owkinwixw

Understanding an indigenous strategy of community discourse as a methodology for inquiry, a technique of examination employing sequential stages of critical analysis in a whole-systems approach. Offered in relationship with the En'owkin Centre. [3-0-0]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 302 (3) Indigenous Governance

Critically examines various traditional Indigenous governance models and the Indigenous response to European attempts to establish political control. Issues such as land ownership, sovereignty, justice, treaty making, and the roles of women in Indigenous governance will be explored. [3-0-0]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 303 (3) Indigenous Studies Theory and Methodology

Conceptualizations from an Indigenous perspective are central to this course. Includes an analysis of current conceptual paradigms within the social sciences, humanities, and performing arts, with a consideration of their appropriateness and applicability for Indigenous studies. [3-0-0]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 304 (3) Indigenous Studies Field Methods

Research strategies and research techniques used in Indigenous studies and related disciplines. These elements will be applied to various topical issues including intellectual property rights, research ethics, oral histories, ethnographic research, and the use of statistics (both descriptive and inferential). [3-0-0]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 305 (3) Indigenous Justice

Decolonial Indigenous concepts, principles and historical consciousness of justice and anti-violence praxis in community-and-land based contexts. Locating agency with Indigenous peoples and Indigenous justice practices, the course puts primacy on ways that Indigenous peoples have engaged in and continue to enact justice. Revitalization of Indigenous knowledge informs ethical and moral issues addressed in relation to healing, and collective transformation. [3-0-0]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 306 (3) Indigenous Land Rights

Legal theories under British Law or its historical derivations that have been used to justify the colonization of Indigenous peoples. Legal arguments and anthropological evidence raised by Indigenous groups to challenge those theories. Particular reference is paid to Canada, Australia, New Zealand, and the United States. [3-0-0]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 307 (3) Traditional Ecological Knowledge

Shows how human life depends on complex systems of cultural knowledge about the natural world. Indigenous people's biological classification and nomenclatural systems, ethnobiology, and Indigenous explanatory models of environmental systems and the application of this knowledge in practice. [3-0-0]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 308 (3) Indigenous Culture, Heritage, and Intellectual Property

Indigenous Peoples' cultural heritage in the Americas and other continents. Many manifestations of Indigenous cultures will be discussed, as well as the many complex issues that have arisen regarding Indigenous heritage in the colonial and neo-colonial periods such as, customary laws, misappropriation, misrepresentation, repatriation, and legal protection and regulation. [3-0-0]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 309 (3) Indigenous Perspectives on Health

Introduction to current thinking about Indigenous peoples' health, and especially Indigenous peoples' perspectives on health and contemporary health systems. Includes a critical examination of concepts of health within the context of ongoing processes of colonization. [3-0-0]

Prerequisite: One of INDG 100, INDG 319. And third-year standing.

INDG 310 (3) Indigenous Women's Perspectives: Gender, Nation, State, Resistance

Historical realities of the salience of states and nations in the lives of Indigenous women. Indigenous methods, de-colonial historical analysis, and gender theory are used to analyze Indigenous women's and peoples' resistances to invasion, colonization, occupation, settler states, and dispossession. [3-0-0]

Prerequisite: One of INDG 100, INDG 102. GWST 100 recommended.



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INDG 319 (3) Indigenous Perspectives on Health and Physical Activity

Focuses on Indigenous worldviews and perspectives to frame Indigenous peoples' health opportunities, issues, and challenges, with an emphasis on physical activity contexts. Restricted to students in the Bachelor of Human Kinetics program. [3-0-0]

Prerequisite: HEAL 200. Third-year standing.

INDG 401 (3) Research Applications

The planning of research projects from the perspective of Indigenous cultures and values. Topics include project development, community relations and ethics, and identification and acquisition of appropriate resources. [0-0-3]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 404 (3) Indigenous Peoples United Nations and Global Issues

Focuses on Indigenous Peoples' common experience of colonialism, non-recognition, conflicts with nation states, and decolonization. Also covers Indigenous Peoples' international engagement and lobbying in various UN forums, including The UN Declaration on the Rights of Indigenous Peoples. [3-0-0]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 405 (3) Indigenous Education: History and Revitalization

Indigenous perspectives on language and cultural shifts through the critical lenses of Indigenous knowledge and insider views on historical education policies; language and knowledge loss and consequences; revitalization and recovery; and transformational community development through Indigenous education and community empowerment. [3-0-0]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 420 (3) Indigenous Perspectives on Food, Place, Identity, and Biodiversity

Overview of the contemporary geopolitical, agricultural, and environmental connections between identity, food, place, and cultural and biological diversity from the perspective of Indigenous peoples. North/south flows of genetic resources and key international and regional conventions and agreements are highlighted. [3-0-0]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 440 (3) Residential Schools and Reconciliation

The history of the Indian Residential School (IRS) is placed within the context of colonization and the official Canadian Government policy of assimilation. The IRS legacy will be placed in the context of issues confronted by the Truth and Reconciliation Commission of Canada. [3-0-0]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 450 (3) Indigenous Women, Activisms, Feminisms

Examines Indigenous women's feminist activisms and theory in historical and contemporary contexts. Emphasizing resistance against colonization, dispossession, violence and ecological destruction as well as development of strategies and models based on Indigenous concepts and consciousness. Emphasizes relationship building and empowerment between Indigenous women beyond borders. [0-0-3]

Prerequisite: One of INDG 100, INDG 102. And third-year standing.

INDG 460 (3) Indigenous Studies Internship

Work experience in language revitalization efforts in the community or organizations. Periodic workshops to support placement are required. Restricted to students in the Bachelor of Nsyilxcn Language Fluency program or Indigenous Studies major program. [0-0-3]

INDG 481 (3) Directed Studies: Readings in Indigenous Studies

Supervised investigation of an assigned topic in Indigenous studies. Independent reading and analysis, and a major term paper. Normally, students may take INDG 481 only once for credit.

Prerequisite: One of INDG 100, INDG 102. 3 credits in INDG 200- or 300-level courses, permission of the department head and third-year standing.

INDG 495 (3/12) d Advanced Topics in Indigenous Studies

With permission of the program advisor, students may take and receive credit for this course more than once. [3-0-0]

Prerequisite: One of INDG 100, INDG 102. 3 credits in INDG 200- or 300-level courses, and third-year standing.

INDG 499 (6) Indigenous Studies Capstone Project

Work experience in decolonizing and/or indigenizing efforts. Restricted to students in the Bachelor of Nsyilxcn Language Fluency program or Indigenous Studies major program. [0-6-2*]

Corequisite: NSYL 439.



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Indigenous Studies, Faculty of Arts and Social Sciences***INLG: Indigenous Language*****INLG 281 (3) Sounds of Endangered Languages: Conservation and Revitalization**

Development of skills in the perception and transcription of speech sounds in endangered languages, focusing on the diversity within BC Indigenous languages. Capacity-building techniques for digital recording, editing, analysis, and archiving; guided by community-based ethical protocols and conservation/revitalization goals. Restricted to students in the Bachelor of Nsyilxcn Language Fluency program. [3-0-0]

INLG 282 (3) Structures of Endangered Languages: Conservation and Revitalization

Documentation, transcription and analysis of grammatical structures in endangered languages, focusing on the diversity within BC Indigenous languages. Applied techniques in documentation, workflow and multi-media digital annotation, guided by community-based ethical protocols and conservation/revitalization goals. [3-0-0]

Prerequisite: INLG 281.

INLG 380 (3) Technologies for Endangered Language Documentation and Revitalization

Digital tools for endangered language documentation, conservation, and revitalization. Overview of best practices, introduction to community engagement and capacity-building, protocols and ethics, project design, cultural context, orthographies, use of audio, video and still photography, data management, archiving and web publishing. [3-0-0]

Prerequisite: INLG 282.

INLG 382 (3) Lexicography for Endangered Languages

Foundational concepts in the discipline of compiling, editing, managing and hosting dictionaries, also known as lexicography. Special focus on the technical and ethical considerations for community-based lexicography projects for endangered and BC Indigenous languages. [3-0-0]

Prerequisite: INLG 282.

INLG 480 (3) Living Languages: Critical Approaches to Endangered Languages

Study of language shift, including local and global factors affecting language loss, endangerment, retention, and revival. Practical strategies for sustaining and reviving languages, including language documentation and revitalization. Credit will only be granted for one of INGL 480 and ANTH 473.

Prerequisite: INLG 282.

INLG 481 (3) Heritage Resources in Endangered Language Revitalization

Examines the complementary and intersecting roles of libraries, archives, and museums in collections acquisition, development, curation, preservation, and access traditions pertaining to Indigenous languages; to explore how each can contribute to endangered language and cultural heritage sustainability. [3-0-0].

Prerequisite: INLG 282.

Japanese Studies, Faculty of Creative and Critical Studies***JPST: Japanese Studies***

Students cannot take language courses out of sequence. Once a student successfully completes a Japanese language course, they can no longer enroll in a course that is below the level of the last course that has been completed. Students should consult an advisor to ensure that they are enrolling in a level-appropriate Japanese language course.

JPST 100 (3) Beginning Japanese Language I

Introduction to spoken and written modern Japanese, with emphasis on both form (grammar and syntax) and functions. Students who have completed Japanese 12, native and heritage speakers cannot receive credit for JPST 100.

JPST 101 (3) Beginning Japanese Language II

Continuation of JPST 100. Students who have not completed JPST 100 should consult with the instructor before enrolling in this course.

Prerequisite: JPST 100. Minimum grade of 55%.

JPST 200 (3) Continuing Japanese Language I

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Pre-intermediate study of spoken and written modern Japanese with a proficiency-based, functional focus. Students who do not have JPST 101 are encouraged to consult with the instructor.

Prerequisite: JPST 101.

JPST 201 (3) Continuing Japanese Language II

Continuation of JPST 200. Students who do not have JPST 200 are encouraged to consult with the instructor.

Prerequisite: JPST 200.

JPST 215 (3) Introduction to Contemporary Japan Through Pop Culture

Contemporary Japanese society through topics in popular culture, such as gender performativity, forms of play, manga, anime and film. In English. Credit will be granted for only one of JPST 215 or CULT 205.

Prerequisite: 3 credits of first-year ENGL.

Equivalency: CULT 205.

JPST 300 (3) Japanese Through Manga: Business Culture

Intermediate grammar patterns, business culture, and professional language in a narrative context of Japanese manga.

Prerequisite: JPST 201.

JPST 354 (3) Introduction to Japanese Cinema

Historical and thematic survey of major directors, genres, and traditions in Japanese film from 1950 to the present. In English.

Prerequisite: Third-year standing.

JPST 370 (3) Japanese Food Culture

Social, historical, political, and environmental dimensions of the development of traditional and contemporary Japanese food culture. Taught in English. Credit will not be granted for both JPST 370 and JPST 395A.

Prerequisite: Third year standing.

JPST 395 (3/9) d Topics in Modern Japanese Literature and Culture

A range of literary and cultural topics such as film adaptations, travel writing, manga, and horror.

Prerequisite: Third year standing.

Korean, Faculty of Creative and Critical Studies

KORN: Korean

Students cannot take language courses out of sequence. Once a student successfully completes a Korean language course, they can no longer enroll in a course that is below the level of the last course that has been completed. Students should consult an advisor to ensure that they are enrolling in a level-appropriate Korean language course.

KORN 100 (3) Basic Korean I

An introduction to the grammar, syntax, and function of modern spoken and written Korean. For absolute beginners; not available to students who have obtained the equivalent of CEFR Level A1 in the language.

KORN 101 (3) Basic Korean II

Continuation of KORN 100. Not available to students who have obtained the equivalent of CEFR Level A1 in the language.

Prerequisite: A score of 55% or higher in KORN 100.

Latin, Faculty of Creative and Critical Studies

LATN: Latin

LATN 300 (6) Intensive Introduction to Latin

Fundamentals of Latin grammar and syntax. Designed for students who need to acquire knowledge of basic Latin in one year for background in their own discipline.

Language and Literacy Education, Faculty of Education



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LLED: Language and Literacy Education**LLED 200 (3) Introduction to Writing in Academic and Professional Registers**

Examination of skills that are central to the production of academic texts. For Maple Leaf School graduates and other students who intend to teach internationally. Only for credit toward the BEDS program.

LLED 213 (3) Introduction to Intercultural Communication and Socialization in Multicultural Contexts

The processes by which individuals become competent members of society through the use of language. For Maple Leaf School graduates and other students who intend to teach internationally. Only for credit toward the BEDS program.

LLED 450 (3) Teaching and Learning Language and Literacy: Kindergarten and Primary Grades

An overview of teaching and learning in English language arts for primary grades (K-3) with attention to oral language, reading and viewing, writing and representing. Pass/Fail. [3-0-0]

LLED 451 (3) Teaching and Learning Language and Literacy: Intermediate and Middle Grades

An overview of teaching and learning in English language arts for intermediate grades with attention to oral language, listening, reading and viewing, writing and representing. Pass/Fail. [3-0-0]

LLED 452 (3) Literacy in the Content Areas: Intermediate and Secondary

Best practices are presented for integrating the teaching of reading and writing in content area material. Multiple instructional strategies will be provided to enable students to make content reading and writing accessible and successful. Pass/Fail. [3-0-0]

LLED 461 (3) Assessment of Literacy and Learning

Based upon current research in reading and language arts practices, students will engage in the selection, administration, and interpretation of formative and summative literacy assessments for the purpose of evaluating reading and language processes. Pass/Fail. [3-0-0]

LLED 463 (3) Early Language and Literacy Development

The influences of language, emergent literacy, and growth are examined. How reading and writing develop as integrated processes within oral language acquisition is also explored. Credit will be granted for only one of LLED 463 or ECED 463. Pass/Fail. [3-0-0]
Equivalency: ECED 463.

LLED 464 (3) Literacy for Diverse Learners in the Elementary Grades

Key issues, research, and practice are examined to improve literacy achievement for elementary students with a range of reading and writing difficulties. Credit will be granted for only one of LLED 464 or EPSE 464. Pass/Fail. [3-0-0]
Equivalency: EPSE 464.

LLED 465 (3) Literacy for Diverse Learners in Middle and Secondary Grades

Key issues, research, and practice are examined to improve literacy achievement for students in middle and secondary grades with a range of reading and writing difficulties. Credit will be granted for only one of LLED 465 or EPSE 465. Pass/Fail. [3-0-0]
Equivalency: EPSE 465.

LLED 466 (3) ESL and Literacy Education

Learning techniques and principles in second language acquisition will be explored. Students will be encouraged to create and modify lessons pertinent to their own K-12 or post-secondary classroom settings. Pass/Fail. [3-0-0]

LLED 467 (3) Drama in English Language Arts Education

Explores how educational drama can be used to support literacy programs in elementary and middle school language arts programs. Content focus is primarily for elementary and middle school educators, however, modifications for other grade levels can readily be made. Pass/Fail. [3-0-0]

LLED 468 (3) Language, Literacy, and Numeracy

Research and best practices will be examined with the intent of acknowledging the link between numeracy and literacy and experiencing how specific pedagogy in the classroom can support this link. Pass/Fail. [3-0-0]

LLED 490 (3/6) d Special Topics in Language and Literacy Education

Pass/Fail. [3-0-0]

LLED 494 (3) Introduction to Additional Language Teaching and Learning

Language teaching methods, instructional skills in English and motivational design are examined. Sociocultural factors and language acquisition are explored with a focus on teaching and assessing listening, speaking, reading, writing, grammar, and vocabulary. Pass/Fail. [3-0-0]



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LLED 495 (3) Curriculum and Materials Design in Additional Language Teaching and Learning

Grounded in English and additional language teaching and learning across age and proficiency levels, sociocultural considerations are taken into account while exploring curriculum, lessons, materials, technology, interaction, and classrooms. Professional development and social justice are examined, with an emphasis on language teachers as scholar-practitioners. Pass/Fail. [3-0-0]

LLED 496 (3) Theory and Practice in Additional Language Teaching and Learning

Intended for a wide range of educators, this course conceptualizes additional language acquisition theory from multiple angles in child, adolescent, and adult contexts. Key issues, concepts, and theoretical perspectives are evaluated and explored with emphasis on current empirical research. Pass/Fail. [3-0-0]

LLED 497 (3) Practicum in Additional Language Teaching and Learning

Professional development as an additional language educator through a supervised 20-hour practicum including guided lesson observations (10 hours) and focused teaching practice (10 hours). Concurrent seminars develop skills in lesson planning, instructional strategies, reflective practice, classroom leadership, interculturality, and community building. Pass/Fail. 3-0-0

Faculty of Applied Science*MANF: Manufacturing Engineering***MANF 230 (4) Manufacturing Engineering Laboratory**

Fundamentals of theory, operations and operational constraints, process simulation, equipment in conventional manufacturing processes, metrology and CAM. Casting, heat treatment, bulk deformation (i.e. rolling, extrusion, drawing), sheet metal, polymer processing, joining, conventional machining, non-conventional machining, and CNC machining. Experiments in metrology, process characterization and simulation, machining, G&M Codes, CNC machining. [1-2-0, 1-2-0]
Prerequisite: Second-year standing.

MANF 270 (3) Production Systems Management I

Introduction to production systems management and operations. Focus on the impact of operations in increasing productivity, reducing waste in manufacturing facilities. [3-0-0]
Prerequisite: Second-year standing.

MANF 330 (6) Manufacturing Engineering Project I

Project-based design and optimization of manufacturing processes (Casting, bulk deformation, sheet metal, polymer), metrology, measuring cutting forces in machining, CNC machining optimization. [1-4-0, 1-4-0]
Prerequisite: MANF 230.

MANF 368 (3) Engineering Measurements and Instrumentation

Industrial measurement needs; architecture of electronic instrumentation systems; electrical representation of physical quantities; sensor technologies; analog signal processing using linear and nonlinear circuits; analog and digital filtering; data acquisition. [3-2*-0]
Prerequisite: APSC 255.

MANF 370 (3) Production Systems Management II

Functional area of production and operations management. Decision-making, capacity planning, aggregate planning, inventory management, distribution planning, materials requirements planning and quality control. [3-0-0]
Prerequisite: MANF 270.

MANF 386 (3) Industrial Automation

Linear system modelling, block diagrams, transient response, root locus, frequency response, Bode plots, and controller design. Principles and components of industrial automation systems, programmable logic controllers (PLCs), controller programming languages. Credit will be granted for only one of MANF 386 or ENGR 315. [3-2-0]
Prerequisite: APSC 246.

MANF 430 (6) Manufacturing Capstone Design Project

Project-based, multi-step, multi-part Capstone design project involving manufacturing engineering design methods, problem solving. [2-3-0; 0-6-0]
Prerequisite: Fourth-year standing.

MANF 450 (3) Life Cycle Analysis and Sustainability

Practical and theoretical applications of life cycle thinking in engineering projects, products, and processes. Understand



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international standards and methods in life cycle assessment (LCA), life cycle costing (LCC). Interpret and provide critical feedback on LCA/LCC studies and analyze claims on sustainability. Credit will be granted for only one of MANF450 or ENGR 544. [3-0-0]

Prerequisite: Fourth-year standing.

MANF 455 (3) Factory Planning

Planning of resources, layout and logistics for manufacturing plants; hands-on training on modular production and cyber-physical manufacturing systems in a laboratory scale, virtual manufacturing environments and factory automation. [2-2-0]

Prerequisite: MANF 465.

MANF 460 (3) Supply Chain Tactics and Strategies

Key concepts and techniques to analyze, manage and improve supply chain processes for different industries and markets. Emphasis on assessment of supply chain performance to improve competitiveness. [3-0-0]

Prerequisite: Fourth-year standing.

MANF 465 (3) Digital Enterprise

Systems integration and data analytics for engineering processes in a digital enterprise with industrial automation systems, production and operation, information fusion, performance monitoring and learning, and software and simulation platforms for manufacturing applications. [3-2-0]

Prerequisite: MANF 386.

MANF 470 (3) Production Systems Management III

Modelling and analysis of manufacturing systems and assembly lines, operational contingencies, multiple-product manufacturing systems, scheduling theory and inventory systems. [3-0-0]

Prerequisite: MANF 370.

MANF 475 (3) Welding and Joining: Processes and Metallurgy

Welding and joining of metals: fusion and solid-state welding processes, brazing, and soldering. Effect of process parameters on joint size and quality. Fusion, partially melted, and heat affected zones. Non-equilibrium solidification, grain structure, and defect formation. Non-destructive testing and evaluation methods for welded joints. [3-2*-0]

Prerequisite: One of ENGR 377, MANF 230.

MANF 486 (3) Mechatronic Systems Laboratory

Smart sensors and actuators, electro-pneumatic actuators, automated control systems, industrial communication, smart maintenance, object detection, industrial robotics, modelling and simulation of mechatronic systems. Hands-on training on mechatronic system trainers in a laboratory scale [1-4-0]

Prerequisite: One of MANF 386, ENGR 481.

Mathematics, Faculty of Science

MATH: Mathematics

MATH 100 (3) Differential Calculus with Applications to Physical Sciences and Engineering

Derivatives of elementary functions, limits. Covers applications and modelling: graphing and optimization. Credit will be granted for only one of MATH 100 or MATH 116. [3-1-0]

Prerequisite: Either (a) a score of 67% or higher in one of MATH 12, PREC 12 or (b) a score of 60% or higher in one of MATH 125, MATH 126.

Equivalency: MATH 116.

MATH 101 (3) Integral Calculus with Applications to Physical Sciences and Engineering

Definite integral, integration techniques, applications, modelling, linear ODE's. Credit will be granted for only one of MATH 101 or MATH 142. [3-1-0]

Prerequisite: One of MATH 100, MATH 116.

MATH 103 (3) Integral Calculus with Applications to Life Sciences

Antiderivatives, the definite integral, integration techniques, numerical integration, infinite series, applications of integration to differential equations and probability, linear algebra. Credit will be granted for only one of MATH 101, MATH 103, or MATH 142. [3-1-0]

Prerequisite: One of MATH 100, MATH 116.

MATH 111 (3) Finite Mathematics



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Intended for students not majoring in Mathematics or the Sciences who want some exposure to mathematical thinking. Logic, set theory, combinatorics, probability theory, matrix algebra, linear programming, graphs, and networks. This course cannot be taken for credit toward a B.Sc. degree. [3-0-1]

Prerequisite: Foundations of Mathematics 11.

MATH 116 (3) Calculus I for Management and Economics

The derivative; limits; rate of change; derivatives of algebraic, logarithmic, trigonometric and exponential functions; applications to marginal analysis; elasticity of demand; optimization and curve-sketching, Newtons Method and Taylor polynomials. Credit will be granted for only one of MATH 116 or MATH 100. [3-0-1]

Prerequisite: Either (a) a score of 67% or higher in one of MATH 12, PREC 12 or (b) a score of 60% or higher in one of MATH 125, MATH 126.

Equivalency: MATH 100.

MATH 125 (3) Pre-Calculus

Prepares students for a calculus course. Functions and their graphs; inverse functions; algebraic, exponential, logarithmic, trigonometric functions; trigonometric identities; matrices; determinants; complex numbers; binomial theorem; sequences; series; conic sections. Cannot be counted for credit toward the B.Sc. or B.M.S. degree. Credit will be granted for only one of MATH 125 or MATH 126. Students with credit for MATH 100 or 116 may not take MATH 125 for further credit. [3-0-1]

Prerequisite: One of Principles of Mathematics 11, Pre-Calculus 11, Foundations of Mathematics 12.

MATH 126 (3) Basic Mathematics: An Aboriginal Perspective

Prepares students for calculus. Functions; graphs; inverse, algebraic, exponential, logarithmic, trigonometric functions; trigonometric identities; matrices; determinants; complex numbers; binomial theorem; sequences; series; conic sections. Uses cyclical analysis common in some Aboriginal cultures. Cannot be counted for credit toward the B.Sc. or B.M.S. degree. Credit will be granted for only one of MATH 126 or 125. Students with credit for MATH 100 or 116 may not take MATH 126 for credit. [3-0-0]

Prerequisite: One of Principles of Mathematics 11, Pre-Calculus 11, Foundations of Mathematics 12, or permission of the Department.

MATH 142 (3) Calculus II for Management and Economics

Continuation of MATH 116. Antiderivatives, the definite integral, integration techniques, numerical integration, double integrals, applications of integration including application to probability, elementary differential equations, functions of several variables; partial derivatives; Lagrange multipliers. Credit will be granted for only one of MATH 142 or MATH 101. [3-0-0]

Prerequisite: One of MATH 100, MATH 116.

MATH 160 (3) Mathematical Reasoning for Arts and Education

For Arts and prospective Education students who wish to gain a deeper understanding of mathematics. Using the approach of problem solving and logical reasoning throughout, topics are chosen from discrete mathematics, elementary number theory, probability and statistics, measurement and geometry, linear algebra, and applications. Credit will only be granted for one of MATH 160 or EDUC 160. Cannot be used for credit toward a B.Sc. or B.M.S. degree, or for the B.A. Major in Mathematics program. [3-0-0]

Prerequisite: Prerequisite: Foundations of Mathematics 11 or Pre-calculus 11

Equivalency: EDUC 160.

MATH 200 (3) Calculus III

Analytic geometry in two and three dimensions, partial and directional derivatives, chain rule, maxima and minima, second derivative test, Lagrange multipliers, multiple integrals with applications. [3-1-0]

Prerequisite: MATH 101.

MATH 220 (3) Mathematical Proof

Sets and functions; induction; cardinality; properties of the real numbers; sequences, series, and limits. Logic, structure, style, and clarity of proofs emphasized throughout. [3-0-1]

Prerequisite: MATH 101.

MATH 221 (3) Matrix Algebra

Systems of linear equations, operations on matrices, determinants, eigenvalues and eigenvectors, diagonalization of symmetric matrices. [3-1-0]

Prerequisite: One of MATH 100, MATH 116.

Corequisite: One of MATH 101, MATH 142.

MATH 225 (3) Introduction to Differential Equations

First-order equations, initial value problems, existence and uniqueness theorems, second-order linear equations, superposition of solutions, independence, general solutions, non-homogeneous equations, phaseplane analysis, numerical methods, matrix



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methods for linear systems, and applications of differential equations to the physical, biological, and social sciences. [3-0-1]

Prerequisite: MATH 101.

Corequisite: MATH 221 is recommended.

MATH 302 (3) Introduction to Probability

Basic notions of probability, random variables, expectation and conditional expectation, limit theorems. [3-0-0]

Prerequisite: MATH 200.

Equivalency: STAT 303.

MATH 303 (3) Numerical Analysis

Numerical techniques for basic mathematical processes and their analysis. Taylor polynomials, root-finding, linear systems, eigenvalues, approximating derivatives, locating minimizers, approximating integrals, solving differential equations. Credit will be granted for only one of MATH 303 or COSC 303. [3-1-0]

Prerequisite: All of MATH 200, MATH 221 and either (a) COSC 111 or (b) DATA 301.

Equivalency: COSC 303.

MATH 307 (3) Applied Linear Algebra

Dependence/independence, bases and orthogonality; linear transformations from \mathbb{R}^n to \mathbb{R}^m ; change of basis; triangularization; quadratic forms in variables. [3-0-0]

Prerequisite: MATH 221.

MATH 308 (3) Euclidean Geometry

Classical plane geometry, solid geometry, spherical trigonometry, polyhedra, and linear and affine transformations. Linear algebra proofs are used. [3-0-0]

Prerequisite: MATH 221.

Corequisite: MATH 307 is recommended.

MATH 311 (3) Abstract Algebra I

Properties of integers, the integers modulo n , groups, subgroups, cyclic groups, permutation groups, linear groups, quotient groups and homomorphisms, isomorphism theorems, direct products, and an introduction to rings and fields. [3-0-0]

Prerequisite: MATH 220.

MATH 312 (3) Introduction to Number Theory

Euclidean algorithm, congruences, Fermat's theorem, applications, diophantine equations. Distribution of the prime numbers. [3-0-0]

Prerequisite: 12 credits of MATH.

MATH 313 (3) Topics in Number Theory

Topics chosen by the instructor. These might include: division algorithms, group theory, continued fractions, primality testing, factoring. [3-0-0]

Prerequisite: MATH 312.

MATH 317 (3) Calculus IV

Parametrizations, inverse and implicit functions, integrals with respect to length and area; grad, div, and curl, and theorems of Green, Gauss, and Stokes. [3-0-0]

Prerequisite: MATH 200.

MATH 319 (3) Introduction to Partial Differential Equations

Methods of separation of variable, Fourier series, heat, wave and Laplace's equations, boundary value problems, eigenfunction expansions, and Sturm-Liouville problems. [3-0-1]

Prerequisite: All of MATH 200, MATH 225.

MATH 323 (3) Applied Abstract Algebra

Congruences and groups, introduction to rings and fields, and topics chosen from: lattices, Boolean algebra and applications, balanced incomplete block designs, introduction to cryptography, applications to group theory. [3-0-0]

Prerequisite: MATH 221.

Corequisite: MATH 311.

MATH 327 (3) Analysis I

Provides a rigorous foundation of calculus. Real numbers; limits and continuous functions; differentiation; elementary functions; the elementary real integral; normed vector spaces. [3-0-0]

Prerequisite: MATH 220.



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MATH 328 (3) Analysis II

Continuation of MATH 327. Limits in normed vector spaces; compactness, series; the integral in one variable and approximation with convolutions. [3-0-0]

Prerequisite: MATH 327.

MATH 330 (3) Abstract Algebra II

Covers properties of rings and fields, factorization, polynomials over a field, field extensions, field isomorphisms and automorphism, group of automorphisms, and Galois theory of unsolvability. [3-0-0]

Prerequisite: MATH 311.

MATH 339 (3) Introduction to Dynamical Systems

Non-linear systems and iteration of functions; flows, phase portraits, periodic orbits, chaotic attractors, fractals, and invariant sets. [3-0-0]

Prerequisite: All of MATH 200, MATH 225.

MATH 340 (3) Introduction to Linear Programming

Linear programming problems, dual problems, the simplex algorithm, solution of primal and dual problems, sensitivity analysis. Additional topics chosen from: Karmarkar's algorithm, non-linear programming, game theory, applications. [3-0-0]

Prerequisite: MATH 221.

MATH 350 (3) Complex Variables and Applications

Covers analytic functions, Cauchy-Riemann equations, power series, Laurent series, elementary functions, contour integrals, and poles and residues. Introduction to conformal mapping and applications of analysis to problems in physics and engineering. [3-0-0]

Prerequisite: MATH 200.

MATH 408 (3) Differential Geometry

Local theory of curves, Frenet-Serret apparatus, fundamentals of the Gaussian theory of surface, normal curvature, geodesics, Gaussian and mean curvatures, theorema egregium, an introduction to Riemannian geometry, Gauss-Bonnet Theorem, and applications. [3-0-0]

Prerequisite: All of MATH 200, MATH 221 and 9 credits of 300-level MATH.

MATH 409 (3) Mathematics of Financial Derivatives

Pricing theory of financial derivative securities. Options and markets, present and future values, price movement modeled by Brownian motion, Ito's formula, parabolic partial differential equations, Black-Scholes model. Prices of European options as solutions of initial/boundary value problems for heat equations, American options, free boundary problems. [3-0-0]

Prerequisite: All of MATH 221, MATH 319 and one of MATH 302, STAT 303.

MATH 410 (3) Introduction to General Topology

General (point-set) topology. Naive set theory, relations and functions, order relations, cardinality, Axiom of Choice, well-ordering, topological spaces, bases, subspaces, product spaces, limit points, continuous functions, homeomorphisms, metric spaces, connectedness, compactness, countability axioms, separation axioms, Urysohn lemma, Tietze extension theorem, Urysohn metrization theorem, Tychonoff theorem. [3-0-0]

Prerequisite: MATH 327.

MATH 429 (3) Analysis III

Continuation of MATH 328. Fourier series, improper integrals, the Fourier integral, calculus in vector spaces. Credit will be granted for only one of MATH 429 or MATH 329. [3-0-0]

Prerequisite: MATH 328.

MATH 430 (3/12) d Special Topics in Optimization and Analysis

Students should consult the department for the particular topics offered in a given year. [3-0-0]

Prerequisite: Third-year standing and permission of the department head.

MATH 432 (3/12) d Special Topics in Algebra and Number Theory

Students should consult the department for the particular topics offered in a given year. [3-0-0]

Prerequisite: Third-year standing and permission of the department head.

MATH 441 (3) Modelling of Discrete Optimization Problems

Formulation of real-world optimization problems using techniques such as linear programming, network flows, integer programming, and dynamic programming. Solution by appropriate software. [3-0-0]

Prerequisite: MATH 340.

MATH 442 (3) Optimization in Graphs and Networks



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Basic graph theory, emphasizing trees, tree growing algorithms, and proof techniques. Problems chosen from: shortest paths, maximum flows, minimum cost flows, matchings, graph colouring. Linear programming duality will be an important tool. [3-0-0]
Prerequisite: MATH 340.

MATH 443 (3) Graph Theory

Introductory course in mostly non-algorithmic topics. Planarity and Kuratowski's theorem, graph colouring, graph minors, random graphs, cycles in graphs, Ramsey theory, extremal graph theory. Proofs emphasized. [3-0-0]
Prerequisite: At least 12 credits of 300-level MATH.

MATH 448 (3/6) d Directed Studies in Mathematics

Investigation of a specific topic as agreed upon by the student and the faculty supervisor. Students will be expected to complete a project and make an oral presentation.
Prerequisite: 15 credits of 300- or 400-level MATH and STAT courses and permission of the department head and faculty supervisor.

MATH 459 (3) Mathematical Biology

Mathematical modelling in biological disciplines such as population dynamics, ecology, pattern formation, tumour growth, immune response, biomechanics, and epidemiology. Theory of such models formulated as difference equations, ordinary differential equations, and partial differential equations. [3-0-0]
Prerequisite: MATH 225. MATH 319 is recommended.

MATH 460 (3/12) d Special Topics in Mathematics

Students should consult the department for the particular topics offered in a given year. [3-0-0]
Prerequisite: Third-year standing and permission of the department head.

MATH 461 (3) Continuous Optimization

Convex analysis, non-smooth optimization, Karush-Kuhn-Tucker theorem, iterative methods. [3-0-0]
Prerequisite: MATH 327.

MATH 462 (3) Derivative-Free Optimization

Mathematical analysis and development of derivative-free optimization methods. Heuristic methods, direct search methods, model-based methods, convergence analysis, topics in implementation and testing. Credit will be granted for only one of MATH 462 or MATH 562. [3-0-0]
Prerequisite: All of MATH 200, MATH 220, MATH 221. MATH 303 or COSC 303 is recommended.

MATH 510 (3) General Topology

Topological spaces, interior, closure, and boundary of a set, creating new topological spaces, quotient spaces: examples and applications, continuous functions and homeomorphism, metric spaces & metrizable, connectedness, compactness, countability and separation axioms, applications chosen from the above topics. [3-0-0]
Prerequisite: MATH 327.

MATH 523 (3) Combinatorial Optimization

Theory of the nature of problems from combinatorial optimization; solution techniques and theory; topics from integer programming, network flows, and matroids. [3-0-0]

MATH 538 (3) Algebraic Number Theory

Ring localizations, integral elements, prime and maximal ideals, Dedekind domains, unique factorization of ideals, algebraic number fields, integral bases, discriminants, norms, class number. [3-0-0]

MATH 549 (12) Thesis for Master's Degree

Pass/Fail.

MATH 559 (3) Mathematical Biology

Mathematical methods in modelling biological processes at levels from cell biochemistry to community ecology. [3-0-0]

MATH 562 (3) Derivative-Free Optimization

Mathematical analysis and development of derivative-free optimization methods. Heuristic methods, direct search methods, model-based methods, convergence analysis, topics in implementation and testing. Credit will be granted for only one of MATH 562 or MATH 462. [3-0-0]

MATH 563 (3) Convex Optimization and Non-smooth Analysis

Separation and support properties of convex sets; polar, tangent, and normal cones; Fenchel conjugation; subgradient calculus for convex functions; Fenchel duality for convex optimization problems; algorithms for non-differentiable optimization; non-smooth analysis and optimization for non-convex objects. [3-0-0]



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MATH 570 (1-3) c Optimization and Analysis I

Topics from optimization and analysis that are particularly relevant for beginning graduate students at the master's level. [0-0-3]

MATH 590 (1-3) c Graduate Seminar

Presentation and discussion of recent results in the mathematical, statistical, or related literature. Credit may be obtained more than once. Pass/Fail. [0-0-1]

MATH 600 (2-15) c Topics in Algebra

Topics chosen from group theory, rings and modules, Galois theory, commutative rings, categorical algebra, representations of finite groups, and other topics.

MATH 601 (2-15) c Topics in Analysis

Topics, which depend on the students' background and requirements and on the instructor, are drawn from functional analysis, measure and integration theory, non-smooth analysis, and variational analysis. [3-0-0]

MATH 604 (2-15) c Topics in Optimization

Advanced theoretical, algorithmic, or computational topics in optimization. Non-smooth optimization and analysis in infinite-dimensional spaces; monotone operators; subgradient calculus for non-convex functions; semidefinite programming. Interior point methods, projection, and other non-differentiable algorithms. Complexity of optimization algorithms; practical overview of optimization solvers for continuous and discrete problems; numerical and symbolic computation of Fenchel conjugates. [3-0-0]

MATH 605 (2-15) c Topics in Applied Mathematics

Topics will be chosen from different areas of applied mathematics. Content will be determined so as to complement course offerings and meet the needs of the students. Credit for this course may be obtained more than once.

MATH 610 (2-15) c Topics in Pure Mathematics

Topics chosen will depend on the instructor. These may include algebraic number theory, group representation theory, analytic number theory, category theory, combinatorics or algebraic topology.

MATH 620 (2-15) c Directed Studies in Mathematics

Advanced study under the direction of a faculty member may be arranged in special situations.

MATH 649 (0) d Ph.D. Thesis

Pass/Fail.

Faculty of Creative and Critical Studies

MDST: Media Studies

MDST 101 (3) Digital Media Theory

Contemporary issues in media studies. Notions of copyright, intellectual property, and information privacy and globalization in relation to digital media, identity, and creativity. Analysis of the digital culture, professionalism and ethics. [2-2-0]

MDST 110 (3) Introduction to Computational Art and Design I

Code as material; design principles; mathematics for space and time; computer programming languages for computational art and design.

MDST 120 (3) Introduction to Computational Art and Design II

Coding as Practice; thinking through code; art and design principles for computational media; generative algorithms for media art and design.

Prerequisite: One of MDST 110, COSC 123.

MDST 210 (3) Creative Coding

Theory and practice of encoding creative process and designing software for visualization, simulation, sonification, and generative systems. Techniques from artificial intelligence, machine learning, cognitive science, graphics and sound generation. Credit will be granted for only one of MDST 210 and MDST 320.

Prerequisite: Either (a) VISA 108 and one of COSC 222, COSC 223; or (b) MDST 120.

MDST 220 (3) Computational Creativity

Key concepts and techniques in the domain of Artificial Intelligence and machine learning for creative media systems, cognitive science, machine analysis, classification, prediction, generative systems. Concepts are analyzed through the research and



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development of student led-creative projects.

Prerequisite: MDST 210.

MDST 310 (3) Mobile Application Design

This course will provide students with a methodology for conceptualizing and producing branded interactive applications for mobile devices including (but not limited to) smart phones and tablets. [1-3-0]

Prerequisite: VISA 268.

MDST 311 (3) Computational Poetics

The impact of computer technology and composition strategies on systems of representations and the question of meaning in the interdisciplinary field of computational art and design. Concepts are developed and applied through the creation of a computational multimedia model and the consequent artistic experience.

Prerequisite: MDST 220.

MDST 330 (3) Immersive Environments

Explores immersive environments as a creative practice that blurs the line between and among both physical and virtual environments. Focus on interactive installation production, reflection on practice and critical discussion.

Prerequisite: MDST 311.

MDST 490 (3) Seminar Series

Presents topics of relevance to media studies. Pass/Fail.

Prerequisite: Fourth-year standing

Corequisite: MDST 499.

MDST 499 (9) Capstone Media Project

Capstone project in teams.

Prerequisite: 3 credits of 3rd-year MDST and 3 credits of 3rd-year DIHU.

Corequisite: MDST 490.

Faculty of Management

MGCO: Management Co-Op

MGCO 401 (3) Co-op Education Work Experience I

Approved and supervised paid work experience with a public or private organization for a minimum of 455 hours full time.

Pre-employment training workshops and co-op assignments are required. Course is restricted to students who have completed all third-year requirements and have secured a work-term with an appropriate employer either independently or through the Co-op Office. Restricted to students accepted to the Management Co-operative Education Program.

MGCO 402 (3) Co-op Education Work Experience II

Approved and supervised paid work experience with a public or private organization for a minimum of 455 hours full time.

Pre-employment training workshops and co-op assignments are required. Course is restricted to students who have completed all third-year requirements and have secured a work-term with an appropriate employer either independently or through the Co-op Office. Restricted to students in the Management Co-operative Education Program.

Prerequisite: MGCO 401.

MGCO 403 (3) Co-op Education Work Experience III

Approved and supervised paid work experience with a public or private organization for a minimum of 455 hours full time.

Pre-employment training workshops and co-op assignments are required. Course is restricted to students who have completed all third-year requirements and have secured a work-term with an appropriate employer either independently or through the Co-op Office. Restricted to students in the Management Co-operative Education Program.

Prerequisite: MGCO 402.

MGCO 404 (3) Co-op Education Work Experience IV

Approved and supervised paid work experience with a public or private organization for a minimum of 455 hours full time.

Pre-employment training workshops, and co-op assignments are required. Course is restricted to students who have completed all third-year requirements and have secured a work-term with an appropriate employer either independently or through the Co-op Office. Restricted to students in the Management Co-operative Education Program.

Prerequisite: MGCO 403.

MGCO 405 (3) Co-op Education Work Experience V



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Approved and supervised paid work experience with a public or private organization for a minimum of 455 hours full time. Pre-employment training workshops and co-op assignments are required. Course is restricted to students who have completed all third-year requirements and have secured a work-term with an appropriate employer either independently or through the 'Co-op Office'.

Prerequisite: MGCO 404.

MGCO 406 (3) Co-op Education Work Experience VI

Approved and supervised paid work experience with a public or private organization for a minimum of 455 hours full time. Pre-employment training workshops and co-op assignments are required. Course is restricted to students who have completed all third-year requirements and have secured a work-term with an appropriate employer either independently or through the 'Co-op Office'.

Prerequisite: MGCO 405.

Management, Faculty of Management*MGMT: Management***MGMT 100 (3) Introduction to Business**

Introduction to the Faculty of Management and traditional areas of business including accounting, economics, finance, marketing, organizational behaviour, operations, business policy, information systems and entrepreneurship. Identifies the steps needed to build and manage successful local, national, and international competitive businesses and organizations. Introduces ethical and policy decisions faced by businesses, organizations and governments. Open to all students. [3-0-0]

MGMT 110 (3) Introduction to Management Thought and Social Responsibility

Introduces management thought in business and organizations. Utilizes critical thinking in socially and ethically responsible decisions at a corporate and personal level. Includes managing responsibly through people, mass production, ethical and socially-responsible practices. Covers start-ups, entrepreneurs, family business, non-profit/for-profit organizations and governments in global regions. Credit will be granted for only one of MGMT 110 or MGMT 200. Open to all students. [3-0-0]

Equivalency: MGMT 200.

MGMT 200 (3) Introduction to Management Thought and Social Responsibility

Introduces management thought in business and organizations. Utilizes critical thinking in socially and ethically responsible decisions at a corporate and personal level. Includes managing responsibly through people, mass production, ethical and socially-responsible practices. Covers start-ups, entrepreneurs, family business, non-profit/for-profit organizations and governments in global regions. Credit will be granted for only one of MGMT 200 or MGMT 110. Open to all students. [3-0-0]

Equivalency: MGMT 110.

MGMT 201 (3) Introduction to Financial Accounting

Construction and interpretation of financial statements. Credit will be granted for only one of MGMT 201 or MGMT 301. [3-0-0]

Prerequisite: MGMT 100 and either (a) MATH 100 or (b) MATH 116. Second-year standing and 3 credits of ENGL.

Corequisite: MGMT 110.

Equivalency: MGMT 301.

MGMT 202 (3) Introduction to Managerial Accounting

Major issues and methods of managerial accounting and how they are used by companies to enhance the quality of their management decisions. Credit will be granted for only one of MGMT 202 or MGMT 302. [3-0-0]

Prerequisite: MGMT 201 and second-year standing.

Equivalency: MGMT 302.

MGMT 220 (3) Introduction to Marketing

Concepts, analyses, and activities that comprise marketing management; practice with assessing and solving marketing problems. Credit will be granted for only one of MGMT 220 or MGMT 320. [3-0-0]

Prerequisite: All of MGMT 100, PSYO 111. Second-year standing and 3 credits of ENGL.

Corequisite: MGMT 110.

Equivalency: MGMT 320.

MGMT 230 (3) Introduction to Organizational Behaviour

Theories and concepts. Research, analytic, and behavioural skills aimed at understanding and managing the behaviour of individuals and groups in organizations. Credit will be granted for only one of MGMT 230 or MGMT 330. [3-0-0]

Prerequisite: All of MGMT 100, PSYO 111. Second-year standing, 3 credits of STAT and 3 credits of ENGL..



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Corequisite: MGMT 110.

Equivalency: MGMT 330.

MGMT 240 (3) Introduction to Management Communications

Opportunity for students to improve abilities to communicate effectively, regardless of the particular medium or situation. Enhances understanding of factors contributing to group effectiveness, and develops skills in working effectively as a member of a group or project team. Credit will be granted for only one of MGMT 240 or MGMT 340. [3-0-0]

Prerequisite: MGMT 100. Second-year standing and 3 credits of ENGL.

Corequisite: MGMT 110.

Equivalency: MGMT 340.

MGMT 250 (3) Introduction to Information Technology Management

IT managerial issues and their impact on small and medium enterprises and their people. Credit will be granted for only one of MGMT 250 or MGMT 350. [3-1-0]

Prerequisite: MGMT 100. Second-year standing and 3 credits of ENGL.

Corequisite: MGMT 110.

Equivalency: MGMT 350.

MGMT 290 (3) Industry Analysis Project

Applications of management concepts to the study of the nature and dynamics of an industry. Credit will not be granted for both MGMT 290 and MGMT 390. [3-0-0]

Prerequisite: All of MGMT 100, ECON 101. Second-year standing and 3 credits of ENGL.

Corequisite: All of MGMT 110, MGMT 201.

Equivalency: MGMT 390.

MGMT 300 (3) Intermediate Financial Accounting I

Environment of financial reporting, standard-setting process, and conceptual framework that underlies financial reporting in Canada. Focuses primarily on accounting for assets. Credit will be granted for only one of MGMT 300 or MGMT 400. [3-0-0]

Prerequisite: Either (a) MGMT 201 or (b) MGMT 301.

Corequisite: MGMT 310.

MGMT 301 (3) Introduction to Financial Accounting

Construction and interpretation of financial statements. Credit will be granted for only one of MGMT 301 or MGMT 201. [3-0-0]

Prerequisite: Third-year standing in the B.Mgt. program or Faculty of Management permission.

Equivalency: MGMT 201.

MGMT 302 (3) Introduction to Managerial Accounting

Major issues and methods of managerial accounting and how they are used by companies to enhance the quality of their management decisions. Credit will be granted for only one of MGMT 202 or MGMT 302. [3-0-0]

Prerequisite: MGMT 301. Third-year standing in B.Mgt. program or Faculty of Management permission.

Equivalency: MGMT 202.

MGMT 304 (3) Intermediate Financial Accounting II

Environment of financial reporting, standard-setting process, and conceptual framework that underlies financial reporting in Canada. Focuses primarily on accounting for liabilities and equity. Credit will be granted for only one of MGMT 304 or MGMT 400. [3-0-0]

Prerequisite: MGMT 300.

MGMT 310 (3) Introduction to Finance

Framework development for analyzing a firm's investment and financing decisions and a foundation in the basic concepts underlying modern corporate finance. [3-0-0]

Prerequisite: Either (a) MATH 100 or (b) MATH 116; and one of MGMT 202, MGMT 220, MGMT 230, MGMT 240, MGMT 250, MGMT 290.

Corequisite: MGMT 201.

MGMT 319 (3/6) d Special Topics in Management

Explores the latest concepts and issues in management. Change management, history of management thought, cooperative strategy, management decision making, public sector management, and other related topics within the field of management. It is not intended for topics routinely covered in the curriculum. Credit will be granted for only one of MGMT 319 or MGMT 419 when the subject matter is of the same nature.

Prerequisite: Third-year standing in B.Mgt. program or Faculty of Management permission.



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MGMT 320 (3) Introduction to Marketing

Concepts, analyses, and activities that comprise marketing management; practice with assessing and solving marketing problems. Credit will be granted for only one of MGMT 220 or MGMT 320. [3-0-0]

Prerequisite: Third-year standing in B.Mgt. program or Faculty of Management permission.

Equivalency: MGMT 220.

MGMT 329 (3/6) d Special Topics in Information Technology Management

Explores the latest concepts and/or issues in information technology management (ITM). Data warehousing, IS security, IT auditing and control, global ITM, and other related topics within the field of ITM. Not intended for topics routinely covered in the curriculum. Credit will be granted for only one of MGMT 329 or MGMT 429 when the subject matter is of the same nature.

Prerequisite: Third-year standing in the B.Mgt. program or Faculty of Management permission.

MGMT 330 (3) Introduction to Organizational Behaviour

Theories and concepts. Research, analytic, and behavioural skills aimed at understanding and managing the behaviour of individuals and groups in organizations. Credit will be granted for only one of MGMT 230 or MGMT 330. [3-0-0]

Prerequisite: Third-year standing in B.Mgt. program or Faculty of Management permission.

Equivalency: MGMT 230.

MGMT 339 (3/6) d Special Topics in Finance

Latest concepts and/or issues in finance. Corporate bankruptcy, financial trading strategies, international banking, and other related topics within the field of finance. Not intended for topics routinely covered in the curriculum. Credit will be granted for only one of MGMT 339 or MGMT 439 when the subject matter is of the same nature.

Prerequisite: MGMT 310 and third-year standing in the B.Mgt. program or Faculty of Management permission.

MGMT 340 (3) Introduction to Management Communications

Opportunity for students to improve abilities to communicate effectively, regardless of the particular medium or situation.

Enhances understanding of factors contributing to group effectiveness, and develops skills in working effectively as a member of a group or project team. Credit will be granted for only one of MGMT 240 or MGMT 340. [3-0-0]

Prerequisite: Third-year standing in B.Mgt. program or Faculty of Management permission.

Equivalency: MGMT 240.

MGMT 349 (3/6) d Special Topics in Marketing

Latest concepts and/or issues in marketing. Marketing research, consumer behaviour, e-marketing, international marketing, sales management, and other related topics within the field of marketing. Not intended for topics routinely covered in the curriculum. Credit will be granted for only one of MGMT 349 or MGMT 449 when the subject matter is of the same nature.

Prerequisite: Third-year standing in the B.Mgt. program or Faculty of Management permission.

MGMT 350 (3) Introduction to Information Technology Management

IT managerial issues and their impact on small and medium enterprises and their people. Credit will be granted for only one of MGMT 250 or MGMT 350. [3-1-0]

Prerequisite: Third-year standing in B.Mgt. program or Faculty of Management permission.

Equivalency: MGMT 250.

MGMT 355 (3) Operations Management

Introduction to the strategic and tactical decisions of operations management as it applies to both service and manufacturing sectors. Topics include process and technology choice, process flow, layout of facilities, capacity and resource planning, inventory control, lean systems, quality management, and quality control. [3-0-0]

Prerequisite: Either (a) MATH 100 or (b) MATH 116; and two of MGMT 201, MGMT 202, MGMT 220, MGMT 230, MGMT 240, MGMT 250, MGMT 290. And 3 credits of STAT.

MGMT 360 (3) Business Conditions Analysis

Basic tools and concepts of macroeconomics; review of the "non-market" factors that influence the effective performance of organizations. Credit will be granted for only one of MGMT 260 or MGMT 360. [3-0-0]

Prerequisite: MGMT 290 and one of MGMT 201, MGMT 202, MGMT 220, MGMT 230, MGMT 240, MGMT 250.

Equivalency: MGMT 260.

MGMT 380 (3) Sustainability and Business

Sustainable development issues and current thinking regarding sustainability and its implications for businesses and their managers. [3-0-0]

Prerequisite: Two of MGMT 201, MGMT 202, MGMT 220, MGMT 230, MGMT 240, MGMT 250, MGMT 290.

MGMT 390 (3) Industry Analysis Project



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Applications of management concepts to study the nature and dynamics of industry. Credit will not be granted for both MGMT 290 and MGMT 390. [3-0-0]

Prerequisite: Third-year standing in the B.Mgt. program or Faculty of Management permission.

Equivalency: MGMT 290.

MGMT 395 (3) Directed Studies in Management

Opportunity for supervised research in a clearly-defined area in the field of management. This research will lead to a major research paper. The topic will be agreed upon by the supervising faculty member, the student, and the dean. This course may not duplicate existing courses which are part of the regular curricular offering of the Faculty of Management. The course may be taken over one or two terms.

Prerequisite: Third-year standing in the B.Mgt. program or Faculty of Management permission.

MGMT 400 (6) Intermediate Financial Accounting

The environment of financial reporting, the standard-setting process, and the conceptual framework that underlies financial reporting in Canada. Technical accounting procedures for the main categories of assets, liabilities, equities, revenues, and expenses will be covered. Credit will be granted for only one of MGMT 300 and MGMT 304 or MGMT 400. [6-0-0]

Prerequisite: One of MGMT 201, MGMT 301 and third-year standing.

MGMT 401 (3) Intermediate Managerial Accounting

Implementation and evaluation of cost systems for management and decision making. Cost issues include: accumulating and analyzing costs using actual and standard approaches, overhead allocation, and cost estimation. Management topics include: pricing, production and investment decisions, revenue analysis, performance evaluation, management incentive systems, and strategy analysis. [3-0-0]

Prerequisite: Either (a) MGMT 202 or (b) MGMT 302.

MGMT 402 (3) Introduction to Income Taxes in Canada

Introduction to the Income Tax Act (Canada). Focuses on fundamental tax principles as well as developing familiarity in using the Income Tax Act and other tax research tools. Topics include sources of income, computing income for tax purposes for individuals and corporations, tax planning opportunities, and other tax issues. [3-0-0]

Prerequisite: Either (a) MGMT 201 or (b) MGMT 301.

MGMT 403 (3) Auditing and Assurance Services

Focuses on the external auditor's provision of assurance services on financial information. Topics include: society's demand for various assurance services; the role, profession, ethics, independence, and liability of the assurance provider; assurance risk and strategy; assurance planning, operations, and reports; computerization and internal control; and emerging assurance services. [3-0-0]

Prerequisite: One of MGMT 304, MGMT 400.

Corequisite: Either (a) DATA 301 or (b) COSC 301.

MGMT 404 (3) Advanced Financial Accounting

Analyzes the concepts and practices underlying financial reporting in more complex areas such as business combinations, multinational operations, future income taxes, and not-for-profit organizations. [3-0-0]

Prerequisite: One of MGMT 304, MGMT 400.

MGMT 405 (3) Advanced Managerial Accounting

Examines the integrative and interdisciplinary role of managerial accounting and its contribution in the strategic management process, including analysis and managerial control. Focuses on cases that deal with management's need for information planning and decision making. Develops analytical, communication, and presentation skills using contemporary management issues. [3-0-0]

Prerequisite: MGMT 401.

Corequisite: Either (a) DATA 301 or (b) COSC 301.

MGMT 410 (3) Leadership in Complex Environments

Examinations of theoretical and practical approaches to leadership and conflict resolution. Topics covered include distinguishing between authority and leadership, technical problems and adaptive challenges, power and progress, diagnostic frameworks for assessment and strategies, and tactics of intervention to mobilize progress. Also explored is the nature of conflict, its role in human social systems, and ways to address its negative impacts and harness its positive possibilities. [3-0-0]

Prerequisite: Either (a) MGMT 230 or (b) MGMT 330. Third-year standing.

MGMT 411 (3) Human Resources Management

Develops an understanding of the diverse areas in human resources management. Examines analysis, planning, staffing, performance evaluation, compensation, training and development, labor relations, employee safety, health, human resource



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management, and an understanding of cultural differences and its impact on the organization. [3-0-0]

Prerequisite: Either (a) MGMT 230 or (b) MGMT 330. Third-year standing.

MGMT 412 (3) Negotiations

Theory and processes of negotiation as it is practiced in a variety of settings. Develop skills experientially, understand useful analytical frameworks, and appreciate the role of emotion in a broad spectrum of negotiation situations. [3-0-0]

Prerequisite: Either (a) MGMT 230 or (b) MGMT 330. Third-year standing.

MGMT 414 (3) Managing and Leading Non-Profit and Public Sector Organizations

Comprehensive perspective on the social non-profit sector and the critical role that leading and managing plays in the success and sustainability of any enterprise. Examine the key elements (vision, strategy, human resource management, financing, fund development, and strategic relationships) of operating the business of a successful social non-profit organization.

Prerequisite: Either (a) MGMT 230 or (b) MGMT 330. Third-year standing.

MGMT 419 (3/6) d Special Topics in Management

Explores the latest concepts and issues in management. Change management, history of management thought, cooperative strategy, management decision making, public sector management, and other related topics within the field of management. It is not intended for topics routinely covered in the curriculum. Credit will be granted for only one of MGMT 419 or MGMT 319 when the subject matter is of the same nature.

Prerequisite: Fourth-year standing.

MGMT 421 (3) Globalization, Offshoring and Outsourcing

Explores, from a strategic perspective, Canadian and global businesses and their wider economic environment. Special emphasis on the impact of information technology used to enable outsourcing, offshoring and joint ventures in the conduct of global trade. Topics further include: government policy, global value chain analysis, and the benefits and downsides of outsourcing and/or offshoring. [3-0-0]

Prerequisite: Fourth-year standing.

MGMT 422 (3) Project Management

Provides the knowledge and skills to successfully initiate, plan, manage, control, and report on projects. Conveys the importance of proper planning, documentation, scope and change control, and quality and risk management. Also covers the people skills required in the areas of team selection, structure, motivation, interviewing, presentation, conflict resolution, and leadership, all of which are critical factors in project management. [3-1-0]

Prerequisite: Either (a) one of MGMT 230, MGMT 330, MGMT 250 or (b) MGMT 350. Third-year standing.

MGMT 423 (3) E-Commerce

Overview of e-commerce from a managerial perspective, with emphasis on the three major driving forces behind e-commerce: technology change, business development, and social controversies. Concepts and frameworks for e-commerce with which to examine existing e-commerce models, new e-commerce opportunities, the prevalent enabling technology, strategic issues confronting new Internet ventures, privacy and intellectual property. [3-0-0]

Prerequisite: Either (a) MGMT 220 or (b) MGMT 320; and either (a) MGMT 250 or (b) MGMT 350. Third-year standing.

MGMT 424 (3) Enterprise Systems Management

Examines enterprise systems and its components including enterprise resource planning (ERP), customer relations management (CRM), and supply chain management (SCM). Integration of enterprise-wide information systems and the managerial and technical issues in planning, designing, acquiring, implementing, and extending enterprise systems. Includes first-hand experience with a commercial ERP system software package. [3-0-0]

Prerequisite: Either (a) MGMT 250 or (b) MGMT 350. Third-year standing.

MGMT 425 (3) Strategies in Entrepreneurial Technology

Examines strategic execution in entrepreneurial settings and startups, latest concepts and/or issues in entrepreneurial technology, entrepreneurial behaviours in larger organizations, new business models, technology-based businesses, IT Platforms and open services organizations that impact global entrepreneurial management and other related topics affecting strategic execution. [3-0-0]

Prerequisite: Third-year standing.

Corequisite: Either (a) MGMT 100 or (b) MGMT 110.

MGMT 429 (3/6) d Special Topics in Information Technology Management

Explores the latest concepts and/or issues in information technology management (ITM). Data warehousing, IS security, IT auditing and control, global ITM, and other related topics within the field of ITM. Not intended for topics routinely covered in the curriculum. Credit will be granted for only one of MGMT 429 or MGMT 329 when the subject matter is of the same nature.

Prerequisite: Fourth-year standing.



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MGMT 435 (3) Risk Management

Introduction to the financial instruments, methods, and tools used in financial risk management. Methodology applies to both corporate and investment settings for managing exchange rate risk, interest rate risk, market risk, and credit risk. Focuses on three types of derivative securities: forwards and futures, options, and swaps. Understanding of the basic properties of these instruments, their hedging uses, and their valuation principles. Value-at-risk and options theory will also be covered. [3-0-0]
Prerequisite: MGMT 310 and third-year standing.

MGMT 436 (3) Investments

Basic principles and tools of investment analysis. Understanding of the properties and uses of three broad types of financial securities: equity securities (common stock), fixed income securities (government and corporate bonds), and derivative securities (e.g., futures, options). The trading process, portfolio theory (risk-return and risk-arbitrage models), security analysis, and investment performance evaluation. [3-0-0]
Prerequisite: MGMT 310 and third-year standing.

MGMT 437 (3) Intermediate Finance

Introduction to theories and methods of corporate finance policy used by senior managers and the board of directors to direct the financial operations and strategy of the firm. Policies examined include financial structure, dividend policy, mergers and acquisitions, and risk management. [3-0-0]
Prerequisite: MGMT 310 and third-year standing.

MGMT 438 (3) Capital Asset Budgeting

Building on introductory and intermediate finance concepts, the course develops a framework for investment decisions involved in securing long-term corporate assets. It focuses on case-based material including assessment of qualitative and quantitative decision making criteria, analysis and forecasting of financial statements and cash flows, cost of capital implications, and valuation and return considerations. [3-0-0]
Prerequisite: MGMT 310 and third-year standing.

MGMT 439 (3/6) d Special Topics in Finance

Latest concepts and/or issues in finance. Corporate bankruptcy, financial trading strategies, international banking, and other related topics within the field of finance. Not intended for topics routinely covered in the curriculum. Credit will be granted for only one of MGMT 339 or MGMT 439 when the subject matter is of the same nature.
Prerequisite: MGMT 310 and fourth-year standing.

MGMT 440 (3) Brands, Culture, and Marketing

Goes beyond traditional courses in brand management and marketing by asking questions about the intricate relationships between culture and the consumption of brands. Raises questions about how a culture can brand itself and promote itself through specific brands. Brand awareness, identity, image, personality, positioning, and equity. Strategies to build and sustain brand equity and the globalization of brands will be addressed. [3-0-0]
Prerequisite: Either (a) MGMT 220 or (b) MGMT 320. Third-year standing.

MGMT 441 (3) Marketing Strategy

Integrative, dynamic view of marketing strategy at both the corporate and business unit level. Understanding, developing, and evaluating brand strategies over the life of a product market. Strategies for: pioneering brands, late entry, growth, mature and declining markets, and defensive marketing. [3-0-0]
Prerequisite: Either (a) MGMT 220 or (b) MGMT 320. Third-year standing.

MGMT 442 (3) Consumer Behaviour

Consumer behaviour is at the heart of any successful business. A clear understanding of consumers is critical in managing the marketing function. Basic concepts and issues in consumer behaviour from a marketing manager's perspective. [3-0-0]
Prerequisite: Either (a) MGMT 220 or (b) MGMT 320. Third-year standing.

MGMT 443 (3) New Product and Service Development

Examines from a marketing perspective the process of conceptualizing, designing, developing, launching and ongoing marketing of new products or services. Topics include reasons for new product failure, barriers to new product adoption, stage gates and project planning tools, idea generation, design trade-off decisions, concept testing, and forecasting. [3-0-0]
Prerequisite: Either (a) MGMT 220 or (b) MGMT 320; and either (a) MGMT 290 or (b) MGMT 390. Third-year standing.

MGMT 444 (3) Market Research

Concepts and applications of market research with emphasis on basic methodologies. Introduces a variety of techniques and provides the basis of how research applies to strategy including marketing advertising, sales and product design, and development. [3-0-0]



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Prerequisite: Either (a) MGMT 220 or (b) MGMT 320. Third-year standing, 3 credits of STAT.

MGMT 449 (3/6) d Special Topics in Marketing

Latest concepts and/or issues in marketing. Marketing research, consumer behaviour, e-marketing, international marketing, sales management, and other related topics within the field of marketing. Not intended for topics routinely covered in the curriculum. Credit will be granted for only one of MGMT 449 or MGMT 349 when the subject matter is of the same nature.

Prerequisite: Fourth-year standing.

MGMT 450 (3) Entrepreneurship and the Smaller Firm

Exposure to the issues and challenges associated with starting a new entrepreneurial business. Students gain an appreciation of the challenges associated with creating a new venture. [3-0-0]

Prerequisite: Third-year standing and 6 credits of MGMT 200 or higher.

MGMT 470 (3) Global Food Systems: Society, Ecology, Sustainability

Evaluating food system sustainability issues, including management and technology alternatives, through the lenses of (1) systems-analytic (i.e. life cycle) thinking and tools; and (2) sustainable scale (relative to ecological carrying capacity), distributive justice, and efficient allocation. Credit will be granted for only one of BIOL 424 or MGMT 470. [3-0-0]

Prerequisite: Third-year standing.

Equivalency: BIOL 424.

MGMT 480 (3) Law and Business

Introduces managers of organizations and businesses to basic legal concepts that they can expect to encounter. Provides the background needed to identify legal issues and make informed decisions in instructing legal counsel and acting on legal advice. May cover product liability, tort, and intellectual property. [3-0-0]

Prerequisite: MGMT 100. Third-year standing and 3 credits of ENGL.

Corequisite: MGMT 110.

MGMT 481 (3) Strategy and Change Management

Investigates how strategy and change affects the organization and how the organization can be designed or realigned to realize its strategy more effectively. Alignment with organizational mission, how strategic decisions affect the organization structures, processes, culture, resources (both human and financial), and management styles, and how the organization can manage the change process. [3-0-0]

Prerequisite: Either (a) MGMT 230 or (b) MGMT 330; and MGMT 360. Third-year standing.

MGMT 482 (3) International Business

Political, legal, technological, competitive, and cultural issues that shape organizations as they operate worldwide. Understanding of the application of management theory (trade theory, modes of entry, foreign direct investment, factor mobility theory) to the strategic management problems of doing business in the international arena. Cultural aspects of operating in an international environment. [3-0-0]

Prerequisite: All of MGMT 100, MGMT 110. Third-year standing and 3 credits of ENGL.

MGMT 490 (3) Capstone Service Learning and Consulting

Culminating experience for a management education. Includes team-based work on a community service project, consulting project, or some other form of experiential or immersion-based learning effort. Explores connections among students' disciplines and between their educational experience and issues in the off-campus community. [3-0-0]

Prerequisite: Either (a) MGMT 202 or (b) MGMT 302; and either (a) MGMT 220 or (b) MGMT 320. Fourth-year standing.

MGMT 495 (3) Directed Studies in Management

Opportunity for supervised research in a clearly-defined area in the field of management. This research will lead to a major research paper. The topic will be agreed upon by the supervising faculty member, the student, and the dean. This course may not duplicate existing courses which are part of the regular curricular offering of the Faculty of Management. The course may be taken over one or two terms.

Prerequisite: Fourth-year standing.

MGMT 534 (0.5-2) Regional Development and Globalization

Explore managing and leading businesses and organizations in globally connected regions. Examine historical and contemporary instances of socio-economic development, and consider future directions and possibilities. Study organizations, institutions, communities and public policy. Pass/Fail.

MGMT 535 (1.5) Approaches to Learning and Research

Acquire skills to learn independently and collaboratively for continuous application in the M.M. program and life-long. Focus on navigating and sorting information, evaluating sources, and building knowledge. Explore methods for research that embody



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rigour, reason, and evidence, and that balance sense and sensibility. Pass/Fail.

MGMT 536 (1.5-9) Enterprise and Innovation

Explore enterprise commonalities and differences collaboratively, likewise regional, national, and global networking, and other forms of interaction. Deepen knowledge of, and apply, core management subjects such as accounting, finance, marketing, people management, information technology and strategy. Pass/Fail.

MGMT 537 (0.5-3) Leading and Citizenship

Study professional and citizenship obligations within and between organizations, institutions and communities - regionally, nationally, and globally. Reflect collaboratively and individually to challenge diverse orientations to the social responsibilities of organizations. Pass/Fail.

MGMT 538 (0.5-1.5) Communicating

Explore and implement various approaches to oral, written, and other forms of management-based communication. Pass/Fail.

MGMT 539 (0.5-1.5) Ethics

Study methods of ethical analysis and apply them in analyzing and developing action plans that ensure ethical practice. Pass/Fail.

MGMT 540 (0.5-1.5) Systems

Explore impact and implications of systems on management issues and study the managing of systems for maximum effectiveness in regional contexts. Pass/Fail.

MGMT 541 (0.5-1.5) Practical Research Methods

Building on the foundations laid in Approaches to Learning and Research, develop skills in research with particular emphasis on the area of activity on which the participant wishes to focus. Pass/Fail

MGMT 542 (0.5-1.5) Career Development

Develop and curate a portfolio of work through the Master of Management program to support and develop future careers. Pass/Fail.

MGMT 543 (0.5-3) Managing Change

Consolidate and integrate material, concepts, and ideas studied in earlier courses. Focus on the importance of people when managing change, including their roles, adaptive capacity, and conflict management. Pass/Fail.

MGMT 544 (1.5-6) Applied Project

Apply what has been learned through the Master of Management program to provide thought leadership and innovative capacity to one or more organizations to help them make progress on an issue they face. Pass/Fail.

MGMT 545 (6) Directed Study

Elect to focus on a particular area of interest within the management field (technology, wine sector, healthcare etc.) or opt (with the agreement of another Faculty, e.g.: Engineering, Creative and Critical Studies etc.) to pursue deeper study in other disciplines. Pass/Fail.

Music, Faculty of Creative and Critical Studies

MUSC: Music

MUSC 115 (3) Popular Music and Visual Cultures

A survey of changing attitudes toward class, ethnicity, gender, and ideology as reflected in folk, blues, jazz, rock, and hip-hop music and their accompanying visual cultures from the early 20th century to the early 21st century. Credit will be granted for only one of MUSC 115 or ARTH 115. [3-0-0]

Equivalency: ARTH 115.

Nursing, Faculty of Health and Social Development

NRSG: Nursing

NRSG 101 (2) Nursing Lab Practice I

Develops evidence-informed nursing practice through seminar, laboratory learning, and simulation. Students gain knowledge,



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skills, and abilities needed to practice foundational nursing assessments and safe ethical care. Weekly concepts will align with NRSRG 136 intentional learning activities. [0-3-1.5]

Prerequisite: All of NRSRG 111, NRSRG 112, NRSRG 113, BIOL 131.

Corequisite: All of NRSRG 126, NRSRG 136.

NRSRG 111 (3) Foundations of Health

Meaning of health and healing. Recognize diversity of beliefs, values, and perceptions of health. Introduction to the Canadian Health Care System, conceptual frameworks of health promotion, determinants of health, disease and injury prevention, and primary health care. [3-0-0]

Prerequisite: First-year BSN-O Standing

Corequisite: All of NRSRG 112, NRSRG 113.

NRSRG 112 (1.5) Introduction to the Profession of Nursing I

Critical reflection of the historical, political, and socioeconomic evolution of nursing. Exploration of foundational theories, nursing practice standards, ethical principles, ethical decision making, and health law that guides evidence-informed professional nursing practice. [1.5-0-0]

Prerequisite: First-year BSN-O Standing

NRSRG 113 (1.5) Relational Practice I

Understanding of self and the capacity to be in caring relation with others (individual, groups, populations, communities).

Reflecting on personal perspectives and experiences to understand one's own attitudes, beliefs, and values. Pass/Fail [1.5-0-0]

Prerequisite: First-year BSN-O Standing

Corequisite: All of NRSRG 111, NRSRG 112.

NRSRG 120 (3) Introduction to Nursing Research

Introduction to nursing research to provide knowledge, skills, and abilities to engage in evidence-informed nursing practice. Key topics will include research concepts, approaches, procedures/processes, ethics, and application in diverse health care settings. [3-0-0]

Prerequisite: All of HINT 110, NRSRG 111, NRSRG 112 and English (3 credits)

Corequisite: All of NRSRG 101, NRSRG 122, NRSRG 123, NRSRG 126, NRSRG 136.

NRSRG 122 (1.5) Introduction to the Profession of Nursing II

Explores the historical development of nursing knowledge, theory, contemporary understandings of nursing as a discipline, the current body of knowledge defining it, and the relationship between practice and theory. Development of teaching and learning knowledge, skills, and abilities. [1.5-0-0]

Prerequisite: All of HINT 110, NRSRG 111, NRSRG 112, NRSRG 113, BIOL 131.

NRSRG 123 (1.5) Relational Practice II

Understanding relational care and relational ethics to build knowledge, skills, and abilities to engage in relational practice with diverse individuals, families, and groups. Explore concepts and evidence for caring, therapeutic communication, and relational identity. Pass/Fail. [1.5-0-0]

Prerequisite: All of HINT 110, NRSRG 111, NRSRG 112, NRSRG 113, BIOL 131.

Corequisite: All of NRSRG 101, NRSRG 120, NRSRG 122, NRSRG 126, NRSRG 136.

NRSRG 126 (3) Health & Healing I

Introduction to adult health assessment with a focus on the older adult with stable chronic health conditions. Concepts will align with NRSRG 136 intentional learning activities. Nursing theories and evidence-informed frameworks guide approaches to care, assessments, clinical reasoning, and care planning. [3-0-0]

Prerequisite: All of HINT 110, NRSRG 111, NRSRG 112, NRSRG 113, BIOL 131.

Corequisite: All of NRSRG 101, NRSRG 120, NRSRG 122, NRSRG 123, NRSRG 136.

NRSRG 136 (3) Nursing Practice I

This first nursing practicum develops knowledge, skills, and abilities to provide safe ethical nursing care to adults with stable chronic health challenges. Intentional learning activities integrate knowledge from NRSRG 101 and NRSRG 126. The focus is on assessment, clinical reasoning, care planning, and documentation. Pass/Fail. [0-6-0]

Prerequisite: All of HINT 110, NRSRG 111, NRSRG 112, NRSRG 113, BIOL 131.

Corequisite: All of NRSRG 101, NRSRG 120, NRSRG 122, NRSRG 123, NRSRG 126.

NRSRG 140 (3) L.P.N. Access to B.S.N

For students entering the Bachelor of Science in Nursing (B.S.N.) Access program. Participants will be introduced, through theory and simulated learning activities, to the foundational constructs associated with nursing courses in the first year of the nursing program. [3-0-0]



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Prerequisite: HINT 110.

Corequisite: NRSG 120.

NRSG 201 (2) Nursing Lab Practice II

Develops evidence-informed nursing practice through seminar, laboratory learning, and simulation. Students advance knowledge, skills, and abilities in preparation to practice nursing assessments and safe ethical care in acute care settings. Concepts will align with NRSG 236 intentional learning activities. [0-3-1.5]

Prerequisite: All of BIOL 131, BIOL 133 and Second-Year BSN-O Standing

Corequisite: All of NRSG 210, NRSG 213, NRSG 226, NRSG 236, HINT 231.

NRSG 202 (2) Nursing Lab Practice III

This course is a continuation of NRSG 201 and provides additional opportunities to develop evidence-informed approaches for safe ethical care. Concepts will align with NRSG 237 intentional learning activities. [0-3-1.5]

Prerequisite: All of NRSG 201, NRSG 210, NRSG 213, NRSG 226, NRSG 236, HINT 231.

Corequisite: All of NRSG 220, NRSG 223, NRSG 227, NRSG 237, BIOL 232.

NRSG 210 (1.5) Pharmacology for Nursing I

Principles of pharmacology, including pharmacokinetics and pharmacodynamics of major drug classes using prototype drugs. Develops knowledge and systematic approaches to safely and ethically administer drug therapy. [1.5-0-0]

Prerequisite: All of BIOL 131, BIOL 133 and Second-Year BSN-O Standing

Corequisite: All of NRSG 201, NRSG 213, NRSG 226, NRSG 236, HINT 231.

NRSG 213 (1.5) Relational Practice III

Emphasis is on the unique experience of clients and their families in health and illness. Through exploration of relational theories and evidence-informed approaches, students explore strategies to deliver therapeutic, ethical, and holistic care. Pass/Fail. [1.5-0-0]

Prerequisite: All of BIOL 131, BIOL 133 and Second-Year BSN-O Standing

Corequisite: All of NRSG 201, NRSG 210, NRSG 226, NRSG 236, HINT 231.

NRSG 220 (1.5) Pharmacology for Nursing II

This course is a continuation of NRSG 210, further expanding on the principles of pharmacology. Further expanding on knowledge and systematic approaches to safely and ethically administer drug therapy. [1.5-0-0]

Prerequisite: All of NRSG 201, NRSG 210, NRSG 213, NRSG 226, NRSG 236, HINT 231.

Corequisite: All of NRSG 202, NRSG 223, NRSG 227, NRSG 237, BIOL 232.

NRSG 223 (1.5) Relational Practice IV

Evidence-informed strategies and approaches of relational inquiry to build relational skills and capacity. Socio-cultural constructs in relation to health and healing. Pass/Fail. [1.5-0-0]

Prerequisite: All of NRSG 201, NRSG 210, NRSG 213, NRSG 226, NRSG 236, HINT 231.

Corequisite: All of NRSG 202, NRSG 220, NRSG 227, NRSG 237, BIOL 232.

NRSG 226 (1.5) Health & Healing II

Evidence-informed assessment and management of health challenges in both episodic and chronic illness. Concepts will align with NRSG 236 intentional learning activities. [1.5-0-0]

Prerequisite: All of BIOL 131, BIOL 133 and Second-Year BSN-O Standing

Corequisite: All of NRSG 201, NRSG 210, NRSG 213, NRSG 236, HINT 231.

NRSG 227 (1.5) Health & Healing III

This course is a continuation of NRSG 226, further expanding on evidence-informed assessment and management of health challenges in both episodic and chronic illness. Concepts will align with NRSG 237 intentional learning activities. [1.5-0-0]

Prerequisite: All of NRSG 201, NRSG 210, NRSG 213, NRSG 226, NRSG 236, HINT 231.

Corequisite: All of NRSG 202, NRSG 220, NRSG 223, NRSG 237, BIOL 232.

NRSG 228 (1.5) Community Health

Theories, ethics and evidence-informed approaches to community health nursing including primary health care, population health, health maintenance and promotion, disease and injury prevention. Exploration of concepts of community-based assessment, planning, intervention and evaluation with community-as-client. [1.5-0-0]

Prerequisite: All of BIOL 131, BIOL 133 and Second-Year BSN-O Standing

Corequisite: NRSG 238.

NRSG 229 (1.5) Mental Health in Nursing

Evidence-informed promotion of mental well-being, assessment and management of episodic and chronic mental health challenges across the life span. Concepts will align with NRSG 239 intentional learning activities. [1.5-0-0]



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Prerequisite: All of BIOL 131, BIOL 133 and Second-Year BSN-O Standing

Corequisite: NRSO 239.

NRSO 236 (3) Nursing Practice II

This practicum in acute care settings develops beginning knowledge, skills, and abilities to provide safe ethical nursing care for adults with episodic and chronic health challenges. Intentional learning activities integrate evidence-informed knowledge from NRSO 201 and NRSO 226. The focus is on assessment, clinical reasoning, care planning, and documentation. Pass/Fail. [0-6-0]

Prerequisite: All of BIOL 131, BIOL 133 and Second-Year BSN-O Standing

Corequisite: All of NRSO 201, NRSO 210, NRSO 213, NRSO 226, HINT 231.

NRSO 237 (3) Nursing Practice III

This second acute care practicum is a continuation of NRSO 236. Develops advancing knowledge, skills, and abilities to provide safe ethical nursing care for adults with episodic and chronic health challenges. Intentional learning activities integrate evidence-informed knowledge from NRSO 202 and NRSO 227. Pass/Fail. [0-6-0]

Prerequisite: All of NRSO 201, NRSO 210, NRSO 213, NRSO 226, NRSO 236, HINT 231.

Corequisite: All of NRSO 202, NRSO 220, NRSO 223, NRSO 227, BIOL 232.

NRSO 238 (3) Nursing Practice in Community

Practicum in community health nursing develops knowledge, skills, and abilities needed to provide to provide safe ethical nursing care health care within varied community settings with diverse populations. Students will draw on principles of social justice and the social determinants of health to engage in evidenced-informed community assessments, health promotion/illness prevention activities, and health teaching. Pass/Fail. [0-6-0]

Prerequisite: All of BIOL 131, BIOL 133 and Second-Year BSN-O Standing

Corequisite: NRSO 228.

NRSO 239 (3) Nursing Practice in Mental Health

Practicum in mental health provides opportunities to acquire knowledge, skills, and attitudes to promote wellness, through safe, ethical nursing care, in a variety of contexts. The focus will be presenting a mental well-being project to a specific target population. Other experiences will provide students an understanding of the mental health nursing process. Intentional learning activities integrate evidence-informed concepts from NRSU 229. Pass/Fail. [0-6-0]

Prerequisite: All of BIOL 131, BIOL 133 and Second-Year BSN-O Standing

Corequisite: NRSO 229.

NRSO 301 (1) Nursing Lab Practice IV

Develops evidence-informed nursing practice through seminar, laboratory learning, and simulation. Students advance knowledge, skills, and abilities in preparation to practice safe ethical nursing care in acute medical settings. [0-2-1.5]

Prerequisite: All of BIOL 131, BIOL 133, HINT 231, BIOL 232. Third-year BSN-O Standing

Corequisite: All of NRSO 326, NRSO 336.

NRSO 302 (1) Nursing Lab Practice V

Develops evidence-informed nursing practice through seminar, laboratory learning, and simulation. Students advance knowledge, skills, and abilities in preparation to practice safe ethical nursing care in acute surgical settings. [0-2-1.5]

Prerequisite: All of NRSO 301, NRSO 326, NRSO 336, BIOL 131, BIOL 133, HINT 231, BIOL 232.

Corequisite: All of NRSO 327, NRSO 337.

NRSO 310 (3) Palliative Approach to Chronic Illness

Examination of the philosophy, principles, and evidence-informed practice of a palliative approach to the care of patient/clients with life-limiting chronic illness over the illness trajectory, including end of life and bereavement. This course will pay special attention to ethics and older adults. [3-0-0]

Prerequisite: Third-Year BSN-O Standing

NRSO 313 (3) Relational Practice V

Understanding and respecting the complexities of difference and diversity with clients in nursing practice. A critical exploration of cultural identities and racism from an Indigenous perspective, facilitates development of evidence-informed practice for culturally safe care for all peoples in a variety of contexts (health care, research, institutions, and society). Pass/Fail. [3-0-0]

Prerequisite: Third-Year BSN-O Standing

NRSO 320 (3) Global Health

Explores the role of the nurse within the context of the global society and the changing health care environment. Develops knowledge of emerging health issues and trends, evidence-informed approaches and ethical concerns for nursing practice at the global level. [3-0-0]

Prerequisite: Third-Year BSN-O Standing



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NRSG 326 (1.5) Health & Healing IV

Evidence-informed assessment and management of complex health challenges in both episodic and chronic illness utilizing a case study approach. [3-0-0 (over 6 weeks)] [3-0-0]

Prerequisite: All of BIOL 131, BIOL 133, HINT 231, BIOL 232 and Third-year BSN-O Standing.

Corequisite: All of NRSG 301, NRSG 310, NRSG 336, HINT 331.

NRSG 327 (1.5) Health & Healing V

Continuation of NRSG 326. Evidence-informed assessment and management of complex health challenges in both episodic and chronic illness utilizing a case study approach. [3-0-0 (over 6 weeks)] 3-0-0

Prerequisite: All of NRSG 301, NRSG 310, NRSG 326, NRSG 336, HINT 331.

Corequisite: All of NRSG 302, NRSG 313, NRSG 320, NRSG 337.

NRSG 328 (1.5) Health of the Childbearing Family

Nursing within a health promotion framework in both community and acute care settings. Evidence-informed guidelines for care of the childbearing family during pregnancy, labour, birth, and postpartum will be drawn on to inform assessment and management of holistic, ethical care. Concepts will align with NRSG 338 intentional learning activities. [3-0-0 (over 6 weeks)] 3-0-0

Prerequisite: All of BIOL 131, BIOL 133, HINT 231, BIOL 232 and Third-year BSN-O Standing

Corequisite: NRSG 338.

NRSG 329 (1.5) Child Health

Child health nursing within a health promotion framework in both community and acute care settings. Family-centered care and interprofessional collaboration will be examined with a focus on understanding the diversity and unique needs of both children and families to inform holistic, ethical care. Concepts will align with NRSG 339 intentional learning activities. [3-0-0 (over 6 weeks)] 3-0-0

Prerequisite: All of BIOL 131, BIOL 133, HINT 231, BIOL 232 and Third-year BSN-O Standing

Corequisite: NRSG 339.

NRSG 336 (4) Nursing Practice in Medical Settings

This early immersion practicum develops advanced knowledge, skills, and abilities for evidence-informed patient care with adults experiencing episodic and chronic health challenges. Ethical dilemmas common to this area of practice will be explored within an ethical decision making framework. Pass/Fail. [0-16-0]

Prerequisite: All of BIOL 131, BIOL 133, HINT 231, BIOL 232 and Third-year BSN-O Standing.

Corequisite: All of NRSG 301, NRSG 310, NRSG 311, NRSG 326.

NRSG 337 (4) Nursing Practice in Surgical Settings

This early immersion practicum develops advanced knowledge, skills, and abilities for evidence-informed patient care with adults experiencing episodic and chronic health challenges. Ethical dilemmas common to this area of practice will be explored within an ethical decision-making framework. Pass/Fail. 0-16-0

Prerequisite: All of NRSG 301, NRSG 310, NRSG 326, NRSG 336, HINT 331.

Corequisite: All of NRSG 302, NRSG 313, NRSG 320, NRSG 327.

NRSG 338 (2) Nursing Practice with Childbearing Families

This specialty practicum develops beginning knowledge, skills, and abilities to provide evidence-informed nursing care in newborn family health contexts. Intentional learning activities integrate knowledge from NRSG 328. Ethical considerations common to this area of practice will be explored. Pass/Fail. 0-8-0

Prerequisite: All of BIOL 131, BIOL 133, HINT 231, BIOL 232 and Third-year BSN-O Standing

Corequisite: NRSG 328.

NRSG 339 (2) Nursing Practice in Child Health

This specialty practicum develops beginning knowledge, skills, and abilities to provide evidence-informed nursing care in a variety child health care contexts. Intentional learning activities integrate knowledge from NRSG 329. Ethical considerations common to this area of practice will be explored. Pass/Fail. 0-8-0

Prerequisite: All of BIOL 131, BIOL 133, HINT 231, BIOL 232 and Third-year BSN-O Standing

Corequisite: NRSG 329.

NRSG 421 (3) Capstone Review

A comprehensive review of entry-level nursing knowledge, skills, and abilities in preparation for writing the nursing entry to practice regulatory examination. Through simulation and interactive case studies participants will have opportunities to apply previous learning and clinical reasoning to situations commonly seen in the first year of registered nursing practice. [3-0-0]

Prerequisite: Fourth-Year BSN-O Standing

Corequisite: All of NRSG 422, NRSG 432.



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NRSG 422 (3) Leadership

Nursing leadership at various levels of the healthcare system with an emphasis on leadership, decision-making, and change theories. Consider the impact of trends, issues, and ethics on leadership in nursing. [3-0-0]

Prerequisite: Fourth-Year BSN-O Standing

Corequisite: All of NRSG 421, NRSG 432.

NRSG 423 (3) Advanced Clinical Reasoning for Care of the Complex Client

Theory and research for evidence-informed practice for the assessment and care of the complex, unstable, acutely ill patient. Understanding challenging etiology, pathophysiology, manifestations, diagnostics and intervention to inform advanced clinical reasoning. [3-0-0]

Prerequisite: NRSG 421. Fourth-year BSN-O Standing

NRSG 424 (3) Primary Care Nursing

Exploring theories, concepts, and principles foundational to primary care nursing practice, learners will build evidence informed knowledge of health promotion, disease prevention, and management of both episodic and chronic conditions. Interprofessional collaborative practice and care planning will be examined. Credit will be granted for only one of NRSG 424 or NRSG 524.

Prerequisite: Year 4 Standing in B.S.N. Program.

NRSG 426 (3) Advanced Gerontology

Theory, research, and best practices for ethical care of the older adult and aging populations builds nursing knowledge, skills, and abilities in gerontology. Develops advanced understanding of issues pertaining to the older adult population in acute and community settings. 3-0-0

Prerequisite: Fourth-Year BSN-O Standing

NRSG 427 (3) Advanced Mental Health

Theory and research for ethical, evidence-informed practice for mental health nursing. Develops advanced knowledge of the pathophysiology, etiology, manifestations, diagnostics and intervention to inform care of patients experiencing acute mental health challenges. [3-0-0]

Prerequisite: Fourth-year BSN-O Standing

NRSG 428 (3) Advanced Community Health Nursing

Theory, research, and best practices for ethical community health nursing builds knowledge, skills, and abilities for practice with diverse populations in a variety of community settings. Develops advanced understanding of health promotion, disease and injury prevention, population health, and epidemiology. Credit will only be granted for one of NRSG 428 or NRSG 528. [3-0-0]

Prerequisite: All of NRSG 228, NRSG 238 and Fourth-Year BSN-O Standing

NRSG 429 (3) Advanced Global Health

Theory, research, and best practices for ethical global health nursing builds knowledge, skills, and abilities for practice. Develops advanced understanding of healthcare systems globally in relation to the determinants of health for diverse populations in cross-cultural and resource-constrained environments. 3-0-0

Prerequisite: NRSG 320 and Fourth-Year BSN-O Standing

NRSG 431 (8) Capstone Acute Care Preceptorship

Preceptored practice course consolidates acute care clinical knowledge, skills, and abilities. Demonstrates evidence-informed practice at a graduate nurse level. Pass/Fail. [240 hours over 8 weeks]

Prerequisite: All of NRSG 421, NRSG 422, NRSG 432 and the recommendation of practice advising committee.

NRSG 432 (4) Capstone Community Project

This practice course provides opportunity to experience evidenced-informed leadership through application of concepts such as influencing and managing change within the context of emerging global health issues and trends. (72 hours of practice and 24 hours of seminar). Pass/Fail. [0-6-2]

Prerequisite: Fourth-Year BSN-O Standing

Corequisite: NRSG 422.

NRSG 434 (4/8) Practice Electives

Preceptored advanced practice experience(s) provides opportunities for evidence-informed practice in varied contexts*.

Application of knowledge, skills, and abilities from related advanced nursing theory course(s). Pass/Fail. *Dependent on availability. [4 credits 120 hours over 4 weeks or 8 credits 240 hours over 8 weeks]

Prerequisite: All of NRSG 421, NRSG 422, NRSG 432. a min of 3 credits of nursing electives related to practicum context, and recommendation of practice advising committee.

NRSG 437 (4/8) d Mental Health Preceptorship



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Preceptored advanced practice experience(s) provides opportunities for evidence-informed practice with the client experiencing challenges with mental health. Application of knowledge, skills, and abilities from related advanced nursing theory course(s). Opportunity to work with interprofessional teams in a variety of settings. [4 credits 120 hours over 4 weeks or 8 credits 240 hours over 8 weeks]

Prerequisite: All of NRSNG 421, NRSNG 422, NRSNG 432, NRSNG 427.

NRSNG 438 (4/8) Community Health Nursing Preceptorship

Preceptored advanced practice experience(s) provides opportunities for evidence-informed practice with individuals, families and populations in the community context*. Application of knowledge, skills, and abilities from related advanced nursing theory course(s). Opportunity to work with interprofessional teams. Pass/Fail. *Dependent on availability. [4 credits 120 hours over 4 weeks or 8 credits 240 hours over 8 weeks]

Prerequisite: All of NRSNG 421, NRSNG 422, NRSNG 428, NRSNG 432 and recommendation of practice advising committee.

NRSNG 439 (8) Global Health Practicum

Advanced practicum provides opportunities to engage in an immersive global health experience in a variety of settings*. Students will practice in collaboration with global health partners. The focus is on application of global health and cultural safety competencies. Pass/Fail. *Dependent on availability and cost of travel is in addition to course tuition.

Prerequisite: All of NRSNG 421, NRSNG 422, NRSNG 429, NRSNG 432 and approval of application.

NRSNG 440 (4/8) Research Preceptorship

Preceptored advanced practice course provides the opportunity to engage in research with a faculty supervisor. Application of knowledge, skills, and abilities in nursing and health related research. Pass/Fail. [4 credits 120 hours over 4 weeks or 8 credits 240 hours over 8 weeks]

Prerequisite: securement of a faculty supervisor and research elective (3/6) as determined by faculty supervisor

NRSNG 500 (3) Nursing Knowledge

Examines historical and contemporary influences on nursing knowledge, with a focus on implications for practice. [3-0-0]

Corequisite: NRSNG 504 or permission of the Graduate Program Coordinator, School of Nursing.

NRSNG 504 (3) Finding and Integrating Knowledge for Evidence-Informed Practice

Focuses on the development of students' abilities to find, critique, and synthesize evidence to inform the scholarly development of advanced practice in their teaching, management, research, and provision of nursing care. [3-0-0]

Prerequisite: First-year standing in the Master of Science in Nursing program or permission of the Graduate Program Coordinator, School of Nursing.

NRSNG 505 (3) Healthcare Policy

An overview of policy processes including analysis, development, implementation, and evaluation in healthcare. Canadian and global health issues will be discussed such as health economics, politics, advocacy, and equity with a focus on policy. [3-0-0]

Corequisite: NRSNG 504 or permission of the Graduate Program Coordinator, School of Nursing

NRSNG 506 (3) Qualitative Research

Understanding the predominant approaches in qualitative research. Knowledge and skills in conducting qualitative research, including methodology, research design, data collection, data analysis, and communication of findings. [3-0-0]

Corequisite: NRSNG 504 or permission from the Graduate Program Coordinator, School of Nursing.

NRSNG 507 (3) Quantitative Research

Focused on developing knowledge and application of core concepts, methods and statistical procedures related to quantitative research design and data analysis in health disciplines. [3-0-0]

Prerequisite: Undergraduate university or graduate university statistics course in the past five years, or approval of the School of Nursing Graduate Coordinator.

Corequisite: NRSNG 504 or permission of the Graduate Program Coordinator, School of Nursing.

NRSNG 512 (3/6) Directed Studies in Nursing

Students may take a maximum of 6 credits of directed studies within the M.S.N. program. Restricted to students in the M.S.N. program or with permission of the M.S.N. coordinator.

NRSNG 522 (3) Introduction to Nursing Education

Examines issues and trends in nursing education including implications for the teaching practices of nurse educators. [3-0-0]

Corequisite: NRSNG 504 or permission of the Graduate Program Coordinator, School of Nursing.

NRSNG 523 (3) Teaching and Learning in Nursing Practice

Examines theory, research, and best practices for teaching and learning in the laboratory and nursing practice courses in acute and community settings. [3-0-0]



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Corequisite: NRS 504 or permission of the Graduate Program Coordinator, School of Nursing.

NRS 524 (3) Primary Care Nursing

Exploring theories, concepts, and principles foundational to primary care nursing practice, learners will build evidence informed knowledge of health promotion, disease prevention, and management of both episodic and chronic conditions. Interprofessional collaborative practice and care planning will be examined. Credit will be granted for only one of NRS 424 or NRS 524.

Prerequisite: Good Standing in M.S.N. Program.

NRS 528 (3) Advanced Community Health Nursing

Theory, research, and best practices for community health nursing among diverse populations. Develops advanced understanding of health promotion, disease and injury prevention, population health, epidemiology, and the importance of ethics. Credit will be granted for only one of NRS 528 or NRS 428. [3-0-0]

Prerequisite: NRS 504. Or permission of the Graduate Program Coordinator, School of Nursing.

NRS 542 (3) Introduction to Nursing Leadership and Management

Examines issues and trends in nursing leadership, including implications for management in the Canadian healthcare context. [3-0-0]

Corequisite: NRS 504 or permission of the Graduate Program Coordinator, School of Nursing.

NRS 543 (3) Nursing Leadership and Management in Practice

Develops essential competencies for management in healthcare leadership positions and integrates evidence-based management concepts into the delivery of quality healthcare to improve health outcomes. This course includes a 75-hour practicum component. [3-0-0]

Corequisite: NRS 504 or permission of the Graduate Program Coordinator, School of Nursing.

NRS 550 (3) Health Care Ethics

Examines a range of ethical theories, relevant research, and approaches to ethical decision-making to critically debate real world problems in health care. [3-0-0]

Corequisite: NRS 504 or permission of the Graduate Program Coordinator, School of Nursing.

NRS 554 (3) Advanced Research Methods

Research design issues relevant to nursing and health research, including the conduct of interdisciplinary research, issues in quantitative and qualitative research, design and conceptual complexities of mixed and multiple method designs, community-based research. This course is restricted to students in the PhD in Nursing program (PHD-O, NRS) unless permission is given by the program coordinator

Prerequisite: All of NRS 506, NRS 507. Or equivalent graduate level quantitative and qualitative methods courses.

NRS 580 (3) Philosophy of Evidence in Nursing

Philosophical foundation upon which students can create informed claims about knowledge, theory and evidence regarding phenomena of concern to the discipline. This course is restricted to students in the PhD in Nursing program (PHD-O, NRS) unless permission is given by the program coordinator.

Prerequisite: NRS 500.

NRS 581 (3) Leadership in Knowledge Application and Translation

Philosophies, theories and praxis in the application of nursing. This course is restricted to students in the Ph.D. in Nursing program unless permission is given by the program coordinator.

Prerequisite: NRS 504. Or equivalent graduate level course in knowledge and evidence-based practice.

NRS 597 (6) Healthcare Capstone Practicum

Integrative practicum in a student's chosen area of practice. Students will critically analyze, synthesize, and apply advanced knowledge to promote change and contribute to knowledge development. [6-0-0]

Prerequisite: All of NRS 500, NRS 504.

NRS 598 (3) Scholarly Project

Pass/Fail.

NRS 599 (12) Research Thesis

Pass/Fail.

Prerequisite: Restricted to students in the M.S.N. program or with permission from the M.S.N. coordinator.

NRS 601 (3) Doctoral Seminar

Phenomena relevant to nursing science, academia, the process of undertaking doctoral thesis research, and building sustainable careers. This course is restricted to students in the PhD in Nursing program (PHD-O, NRS) unless permission is given by the



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NRSG 699 (0) Doctoral Dissertation

Pass/Fail.

Indigenous Studies, Faculty of Arts and Social Sciences**NSYL: Nsyilxcn****NSYL 331 (3) Language Practice and Pedagogy: Praxis in Different Immersion Contexts**

Language acquisition pedagogies in and through practice. The language of instruction is Nsyilxcn. Restricted to students in the Bachelor of Nsyilxcn Language Fluency program. [1-0-4]

Corequisite: NSYL 351.

NSYL 332 (3) Language Practice and Pedagogy: Creative, Constructive and Performative Arts

Intensive language immersion class demonstrating, in and through practice, traditional Syilx visual arts. The language of instruction is Nsyilxcn. Restricted to students in the Bachelor of Nsyilxcn Language Fluency program. [1-0-4]

Prerequisite: NSYL 331.

Corequisite: NSYL 352.

NSYL 333 (3) Language Practice and Pedagogy: Traditional Ecological Knowledge

Intensive language immersion class focused on the application of traditional ecological knowledge (TEK), in and through practice. The language of instruction is Nsyilxcn. May be offered on the land. Restricted to students in the Bachelor of Nsyilxcn Language Fluency program. [1-4-0]

Prerequisite: NSYL 332.

Corequisite: NSYL 353.

NSYL 351 (3) Language Applications: Numeracy and Math

Numeracy and math frameworks from a Syilx perspective towards increased proficiency in functional numeracy. The language of instruction is Nsyilxcn. Restricted to students in the Bachelor of Nsyilxcn Language Fluency program [1-0-4]

Corequisite: NSYL 331.

NSYL 352 (3) Language Applications: Literature and Performative Arts

Emphasis on the language domains of literature and performative arts, and a diverse range of language learning skills that advance competency in conversational fluency, pronunciation, comprehension, vocabulary, oral traditions, literacy, grammatical understanding, and the cultural contextualization of language use in these domains. The language of instruction is Nsyilxcn. Restricted to students in the Bachelor of Nsyilxcn Language Fluency program. [1-0-4]

Prerequisite: NSYL 351.

Corequisite: NSYL 332.

NSYL 353 (3) Language Applications: Traditional Ecological Knowledge

Emphasis on the language domains of ecology and traditional ecological knowledge (TEK), and a diverse range of language learning skills that advance competency in conversational fluency, pronunciation, comprehension, vocabulary, oral traditions, literacy, grammatical understanding, and the cultural contextualization of language use in these domains. Restricted to students in the Bachelor of Nsyilxcn Language Fluency program. [1-0-4]

Prerequisite: NSYL 352.

Corequisite: NSYL 333.

NSYL 433 (3) Special Topics in Language Practice and Pedagogy

Intensive language immersion course to enhance and improve proficiency. Focused on language pertaining to a specific topic or language domain. The language of instruction is Nsyilxcn. May be offered on the land. Restricted to students in the Bachelor of Nsyilxcn Language Fluency program. [0-2-3]

Prerequisite: NSYL 333.

NSYL 439 (3) Capstone: Language Immersion

Project designed to provide students an intensive language immersion experience on a specific topic or domain. Restricted to students in the Bachelor of Nsyilxcn Language Fluency program.

Corequisite: INDG 499.



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Philosophy, Faculty of Arts and Social Sciences**PHIL: Philosophy****PHIL 111 (3) Introduction to Philosophy I**

Introduction to outstanding philosophers and their systems. Ethics, political philosophy, metaphysics, and philosophy of religion. [3-0-0]

PHIL 120 (3) Introduction to Logic and Critical Thinking

Tools for dealing with both everyday and more technical arguments and concepts. Analysis and resolution of confusions, ambiguities, and fallacies. This course is restricted to students with fewer than 90 credits. [3-0-0]

PHIL 121 (3) Introduction to Philosophy II

Introduction to outstanding philosophers and their systems. Theory of knowledge, logic, and contemporary philosophy. [3-0-0]

PHIL 125 (3) Introduction to Scientific Reasoning

Historical and logical analysis of various types of scientific hypotheses and the data that support or undermine them. This course is restricted to students with fewer than 90 credits. [3-0-0]

PHIL 210 (3) Introduction to Social and Political Philosophy

Introduction to philosophical issues concerning society, its fundamental institutions, and their nature. Lectures will also address philosophical questions concerning legal reasoning. The approach will be mainly systematic, although some reference to the history of certain philosophical views may be included. [3-0-0]

Prerequisite: Second-year standing.

PHIL 220 (3) Symbolic Logic I

Sentential and predicate logic. Translation from natural language; truth tables and interpretations; systems of natural deduction up to relational predicate logic with identity; alternative proof methods. Some sections may use computer-based materials and tests. [3-0-0]

PHIL 230 (3) Ethics

Theories of obligation and value; moral reasoning; normative ethics, descriptive ethics, and metaethics. Readings in classic and contemporary texts. [3-0-0]

Prerequisite: Second-year standing.

PHIL 233 (3) Biomedical Ethics

Moral problems arising in the health sciences. Topics may include abortion, death and euthanasia, genetic engineering, behaviour modification, compulsory treatment, experimentation with human beings and animals, and/or the relationship between professionals and their patients, subjects, or clients. Credit will be granted for only one of PHIL 233 or PHIL 433. [3-0-0]

Prerequisite: Second-year standing.

PHIL 235 (3) Contemporary Moral Issues

Applied ethical issues from philosophical perspectives. Topics may include abuses of speech (hate speech, propaganda), censorship, concentrating ownership of media outlets and the foundations of civil society, conceptions of citizenship, democratic civic education, life issues, torture, poverty, terrorism, global justice. [3-0-0]

Prerequisite: Second-year standing.

PHIL 240 (3) Science, Technology and Society

The study of social determinants and significance of scientific knowledge in contemporary epistemology. Examines claims of objectivity and rationality by scientists and philosophers of science, given interactions of multiple perspectives, including those from technological breakthroughs and state-sponsored research policies. [3-0-0]

Prerequisite: Second-year standing

PHIL 245 (3) Introduction to Metaphysics

Familiarizes students with fundamental issues such as time, causality, personal identity, and the mind-body problem. [3-0-0]

Prerequisite: Second-year standing and 6 credits of PHIL.

PHIL 309 (3) Ancient Philosophy

Consists of intensive study of pre-Socratics and selections from the writings of Aristotle. The writings of the Stoics or Epicurus may be included. [3-0-0]

Prerequisite: Third-year standing and 3 credits of PHIL.

PHIL 310 (3) The Philosophy of Plato



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A study of Plato's writings and his influence on subsequent philosophy. [3-0-0]

Prerequisite: Third-year standing and 3 credits of PHIL.

PHIL 314 (3) Philosophy in the 17th Century

Survey of seventeenth-century philosophy from Bacon to Leibniz, including the writings of Hobbes, Descartes, and Spinoza. The influence of science and religion on philosophical thought. [3-0-0]

Prerequisite: Third-year standing and 3 credits of PHIL.

PHIL 315 (3) Philosophy in the 18th Century

Survey of eighteenth-century philosophy from Locke to Kant, including the writings of Berkeley, Rousseau, and Hume. The influence of science and religion on philosophy. [3-0-0]

Prerequisite: Third-year standing and 3 credits of PHIL.

PHIL 331 (3) Computer Ethics

Ethical and professional issues facing those who work with computers. Piracy, hacking, responsibility, and liability for the use of software; cyberpornography and freedom of information; computerized invasion of privacy; computers in the workplace; the use of artificial intelligence; and expert systems. [3-0-0]

Prerequisite: Third-year standing in an Arts program and 3 credits of PHIL, or third-year standing in a Science program.

PHIL 338 (3) Philosophy of Law

Concepts of law, constitution, and sovereignty; law and morality; natural law theories and legal positivism; obligation, responsibility, and punishment. [3-0-0]

Prerequisite: Third-year standing and 3 credits of PHIL.

PHIL 345 (3) Theory of Knowledge

Examines the criteria of knowing, problems of perception, and theories of truth. [3-0-0]

Prerequisite: Third-year standing and 6 credits of PHIL.

PHIL 361 (3) Introduction to the Austrian School of Economics

Introductory analysis of the Austrian School of Economics - known for its systematic defence of private property rights, sound money, free enterprise, and free markets. Credit will be granted for only one of PHIL 361 or ECON 338. [3-0-0]

Prerequisite: All of ECON 101, ECON 102. Or 3 credits of PHIL. Third-year standing.

Equivalency: ECON 338.

PHIL 373 (3) Feminist Philosophy

A brief introduction to the history of feminist thought is included. An overview of the traditional concept of the feminine in contrast to the masculine will be examined. Lecture topics include: liberal feminism, Marxist feminism, radical and cultural feminism. The approaches that feminist theory has taken to traditional areas of philosophical inquiry, such as the theory of knowledge (epistemology), aesthetics, and the history of philosophy will also be studied. [3-0-0]

Prerequisite: Third-year standing and 3 credits of PHIL.

PHIL 391 (3/6) d Topics in Philosophy

Examination of selected topics in Philosophy. Topics may vary each time the course is offered. Repeatable for up to 6 credits with different topics. [3-0-0]

Prerequisite: Third-year standing and 3-credits of PHIL.

PHIL 404 (3) Aesthetics

Introduction to philosophical questions in the theory of art and art criticism. The nature of artistic creativity: form, content, and expression in art; the definition of art; the nature of taste; interpretation and evaluation; art and its place in society. [3-0-0]

Prerequisite: Third-year standing and 3 credits of PHIL; or second-year standing in Fine Arts.

PHIL 414 (3) Topics in the History of Modern Philosophy

Intensive study of a major philosopher or school such as Descartes, Hume, Empiricism, Rationalism, or the British utilitarians. [3-0-0]

Prerequisite: Third-year standing and 3 credits of PHIL.

PHIL 415 (3) The Philosophy of Immanuel Kant

Study of Kant's critical philosophy. [3-0-0]

Prerequisite: Third-year standing and 6 credits of PHIL.

PHIL 418 (3) Topics in 20th-Century Philosophy

Intensive study of a major philosopher such as Wittgenstein, Russell, or Heidegger, or school such as pragmatism or logical empiricism. [3-0-0]



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Prerequisite: Third-year standing and 3 credits of PHIL.

PHIL 419 (3) Philosophy of History

Concepts of history and historical explanation, historical progress, purpose, necessity, law and causation. Hegel, Marx, Vico, Spengler, Pareto, Collingwood, Croce, and Toynbee, as well as contemporary figures. Students will be expected to have an adequate knowledge of ancient or modern history. [3-0-0]

Prerequisite: Third-year standing and 3 credits of PHIL or 6 credits of HIST.

PHIL 425 (3) Philosophy of Language

Philosophical approaches to reference, meaning, and truth, given their correlation with linguistic expressions and speech. Topics may include interpretation and translation, literal and figurative language, pragmatics and the norms of conversation, the nature of language. [3-0-0]

Prerequisite: Third-year standing and 6 credits of PHIL, including one of PHIL 120, PHIL 220.

PHIL 427 (3) Philosophy of Mathematics

Logicism, formalism, and constructivism; implications of metatheorems such as those of Gödel and Church; mathematical truth; mathematics and mental construction; mathematics and the physical world. [3-0-0]

Prerequisite: Third-year standing in an Arts program and 3 credits of PHIL; or third-year standing in a Science program.

PHIL 434 (3) Business Ethics

Moral problems in contemporary business and professional practice, general moral theory, the law, and policy formation.

Corporate social and environmental responsibility, employee rights, preferential hiring and affirmative action programs, conflicts of interest, advertising, "whistle blowing," and self-regulation. [3-0-0]

Prerequisite: Third-year standing and 3 credits of PHIL.

PHIL 435 (3) Environmental Ethics

Moral problems arising in the context of human relationships to nature and non-human living things, in terms of both general moral theory and policy formation. Moral standing, animal rights, obligations to future generations, pollution, hazardous materials, depletion of natural resources, treatment of non-human living things. [3-0-0]

Prerequisite: Third-year standing and 3 credits of PHIL.

PHIL 437 (3) Philosophy and the Global Order

Central contemporary philosophical approaches to global political systems and governance. Clarifying the meaning of basic political concepts (e.g., citizenship, civil society, liberty and human rights) in both a global context and when necessary outside the traditional framework of the nation state. [3-0-0]

Prerequisite: Third-year standing and 3 credits of PHIL.

PHIL 446 (3) Philosophy of Psychology

The nature of theory in psychology and its relation to other scientific theories. The status of imagery in psychological theories; the extent to which human irrationality can be experimentally demonstrated; introspection as a source of evidence. [3-0-0]

Prerequisite: 12 credits of PHIL and/or PSYO.

PHIL 451 (3) Philosophy of Mind

The nature of the mental and physical; the relation between minds and bodies; the character of psychological explanation. [3-0-0]

Prerequisite: Third-year standing and 3 credits of PHIL.

PHIL 460 (3) Philosophy of Science

Issues common to all sciences. Philosophical questions including the character of scientific laws, theories and revolutions, the nature of scientific confirmation, causality, explanation and prediction, and the use of logic and probability. Difficulties in the interpretation of atomic physics and questions about relationships between biology and psychology. No philosophical background is assumed. [3-0-0]

Prerequisite: Third-year standing in Arts and 3 credits of PHIL; or third-year standing in Science.

PHIL 469 (3) Topics in Philosophy of Science

Probability and induction; foundations of measurement; theory construction. [3-0-0]

Prerequisite: Third-year standing in Arts and 3 credits of PHIL; or third-year standing in Science.

PHIL 491 (3) Directed Studies in Philosophy

Students will undertake supervised investigation of a topic in philosophy agreed upon by the supervising faculty member and the student, and approved by the dean of the faculty. They will complete a significant amount of independent reading and analysis, and produce a major term paper at the end of the course. [0-0-1]

Prerequisite: Fourth-year standing, 12 credits of PHIL; a minimum grade average of at least 72% in all completed PHIL courses; and permission of the department head.



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PHIL 497 (3) Directed Studies for PPE Majors

Students will undertake a supervised investigation of an assigned topic in public policy. They will be expected to do a significant amount of independent reading and analysis and to produce a major term paper at the end of the course. Credit will be granted for only one of PHIL 497, ECON 497, or POLI 497. [0-0-1]

Prerequisite: Fourth-year standing in the PPE Major program, with an emphasis in Philosophy (option C) and permission of the instructor.

Physics, Faculty of Science*PHYS: Physics***PHYS 111 (3) Introductory Physics for the Physical Sciences I**

Introduction to mechanics primarily for students majoring in the physical sciences (e.g. physics, chemistry, mathematics, computer science, geology, physical geography) or engineering. Particle kinematics and dynamics, work and energy, momentum, gravitation, rigid body motion, fluid statics and dynamics with applications to the physical sciences. Credit will be granted for only one of PHYS 111 and PHYS 112. Students with Physics 12 may apply for a tutorial exemption. [3-3-1]

Prerequisite: PHYS 11 and one of MATH 12, PREC 12, MATH 125, MATH 126. Physics 12 is strongly recommended.

Corequisite: MATH 100.

PHYS 112 (3) Introductory Physics for the Life Sciences I

Introduction to mechanics primarily for students majoring in the life sciences (e.g. biochemistry, biology, microbiology, pharmacy, human kinetics, human geography or psychology). Particle kinematics and dynamics, work and energy, momentum, gravitation, rigid body motion, fluid statics and dynamics with applications to the biological sciences. Credit will be granted for only one of PHYS 111 and PHYS 112. Students with Physics 12 may apply for a tutorial exemption. [3-3-1]

Prerequisite: One of MATH 12, PREC 12, MATH 125, MATH 126. Physics 11 and Physics 12 are strongly recommended.

Concurrently taking MATH 100 is strongly recommended.

PHYS 121 (3) Introductory Physics for the Physical Sciences II

Introduction to physics primarily for students majoring in the physical sciences. Basic concepts of simple harmonic motion, sound, physical and wave optics, electricity, electric circuits, and magnetism with applications to the physical sciences. Experimental laboratory investigations in electricity, magnetism, waves and optics. Credit will be granted for only one of PHYS 102, PHYS 121 and PHYS 122. Students with Physics 12 may apply for a tutorial exemption. [3-3-1]

Prerequisite: MATH 100 and one of PHYS 111, PHYS 112.

Corequisite: MATH 101.

PHYS 122 (3) Introductory Physics for the Life Sciences II

Introduction to physics primarily for students majoring in the life sciences. Basic concepts of simple harmonic motion, sound, physical and wave optics, electricity, electric circuits, and magnetism with biological applications. Experimental laboratory investigations in electricity, magnetism, waves and optics. Credit will be granted for only one of PHYS 102, PHYS 121 and PHYS 122. Students with PHYS 12 may apply for a tutorial exemption. [3-3-1]

Prerequisite: MATH 100 and one of PHYS 111, PHYS 112.

Corequisite: MATH 101.

PHYS 200 (3) Relativity and Quanta

Special relativity: Lorentz transformation, dynamics, and conservation laws. Quantum physics: the experimental evidence for quantization; a qualitative discussion of the concepts of quantum mechanics and their application to simple systems of atoms and nuclei. [3-0-1]

Prerequisite: MATH 101 and one of PHYS 121, PHYS 122.

PHYS 215 (3) Thermodynamics

Thermodynamics at an intermediate level. Temperature, heat and work, the First Law, heat transfer, heat engines, entropy, and the Second Law. [3-0-0]

Prerequisite: MATH 101 and one of PHYS 121, PHYS 122.

PHYS 216 (3) Mechanics I

Review of kinematics, Newton's laws, angular momentum, and fixed axis rotation. Rigid body motion, central forces, non-inertial frames of reference. [3-0-1]

Prerequisite: MATH 100 and one of PHYS 111, PHYS 112.



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PHYS 225 (3) Intermediate Electricity and Magnetism

Electrostatics, Gauss' law, electric potential, DC circuits, conduction models, strain gauges, RTD, circuit analysis theorems, magnetic fields, Hall effect, Ampere's law, Faraday's law, inductance, and semiconductors with basic applications. [3-0-0]

Prerequisite: MATH 101 and one of PHYS 121, PHYS 122.

PHYS 231 (3) Introduction to Electronics

Design and analysis of analog AC circuits, digital circuits, and analog-to-digital conversion methods. Basic physics laboratory skills including data collection, presentation of results, and analysis of uncertainties. Credit will be granted for only one of PHYS 231 or PHYS 219. [2-3-0]

Prerequisite: MATH 101 and one of PHYS 121, PHYS 122.

PHYS 232 (3) Modern Physics Laboratory

Selected experiments in relativity, quantum mechanics, thermodynamics, particle physics or nuclear physics. Quantitative analysis of data, methods of measurement, formal presentation of laboratory results. [2-3-0]

Prerequisite: MATH 101 and one of PHYS 121, PHYS 122.

PHYS 301 (3) Electricity and Magnetism

Electric fields and potentials of static charge distributions, current, fields of moving charges, magnetic field, electromagnetic induction, Maxwell's equations. [3-0-1]

Prerequisite: MATH 317 and either (a) PHYS 121 or (b) a score of 68% or higher in PHYS 112 and a score of 68% or higher in PHYS 122.

PHYS 304 (3) Introduction to Quantum Mechanics

The beginnings of quantum mechanics, wave mechanics and the Schroedinger equation, one-dimensional potentials, the postulates of quantum mechanics, and applications to three-dimensional systems. [3-0-0]

Prerequisite: All of MATH 225, PHYS 200.

PHYS 305 (3) Introduction to Biophysics

Analysis of biological systems from a physicist's perspective. Introduction to physics underlying biological phenomena, and range of applicability of simple physical principles. Form and size in animals, strength and energy storage in structural elements, thermal regulation, fluid motion within organisms, life in fluids, and molecular physics topics. [3-0-0]

Prerequisite: MATH 101 and either (a) PHYS 121 or (b) a score of 68% or higher in PHYS 112 and a score of 68% or higher in PHYS 122. Third-year standing in Science or a 200-level PHYS course taken concurrently.

PHYS 310 (3) Introduction to Medical Physics

Radiation interactions with matter; use of ionizing and non-ionizing radiation to diagnose and treat disease; radiation dosimetry; introduction to radiobiology; radiation effects in healthy and tumour tissue; radiation protection; medical imaging in radiation therapy. [3-0-0]

Prerequisite: MATH 101 and either (a) PHYS 121 or (b) a score of 68% or higher in PHYS 112 and a score of 68% or higher in PHYS 122. Third-year standing in Science or a 200-level PHYS course taken concurrently.

PHYS 314 (3) Fluids

Kinetic theory: diffusion, viscosity, and sound waves. Introduction to hydrodynamics: Laminar flow, capillary and gravity waves, convection, and turbulence. Dimensional analysis. [3-0-0]

Prerequisite: MATH 101 and either (a) PHYS 121 or (b) a score of 68% or higher in PHYS 112 and a score of 68% or higher in PHYS 122. Third-year standing in Science.

PHYS 320 (3) Environmental Physics

Contemporary environmental issues: physics of climate modification, ozone depletion, energy sources for electrical generation, energy storage, energy conservation strategies, transportation, pollutant transport, non-ionizing radiation, risk analysis, and other current topics of interest. [3-0-0]

Prerequisite: MATH 101 and either (a) PHYS 121 or (b) a score of 68% or higher in PHYS 112 and a score of 68% or higher in PHYS 122. Third-year standing in Science or a 200-level PHYS course taken concurrently.

PHYS 321 (3) Stellar Astrophysics

Stellar structure and evolution. Hydrostatics, radiative transfer, fusion, equations of state. Main sequence stellar models. Low and high mass stellar post main sequence evolution. Stellar remnants. [3-0-0]

Prerequisite: All of PHYS 200, PHYS 216, ASTR 210.

PHYS 324 (3) Waves

Intermediate treatment of wave production, propagation, reception. Acoustics, electrical transmission lines, electromagnetics, scalar wave equation. Finite difference time domain computer simulation, boundary conditions, normal modes, input impedance,



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energy density, power flux/propagation across boundaries at normal and oblique incidence, sonic transducers, alternating current sources, and antennae. [3-0-0]

Prerequisite: MATH 200 and one of PHYS 200, PHYS 216.

PHYS 328 (3) Advanced Mechanics

Variational calculus, the Lagrangian Method applied to a variety of problems, weak anharmonic perturbations of normal-mode systems, Hamilton's equations of motion, phase space, Liouville's theorem, chaos in Hamiltonian systems, rigid-body rotations in three dimensions, Lagrangian formulation of relativistic mechanics, and the Virial theorem. [3-0-0]

Prerequisite: All of MATH 200, MATH 221, MATH 225, PHYS 216.

PHYS 331 (3) Experimental Physics I

Selected advanced physics experiments in solid-state physics, fluid dynamics, particle physics, astrophysics, optics, nonlinear dynamics or electromagnetism. Emphasis on experimental design and construction, including machine shop training. Credit will be granted for only one of PHYS 331 or PHYS 327. [0-3-1.5]

Prerequisite: All of PHYS 231, PHYS 232.

PHYS 335 (3) The Universe from Aristotle to Hawking

Traces the evolution of rational cosmology from the ancient Greeks to the present. There are no specific Mathematics and Physics prerequisites, but students must have third-year standing. It may be taken for credit by Science and non-Science students, but may not be used to replace any of the required courses in the Physics Major, or to satisfy the Physics credit requirements in a B.Sc. general degree. [3-0-0]

Prerequisite: Third-year standing.

PHYS 336 (3) Introduction to Medical Imaging and Radiation Safety

X-ray, CT, MRI, Ultrasound and Nuclear Medicine images: creation and use to aid in the diagnosis and treatment of human health conditions. Radiation safety and regulatory aspects of Medical Imaging. Emphasis on multi-disciplines: especially the role of Physics, Mathematics, Statistics and Computer Science in the field of Medical Imaging. Credit will be granted for only one of PHYS 336 or COSC 335. [3-0-0]

Prerequisite: A score more than 60% in one of PHYS 121, PHYS 122 and 3rd-year standing.

PHYS 360 (3/6) d Special Topics in Physics

Astrophysics, geophysics, medical physics, medical imaging physics, medical radiation physics, physics of music, atmospheric physics, or other topics as required based upon student demand and faculty availability. Consult department for specific topic to be offered in any given year. With different topics, this course may be taken twice for credit. Only 3 credits of this course can be counted as Physics credits; further credits will be considered Science electives. [3-0-0]

Prerequisite: MATH 101 and either (a) PHYS 121 or (b) a score of 68% or higher in PHYS 112 and a score of 68% or higher in PHYS 122.

PHYS 400 (3) Introduction to Elementary Particles

Standard model, classification of elementary particles and forces of nature, symmetries, conservation laws, quark model, quantum electrodynamics, quantum chromodynamics, and the theory of weak interactions. [3-0-0]

Prerequisite: PHYS 304.

PHYS 401 (3) Electromagnetic Theory

The application of Maxwell's theory to the propagation of electromagnetic waves. [3-0-0]

Prerequisite: PHYS 301.

PHYS 402 (3) Advanced Quantum Mechanics

Quantum mechanical methods and concepts emphasizing operator algebra approaches. Commutation relations; quantum dynamics; approximation methods including stationary-state and time-dependent perturbation theory; interaction of radiation with matter; identical particles. [3-0-0]

Prerequisite: PHYS 304.

PHYS 403 (3) Statistical Mechanics

Ensemble theory, application to classical and quantum gases, and Boltzmann equation. Principles and applications of statistical mechanics. Ideal gases, degenerate Fermi gases, Bose-Einstein condensation, black body radiation, fluctuations and phase transitions. [3-0-0]

Prerequisite: All of MATH 200, PHYS 215.

Corequisite: PHYS 304.

PHYS 407 (3) Introduction to General Relativity

Physical consequences of Einstein's equations, including the principle of equivalence, curved space-time, geodesics, the



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Schwarzschild solution, deflection of light, black holes, and gravitational radiation. [3-0-0]

Prerequisite: All of MATH 225, MATH 317, PHYS 200, PHYS 216.

PHYS 408 (3) Optics

Matrix formulation of geometrical optics. Physical optics: interference, diffraction, polarization, Fourier optics. Modern applications including fibre optics. Credit will be granted for only one of PHYS 308 and PHYS 408. [3-0-0]

Corequisite: PHYS 301.

PHYS 418 (3) Methods of Theoretical Physics

Powerful analytical techniques repeatedly encountered in the subject areas of physics, unity in theoretical treatment of different subject areas. Tensors, operator algebra, variational principles, the Dirac delta-function formalism, adiabatic approximations, and stochastic processes. [3-0-0]

Prerequisite: All of MATH 221, MATH 225, MATH 317, PHYS 200, PHYS 216.

PHYS 420 (3) Data and Image Processing

Introduction to digital signal and image processing. Correlation, convolution, Fourier transforms, digital filtering, model of image formation and degradation, image filtering in the spatial and Fourier domain, deconvolution, multivariate analysis. [3-0-0]

Prerequisite: All of MATH 225, MATH 317 and 3 credits in 200-level Physics.

PHYS 425 (3) Low-Temperature Physics

Cryogenic techniques and instrumentation. Production of low temperatures: cryogenic liquids; closed-cycle refrigerators; dilution refrigerators; magnetic cooling. Low-temperature material properties and cryostat design. Macroscopic quantum effects: superconductivity and superfluidity. [3-2-0]

Prerequisite: All of PHYS 215, PHYS 304.

PHYS 441 (3) Experimental Physics II

Student designs and constructs a single experiment in solid-state physics, fluid dynamics, particle physics, astrophysics, optics or electromagnetism. Emphasis on experimental design, construction, and formal presentation of results. Credit will be granted for only one of PHYS 441 or PHYS 329. [0-3-1.5]

Prerequisite: One of PHYS 327, PHYS 331.

PHYS 448 (2-6) c Directed Studies in Physics

The investigation of a specific topic in physics may be undertaken under the direction of a Physics department staff member.

Prerequisite: Permission of the department head.

PHYS 449 (6) Honours Thesis

A research project undertaken under the direction of a faculty member culminating in a thesis. [0-6-1*, 0-6-1*]

PHYS 474 (3) Solid State Physics

Symmetry of crystal structures, reciprocal lattice, band theory, conduction in metals and semiconductors, phonons, and superconductivity. [3-0-0]

Prerequisite: All of PHYS 200, PHYS 216, PHYS 304.

PHYS 534 (3) Radiotherapy Physics I

Principles of dosimetry of ionizing radiation with emphasis on applications to radiotherapy and radiobiology. Covers the basics of linear accelerator design as well as design of X-ray generating apparatus; also provides the basics of electron and photon interactions with media, energy deposition in media, and radiation protection and shielding.

PHYS 535 (3) Radiotherapy Physics II

A continuation of Physics 534. Covers the physics and applied dosimetry of current external and internal irradiation treatment techniques. Photon and electron beam radiation treatment planning. Brachytherapy and special techniques. Errors in radiation therapy.

Prerequisite: PHYS 534.

PHYS 539 (3) Radiation Dosimetry

The fundamentals of radiation dosimetry, ionization cavity theories, and radiation dosimetry protocols. A variety of absolute and relative dosimetry techniques are also covered, with hands-on experience provided through a series of lab exercises on medical linear accelerators. Monte Carlo simulation of radiation transport for dosimetry applications is introduced.

PHYS 540 (3) Medical Imaging

Fundamental theory and application of medical imaging, including radiology, computed tomography, magnetic resonance imaging, ultrasound, and nuclear medicine imaging. Basic principles, image formation and reconstruction, imaging instrumentation and hardware, and current trends of each imaging modality will be given.



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PHYS 544 (3) Radiation Biophysics

Topics in radiation biophysics including DNA strand breaks, cell survival curves, fractionation and dose rate effects, oxygen effect, relative biological effectiveness, tumour radiobiology, radiation pathology, radiobiological modelling, stochastic and deterministic effects, and molecular techniques in radiobiology.

PHYS 546 (2) Clinical Shadowing

Shadowing course designed to give the student some insight into the clinical aspects of the medical physics profession. Under the guidance of a clinical physicist, students progress through a series of clinical areas. Modules illustrate the collaborative nature of the profession and the interaction with other medical professionals. Restricted to graduate students in the Medical Physics program. Pass/Fail.

PHYS 547 (1) Anatomy and Physiology for the Medical Physicist

Self-guided computer-based course covering basics of anatomy and physiology. Aimed at students in medical physics who are interested in clinical and/or academic careers that will require interaction with radiation oncologists and other health care professionals. Restricted to graduate students in the Medical Physics program. Pass/Fail.

PHYS 548 (3/6) d Special Topics in Medical Physics

The investigation of specific topics in medical physics may be undertaken under the direction of a Medical Physics department faculty member.

Prerequisite: Permission of the department head and registration in the Medical Physics graduate program.

PHYS 549 (12) Master's Thesis

Pass/Fail.

PHYS 649 (0) Doctoral Dissertation

Pass/Fail.

Political Science, Faculty of Arts and Social Sciences*POLI: Political Science***POLI 100 (3) Introduction to Politics**

Introduction to the broad field of political science. Noteworthy issues from the subfields of political science will be addressed, including Canadian politics, global politics, comparative politics and political philosophy. [1.5-0-1.5]

POLI 202 (3) The Government of Canada

Examination of the institutions and processes of Canadian government. Credit will be granted for only one of POLI 202 or POLI 101. [3-0-0]

POLI 220 (3) Introduction to Comparative Politics

Comparative analysis of foreign governments. Specific countries to be covered will vary according to section. [3-0-0]

POLI 221 (3) International Politics

Study of the emergence and organization of the modern international system of states, including an examination of the ends and means of interstate relations. [3-0-0]

Prerequisite: Second-year standing.

POLI 222 (3) International Politics II

Modern aspects of international politics emphasizing international political economy, foreign policy analysis, and security issues. [3-0-0]

Prerequisite: Second-year standing.

POLI 223 (3) Introduction to Philosophy, Politics and Economics (PPE)

The relationship of ethics, economics and politics to the advocacy, formulation, legislation and administration of public policy. [3-0-0]

Prerequisite: 3 credits in each of ECON, PHIL and POLI and an average of at least 70% in each discipline.

POLI 240 (3) Currents of Political Thought

Critical introduction to some major ideologies and traditions of Western political thought that examines their philosophical origins as well as their implications for political life. [3-0-0]

POLI 303 (3) Federalism in Canada



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Theory and practice of federalism; cultural duality, social stresses, and problems of flexibility. The constitution and role of the courts. [3-0-0]

Prerequisite: 3 credits of 100- or 200-level POLI and third-year standing.

POLI 310 (3) Topics in European Politics

Comparative survey of government and politics in major European democracies and their relationship to post-Soviet republics. [3-0-0]

Prerequisite: POLI 220 and third-year standing.

POLI 311 (3) Topics in Middle East Politics

[3-0-0]

Prerequisite: 3 lower-level POLI credits and third-year standing.

POLI 313 (3) Topics in European Integration

Continuation of POLI 310, with special attention to the economic, monetary, and political integration of Europe. [3-0-0]

Prerequisite: 3 credits of 100- or 200-level POLI and third-year standing.

POLI 314 (3) Topics in Comparative Politics: China

Comparative study of Chinese politics, including an analysis of Chinese society, the Chinese Communist party, government structure, and political and economic reform. [3-0-0]

Prerequisite: POLI 220 and third-year standing.

POLI 315 (3) Topics in Comparative Politics: Northeast Asia

Comparative study of the politics of Northeast Asia including an analysis of the regional economic system, the Korean experience, the Taiwanese experience, self-reliance, and democracy. [3-0-0]

Prerequisite: 3 lower-level POLI credits and third-year standing.

POLI 317 (3) Politics of sub-Saharan Africa

Politics and society in sub-Saharan African states since independence. Themes include the colonial legacy, nation-building strategies, economic development and underdevelopment, authoritarianism and democracy, war and conflict, and the status of African women. Credit will be granted for only one of POLI 317 or POLI 391 when on the same topic. [3-0-0]

Prerequisite: POLI 220 and third-year standing.

POLI 318 (3) Politics of Mexico and Central America

Analysis of politics in Mexico, Central America, and selected Caribbean countries. [3-0-0]

Prerequisite: 3 credits of POLI and third-year standing.

POLI 319 (3) Issues in South American Politics

Analysis of politics in South America. [3-0-0]

Prerequisite: POLI 220 and third-year standing.

POLI 323 (3) South Asian Government and Politics

Comparative analysis of politics and government in India, Pakistan, Bangladesh, and Sri Lanka. Imperial legacies and nationalist movements; political institution-building amidst socio-cultural diversity; parties and interest groups; elections and leadership crises; military intervention; ethnic and class conflicts; foreign policy. [3-0-0]

Prerequisite: POLI 220 and third-year standing.

POLI 334 (3) Government and Politics of the United States of America

The institutions, behaviour, and policies of the political system of the US in a comparative context. The constitution and the major institutions of government and public policy. [3-0-0]

Prerequisite: 3 lower-level POLI credits and third-year standing.

POLI 336 (3) Government and Politics of the United States of America II

Continuation of POLI 334, with special attention to the relationship between domestic politics and foreign policy. [3-0-0]

Prerequisite: POLI 334.

POLI 352 (3) Comparative Politics of Public Policy

Policy-making across industrialized democracies, with a focus on North America and Europe. [3-0-0]

Prerequisite: POLI 220 and third-year standing.

POLI 354 (3) History of Political Ideas I

Ideas of leading political philosophers from Plato to Hobbes. Credit will be granted for only one of POLI 340 or POLI 354. [3-0-0]

Prerequisite: POLI 240 and third-year standing.



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POLI 356 (3) History of Political Ideas II

Ideas of leading political philosophers from Locke to Marx. Credit will be granted for only one of POLI 340 or POLI 356. [3-0-0]
Prerequisite: POLI 240 and third-year standing.

POLI 358 (3) Politics and Religion

Perspectives, arguments, and questions at the intersection of political and religious thought and practice. Works in various religious and political-philosophical traditions will be considered. Credit will be granted for only one of POLI 358 or POLI 391 when the subject matter is of the same nature. [3-0-0]
Prerequisite: 3 credits of 100- or 200-level POLI and third-year standing.

POLI 362 (3) The Great Powers and International Politics

Examination of the changing nature of Great Power relations, including procedures and institutions for managing their conflicts, in the pre-Cold War, Cold War, and post-Cold War international systems. [3-0-0]

POLI 363 (3) Canadian Foreign Policy

Analysis of Canadian foreign policy on important international issues since the 1960s, and of the policy-making process. Defence commitments, economic relations, activities of international organizations, and relations with the US, Europe, USSR, Asia, and the Third World. [3-0-0]
Prerequisite: 3 credits of 100- or 200-level POLI and third-year standing.

POLI 364 (3) International Organizations

Analysis of the activities and influence of modern international organizations in international security, economic, and social issue areas. Organizations associated with the United Nations; other world and regional bodies will also be analyzed. [3-0-0]
Prerequisite: One of POLI 221, POLI 222. And third-year standing.

POLI 366 (3) International Political Economy

Analysis of governmental policies and international political bargaining in regard to such issues as international investment, trade, and monetary relations. [3-0-0]
Prerequisite: One of POLI 221, POLI 222 and third-year standing.

POLI 371 (3) The Politics of NAFTA

Political and strategic issues associated with the North American Free Trade Agreement (NAFTA). Historical evolution of the trade pact. [3-0-0]
Prerequisite: 3 credits of 100- or 200-level POLI and third-year standing.

POLI 372 (3) Gender and International Relations

The role of ordinary men and women in the national and international arena. Themes include: war and violence, labour and migration, feminism and the politics of women's rights, and diverse conceptions of men and masculinity. [3-0-0]
Prerequisite: Two of POLI 220, POLI 221, POLI 222 and third-year standing.

POLI 377 (3) Politics of the Global South

Processes and state-society relations with particular attention to the legacy of colonialism and neo-colonialism, North/South economic relations, and patterns of dictatorship and democracy. Case studies drawn from all major regions of the global South. [3-0-0]
Prerequisite: Two of POLI 220, POLI 221, POLI 222 and third-year standing.

POLI 378 (3) The Age of Imperialism, 1800-1914

Modern international relations as determined by imperial competition among established and emerging Great Powers. Changes in state-society relations and the imperial struggle within Europe; the study of Europe's profound impact on Indigenous peoples and cultures of Africa and Asia. [3-0-0]
Prerequisite: 3 credits of POLI and third-year standing.

POLI 382 (3) Genocide: An Interdisciplinary Perspective

Evolution of genocide. Strategies for intervention and prevention. Case studies. Genocide from the perspectives of psychology, sociology, anthropology, political science/international relations. [3-0-0]
Prerequisite: Two of POLI 220, POLI 221, POLI 222 and third-year standing.

POLI 383 (3) Crimes Against Humanity

Crimes against humanity and the evolution of the component crimes (including genocide, slavery, torture, sexual violence, apartheid) as legal concepts, social-historical phenomena, and sites of popular struggle. [3-0-0]
Prerequisite: 3 credits of 100- or 200-level POLI and third-year standing.

POLI 391 (3-9) d Special Topics in Political Science



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Examination of selected topics in current political science and/or policy. Topics may or may not vary each time the course is offered. Repeatable for up to 9 credits with different topics. [3-0-0]

Prerequisite: 3 lower-level POLI credits and third-year standing.

POLI 402 (3) Law and Politics of the Canadian Constitution

Seminar on the origins and development of the Canadian Constitution: the political aspects of federalism, and the legal consequences of the *Canadian Charter of Rights and Freedoms*. [0-0-3]

Prerequisite: 3 credits of 100- or 200-level POLI and third-year standing.

POLI 432 (3) Contemporary Issues in Law

Basic legal concepts, principles and procedures, categories of law, litigation principles, and alternative dispute resolution. New norms and rules for global governance, international trade, human rights, and environmental issues. [0-0-3]

Prerequisite: 3 credits of 100- or 200-level POLI and third-year standing.

POLI 433 (3) Europe Between the Wars: Seminar

Disintegration of the European political and diplomatic settlement between the Treaty of Paris in 1919 and Germany's invasion of Poland in 1939. Domestic politics and international position of Britain, France, Germany, Russia, and the United States.

Designed to provide a basic understanding of the politics and international relations of the great powers in the first half of the twentieth century. [0-0-3]

Prerequisite: 6 credits of POLI and third-year standing.

Equivalency: HIST 468.

POLI 435 (3) International Politics on Film

Major themes and conflicts of international politics in the modern age through an exploration of key works of political cinema. [2-0-3]

Prerequisite: 3 credits of 100- or 200-level POLI and third-year standing.

POLI 441 (3) Quantitative Methods in Political Science

Introduction to the logic of quantitative research designs in political science: theory and practical applications. Students will pursue their research interests using the methodology learned in class. [3-0-0]

Prerequisite: Third-year standing.

POLI 462 (3) International Relations Theory

Seminar on major theoretical approaches to the study of international relations. For specific content in a given year, consult the department website. [0-0-3]

Prerequisite: Any two courses in International Relations, including one of POLI 221, POLI 222.

POLI 464 (3/12) d Problems in International Relations: Seminar

Seminar in which content varies from year to year. Consult the departmental website. One section (of 3 credits) is reserved for fourth-year students in the Major program in International Relations. May be repeated on a different topic for a maximum of 12 credits during complete program of study. [0-0-3]

Prerequisite: Any two courses in International Relations, including one of POLI 221, POLI 222.

POLI 465 (3) International Law: Seminar

The nature, sources, and sanctions of international law; the notion of nationhood with particular reference to the status of the British Dominions; territorial and extra-territorial jurisdiction; diplomatic and sovereign immunities; international delinquency; treaties; settlement of disputes; international organizations. This course may not be taken for credit in both Arts and Law. [0-0-3]

Prerequisite: One of POLI 100, POLI 221, POLI 222 and third-year standing.

POLI 472 (3) War and the Modern State

Evolution of military conflict from 1789 to the present. Case studies illustrate development of modern states, progress of industrial and scientific innovation, implications of hyperbolic inter-state violence, and the limited war in the nuclear age. [0-0-3]

Prerequisite: 3 credits of POLI and third-year standing.

POLI 476 (3) Statecraft and International Affairs: Seminar

Discussion of the ethical dimension in international affairs. Historical and contemporary case studies in which moral questions influence the spirit and content of political choice in relations between states. Topics include: public opinion; cultural tradition; government effectiveness; pacifism and just war tradition, the ethics of intervention and covert action; disarmament and nuclear deterrence; human rights and the global market; sovereignty and self-determination. [0-0-3]

Prerequisite: Third-year standing.

POLI 491 (3) Directed Studies in Political Science

Supervised investigation of a topic agreed upon by the supervising faculty member and the student, and approved by the dean



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of the faculty. Significant amount of independent reading and analysis, and a major term paper.

Prerequisite: Fourth-year standing, 12 credits of POLI; a minimum grade average of 72% in all completed POLI courses; and permission of the department head.

POLI 497 (3) Directed Studies for PPE Majors

Students will undertake a supervised investigation of an assigned topic in public policy. They will be expected to do a significant amount of independent reading and analysis and to produce a major term paper at the end of the course.

Prerequisite: Minimum fourth-year standing in the PPE major program with an emphasis in Political Science (option B); and permission of the instructor.

Psychology, Faculty of Arts and Social Sciences

PSYO: Psychology

PSYO 111 (3) Introduction to Psychology: Basic Processes

Survey of topics in psychology which relate to basic processes. Methods and statistics, the nervous system and physiological processes, sensation and perception, learning, cognition and memory. [3-0-0]

PSYO 121 (3) Introduction to Psychology: Personal Functioning

Survey of topics in psychology which relate to personal functioning. Methods and statistics, motivation and emotion, life span development, social processes, personality, abnormal behaviour, and psychotherapy. [3-0-0]

Prerequisite: PSYO 111.

PSYO 219 (3) Introduction to Cognition

A brief introduction to how the mind works from a cognitive perspective. Topics will be drawn from memory, decision making, reasoning, attention, object perception, and speech and language. [3-0-0]

Prerequisite: All of PSYO 111, PSYO 121. Or all of PSYC 101, PSYC 102. Or PSYC 100.

PSYO 220 (3) Lifespan Development

Introduction to the field of lifespan developmental psychology. Examination of the physical, cognitive, and psychosocial development of the individual from conception through later adulthood. [3-0-0]

Prerequisite: All of PSYO 111, PSYO 121. Or all of PSYC 101, PSYC 102. Or PSYC 100.

PSYO 230 (3) Biopsychology of Behaviour

Topics will include structure and function of the nervous system, research methods, and their application to a selection of the following topics: human brain damage and recovery, stress, selected psychological and neurological disorders, sleep, memory, and vision. [3-0-0]

Prerequisite: All of PSYO 111, PSYO 121. Or all of PSYC 101, PSYC 102. Or PSYC 100.

PSYO 241 (3) Personality

Focuses on a variety of personality theories including psychoanalytic, behaviouristic, cognitive, humanistic, and trait perspectives. Methods of research and critical analysis of theoretical foundations and research. [3-0-0]

Prerequisite: All of PSYO 111, PSYO 121. Or all of PSYC 101, PSYC 102. Or PSYC 100.

PSYO 252 (3) Introduction to Social Psychology

Introduction to social psychology. Attitudes, opinions and beliefs, persuasion, mass communication, group processes, prejudice, interpersonal attraction, conformity, aggression, and conflict. [3-0-0]

Prerequisite: All of PSYO 111, PSYO 121. Or all of PSYC 101, PSYC 102. Or PSYC 100.

PSYO 270 (3) Introduction to Research Methods and Design

Introduction to the procedures and difficulties in the design and critical evaluation of research in experimental psychology.

Various research designs and basic statistics. A required course for students majoring in Psychology. [3-0-0]

Prerequisite: All of PSYO 111, PSYO 121. Or all of PSYC 101, PSYC 102. Or PSYC 100.

PSYO 271 (3) Introduction to Data Analysis

Introduction to behavioural data analysis focusing on the use of inferential statistics in psychology and the conceptual interpretation of data as related to basic experimental designs (laboratory, field research methods). A required course for students majoring in Psychology. STAT 121 is recommended. [3-0-0]

Prerequisite: PSYO 270.

PSYO 281 (1-3) d Research Experience in Psychology



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An entry-level research experience; students gain first-hand familiarity conducting Psychological research; the scope of the work will vary, but will involve active participation with ongoing research. Pass/Fail.

Prerequisite: One of PSYO 111, PSYO 121. Or one of PSYC 101, PSYC 102, PSYC 100. 9 credits; permission of the head and a faculty member prepared to supervise the experience.

PSYO 310 (3) Learning

A critical survey of the basic experimental findings and theory of the learning process with emphasis on the theoretical formulation of the necessary conditions for learning, retention, and transfer of training. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 311 (3) Memory

An examination of memory systems and how they work. Topics will focus on how we input, store, and retrieve memories; the systems that process these memories; and the disruptions of memory in amnesia, false memory, and eyewitness testimony. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 313 (3) Visual Perception

Examines how our brain enables us to see. Topics will focus on visual processing involved in perceiving objects, colours, movement, and depth. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 314 (3) Non-Visual Perception

Although vision is our primary source of information, we have several other well-developed perceptual systems. This course examines the research behind our understanding of the processing that allow us to hear, feel, touch, smell, and taste. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 315 (3) Psychology of Touch I

Focuses primarily on the sensory aspect of touch. Topics include: tactual perception in historical perspective, sensory and physiological bases of touch, the psychophysics of touch, thermal sensibility, pain responsiveness, and the introduction of the haptic system and its components. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 316 (3) Psychology of Touch II

Focuses on the perceptual aspects of touch. Perception of texture and layout, development of haptic perception, intermodality relations between vision and touch, Braille, and tactile pictures. [3-0-0]

Prerequisite: PSYO 315.

PSYO 317 (3) Psychology of Creativity

Experimental and theoretical approaches used by psychologists to investigate the interplay of internal and external factors involved in the creative process. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 321 (3) Child Development

Survey of developmental psychology, focusing on the childhood segment of the lifespan. Examines the physical, cognitive, and psychosocial development of children from conception through the school years. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 322 (3) Adolescent Development

Survey of developmental psychology, focusing on the adolescent segment of the lifespan. It examines physical, cognitive, personality, and social aspects of adolescent development. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 323 (3) Adult Development and Aging

Survey of developmental psychology, focusing on the adult segment of the lifespan. Examines the physical, cognitive, personality, and social aspects of adult development. [3-0-0]



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Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 334 (3) Neuroscience of Cognition

Modern imaging techniques provide new insights into where and how thinking occurs in the brain. This course examines how these techniques have led to a new understanding of topics in cognition such as memory, language, decision making, evolution, and cerebral lateralization. Discussion will include a consideration of specific phenomena such as false memories and reading impairment. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 335 (3) Drugs and Behaviour

Surveys topics related to the effects of drugs on behaviour. Cellular mechanisms of action, drug absorption, tolerance, addiction, withdrawal, and placebo effects. Classes of drugs studied will include alcohol, tranquilizers, nicotine, stimulants, opiates, marijuana, hallucinogens, antidepressants, and antipsychotics. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 343 (3) Psychopathology I

Detailed introduction to general principles underlying scientific study of mental health and psychopathology. Critical theoretical and methodological issues related to the assessment, diagnosis, and treatment of psychological disorders. Psychological disorders used to illustrate general issues and principles discussed. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 344 (3) Psychopathology II

General issues concerning mental health and mental disorders. Contemporary issues pertaining to specific aspects of some psychological disorders. Ethical issues pertinent to clinical psychopathology. Lectures emphasize a multi-disciplinary perspective. [3-0-0]

Prerequisite: PSYO 343.

PSYO 346 (3) Abnormal Child Psychology

Introduction to the theories, causes, and treatments for major forms of abnormal psychological development in childhood and adolescence including behaviour disorders, emotional disorders, developmental and learning problems, and problems related to physical and mental health [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 348 (3) Health Psychology

Critical survey of research and theory on relation between psychological factors (behaviour, emotion, cognition, personality, and interpersonal relationships) and health. Health-related behaviours: smoking and drug use, effect of stressful events on health, methods for coping with stress, impact of chronic illness on family, and social support systems. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 349 (3) Positive Psychology

The psychology of happiness and well-being. Current research designs, techniques, empirical findings, and theories in positive psychology. Practical experience with some of the interventions and strategies used in positive psychology. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 353 (3) Psychological Aspects of Human Sexuality I

Academic overview of human sexuality from a biological, psychological, and behavioural perspective. Examination of the difficulties of research in the area of human sexuality, biological foundations of sexuality, human reproduction, birth control, and psychosexual development. [3-0-0]

Prerequisite: All of PSYO 111, PSYO 121 and third-year standing.

PSYO 354 (3) Psychological Aspects of Human Sexuality II

Academic overview of human sexuality from a biological, psychosocial, and behavioural perspective. Sexual behaviour, sexual complications and their treatment, attraction and love, sexual orientation, and problematic sexual behaviour. [3-0-0]

Prerequisite: PSYO 353.



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PSYO 355 (3) Forensic Psychology I

The implications of theory and research in psychology for the criminal justice system. Topics include the definition and measurement of crime with a review of psychological and biosocial factors associated with selected criminal behaviour. [3-0-0]
Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 356 (3) Forensic Psychology II

Implications of theory and research in psychology for the criminal justice system. Role played by psychologists in the criminal justice system, assessment and treatment of offenders, victims, and survivors. [3-0-0]
Prerequisite: PSYO 355.

PSYO 357 (3) Community Psychology

Introduction to the historical, theoretical, and empirical underpinnings of community psychology. Examines the application of psychological principles to social issues that affect communities. Special emphasis on community mental health, prevention of illness and promotion of wellness, and the community practitioner as an agent of social change. [3-0-0]
Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 362 (3) Psychology of Humour

Cognitive, social, and biological perspectives on humour and comedy. Applications of humour research in educational, business, and clinical settings, as well as in everyday life.
Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 372 (3) Research Methods and Statistics

Examination of sophisticated research designs and associated statistical methods. Direct research experience involving design, collection, and analysis of data in a formal research report; familiarity with use of computer programs to analyze research results. [3-3-0]
Prerequisite: A score of 80% or higher in PSYO 270 and a score of 80% or higher in PSYO 271 and permission of the department head.
Corequisite: Enrolment in a three-hour laboratory section is required.

PSYO 373 (3) Advanced Research Methods and Statistics

Addresses selected issues on the validity and quality of research, complex research designs, and associated statistical analyses. Students will gain additional experience in the use of standard statistical computer programs. [3-3-0]
Prerequisite: A score of 76% or higher in PSYO 372 and permission of the department head.
Corequisite: Enrolment in a three-hour laboratory section is required.

PSYO 380 (1-12) d Special Topics in Psychology

Intensive examination of selected topics and issues in psychology. This course will not be offered each term; check list of current offerings. May be repeated on a different topic for a maximum of 12 credits during complete program of study. [1-9 hours/week lecture]
Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology.

PSYO 381 (3/9) d Directed Studies in Psychology

Directed investigation of a research problem requiring a written report of findings. [0-0-3]
Prerequisite: Third-year standing and permission of the head and a faculty member prepared to supervise the investigation; minimum of 76% average over all courses taken.

PSYO 435 (3) Substance Use and Abuse

Behavioural and cognitive processes that contribute to the initiation, escalation, and cessation of drug-taking behaviour; the development and prevention of problems associated with drug use. [2-0-1]
Prerequisite: PSYO 335 and third-year standing in Psychology.

PSYO 440 (3) Introduction to Counselling and Interviewing

Theoretical and applied issues fundamental to psychological counselling and other helping professions. Development of basic interviewing skills. Credit will not be granted for both PSYO 440 and PSYO 480K. [0-3-0]
Prerequisite: Fourth-year standing. At least 6 credits of 300-level Psychology, including at least 3 credits of Area 4 (Abnormal/Personality). Students will be screened for entry into this course through a selection interview

PSYO 460 (3) History and Theories of Psychology



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Emergence of modern psychology as a separate, independent discipline and its continuity of development in terms of people, ideas, and major schools of thought. Schools of thought and pivotal figures will be placed in their social and institutional contexts. [3-0-0]

Prerequisite: Two of PSYO 219, PSYO 220, PSYO 230, PSYO 241, PSYO 252, PSYO 270, PSYO 271, PSYO 298, PSYO 299 or 6 credits of 200-level Psychology. Fourth-year standing.

PSYO 480 (1-9) d Advanced Special Topics in Psychology

Intensive examination of selected advanced topics and issues in psychology. May be repeated on a different topic for a maximum of 9 credits during complete program of study. [1-9 hours/week lecture]

Prerequisite: Third-year standing and permission of the department head.

PSYO 481 (3/6) d Directed Studies

Directed investigation of a research problem in psychology requiring a written report of findings.

Prerequisite: PSYO 271. Fourth-year standing and permission of the head and a faculty member prepared to supervise the investigation also required; minimum of 76% average over all courses taken.

PSYO 490 (3/6) d Undergraduate Honours Thesis

Two terms. A research problem in psychology under the supervision of a Psychology faculty member. Students engage in research requiring a written report with a public presentation of the findings. Students are required to participate in regularly scheduled colloquia and seminars. 6 credits required for Honours program. [0-0-1]

Prerequisite: PSYO 372. Permission of the department head and a minimum grade average of 76% in all attempted Psychology courses also required.

PSYO 506 (3) Contemporary Theories of Psychology

Major theories that comprise core areas of contemporary psychology. Historical perspectives of schools of thought, social and institutional contexts, and evolution of the discipline. [3-0-0]

PSYO 507 (6) Advanced Statistics and Research Methods

A survey of advanced topics in statistics and research methodology, including: philosophy of science, research designs, psychological measurement, statistical reasoning, meta-analysis, regression, multivariate analysis of variance, factor analysis, structural equation modelling, multilevel modelling, multiway frequency analysis, and the analysis of change. [3-0-0][3-0-0]

PSYO 508 (1-9) d Advanced Topics**PSYO 509 (3-12) d Directed Studies in Psychology**

Allows investigation of a specific topic as agreed upon by the faculty member and the student.

Prerequisite: Permission of the Psychology Graduate Coordinator and the course instructor.

PSYO 510 (3) Psychopathology I

Basic knowledge of the phenomenology of behavioural disorders in adults and children. [3-0-0]

PSYO 511 (3) Psychopathology II

An advanced overview of psychopathology from an historical and current scientific perspective. [3-0-0]

PSYO 512 (3) Ethics and Professional Standards in Clinical Psychology

A variety of ethical, professional, and legal conflicts associated with the role of clinical psychologists. Restricted to the Graduate Clinical Psychology Program. [3-0-0]

PSYO 514 (3) Psychological Assessment I

Core principles of clinical assessment; test interpretation; interviewing techniques; developmental factors in interpretation; integrative report writing. Restricted to the Graduate Clinical Psychology Program. [3-0-0]

PSYO 515 (3) Psychological Assessment II

Advanced topics in psychological assessment including in-depth coverage of the major commonly used standardized objective and self-report personality measures. Additional content will vary depending on the topic selected. Restricted to the Graduate Clinical Psychology Program. [3-0-0]

PSYO 516 (3) Psychological Intervention I: Process, Motivation, and Introduction to CBT Skills

Introduction to psychotherapy, including historical and current models of therapy, as well as introducing the use of Cognitive Behavioural Therapy and motivational enhancement therapy. Restricted to the Graduate Clinical Psychology Program. [3-0-0]

PSYO 517 (3) Psychological Intervention II: Advanced Topics in CBT

Evidence-based treatments in Cognitive Behavioural Therapy. Content will focus on cognitive behavioural models of intervention for a variety of mental health conditions. Restricted to the Graduate Clinical Psychology Program. [3-0-0]



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PSYO 521 (3) Social Bases of Behaviour

Social psychology; cultural, ethnic, and group processes; sex roles; organizational and systems theory. [3-0-0]

PSYO 522 (3) Biological Bases of Behaviour

Basic topics in human neuropsychology; neuroanatomy and neurophysiology; central nervous system damage; psychological dysfunction. [3-0-0]

PSYO 523 (3) Cognitive Basis of Behaviour

Current topics in cognitive psychology as they relate to clinical and health psychology; cognitive disorders; cognitive neuroscience. [3-0-0]

PSYO 524 (1) Clinical Supervision

Restricted to the Graduate Clinical Psychology Program. [0-0-1]

PSYO 526 (3) Program Evaluation

Practical course guiding students in the application of research methods to planning and carrying out program evaluations. [0-0-3]

PSYO 530 (1-12) c Clinical Psychology Practicum (Masters)

Focus on clinical skills. Students work under the supervision of a clinical faculty member. Training contracts are established at the start of the term. Restricted to the Graduate Clinical Psychology Program.

PSYO 599 (12) Master's Thesis

Pass/Fail.

PSYO 625 (1) Internship Preparation

Restricted to the Graduate Clinical Psychology Program. Credit will be granted for only one of PSYO 625 or PSYO 525. [0-0-1]

PSYO 630 (1-12) c Clinical Psychology Practicum (Doctoral)

Focus on clinical skills. Students work under the supervision of a clinical faculty member. Training contracts are established at the start of the term. Restricted to the Graduate Clinical Psychology Program.

PSYO 699 (0) Doctoral Dissertation

Pass/Fail.

PSYO 730 (6) Clinical Psychology Internship

Pass/Fail

Sociology, Faculty of Arts and Social Sciences

SOCI: Sociology

SOCI 111 (3) Introduction to Sociology I

Studies how society influences human behaviour. How is society organized and structured? How does it affect the way we think and act? What is the relationship between individuals and society? What is our social nature? Why is there inequality in the world? [3-0-0]

SOCI 121 (3) Introduction to Sociology II

Theories and methods sociologists use to examine social life. Class, gender, race and ethnicity; families, education, work; media and technology; inequality, power, crime and deviance; population changes, the state, globalization, conflict, and social change. [3-0-0]

Prerequisite: SOCI 111.

SOCI 209 (3) Foundations of Sociological Thought

Foundational ideas in the historical development of sociological thought. Ways in which these ideas have influenced new generations of sociologists. [3-0-0]

Prerequisite: SOCI 111.

SOCI 212 (3) Sociology of Race and Ethnicity

Key concepts and theoretical ideas of race and ethnicity; how race and ethnicity shape power, cultural expressions, identities, and resistance movements. [3-0-0]

Prerequisite: SOCI 111.

SOCI 216 (3) Media and Society



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Critical and contextual analysis of the form and content of mass communication. Relationship between culture, social behaviour, and public channels of communication such as print media, advertising, television, film, and popular literature. [3-0-0]
Prerequisite: SOCI 121.

SOCI 217 (3) Introduction to Sociology of Gender

How gender organizes and influences individuals, social interactions, and institutions such as families, media and work; how gender intersects with other structures of inequality. [3-0-0]
Prerequisite: SOCI 121.

SOCI 219 (3) Gender and Work: Issues and Controversies

How gender informs and is informed by power in paid and unpaid labour in a globalized world. Theoretical and empirical studies on the intersection of gender and work; wages; sexual harassment; segregation; work on the margins; resistance to gender inequalities. Credit will be granted for only one of SOCI 219 or SOCI 295 when on the same topic. [3-0-0]
Prerequisite: SOCI 111 and SOCI 121.

SOCI 226 (3) Work, Technology, and Social Change

Relationship between work, technological innovation, and social change. Emphasis on industrial and communications revolutions. Effects of technology on work, social stratification, family, gender identity, and politics. [3-0-0]
Prerequisite: SOCI 121.

SOCI 228 (3) Sociology of the Anthropocene

Examination of the "Anthropocene" at the intersections of the environment, colonialism, racialization, gender, and species. Explores the drivers of the Anthropocene, the politics of naming and dating an epoch after humans, as well as environmental justice and Anthropocene futures. Credit will only be granted for one of SOCI 228 or SOCI 295E. [3-0-0]
Prerequisite: SOCI 121.

SOCI 249 (3) Crime and Society

Introduction to crime as a social phenomenon. Changing definitions of crime in relation to social and political change; scope and nature of crime; criminalization; growth of criminology; institutional responses to criminal behaviour by the justice system. [3-0-0]
Prerequisite: SOCI 111.

SOCI 270 (3) Youth, Crime, and Deviance

Norm-breaking behaviour by youth. Study of victims and perpetrators; youth criminalization and social control; theories of crime and delinquency including intersections of class, race, gender and sexuality. [3-0-0]
Prerequisite: SOCI 111.

SOCI 271 (3) Statistical Analysis in Sociology I

Elementary statistics in the social sciences. Calculation and interpretation of basic measures of central tendency, variability, and association. Problems of measurement, sampling, estimation, and inference. [3-0-0]
Prerequisite: SOCI 111.

SOCI 280 (3) Sociology of Aging

Interplay of social, cultural, political, and individual contexts for older persons. Emphasis on the social construction of aging. [3-0-0]
Prerequisite: SOCI 111.

SOCI 295 (3) Current Topics in Sociology

Examination of selected topics in contemporary sociology. Consult with the department for current offerings. This course may be taken more than once but with different topics. [3-0-0]
Prerequisite: All of SOCI 111, SOCI 121.

SOCI 301 (3/6) d Sociology of Development

Theories of development and post-development. Emphasis on colonialism, globalization, neoliberalism, and resistance and liberation movements. [3-0-0]
Prerequisite: Third-year standing.

SOCI 303 (3/6) d Ethnic and Racial Inequality

Classical and contemporary theories. Emphasis on racialization, racism, and critical analyses of ethnicity. [3-0-0]
Prerequisite: SOCI 121.

SOCI 305 (3) Sociology of Families

Theoretical and methodological approaches to family structures and relations. [3-0-0]
Prerequisite: SOCI 121.

SOCI 309 (3) Violence in Intimate Relations



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Social, historical, cultural, and political roots of violence in intimate relations. Primary focus on women, children and the elderly. [3-0-0]

Prerequisite: Third-year standing.

SOCI 311 (6) Canadian Society

Critical analyses of social relations and structures in Canada. Topics may include politics, the economy, globalization, First Nations, social inequality, families, crime, welfare systems, immigration, racism, nationalism. [3-0-0]

Prerequisite: SOCI 111 and third-year standing.

SOCI 313 (3) Advanced Studies in Sociology of Gender

Critical analysis of current debates on gender. Postmodern challenges; masculinities; femininities; inter-sectionality; bodies. Particular attention paid to institutions, such as sport, education, and media. [3-0-0]

Prerequisite: SOCI 217.

SOCI 320 (3) Cultural Studies in Sociology

How culture informs and is informed by social, political, subjective, and aesthetic concerns. Special emphasis on critical and post-colonial theories and methodologies. [3-0-0]

Prerequisite: SOCI 121 and third-year standing.

SOCI 330 (3) Sociology of Tourism

Critical analysis of the global tourist industry and the tourist experience; impact of tourism on communities and labour; relationship between tourism and leisure. [3-0-0]

Prerequisite: SOCI 121 and third-year standing.

SOCI 362 (3/6) d Social Inequality

Structural and interactional approaches to relations of power that (re)produce inequality with a focus on the intersections of race, class, gender, and sexualities. [3-0-0]

Prerequisite: SOCI 121 and third-year standing.

SOCI 371 (3/6) d Deviance and Social Control

The social construction of deviance. Perspectives on social control such as moral regulation, surveillance, and punishment. Theoretical frameworks will be stressed. [3-0-0]

Prerequisite: SOCI 121 and third-year standing.

SOCI 373 (3) Sociology of Punishment and Captivity

The prison and its abolition analyzed from critical race, feminist, queer, trans, disability, animal studies, and environmental perspectives. Settler colonialism and slavery as foundational to punishment and incarceration in Canada and the United States. [3-0-0]

Prerequisite: SOCI 121.

SOCI 376 (3) Classical Sociological Theory

Classical sociological theories and their relationship to methodological issues. Emphasis on the procedures by which sociological explanations are made. Credit will be granted for only one of SOCI 376 or SOCI 375. [3-0-0]

Prerequisite: SOCI 209 and third-year standing.

SOCI 377 (3) Contemporary Sociological Theory

Contemporary sociological theories and their relationship to methodological issues. Emphasis on the procedures by which sociological explanations are made. Credit will be granted for only one of SOCI 377 or SOCI 375. [3-0-0]

Prerequisite: SOCI 376 and third-year standing.

SOCI 390 (6) Sociological Methods: Social Survey Design and Analysis

Introduction to quantitative research. Questionnaire design and interviewing techniques; statistical methods such as sampling and analysis of survey data using SPSS. [3-0-0]

Prerequisite: SOCI 121 and one of SOCI 271, STAT 121 and third-year standing.

SOCI 395 (6) Sociological Methods: Qualitative Research

Examination of methods such as ethnography, interviewing, historical and discourse analyses. Theoretical, epistemological, and ethical issues in social research and methods. [3-0-0]

Prerequisite: SOCI 121 and third-year standing.

SOCI 411 (3/6) d Special Studies in Canadian Society

Advanced analysis of issues in Canadian society. Consult the department head for frequency of offering and course topic. [3-0-0]

Prerequisite: SOCI 111 and third-year standing.



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SOCI 415 (3) Feminist Theory

Development of feminist theories and their relationship to sociology. Social and cultural bases of feminism. Special attention to contemporary debates. [1-0-2]

Prerequisite: SOCI 121 and third-year standing.

SOCI 421 (3) Sociology of Fear

The role of fear in the production, control, and management of individuals and societies. [3-0-0]

Prerequisite: SOCI 121 and third-year standing.

SOCI 426 (3) Urban Sociology

Demographic, behavioural, and organizational aspects of contemporary urban structures, as well as urbanization in different societies and periods. [3-0-0]

Prerequisite: SOCI 121 and third-year standing.

SOCI 429 (3) Globalization, Social Justice and Human Rights

Human rights from a political economy approach. The role of the state and international institutions in economic globalization.

Consequences of market-oriented policies on human development, with particular focus on problems related to working conditions and rights, land-grabbing, violence, migration, and human trafficking. Credit will be granted for only one of SOCI 429 or SOCI 496L. [3-0-0]

Prerequisite: SOCI 121. Third-year standing.

SOCI 430 (3) Labour in a Global Economy

Relationship between globalization and international labour; impact of global change on the international division of labour; barriers to and possibilities of new organizational strategies for labour solidarity. [3-0-0]

Prerequisite: SOCI 121 and third-year standing.

SOCI 432 (3) Sociology of Food

How does food shape social relations (class, gender, race, age)? What is its role in the construction of meaning and identity? How does it connect to the political through civil society and social movements? How is it impacted by globalization? Credit will only be granted for one of SOCI 432 or SOCI 496 when on the same topic. [2-0-1]

Prerequisite: SOCI 111 and SOCI 121 and fourth-year standing.

SOCI 434 (3/6) d Directed Studies

An individualized directed reading and/or research project in sociology under the supervision of a faculty member. [0-0-3]

Prerequisite: Permission of the department head and faculty member. Students must consult with the department head prior to registration.

SOCI 446 (3) Sociology of Sport

Theoretical debates on sport and society; impact of sport on management and disciplining of populations; sport and capitalism; globalization, nationalism and identity; racialization and gender issues in sport. [3-0-0]

Prerequisite: SOCI 121 and third-year standing.

SOCI 450 (3) Sociology of India

Historical and geographical overview of contemporary Indian society, including social institutions such as religion, community, family, education, and government. Emphasis on social divisions based on religious heritage, gender, region, language, caste, class, and political ideology. [3-0-0]

Prerequisite: SOCI 121 and third-year standing.

SOCI 456 (3) Sociology of Elites

Examines theoretical and empirical studies of elites - who they are; what role they play in society; how they operate. Reviews research countering the prominence of elites in economic, social and political life. Focuses primarily on Canada. Credit will only be granted for one of SOCI 456 or SOCI 496 when on the same topic. [3-0-0]

Prerequisite: SOCI 111 and SOCI 121 and third-year standing.

SOCI 463 (3/6) d Political Sociology

Social and economic basis of political power. State and inter-state relations; ideology and control; alienation and anomie; political movements and social revolutions; political violence and terrorism; the political economy of world conflict. [3-0-0]

Prerequisite: Either (a) SOCI 121 or (b) POLI 221 or (c) all of HIST 115, HIST 145.

SOCI 467 (3/6) d Social Movements

The origins, development, and impact of social movements in a globalized world with emphasis on current theoretical debates. [3-0-0]

Prerequisite: SOCI 121 and third-year standing.



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SOCI 468 (3/6) d Socialization and Education

Classroom socialization and curriculum; cultural and social capital; streaming, and credentialism; power and inequality with emphasis on the intersection of class, race, gender, and sexuality. [3-0-0]

Prerequisite: Third-year standing.

SOCI 480 (3) Aging, Diversity, and Inequality: Global and Comparative Perspectives

Comparative examination of aging in an era of globalization with a social justice and intersectional perspective. Emphasis on ageism and issues of power for older adults. [3-0-0]

Prerequisite: SOCI 280.

SOCI 485 (3/6) d Sociology of Health and Illness

The social construction of illness; the medicalization of society; historical rise of medical power and biomedicine; epidemics; colonialism and medicine; gender, race, sexuality and health. [3-0-0]

Prerequisite: SOCI 121 and third-year standing.

SOCI 492 (3) Surveillance and Society

Surveillance as a social phenomenon, involving differences in power and visibility. How surveillance is related to governance, control, and privacy. Theories and concepts from the interdisciplinary field of surveillance studies, with an emphasis on social relationships. Credit will be granted for only one of SOCI 492 or SOCI 496V. [3-0-0]

Prerequisite: SOCI 121. Third-year standing.

SOCI 496 (3/6) d Advanced Studies in Sociology

In-depth examination of selected topics in sociology. Topic may change each time the course is offered. Consult the department for frequency of offering and current course topic. [3-0-0]

Prerequisite: SOCI 121 and third-year standing.

Social Work, Faculty of Health and Social Development**SOCW: Social Work****SOCW 511 (3) Introduction to Social Work**

An introduction to social work with emphasis on ethical decision making and preparation for professional practice.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 512 (3) Theories and Interventions for Clinical Social Work

Advances students' understanding of major theoretical frameworks and treatment modalities for clinical and direct social work practice and their relevance to and application within the planned change process.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 513 (3) Assessment Skills for Clinical Social Work

Theoretical perspectives and foundational skills for assessment in clinical social work.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 514 (3) Diversity and Critical Reflexive Practice

Meanings, dynamics, and impacts of diversity in social work practice. Students examine their own identities and social locations and a range of theories and orientations to inclusion and social justice.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 515 (3) Social Welfare Policy in Canada

Historical and current forces shaping Canadian legislation, policies, programs, and services; impacts of these on social work practice and service users.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 516 (3) Foundations of Ethical Practice

Values and principles of ethical practice in clinical social work; ethical dilemmas and decision making with individuals, families, groups, organizations, and communities within the framework of the social work profession's Codes of Ethics.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 517 (3) Social Work and Indigenous Peoples in Canada

Overview of historical and current issues confronting social work with First Nations, Métis, and Inuit individuals, families, and communities within Canada including but not limited to child protection; critical assessment of theories for social work practice



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with Canada's Indigenous peoples.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 518 (3) Integrative Seminar for Field Education

Links classroom education with field education. Consists of independent readings, invited speakers, and online discussions. Pass/Fail.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 519 (6) Social Work Field Education I

Development, application, and integration of core social work knowledge and skills in social work practice settings. Pass/Fail.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 520 (3) Social Work Practice with Families

Examines major interdisciplinary theoretical perspectives and practice approaches for assessment and intervention with families.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 521 (3) Social Work Practice with Groups

Examines a range of group treatment approaches with a focus on group facilitation, dynamics and processes.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 522 (3) Clinical Practice with Children and Adolescents

Addresses the assessment and treatment of children and adolescents using biological, psychological, developmental, and social/environmental perspectives.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 523 (3) Advanced Assessment and Treatment With Children, Adolescents and Families

Conducting advanced clinical assessments, diagnoses, and interventions with children, adolescents, and families and exploration of research evidence to guide intervention choices. Includes supervised clinical work.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 525 (3) Human Development for Clinical Social Work

Empirical and theoretical knowledge of human development relevant for clinical social work practice across the lifespan.

SOCW 531 (3) Anti-Racist and Anti-Oppressive Clinical Practice

Provides an opportunity to expand theoretical and analytical foundation in the awareness, knowledge, understanding, and skills needed to effectively carry out anti-oppressive social work practice.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 540 (3-12) d Selected Topics in Social Work Practice

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 541 (3) Directed Studies in Social Work

A learning experience in a focused area of study, with the agreement and under supervision of a faculty member selected by the student and approved by the Director, School of Social Work.

SOCW 551 (3) Advanced Clinical Social Work Theory and Practice

Integrates theory and practice with attention to relational principles and a complex analysis of personal and social problems.

Consideration of the dynamic interaction between the individual and the social world, and the possibility of intervention at multiple levels.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 552 (3) Community, Place and Policy in Clinical Practice

Linking clinical social work practice to the broader community and policy contexts in which clinician and client are situated.

Examining how policy approaches structure clinical practice in relation to community and place and builds culturally relevant community and place centered practice skills in assessment and intervention. Credit will not be granted for both SOCW 552 and SOCW 502 or both SOCW 552 and SOCW 503.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 553 (3) Research Knowledge and Evidence in Clinical Social Work Practice

Knowledge and skills for utilizing empirical evidence to guide clinical social work practice.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 554 (3) Mental Health and Mental Illness

Explores relevant mental health issues to social work practice in a broad range of settings. Critically examines social work's role



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in providing effective, evidence-based, theoretically sound interventions and treatments.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 555 (3) Organizations and Leadership

Knowledge of human service organizations and tools for effective leadership.

SOCW 558 (3) Advanced Integrative Seminar for Field Education

Integrates theoretical knowledge and practice experience in direct/clinical settings. This course is graded on a pass/fail basis.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 559 (6) Social Work Field Education II

Provides 2nd year Foundational and Advanced One-Year track students an opportunity to apply and integrate theory and practice in clinical social work practice settings. Pass/Fail.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 560 (3) Braiding Indigenous Knowledge Into Clinical Practice

Integrates Western and Indigenous knowledges in clinical social work practice.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 562 (3) Cognitive Behavioral Therapy

Explores cognitive behavioral theories and therapeutic techniques in clinical social work practice.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 563 (3) Social Work in Health Care

Knowledge and skills for social work practice in a range of health care settings.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 564 (3) Trauma-Informed Clinical Social Work

Knowledge of trauma, its relevance to assessment and treatment in clinical social work practice.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 565 (3) Supervision of Clinical Social Work

Educates social workers in the practice of clinical supervision from a relational perspective including key principles, methods, skills, processes and the handling of common challenges.

Prerequisite: Restricted to students in the M.S.W. program.

SOCW 598 (3) Graduating Paper

A scholarly paper in an area of interest that conforms to the demands of a peer-reviewed social work journal. Pass/Fail.

SOCW 599 (9) Thesis

An independent research or scholarly project which aims to develop knowledge and practice implications for clinical social work practice. Pass/Fail.

Spanish, Faculty of Creative and Critical Studies

SPAN: Spanish

Students cannot take language courses out of sequence. Once a student successfully completes a Spanish language course, they can no longer enroll in a course that is below the level of the last course that has been completed. SPAN 150 is excluded from these restrictions. Students who have successfully completed Spanish 12 with a minimum of 70% must enrol in Spanish classes at the 200 level. Students should consult an advisor to ensure that they are enrolling in a level-appropriate Spanish language course.

SPAN 101 (3) Beginners' Spanish I

Development of listening, speaking, reading, and writing in Spanish. Corresponds to the first half of level A1 of the Common European Framework of Reference for Languages (CEFR).

SPAN 102 (3) Beginners' Spanish II

Development of listening, speaking, reading, and writing in Spanish. Completes level A1 of the Common European Framework of Reference for Languages (CEFR).

Prerequisite: Either (a) a score of 70% or higher in Spanish 11 or (b) SPAN 101.



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SPAN 201 (3) Advanced Beginners' Spanish I

Grammar, introduction to composition, oral practice, and reading. Corresponds to the first half of level A2 of the Common European Framework of Reference for Languages (CEFR).

Prerequisite: Either (a) a score of 70% or higher in Spanish 12, or (b) SPAN 102.

SPAN 202 (3) Advanced Beginners' Spanish II

A continuation of SPAN 201. Grammar, composition, oral practice, and reading. Completes level A2 of the Common European Framework of Reference for Languages (CEFR).

Prerequisite: SPAN 201.

SPAN 301 (3) Intermediate Spanish I

Intermediate grammar, composition, oral practice, and reading. Corresponds to the first half of level B1 of the Common European Framework of Reference for Languages (CEFR).

Prerequisite: SPAN 202.

SPAN 302 (3) Intermediate Spanish II

A continuation of SPAN 301. Intermediate grammar, composition, oral practice, and reading. Completes level B1 of the Common European Framework of Reference for Languages (CEFR).

Prerequisite: SPAN 301.

SPAN 303 (3) Conversational Spanish

Development of speaking and listening skills through active learning activities and discussions about a variety of topics that may include social media, streaming programs, movies, and current events. Corresponds to level B1 of the Common European Framework of Reference for Languages. [3-0-0]

Prerequisite: SPAN 202.

SPAN 308 (3/6) d Topics in Hispanic Cinema

In English. Films will be subtitled. Available for credit towards a Minor in Spanish, and Major in Languages, with instructor's permission for students who undergo evaluation in Spanish. With different topics, this course may be taken more than once for credit. Credit will only be granted for up to a maximum of 6 credits of SPAN 280 and SPAN 308.

SPAN 312 (3) Spanish and English in Contrast

Linguistic analysis of the similarities and differences between Spanish and English. The sound systems and the formation of words and sentences will be compared. Difficulties for second-language learning will also be discussed.

Corequisite: SPAN 301

SPAN 315 (3) Introduction to Spanish Linguistics

Spanish phonetics, phonology, morphology, syntax, semantics, and linguistic variation. Not offered every year. [3-0-0]

Corequisite: SPAN 301.

SPAN 320 (3) Spanish American Short Story

An understanding and analysis of literary texts through selected authors and short stories from Spanish America.

SPAN 380 (3/9) d Selected Studies in Spanish

Topics in Spanish or Spanish American language, literature, culture, or linguistics.

Corequisite: SPAN 301 or permission of the instructor.

SPAN 401 (3) Advanced Spanish I

Advanced grammar, composition, oral practice, and reading. Corresponds to level B2 of the Common European Framework of Reference for Languages (CEFR).

Prerequisite: SPAN 302 or equivalent

SPAN 402 (3) Advanced Spanish II

Advanced grammar, composition, oral practice, and reading. Corresponds to level B2 of the Common European Framework of Reference for Languages (CEFR).

Prerequisite: SPAN 401.

SPAN 407 (3) Development of the Spanish Language

Origin, development, and spread of the Spanish language from the Roman Empire to the Modern Era.

Prerequisite: SPAN 301 and one of SPAN 312, SPAN 315, SPAN 442.

SPAN 419 (3) Introduction to Translation and Interpretation from Spanish to English

General aspects of translation and interpretation. Theory and practice.

Prerequisite: SPAN 301.



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SPAN 425 (3) Introduction to Translation and Interpretation from English to Spanish

General aspects of translation and interpretation. Theory and practice.

Prerequisite: SPAN 301.

SPAN 441 (3) Spanish Applied Linguistics

Application of linguistic studies in the second-language classroom.

Prerequisite: SPAN 301.

SPAN 442 (3) The Sounds of Spanish

An exploration of the sounds and sound patterns of Spanish through the use of video, audio recordings, music and texts. Focus will be on the analysis and practice of Spanish pronunciation, including Spanish of the Americas and Peninsular Spanish.

Prerequisite: SPAN 301.

SPAN 495 (3/9) Directed Studies

Topics in Peninsular Spanish or Spanish American literature, culture, language, and linguistics.

Prerequisite: Consent of instructor and permission of the department required.

Statistics, Faculty of Science**STAT: Statistics****STAT 121 (3) Elementary Statistics**

Descriptive and inferential statistics, elementary probability, probability distributions, estimation of parameters, hypotheses testing, correlation, linear regression. Credit will be granted for only one of STAT 121 or STAT 124. [3-1-0]

Prerequisite: Either (a) a score of 60% or higher in one of MATH 125, MATH 126 or (b) a score of 67% or higher in one of MATH 12, PREC 12.

STAT 124 (3) Business Statistics

Introduction to surveys and simple sampling strategies; descriptive methods for one and two variables; frequency distributions; correlation and regression; descriptive methods for time series and index numbers; and probability and relationship to statistical inference. Good for CA, CMA credit. Credit will be granted for only one of STAT 121, STAT 124. [3-1-0]

Prerequisite: One of Principles of Mathematics 11, Pre-Calculus 11, Foundations of Mathematics 12.

STAT 224 (3) Mathematics of Finance

Simple interest and discount, compound interest and discount, simple and general annuities, amortization of debts, bonds, depreciation, probability, mortality tables, contingent payments, life annuities and insurance. Calculations will be carried out using a modern scripting language.

Prerequisite: DATA 101 and one of MATH 100, MATH 116 and one of STAT 121, STAT 124.

STAT 230 (3) Introductory Statistics

Applied statistics for students with a first-year calculus background. Estimation and testing of hypotheses, problem formulation, models and basic methods in analysis of variance, linear regression, and non-parametrics. Descriptive statistics and probability are presented as a basis for such procedures. [3-1-0]

Prerequisite: One of MATH 101, MATH 142 and one of DATA 101, COSC 221, ECON 102.

STAT 303 (3) Introduction to Probability

Basic notions of probability, random variables, expectation and conditional expectation and limit theorems. [3-0-0]

Prerequisite: MATH 200.

Equivalency: MATH 302.

STAT 400 (3) Statistical Communication and Consulting

Development of broad guidelines for a comprehensive approach to data analysis with a focus on communicating statistical ideas from planning experiments to the presentation of results. Topics include criteria for selection of suitable methodologies, data preparation, outlier detection, and exploratory data analysis. Credit will be granted for only one of DATA 500 or STAT 400 when the subject matter is of the same nature. [3-0-0]

Prerequisite: DATA 311, and fourth-year standing in the Data Science major or honours program.

STAT 401 (3) Probability and Statistical Inference

Formal introduction to the theory of statistical modelling with a focus on distributions of data, likelihood based inference for learning unknown parameters, construction of confidence intervals and development of tests. Bayesian methods will be used to



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contrast standard statistical procedures. Credit will be granted for only one of STAT 309 or STAT 401. [3-1-0]

Prerequisite: All of STAT 230, STAT 303.

STAT 403 (3) Stochastic Processes

Random walks, Markov chains, Poisson processes, continuous time Markov chains, birth and death processes, exponential models, and applications of Markov chains. [3-0-0]

Prerequisite: STAT 303.

STAT 406 (3) Environmetrics

Foundation of the use of statistical concepts and methods in environmental science and management. Scientific problem-solving using statistical methods. Integration of the formulation of objectives, study design, and quantitative methods appropriate for the design. The role and use of statistical software packages. [3-0-0]

Prerequisite: STAT 230.

STAT 448 (3/6) d Directed Studies in Statistics

Investigation of a specific topic as agreed upon by the student and the faculty supervisor. Completion of a project and an oral presentation are required. No more than 6 credits of STAT 448 may be taken for credit.

Prerequisite: Successful completion of 15 credits of 300- or 400-level MATH and STAT courses; and permission of the department head and faculty supervisor.

STAT 449 (3-9) d Special Topics in Statistics

Students should consult with the unit to determine the availability of specific topics to be offered under the direction of a staff member. May be taken more than once with different topics.

Prerequisite: Permission of the department head.

STAT 507 (3) Sampling and Design

Collection of data using either designed experiments or survey samples. Planning and practice of data collection. Observational and experimental data pros and cons. Standard methods in survey samples. Experimental design review. Credit will be granted for only one of DATA 407, STAT 405, STAT 407 or STAT 507.

STAT 538 (3) Advanced Statistical Modelling

Least-squares, generalized least-squares and likelihood estimation. Theory and application of parametric and non-parametric regression models such as splines, penalized splines, and generalized additive models. Assessment and treatment of data issues including missingness and measurement error. Credit will be granted for only one of DATA 410, STAT 310, STAT 410, or STAT 538. [3-2-0]

STAT 547 (2-15) d Topics in Statistics

Topics chosen from different areas within the field of statistics, such as time series, longitudinal and multi-level modelling, multivariate analysis, machine learning, resampling and permutation methods, smoothing and filtering, survival analysis, sports analytics and spatial statistics. Content will be determined so as to complement course offerings and meet the needs of the students. With the permission of the department head, this course may be taken more than once on a different topic. [3-0-0]

STAT 560 (3) Probability and Stochastic Processes

Theory of probability, including random variables, expectation, conditional expectation, generating functions, modes of convergence of random variables and their distributions. Applications to random models such as Markov, Poisson, birth-death, Gaussian and diffusion processes. [3-0-0]

Sustainability, Faculty of Science

SUST: Sustainability

SUST 100 (3) Sustainability: People, Place, and Process

The concept of sustainability and its relationship to people and communities, the management and conservation of natural resources, land and food systems, and the built environment. Guest speakers and in-class discussions covering topics which address local and global contexts. May include community service learning project. [3-0-0]

SUST 104 (3) Introduction to Environmental Humanities

Explores the contribution of historical, philosophical, anthropological, and literary scholarship to elucidation and mitigation of a specific environmental issue. Restricted to students in the Bachelor of Sustainability program. [3-0-0]

Prerequisite: SUST 100 recommended.



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SUST 200 (3) Application, Practice and Management Approaches

Concepts of governance, natural resource management, and economy-environment connections. Restricted to students in the Bachelor of Sustainability program. [3-0-0]

Prerequisite: SUST 100.

SUST 201 (3) Introduction to Research in Sustainability and Geography

Introduces skills required to conduct, critically assess, and present research in geography and sustainability. Develops research skills from problem definition through to design and execution of research projects, including how to identify and categorize scholarly articles; identify research questions; and, collect, analyze, and present data and research findings. Credit will be granted for only one of SUST 201, GEOG 201, or GEOG 371. [2-0-1]

Equivalency: GEOG 201.

SUST 202 (1) Community Service Learning

Apply sustainability learning and knowledge to the broader community through a self-directed project involving at least 30 hours of community service. Restricted to students in the Bachelor of Sustainability program. [0-0-1]

SUST 204 (3) Creative Communication and Engagement

Using experiential and collaborative learning, students of sustainability improve their communication skills as speakers, listeners, collaborators, leaders and problem solvers. Credit will be granted for only one of SUST 204 or THTR 204. [3-0-0]

Prerequisite: SUST 104 recommended.

Equivalency: THTR 204.

SUST 205 (3) Sustainability Economics

Explores and contrasts approaches and tools from mainstream economics and heterodox economics that may contribute to sustainability decision making. Identification and evaluation of trade-offs associated with choices made in the name of sustainability. Restricted to students in the Bachelor of Sustainability program. [3-0-0]

Prerequisite: SUST 200 recommended.

SUST 300 (3) Achieving Sustainability at the Regional Scale

Advanced analysis of regional-scale challenges and solutions to sustainability in developed and developing nations. Ecosystem services and relationships to human well-being. Social and ecological resilience of landscapes. [3-0-0]

Prerequisite: SUST 200.

SUST 301 (3) Methods in Solving Wicked Problems

Interdisciplinary methods to address challenges of finding sustainable solutions to multi-scale, multi-stakeholder problems that require systems-level approaches. We begin with the premise that these problems are 'wicked' problems that have no single, correct solution, and where any solution is intertwined with issues of human ethics, values, and social equity. Restricted to students in the Bachelor of Sustainability program. [3-0-0]

Prerequisite: SUST 300 and one of BIOL 202, STAT 230, SUST 201.

SUST 302 (1) Community Service Learning

Apply sustainability learning and knowledge to the broader community through a self-directed project involving at least 30 hours of community service. Development of personal sustainability goals. Restricted to students in the Bachelor of Sustainability program. [0-0-1]

Prerequisite: SUST 202.

SUST 400 (6) Capstone Project in Sustainability

Applied project in sustainability studies. May follow a traditional academic research model or may be community-based. May be undertaken in partnership with external organizations as relevant. Restricted to students in the Bachelor of Sustainability program. [6-0-0]

Prerequisite: SUST 301.

SUST 402 (1) Community Service Learning

Apply sustainability learning and knowledge to the broader community through a self-directed project involving at least 30 hours of community service. Refine personal sustainability goals. Work with diverse stakeholders to attain a common objective. Restricted to students in the Bachelor of Sustainability program. [0-0-1]

Prerequisite: SUST 302.

SUST 491 (3) Special Topics in Sustainability

Intensive examination of selected topics in sustainability. May include field project or travel. Consult department for this year's offerings. [3-0-0]

Prerequisite: SUST 100 and third-year standing.



Theatre, Faculty of Creative and Critical Studies

THTR: Theatre

THTR 101 (3) Performance Improvisation

A physical approach to improvisation as it relates to the creation of live performance events. [3 hours/week studio]

THTR 102 (3) The Performer's Process I

Introduction to physical and vocal training and intercultural, movement-based performance work rooted in European experimental theatre and non-Western performance traditions. [3 hours/week studio]

THTR 103 (3) Acting for Stage and Screen

An introduction to acting techniques pertaining to the style of psychological realism for stage and screen. Credit will be granted for only one of THTR 103 or FILM 103. [3 hours/week studio]

Equivalency: FILM 103.

THTR 104 (3) The Art of Public Speaking

Verbal and nonverbal communication skills as well as knowledge of basic communications technologies. Well-suited to students who wish to build skill and confidence in public presentation.

THTR 111 (3) Introduction to Theatre and World Performance Traditions

Cross-cultural investigation of Western and non-Western performance traditions and practices including realistic, experimental, and intercultural theatre, as well as ritual performance processes. [2-1-0]

THTR 180 (3) Theatre Appreciation: The Power of Live Performance

Explores how live performances (stand-up comedy, circus, puppetry, performance art, theatre, dance and music) engage an audience and reveal the shifting dynamics of public communication.

THTR 201 (3) Performer/Creator Resources

Research and exploration of diverse sources in the creation of new performance work. Sources may include specific sites or communities, natural and man-made materials, texts, or music.

THTR 202 (3) The Performer's Process II

Intermediate physical and vocal training and intercultural, movement-based performance work rooted in European experimental theatre and non-Western performance traditions. [3 hours/week studio]

Prerequisite: One of THTR 102, THTR 101, VISA 102, VISA 104, VISA 106, CRWR 150, CRWR 160 or permission of the instructor.

THTR 211 (3) Performance, Embodiment, and Creativity

Interdisciplinary investigation of the history, theory, and practice of performance as an embodied creative process and a form of artistic research. [2-1-0]

THTR 212 (3) Creativity as Source & Resource

Process-oriented exploration of creativity as a source of personal growth and expressive freedom, and a resource for the cultivation of self-confidence, resilience, and well-being.

Prerequisite: Second year standing.

THTR 280 (3/6) d Devised Public Performance

An intensive laboratory course in performance creation leading to a public presentation. Students may work extensively out in the community and compulsory rehearsals will be scheduled outside of class time. [5 hours/week studio]

Corequisite: THTR 101.

THTR 301 (3/6) d Special Topics in Performance Styles

Training in performance styles such as Spoken Word, Commedia dell'Arte, Tragedy, Bouffon, Clown and Performance Art. Students will study both traditional and contemporary examples of one of these styles. With different topics, this course may be taken more than once for credit. [3 hours/week studio]

Prerequisite: One of THTR 101, THTR 102, THTR 201, THTR 202, THTR 280, THTR 480 or permission of the instructor.

THTR 302 (3) Indigenous Performance Practices

Indigenous performance training methods in movement, dance, singing, and storytelling that connect Indigenous Peoples to their homelands and ancestral territories. The interrelation of community, ecology, language, and culture will be explored under the expert guidance of an Indigenous instructor and the mentorship of guest Indigenous artists and Elders. May include field trips. [5



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hours/week studio]

Prerequisite: One of THTR 201, THTR 202 or third year standing and permission of the instructor.

THTR 303 (3) Narrative Film Production

The theory and practice of producing a short narrative motion picture for the purpose of developing narrative film literacy. Credit will be granted for only one of THTR 303, CULT 316 or FILM 303. VISA 106, VISA 261, VISA 271, CULT 210, THTR 103, CRWR 250, or FILM 100 recommended.

Prerequisite: Third-year standing.

Equivalency: CULT 316;FILM 303.

THTR 304 (3) World Theatre and Cultural Performance

Explorations of world theatre and cultural performance traditions and practices from South, Southeast and East Asia; Oceania; Sub-Saharan Africa; the Middle East; and the Americas; includes Indigenous theatre. Credit will be granted for only one of THTR 304 or WRLD 304.

Prerequisite: Third-year standing.

Equivalency: WRLD 304.

THTR 309 (3) Performance Art: Global Perspectives

History, theory, and practice of performance art as a visual medium, a global language, and a political force. Explores a wide range of experimental and interdisciplinary performance art practices, including key contributions by Indigenous artists. Credit will be granted for only one of THTR 309, ARTH 309 or CULT 380.

Prerequisite: Third-year standing.

Equivalency: ARTH 309, CULT 380.

THTR 313 (3/6) d Dramatic Literature in Performance

Explores the performance of dramatic literature through a combination of interactive lectures and acting/directing training for a selected dramatic repertoire. Rehearsals outside class time required. Culminates in a public presentation. With different topics, the course can be taken more than once for credit. Credit will be granted for no more than a total of 6-credits of THTR 313 and WRLD 313.

Prerequisite: Third-year standing.

Equivalency: WRLD 313.

THTR 384 (3) Spoken Word

Advanced workshop in writing and performing Spoken Word texts. Credit will be granted for only one of THTR 384 or CRWR 384 or CULT 308. [0-3-0]

Prerequisite: 6 credits of Creative Writing and/or Theatre. Third-year standing.

Equivalency: CRWR 384, CULT 308.

THTR 401 (3) Live Art/New Media

Interdisciplinary training incorporating the use of old and new technology in live performance. [3 hours/week studio]

Prerequisite: One of THTR 201, THTR 301, VISA 106, VISA 108 or permission of the instructor.

THTR 411 (3) Performance Studies

Seminar in the interdisciplinary field of performance studies, broadly conceived as the investigation of aesthetic, ritual, and everyday life performance practices. Credit will be granted for only one of THTR 411 or CULT 480. [2-1-0]

Prerequisite: Third-year standing.

Equivalency: CULT 480.

THTR 480 (3/12) d Special Topics in Performance Creation

An intensive course in performance creation leading to a public presentation. Students may work extensively out in the community and additional compulsory rehearsal time will be scheduled. [5 hours/week studio]

Prerequisite: THTR 280 or permission of the instructor.

THTR 482 (6) Advanced Performance Practices I

In consultation with a faculty advisor, students will propose a program of interdisciplinary study for a thesis project. Intensive course for fourth-year Creative Studies students. [5-5-0]

Prerequisite: THTR 301.

THTR 483 (6) Advanced Performance Practices II

A continuation of THTR 482 concluding with an advertised, public performance or community project. [5-5-0]

Prerequisite: THTR 482.

THTR 485 (3/6) c Directed Studies



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Performance theories and/or practices leading to completion of a significant written research project (with or without a practical component) or a documented interdisciplinary performance project. [2-3-0]

Prerequisite: Third-year standing and permission of both the department and the supervising faculty member.

THTR 530 (3) Directed Studies in Theatre

Directed studies course for graduate students in performance. Restricted to students in the M.F.A. program with specialization in Interdisciplinary Studies, or with permission of the Department of Creative Studies.

Vantage College*VANT: Vantage College***VANT 150 (3) Sustainability and Engineering Design**

Topics in sustainability, including the impact of technology on the environment and society, and fundamentals of engineering design. Restricted to students in the UBC Vantage College Engineering Stream. [1-0-2; 1-0-2]

VANT 151 (3) Multi-disciplinary Engineering Design Project

Design project that culminates in student-led project fair. Restricted to students in the UBC Vantage College Engineering Stream. [2-0-3]

Prerequisite: .

Visiting Graduate Research Students, College of Graduate Studies*VGRS: Visiting Graduate Students***VGRS 599 (0) Visiting Graduate Research Students**

Restricted to visiting graduate students.

Visual Arts, Faculty of Creative and Critical Studies*VISA: Visual Arts***VISA 090 (0) Safety Training**

Develops students' competence in using the tools in the woodshop and metalshop through demonstrations and the completion of a small project. This non-credit course is required in order to work in these facilities. Pass/Fail.

VISA 102 (3) Drawing and Two-Dimensional Art Practices I

This foundation course will introduce the principles, practices, and concepts central to drawing and two-dimensional art. Credit will be granted for only one of VISA 102, VISA 133, or VISA 135. [2-2-0]

VISA 103 (3) Drawing and Two-Dimensional Art Practices II

Continuation of VISA 102. Credit will be granted for only one of VISA 103, VISA 143, or VISA 145. [2-2-0]

Prerequisite: VISA 102.

VISA 104 (3) Three-Dimensional Art Practices I

This foundation course will introduce the materials, principles of form and space, and ideas in contemporary 3D art practices. Credit will be granted for only one of VISA 104 or VISA 136. [2-2-0]

VISA 105 (3) Three-Dimensional Art Practices II

Continuation of VISA 104. Credit will be granted for only one of VISA 105 or VISA 146. [2-2-0]

Prerequisite: VISA 104.

VISA 106 (3) Introduction to Digital Media I

Introduces digital media in contemporary art practice through photography, computer imaging, video, and other emerging digital technologies. [1-3-0]

VISA 108 (3) Introduction to Digital Media II

Expands on digital media in contemporary art practices through computer imaging, animation, and other emerging digital



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technologies. [1-3-0]
Prerequisite: VISA 106.

VISA 110 (3) Studies in Photography

Introduction to digital photography and its cultural context. Fundamental techniques of digital photography and principles of visual communication as applied to contemporary photography. [2-1-0]

VISA 137 (3) Introduction to Art I

Survey of art theory and practice for students with little or no previous art experience. A wide range of ideas, approaches, and media will be studied. [2-1-0]

VISA 206 (3) Sound Art

Introduction to the art of listening, acoustic communication, sound making, sound technology and interaction. The course covers the basic principles and properties of sound and its applications in digital media creation. [1-3-0]

Prerequisite: VISA 108.

VISA 215 (3) Painting I

Introduction to the materials and techniques of painting. Exploration of colour, surface, structure, and space. Students will be encouraged to search for personal imagery. Critical evaluation skills will be developed through individual and group critiques. [2-2-0]

Prerequisite: Either (a) all of VISA 102, VISA 103 or (b) VISA 145.

VISA 225 (3) Painting II

Continuation of VISA 215. [2-2-0]

Prerequisite: VISA 215.

VISA 233 (3) Printmaking: Screenprinting I

Examination of the various processes of screenprinting. Project-based course with considerable emphasis on technical development and skills acquisition. Focus will be on the synthesis of a student's personal imagery and the process of screenprinting. [2-2-0]

Prerequisite: Either (a) all of VISA 102, VISA 103 or (b) VISA 143.

VISA 235 (3) Sculpture I

For the student who wishes to specialize in sculpture. Students will examine three-dimensional space through a variety of projects and materials. [2-2-0]

Prerequisite: Either (a) all of VISA 104, VISA 105 or (b) VISA 146.

VISA 244 (3) Photography I

Introduction to the basics of photography and darkroom techniques through the use of the camera as an expressive, conceptual, and artistic tool. A 35mm SLR film camera and tripod are required.

Prerequisite: One of VISA 103, VISA 106, VISA 108.

VISA 245 (3) Sculpture II

For the student who wishes to specialize in sculpture. Students will work with the concepts of space and materials to create personal solutions to problems set by the instructor. [2-2-0]

Prerequisite: VISA 235.

VISA 253 (3) Printmaking: Screenprinting II

Provides opportunities for students to continue their exploration of the medium of screenprinting. More advanced processes will be introduced, with continued focus on the development of each student's personal imagery. [2-2-0]

Prerequisite: VISA 233.

VISA 254 (3) Introduction to Printmaking: Etching and Lithography

Introduction to drawing-based printmaking processes - line etching and stone lithography. Focus is on gaining familiarity with these processes and on personal imagery. Basic drawing skills are an asset. [2-2-0]

Prerequisite: Either (a) VISA 103 or (b) VISA 147 or permission of the instructor.

VISA 255 (3) Introduction to Printmaking: Linocut and Letter Press Printing

Introduction to the printmaking processes - relief printing and text-based letterpress printing. Focus is on gaining familiarity with these processes and on the development of personal imagery. Basic drawing skills are an asset. [2-2-0]

Prerequisite: One of VISA 103, VISA 147 or permission of the instructor.

VISA 256 (3) Photography II

A further refinement of photographic and darkroom processing skills emphasizing creative, conceptual, and experimental



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approaches. A 35mm SLR film camera and tripod are required. [2-2-0]

Prerequisite: VISA 244.

VISA 261 (3) Video I

Introduction to organizational, technical, creative, and critical skills required in video production. Provides experience in all stages of the production process, including pre-production, production, and post-production. Considers a variety of approaches to video, such as artist videos, music videos, and television productions. Credit will be granted for only one of VISA 261 or FILM 261. [2-2-0]

Prerequisite: One of VISA 106, VISA 108.

Equivalency: FILM 261.

VISA 266 (3) 2D Animation

Introduces core principles and techniques required for the creation of two-dimensional digital animation projects. [1-3-0]

Prerequisite: VISA 108.

VISA 268 (3) Strategies in Digital Art: Visual Communication

Concepts, principles, and techniques to design effective interfaces exploring areas of branding, information architecture and interaction design. [1-3-0]

Prerequisite: VISA 108.

VISA 269 (3) Strategies in Digital Art: Virtual Worlds

Critical understanding and research-creation of virtual environments employing non-linear storytelling, media aesthetics, modelling, animation, interaction design and coding using 3D modelling software. [1-3-0]

Prerequisite: VISA 108.

VISA 271 (3) Video II

Continuation of VISA 261. Further work on organizational, technical, creative, and critical skills required in video production. Provides experience in all stages of the production process, including pre-production, production, and post-production. Considers a variety of approaches to video, such as artist videos, music videos, and television productions. Credit will be granted for only one of VISA 271 or FILM 271. [2-2-0]

Prerequisite: One of VISA 261, FILM 261.

Equivalency: FILM 271.

VISA 282 (3) Drawing III

Core course in drawing. Various drawing approaches, material applications, and image manipulation practices are explored. [2-2-0]

Prerequisite: Either (a) all of VISA 102, VISA 103 or (b) VISA 143.

VISA 283 (3) Drawing IV

Continuation of VISA 282. Extended exploration of various drawing approaches, material applications, and image manipulation practices. [2-2-0]

Prerequisite: VISA 282.

VISA 290 (3/6) d Special Topics in Visual Art

For students in Visual Art and other Creative Studies programs who wish to work on a special topic not normally covered in other Visual Arts courses. Topics vary. Not offered every year. [2-2-0]

Prerequisite: Second-year standing in the B.F.A. program or permission of the department.

VISA 300 (3-12) d Advanced Practice in Drawing

To extend students' abilities in mark-making, image production, and expression of meaning through drawing. Emphasis on developing personal visual languages. [2-2-0]

Prerequisite: VISA 283.

VISA 312 (3-12) d Advanced Practice in Painting

Advanced studio course to increase the student's exploration and understanding of painting. [2-2-0]

Prerequisite: VISA 225.

VISA 322 (3-12) d Advanced Practice in Sculpture

Advanced studio course to explore contemporary practices in sculpture. [2-2-0]

Prerequisite: VISA 245.

VISA 336 (3-12) d Advanced Practice in Printmaking

Opportunity for students to continue their exploration of select media in printmaking (intaglio, relief, lithography, and



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screenprinting) within the context of contemporary art practice. Interdisciplinary crossover, evolving processes, and new materials will be encouraged. [2-2-0]

Prerequisite: One of VISA 253, VISA 254, VISA 255.

VISA 362 (3/12) d Advanced Practice in Photography

Advanced studio course in digital- and film-based photography. Emphasis on photography as an artistic tool. No more than 12 credits in total will be granted for VISA 362, CULT 310, or any combination thereof.

Prerequisite: VISA 256.

Equivalency: CULT 310.

VISA 382 (3/12) d Advanced Practice in Media Arts

Advanced interdisciplinary course addressing the importance of technology-based approaches in contemporary art with emphasis placed upon the formation of an idea and the media most appropriate to its expression. No more than 12 credits in total will be granted for VISA 382, CULT 311, or any combination thereof.

Prerequisite: One of VISA 206, VISA 266, VISA 268, VISA 269, VISA 271.

Equivalency: CULT 311.

VISA 400 (3-6) c Practicum

Students work and learn in certain off-campus, art-related positions to receive credit toward the B.F.A. degree. The department head, the program coordinator, and the course instructor will determine if the activity meets the criteria to qualify for credit. [0-0-6]

Prerequisite: Completion of two 300-level VISA courses in the area of the proposed practicum activity.

VISA 460 (3/6) d Special Topics in Visual Art

For senior students in Visual Art and other Creative Studies programs who wish to work on a special topic not normally covered in other Visual Arts courses. Topics vary. Not offered every year. [2-2-0]

Prerequisite: Third-year standing in the B.F.A. program or permission of the department.

VISA 482 (6) Advanced Art Practices I

Advanced studio course for fourth-year visual arts students. Students will propose and carry out an independent program of studio work in consultation with course directors and faculty advisors. Students will be intensively involved in artistic research and creation. Interdisciplinary activity will be encouraged. Self-directed readings, writing projects, individual and group critiques, and participation in a final exhibition will be required. Various professional practice topics will be covered. [2-4-0]

Prerequisite: 12 credits of 300-level studio courses, and a combined minimum grade average of 68% in ARTH 301 and another 3 credit 300- or 400-level ARTH course.

VISA 483 (6) Advanced Art Practices II

Continuation of VISA 482. As part of the course requirements, students must participate in a graduating exhibition. [2-4-0]

Prerequisite: VISA 482.

VISA 485 (3/6) d Directed Studies

Students will investigate a visual arts practice and complete a significant studio-based project.

Prerequisite: Third-year standing in the B.F.A. program and permission of department and supervising faculty.

VISA 520 (3) Special Topics in Visual Arts

Restricted to students in the M.F.A. program with specialization in Visual Arts, or with permission of the Department of Creative Studies.

VISA 530 (3) Directed Studies in Visual Arts

Restricted to students in the M.F.A. program with specialization in Visual Arts, or with permission of the Department of Creative Studies.

VISA 582 (3) Graduate Studio in Visual Arts I

A studio course for graduate students in Visual Arts. The production of independent artwork and the critical analysis of that work. Students may work in any artistic discipline. Restricted to students in the M.F.A. program with specialization in Visual Arts, or with permission of the Department of Creative Studies.

VISA 583 (3) Graduate Studio in Visual Arts II

The production of independent artwork and the critical analysis of that work. Students may work in any artistic discipline.

Prerequisite: VISA 582. Or permission of the Department of Creative Studies.

Visiting Undergraduate Research Students, Faculty of Applied Science



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VURS: Visiting Undergraduate Research Students**VURS 499 (0) Visiting Undergraduate Research Students**

World Literature, Faculty of Creative and Critical Studies

WRLD: World Literature

WRLD 100 (3) A World History of Horror

Introduction to the idea of horror across historical times, geographic regions, and genres, with an emphasis on the interdisciplinary methodologies and theories of World Literature. [3-0-0]

WRLD 150 (3) Introduction to Intercultural Communication

Current intercultural communication theories and their critiques. Key concepts are applied to popular culture texts from around the world, providing a context for practice with a variety of intercultural communication skills, development tools, and self-reflective writing techniques.

WRLD 151 (3) Introduction to Language and Culture: Mandarin Chinese

Basic introduction to modern spoken Mandarin Chinese, and key intercultural and sociolinguistic concepts from the cultures where Mandarin Chinese is spoken. Not available for students with a CEFR level (or equivalent) of A1 or higher.

WRLD 152 (3) Introduction to Language and Culture: Modern Korean

Basic introduction to modern spoken Korean, and key intercultural and sociolinguistic concepts from the cultures where Korean is spoken. Not available for students with a CEFR level (or equivalent) of A1 or higher.

WRLD 153 (3) Introduction to Language and Culture: French in Canada

Basic introduction to French spoken in Canada, and key intercultural and sociolinguistic concepts from the cultures where French is spoken. Not available for students with a CEFR level (or equivalent) of A1 or higher.

WRLD 154 (3) Introduction to Language and Culture: Modern Farsi (Iranian)

Basic introduction to modern spoken Iranian Farsi, and key Iranian intercultural and sociolinguistic concepts. Not available for students with a CEFR level (or equivalent) of A1 or higher.

WRLD 155 (3) Introduction to Language and Culture: Modern Maya

Basic introduction to modern spoken Yucatec Maya, and key Indigenous intercultural and sociolinguistic concepts. Not available for students with a CEFR level (or equivalent) of A1 or higher.

WRLD 156 (3) Introduction to Language and Culture: Modern Punjabi

Basic introduction to modern spoken Punjabi, and key intercultural and sociolinguistic concepts from the cultures where Punjabi is spoken. For beginners; not available for students with a CEFR level (or equivalent) of A1 or higher.

WRLD 157 (3) Introduction to Language and Culture: Modern Arabic

Basic introduction to modern spoken Arabic, and key intercultural and sociolinguistic concepts from the cultures where Arabic is spoken. For beginners; not available for students with a CEFR level (or equivalent) of A1 or higher.

WRLD 158 (3) Introduction to Language and Culture: Modern Japanese

Introduction to key intercultural and sociolinguistic concepts that affect social interaction in a Japanese-speaking environment, using basic spoken Japanese.

WRLD 200 (3) Introduction to World Literatures

A thematically organized introduction to world literatures, interconnecting a range of cultures and historical periods. Texts will be studied in English translations. [3-0-0]

Prerequisite: 3 credits of first year English

WRLD 240 (3) World Sacred Scriptures: The Hebrew Bible

Survey of the Hebrew Bible as a literary text, with special consideration of influence across cultures and historical contexts.

Prerequisite: 3 credits of first year English.

WRLD 304 (3) World Theatre and Cultural Performance

Explorations of world theatre and cultural performance traditions and practices from South, Southeast and East Asia; Oceania; Sub-Saharan Africa; the Middle East; and the Americas; includes Indigenous theatre. Credit will be granted for only one of THTR 304 or WRLD 304.

Prerequisite: Third-year standing.



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Equivalency: THTR 304.

WRLD 310 (3) Mythologies in Motion

Literary study of a selection of transcultural myths and their influence across time. [3-0-0]

Prerequisite: Third-year standing.

WRLD 313 (3/6) d Dramatic Literature in Performance

Explores the performance of dramatic literature through a combination of interactive lectures and acting/directing training for a selected dramatic repertoire. Rehearsals outside class time required. Culminates in a public presentation. With different topics, the course can be taken more than once for credit. Credit will be granted for no more than a total of 6-credits of THTR 313 and WRLD 313.

Prerequisite: Third-year standing.

Equivalency: THTR 313.

WRLD 330 (3) War in Literature

An intercultural exploration of the literary representation of war in various textual forms.

Prerequisite: Third-year standing.

WRLD 331 (3) 'Best' International Feature Films

An intercultural exploration of films that have been included in the American Academy Award for Best International Feature Film Category

Prerequisite: Third-year standing.

WRLD 332 (3) Nobel Prize Literature

An intercultural and interdisciplinary exploration of literary texts by authors who have won the Nobel Prize for Literature.

Prerequisite: Third-year standing.

WRLD 340 (3) Tales of Resistance: Indigenous Voices in Central America

Indigenous literature (including oral traditions, myths, legends, stories, songs testimonial narratives) from Indigenous nations in Southern Mexico and Guatemala. Students may be evaluated in Spanish with instructor's permission. Available for credit towards a Minor in Spanish only for students evaluated in Spanish.

Prerequisite: Third-year standing.

WRLD 351 (3) Mediterranean World in Cinema and Literature

Changing depictions of the ancient Mediterranean world in media, such as novels, plays, paintings, movies, and television series. Credit will not be granted for both WRLD 351 and WRLD 399f.

Prerequisite: Third-year standing.

WRLD 353 (3) Ancient Mediterranean Science and Technology

Significant contributions to science and technology made by civilizations of the ancient Near East, Egypt, Greece, and Rome. Development of critical thinking skills through analysis of ancient texts, artefacts, and monuments in their social and historical context. Credit will not be granted for both WRLD 353 and WRLD 399h.

Prerequisite: Third-year standing.

WRLD 354 (3) Greek and Latin Scientific Terminology

Study of vocabulary of technical terms derived from Greek and Latin terminology in scientific disciplines.

Prerequisite: Third-year standing.

WRLD 360 (3) Literature and Power

Explores the intersections of literature and power, featuring poems, short stories, and novels from nations as geographically, politically, and ethnically diverse as Iran, North Korea, Cuba, Italy, and Great Britain. [3-0-0]

Prerequisite: Third-year standing.

WRLD 370 (3) Story and Image Across the Islamic World

Selections from the arts of the book across the Islamic world (8th to 19th C) showing how literature inspired painters and calligraphers to weave together word and image. Digital art historical approaches will normally be used, though no computing experience is required. Credit will be granted for only one of ARTH 370, DIHU 370, or WRLD 370.

Prerequisite: Third-year standing.

Equivalency: ARTH 370, DIHU 370.

WRLD 375 (3) Encountering India: The Age of the Mughals

An examination of interrelated arts, visual cultures and texts in South Asia (15th to 19th C) within their historical and cultural contexts. Topics include the rise of the multicultural Mughal Empire, the roles of Hinduism, Islam, and Sikhism, and encounters



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with Renaissance and Colonial Europe. Digital art historical approaches will normally be used, though no computing experience is required. Credit will be granted for only one of ARTH 375, DIHU 375, or WRLD 375.

Prerequisite: Third-year standing.

Equivalency: ARTH 375, DIHU 375.

WRLD 382 (3) Cross-cultural Travel Narratives

Experiential learning course combining introduction to intercultural communication theory and the literary study of cross-cultural migration narratives.

Prerequisite: Third-year standing.

WRLD 388 (3) Modern Memoirs and History: China, Japan, and Korea

Comparative exploration of life-history memoirs and films from East Asia, with a focus on relationships between modern history, public and personal memory, daily life, and the literary construction of individual voice. Credit will not be granted for both WRLD 388 and WRLD 399b.

Prerequisite: Third-year standing.

WRLD 399 (3/9) d Special Topics in World Literatures

Trans-cultural or cross-regional topics, with a focus on a specific genre and/or historical period. With different topics this course may be taken more than once for credit.

Prerequisite: Third-year standing.

WRLD 403 (3) Global Surrealism

The development of Surrealism from its roots in 20th-century French thought to its global proliferation in film, literature, visual culture and contemporary theories. Credit will be granted for only one of ARTH 403 or WRLD 403.

Prerequisite: Third-year standing.

Equivalency: ARTH 403.

WRLD 428 (3) Anti-Semitism: Then and Now

Roots, developments and transformations of anti-Semitism in literature, and culture.

Prerequisite: Third-year standing.

WRLD 480 (3) Modern Japanese Literature and the Invention of Japaneseness

The modern Japanese literary canon (in translation) and its relationship to Japanese nationalism. Credit will be granted for only one of WRLD 480, WRLD 399A, JPST 364.

Prerequisite: Third-year standing.

WRLD 482 (3) Voices from the Margins: Minority Writing from Japan

Literary representations of Japanese national identity via an analysis of writing by minority and Indigenous authors from Japan, in English/translation. Credit will be granted for only one of WRLD 399E and WRLD 482.

Prerequisite: Third-year standing.

WRLD 497 (3) Community Service Learning

Experiential learning course where volunteer work in a local, regional, or international community organization is combined with guided critical self-reflective writing, critical reading and discussion of related social issues, and the analysis of intercultural and/or interpersonal communication. Consult instructor for a list of the current projects.

Prerequisite: Third-year standing.

WRLD 498 (3) Work-Integrated Learning

Experiential learning course where intercultural communication and other related professional skills are practiced via a practicum or period of volunteer work in a local, regional, or international workplace. Consult instructor for list of current projects.

Prerequisite: Third-year standing

WRLD 499 (3/6) d Project-Based Learning

Experiential learning course where students plan their own individual or small-group projects in world literatures and/or intercultural communication. This course may be taken more than once with different projects, or once for six credits for a larger project.

Prerequisite: Third-year standing and a 75% average across a minimum of 6 credits of upper-level WRLD courses. Permission of instructor is required. See WRLD website for application materials.