Kinesiology KNES

Instruction offered by members of the Faculty of Kinesiology.

Students should also see course listings under the headings Dance Education, Dance Education Activity/Theory, Outdoor Pursuits, Outdoor Pursuits Activity/Theory, Physical Education, and Physical Education Activity/Theory.

Junior Courses

Kinesiology 201 **H(1-3)**

Activity: Essence and Experience

Experience in various activities and movement patterns and the study of the fundamental factors that influence the activities we choose and the way we move.

Kinesiology 203 **H(1-3)**

Activity: Health and Performance

A variety of activities to experience the short-term benefits of exercise.

Note: Students are responsible for completing Par-Q Activity Readiness questionnaire, and medical clearance if required

Kinesiology 211 **H(2-1)**

Leadership and Communication

The study and application of knowledge, skills, and abilities which contribute to effective leadership and communication in kinesiology.

Kinesiology 213 **H(2-1)**

Communication: The Analytical Process

An introduction to communication in kinesiology using the critical thinking process, including basic statistical knowledge. Practical application of concepts through direct involvement in individual and group projects.

Prerequisite or Corequisite: Kinesiology 211.

Kinesiology 233 **H(3-0)**

Introduction to Sport Management

Application of management theory to sport organizations, including an overview of sport manager functions such as marketing, budgeting, planning, evaluating, and the management of human resources, events, facilities, and risk.

Kinesiology 237 **H(3-0)**

Introduction to Nutrition

Provides students with a basic understanding of the role of nutrition in health and fitness.

Prerequisite: Biology 231.

Kinesiology 243 **H(2-1)**

History of Movement Culture

A historical examination of physical and movement culture, with an emphasis on sport, from ancient to modern times.

Note: Credit for both Kinesiology 243 and 240 will not be allowed.

Kinesiology 245 **H(2-1)**

Socio-Cultural Perspectives in Sport

An examination of current methodologies in the study of cultural meanings of sport, leisure, and physical education.

Note: Credit for both Kinesiology 245 and 240 will not be allowed.

Kinesiology 251 **H(3-0)**

Mind Sciences I

An introduction to neural and cognitive concepts underlying human behaviour in physical activity and health.

Note: Credit for both Kinesiology 251 and 250 will not be allowed.

Kinesiology 253 **H(3-0)**

Mind Sciences II

An introduction to the psycho-social concepts underlying an understanding of human behaviour in physical activity, sport, and health.

Note: Credit for both Kinesiology 253 and 250 will not be allowed.

Kinesiology 261 **H(3-2)**

Human Anatomy

Systemic human anatomy. A study of the following anatomical systems and their structural inter-relationships: skeletal, arthrodial, muscular, circulatory, digestive, respiratory, urogenital, neural.

Kinesiology 263 **H(3-1T)**

Biomechanics I

Muscular and mechanical analysis of human movement.

Prerequisite: Kinesiology 261.

Kinesiology 291 **Q(1-1)**

Research Seminar I

Students attend, discuss, and critique a series of research seminars in the Human Performance Laboratory.

Kinesiology 293 **Q(1-1)**

Research Seminar II

Students attend, discuss, and critique a series of research seminars in the Human Performance Laboratory.

Senior Courses

Kinesiology 303 **H(3-0)**

Special Topics in Kinesiology

MAY BE REPEATED FOR CREDIT

Kinesiology 321 **H(3-0)**

Foundations of Pedagogy

The fundamental principles of creating an effective learning environment in the school physical education setting (ECS to Grade 12).

Note: Open to Pedagogy Majors only.

Kinesiology 330 **H(2-2)**

Flexibility and Relaxation Techniques

Study of joint flexibility, relaxation techniques, and stress management and their importance to physical fitness, human performance, wellness, and health.

Prerequisite: Kinesiology 261 (or Zoology 269 for students in Nursing).

Kinesiology 331 **H(3-0)**

Foundations of Coaching

The fundamental principles of creating an effective training environment for the developing athlete.

Kinesiology 351 **H(3-0)**

Cognition and Learning in Human Movement

An examination of cognitive science and its contribution to understanding human movement. The emphasis will be placed on enhancing learning and performance in physical activity and sport.

Prerequisites: Kinesiology 251 and 253 or 250.

Kinesiology 353 **H(3-0)**

Neural Basis of Human Movement

The study of the structure and function of the central and peripheral nervous systems in the control of human movement.

Prerequisites: Kinesiology 251 and 253 or 250.

Kinesiology 355 **H(3-0)**

Human Growth and Development

The physiological, anatomical, emotional and social changes in human growth and development, with a view to the planning and selection of appropriate programs in physical education, sport, and dance.

Prerequisite: Kinesiology 261.

Prerequisite or Corequisite: Zoology 363.

Kinesiology 363 **H(3-0)**

Biomechanics II

Quantitative techniques in the analysis of human motion.

Prerequisites: Mathematics 30 or equivalent and Kinesiology 263.

Kinesiology 367 **H (2-1T-1)**
(formerly Kinesiology 267)

Adapted Physical Activities

An examination of specific problems within the psychomotor domain and the related delivery systems for their identification and amelioration.

Prerequisite: Kinesiology 261.

Kinesiology 369 **H(3-0)**

Physical Activity, Health, and Aging

Aging and its impact on neuromotor performance, fitness, health, and patterns of participation in physical activity and recreational pursuits.

Prerequisite: Kinesiology 355

Kinesiology 371 **H(3-2)**

Scientific Basis of Prevention and Care of Athletic Injuries

Responsibilities of physical educators with respect to their role in the prevention and care of athletic injuries.

Prerequisite: Kinesiology 261.

Kinesiology 375 **H(2-2/2)**

Tests and Measurements in Kinesiology

Establishment of tests, criteria for selection of tests, measurement devices used to evaluate physiological status, human growth, and skill levels in physical activity programs.

Prerequisite: Kinesiology 213.

Note: Students are responsible for completing Par-Q Activity Readiness questionnaire, and medical clearance if required.

Kinesiology 381 **H(2-2)**

Computer Applications in Kinesiology

An introduction to the use of the computer in kinesiology which involves hands-on experiences with selected software packages.

Kinesiology 391 **H(1-3)**

Practicum I

Practical experiences with children and youth in instructional programs of physical activity.

Prerequisite: Kinesiology 321.

Note: Open to Pedagogy Majors only. Students must consult with the Pedagogy Coordinator in order to obtain required documentation to comply with the legal requirements for placement in schools.

NOT INCLUDED IN GPA

Kinesiology 393 **H(0-4)**

Introductory Practicum

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Kinesiology 397 **H(3-0)**

Health and Exercise Psychology

An examination of psychological issues related to health, exercise, and physical activity.

Prerequisites: Kinesiology 251 and 253 or 250.

Kinesiology 399 **H(3-0)**

Sport Psychology

An analysis of personality and social psychological variables affecting the athlete/coach in the context of sport.

Prerequisites: Kinesiology 251 and 253 or 250.

Kinesiology 415 **H(3-0)**

Football Coaching Theory

Prerequisite: Consent of the Faculty.

Kinesiology 425 **H(3-0)**

Swimming Coaching Theory

Prerequisite: Consent of the Faculty.

Note: Students should have some competence in advanced swimming strokes.

Kinesiology 433 **H(3-0)**

Health Physiology

Exploration of the health benefits and the risk factor concept associated with physical activity and cardiovascular fitness with reference to chronic medical conditions, stress, and well being. Each student will be required to complete the following: a blood lipids profile, a three-day nutritional analysis, and a health appraisal.

Prerequisites: Zoology 361 and 363.

Kinesiology 435 **H(3-0)**

Volleyball Coaching Theory

Prerequisite: Physical Education Activity/Theory 319.

Kinesiology 455 **H(2-2T-1)**

International Perspectives in Sport Sociology

Social function or dysfunction of sport and physical education in global society.

Prerequisite: Kinesiology 240, or 243 and 245.

Note: Students may incur additional costs to complete assignments in this course (e.g., access to camcorder and editing equipment).

Kinesiology 463 **H(3-0)**

Biomechanical Analysis of Human Motion

An examination of advanced techniques used in biomechanical analysis.

Prerequisite: Kinesiology 363.

Kinesiology 465 **H(3-2/2)**
(formerly Outdoor Pursuits 473)

Adaptation to Environmental Stress

Physiological effects of temperature and humidity fluctuations; principles of heat generation, conservation and transfer; acute and chronic effects of hypo and hyperbarometric pressures; special dietary considerations; and associated physio-psychological implications will be examined.

Prerequisite or Corequisite: Zoology 363.

Kinesiology 466 **F(0-6)**

Biomechanics Research Project

A capstone course where students assimilate their knowledge by designing and conducting a biomechanics research project.

Prerequisites: Kinesiology 291, 293, 363 and half-course Statistics.

Prerequisite or Corequisite: Kinesiology 463.

Kinesiology 469 **H(3S-0)**

Topics in Sport Medicine

An examination of current medical topics in sport medicine as they relate to the athlete. The topics will include common medical problems and drugs in sport.

Prerequisites: Kinesiology 371, Zoology 361 and 363.

Kinesiology 473 **H(3-2)**

Exercise Physiology

The physiology of muscular exercise, physical conditioning, and training. The course will cover aspects of the nervous, muscular, cardiovascular, and respiratory systems and also present the material in the context of the effects of exercise on an integrated system. Short and long term adaptations to exercise will be examined relative to health and human activity.

Prerequisites: Kinesiology 203 and 213, Zoology 361 and 363, and admission to Kinesiology.

Kinesiology 475 **H(3-0)**

Physiology of Athletic Performance

The physiological factors and principles of training affecting performance will be reviewed and challenged on the scientific basis of experimental evidence.

Prerequisite: Kinesiology 473.

Prerequisite or Corequisite: Biochemistry 341 (or Chemistry 351/353).

Kinesiology 477 **H(3-2)**

Principles and Practices of Fitness Leadership

Principles and practices of fitness leadership and fitness delivery systems; testing, counselling, motivation, and exercise prescription considerations; practice in leading fitness classes.

Prerequisites: Kinesiology 203 and third year standing.

Corequisite: Kinesiology 473.

Kinesiology 481 **H(3-0)**

Foundations of Recreational Services

A study of the philosophy, principles, history and practice of recreation related to human and community needs. Emphasis on the theoretical foundations of recreational service with a cursory survey of organized recreation practices.

Kinesiology 483 **H(3-0)**

Practices and Principles of Recreational Services

A study of the practices of community recreational services. Emphasis on the study of the practices of organized recreational service with a cursory survey of the principles of recreational services.

Kinesiology 485 **H(3-0)**

Skeletal Muscle Properties

The structural organization, neural control, contractile consequences, and determinants of energy cost of contraction of skeletal muscle will be studied in detail.

Prerequisite: Kinesiology 473.

Kinesiology 487 **H(3-0)**

The Olympic Games

A critical analysis of the modern Olympic Games.

Kinesiology 490 **F(3-0)**

Interpretation of Research and Research Project

Prerequisites: One half course in Statistics and consent of the Faculty.

Note: Open to Kinesiology Honours students only.

Kinesiology 491 **H(1-3)**

Practicum II

Additional practical experiences with children and youth in instructional programs of physical activity.

Prerequisite: Kinesiology 391.

Note: Open to Pedagogy Majors only. Students must consult with the Pedagogy Coordinator in order to obtain required documentation to comply with the legal requirements for placement in schools.

NOT INCLUDED IN GPA

Kinesiology 493 **H(3-0)**

Physiology of Health and Physical Activity

The quality and extent of research supporting the relationships between health, disease, regular physical activity, and fitness.

Prerequisite: Kinesiology 473.

Kinesiology 495 **H(3-0)**

Physiological Aspects of Aging, Disease, and Physical Activity

An examination of the interaction between aging, age-associated disease (e.g., cardiovascular disease) and physical activity. The major emphasis will be on the physiological processes involved.

Prerequisites: Kinesiology 355 and 473.

Kinesiology 497 **H(3-0)**

Canadian Sport History

The sources and development of sporting activity in Canadian society.

Kinesiology 503 **H(3-0)**

Special Topics in Kinesiology

An examination of selected special topics in kinesiology and related subjects.

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Kinesiology 569 **H(3-1)**

Rehabilitation Through Recreational Activities

Issues of planning and implementing recreation, health, and wellness programs for persons with disability including advocacy, planning principles, creativity, learning techniques, and teamwork.

Prerequisite: Admission to the BCR program or Kinesiology 367.

Kinesiology 591 **H(0-4)**

Practicum

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Kinesiology 593 **H(0-4)**

Senior Practicum

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Graduate Courses

Kinesiology 601 **H(3S-0)**

Graduate Seminar

Seminar discussion and critique on current research in human physical activity and related subjects.

Prerequisite: Consent of the Faculty.

Kinesiology 603 **H(3-0)**

Special Topics

Intensive study of selected topics in human physical activity and related subjects.

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Kinesiology 605 **H(4T-8)**

Practicum

Prerequisite: Consent of the Faculty.

Note: Open to Exercise and Functional Fitness students only. If this choice is made, the student must select another approved graduate level half-course option.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Kinesiology 607 **H(0-3T)**

Project

Students will identify, address, and resolve problems relating to their specialty. The project will be completed under the direction of a supervisor. A final report in a format appropriate to the nature of the project will be required.

Prerequisite: Consent of the Faculty.

Kinesiology 611 **H(3-1)**

Research Methods and Design in Sport and Fitness

The research process including study design; data collection, analysis and interpretation; and critical assessment from the literature in the field of coaching and exercise science.

Prerequisite: Consent of the Faculty.

Kinesiology 637 **H(3-0)**

Nutrition for Physically Active Populations

The nutritional requirements of specific athletic and/or physically active groups such as cardiac rehabilitation patients and child athletes.

Prerequisite: Consent of the Faculty.

Kinesiology 643 **H(3S-0)**

Selected Topics in Sport and Fitness Management

An examination of the managerial role in selected sport and fitness situations.

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Kinesiology 651 **H(3S-0)**

Cognitive Science: Vision and Motor Behaviour

An exploration of research in cognitive science, vision, and eye movement as these areas relate to motor learning and performance with particular attention to the development of motor expertise, in both normal and atypical populations.

Prerequisite: Kinesiology 251 and 253 or 250 or equivalent.

Kinesiology 653 **H(3-0)**

Special Topics in Neuromotor Psychology

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Kinesiology 655 **H(2-2)**

Kinanthropometry

The quantitative study of size, shape, proportion, composition, and maturation of the human body in relation to gross motor function in sport, physical activity, and the work place.

Prerequisite: Kinesiology 355 or consent of the Faculty.

Kinesiology 661 **H(3-0)**

Special Topics in Biomechanics

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Kinesiology 663 **H(3-0)**
(Mechanical Engineering 663)
(Medical Science 663)

Advanced Biomechanics

Theoretical and applied aspects of biomechanics in the acquisition and performance of sport skills.

Prerequisite: Consent of the Faculty.

Kinesiology 669 **H(3-0)**

Special Topics in Sport Medicine

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Kinesiology 673 **H(3-3)**

Exercise Physiology

Topics in exercise physiology will include the effects of exercise on muscle, metabolism, hormones, respiration, and the cardiovascular system. Nutrition, body composition, ergogenic aids, and environmental factors will also be examined.

Prerequisite: Kinesiology 473 or consent of the Faculty.

Kinesiology 675 **H(3-0)**

Special Topics in Exercise Physiology

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Kinesiology 685 **H(3-3)**
(Mechanical Engineering 685)
(Medical Science 685)

Biomechanics of Human Movement

Introduction to the measuring methods (accelerometry, goniometry, film and film analysis, video systems) of biomechanical analysis of human movement (force and force distribution). Description of the mechanical properties of bone, tendon, ligaments, cartilage, muscles and soft tissues. The relation between structure and function of biomaterials. Introduction to descriptive analysis of human movement.

Prerequisite: Consent of the Faculty.

Kinesiology 687 **H(3-3)**
(Medical Science 687)

Biomechanical Modelling

Mechanics of a particle, a system of particles, a rigid body and of systems of rigid bodies as applied to human movement. Modelling of the human body in specific cases with emphasis on advantages and disadvantages of different approaches. Application of models in research projects.

Prerequisite: Consent of the Faculty.

Kinesiology 690 **F(4T-8)**

Practicum

The practicum will normally be either an intensive coaching leadership experience under the mentorship of a master coach or an appropriate experience in a functional fitness environment. The practicum shall recognize each student's needs and interests.

Prerequisite: Consent of the Faculty.

NOT INCLUDED IN GPA

Kinesiology 695 **H(3-0)**

Special Topics in Sport and Exercise Psychology

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Kinesiology 697 **H(3S-0)**

Health and Exercise Psychology

An examination of applied psychological theories, research, and practices in promoting exercise adherence and in the development of optimal health through physical fitness.

Prerequisite: Consent of the Faculty.

Kinesiology 699 **H(3S-0)**

Applied Sport Psychology I

The examination and practice of mental training theory and skills in maximizing athletic performance.

Prerequisite: Consent of the Faculty.

Kinesiology 751 **H(3T-0)**

Directed Study in Neuro-Motor Psychology

Individual study in a tutorial setting. An individual course is set for each student based on a mutually agreed upon topic. Students are required to read extensively in a specialist area of their choice.

Prerequisite: Kinesiology 651.

Kinesiology 773 **H(3-3)**

Applied Exercise Physiology

Training effects on selected physiological systems.

Prerequisite: Kinesiology 673.

Kinesiology 775 **H(3-3)**

Testing, Interpretation, and Prescription of Exercise

The development of expertise in laboratory and field exercise testing and the interpretation of physiological and biochemical data for exercise prescription.

Prerequisite: Kinesiology 773.

Kinesiology 777 **H(3-0)**

Physiology of Skeletal Muscle

An in-depth study of the structural and contractile properties of skeletal muscle.

Note: Credit for both Kinesiology 777 and 675.85 will not be allowed.

Kinesiology 799 **H(3S-0)**

Applied Sport Psychology II

An examination of further selected topics in applying psychological technique to athletic performance.

Prerequisite: Kinesiology 699.

Latin LATI

Instruction offered by members of the Department of Greek and Roman Studies in the Faculty of Humanities.

Department Head – P. Toohey

Note: For courses in Latin Literature in translation, Roman History, Art, Archaeology, etc., see Greek and Roman Studies (GRST).

Note on Sequence and Prerequisites: The normal sequence is Latin 201, 203, 301, 303, 401 and/or 413, 525. Enrollment in any higher level Latin course requires a grade of at least "C-" in the prerequisite course(s), or consent of the Department. Latin 205, 207 are alternatives to Latin 201, 203, and are designed primarily for Science and Engineering students. Latin 333, 433, 453, 551 are supplementary courses.

Junior Courses

Latin 201 **H(3-2T)**

Latin I

This course for beginners provides the first steps towards reading Latin texts.

Latin 203 **H(3-2T)**

Latin II

Continuation of Latin 201.

Prerequisite: Latin 201 or 205 or consent of the Department.

Latin 205 **H(4-0)**

The Latin of Science I

An introduction to Latin through ancient, medieval and modern scientific texts, designed for students in the Sciences and Engineering.

Note: Credit for both Latin 205 and 201 will not be allowed.

Latin 207 **H(4-0)**

The Latin of Science II

Prerequisite: Latin 205 or 201.

Note: Credit for both Latin 207 and 203 will not be allowed.

Senior Courses

Latin 301 **H(3-1T)**

Latin III

Completes the study of basic grammar, vocabulary and translation skills.

Prerequisite: Latin 203 or 207 or consent of the Department.

Latin 303 **H(3-0)**

Intermediate Readings in Classical and Post-Classical Texts

Prerequisite: Latin 301 or consent of the Department.

Latin 333 **Q(0-2T)**

Second-Year Supplementary Study

Supplementary work in language and translation skills.

Prerequisite or Corequisite: Latin 303.

Latin 401 **H(3-0)**

Third-Year Readings I

Readings will normally be selected from classical texts.

Prerequisite: Latin 303 or consent of the Department.

Latin 413 **H(3-0)**

Third-Year Readings II

Readings will normally be selected from Patristic and Medieval texts.

Prerequisite: Latin 303 or consent of the Department.

Latin 433 **Q(0-2T)**

Third-Year Supplementary Study I

Prerequisite or Corequisite: Latin 401 or 413.

Latin 453 **Q(0-2T)**

Third-Year Supplementary Study II

Prerequisite or Corequisite: Latin 401 or 413.

Latin 525 **H(3S-0)**

Topics in Latin Literature and Language

Prerequisite: Latin 401 or 413.

MAY BE REPEATED FOR CREDIT

Latin 551 **H(0-2T)**

Directed Studies in Latin Literature and Language

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Graduate Course

Latin 601 **H(3S-0)**

Graduate Seminar

MAY BE REPEATED FOR CREDIT

Latin American Studies LAST

A collaborative offering of the Faculties of Communication and Culture, Humanities and Social Sciences. For information contact the Program Director or 220-6343.

Additional interdisciplinary courses are offered under the course headings African Studies, Canadian Studies, Central and East European Studies, Communications Studies, Development Studies, East Asian Studies, General Studies, Law and Society, Leisure, Tourism and Society, Museum and Heritage Studies, Northern Planning and Development Studies, Science, Technology and Society, South Asian Studies, Urban Studies, and Women's Studies.

Junior Courses

Latin American Studies 201 **H(3-0)**

Introduction to Cultural and Historical Roots of Latin America

An interdisciplinary survey of important themes providing a background for understanding Latin America, the physical landscape, prehistory, Iberian influence, and historical development to independence.

Latin American Studies 203 **H(3-0)**

Introduction to Contemporary Latin America

An interdisciplinary survey of important themes for understanding contemporary Latin America. Indigenous cultures, contemporary cultures and societies, political trends, modern history, demography and settlement patterns, natural resources and economic development and literature.

Senior Courses

Latin American Studies 301 **H(0-3)**

Field Study in Latin America

An experiential learning course, designed to provide a framework for the student's empirical learning experience during the Latin American Studies Field School. Provides a forum for the sharing of cross-cultural experiences among the students, as they analyze and reflect on the realities of life in Latin America. Students will be expected to live with a local family during the Field School, to take an active part in discussions, and to participate in events and field trips.

Note: Normally offered during the Spring or Summer Sessions.

NOT INCLUDED IN GPA

Latin American Studies 303 **H(3-0)**

Latin American Field Research

In a Latin American field setting, this course guides students in integrating their own observations and experiences with scholarly readings on themes of relevance and importance to the particular setting. Attention is paid to the archaeological and historical contexts as well as present day economic, political, and social issues of Latin America. The regional and theoretical focus of the material will vary according to the location at which the course is given.

Note: Normally offered during the Spring or Summer Sessions.

Latin American Studies 401 **H(3S-0)**

Integrative Seminar in Latin American Studies

An advanced seminar involving research on a special Latin American topic integrating a variety of disciplinary and interdisciplinary perspectives (eg. political science, anthropology, geography, cultural studies).

Prerequisites: Latin American Studies 201, 203 and third year standing or consent of the Associate Dean (Student Affairs and Curriculum).

Note: May not be offered every year. May be taken as a reading course if an instructor is available.

Latin American Studies 501 **H(3-0)**

Directed Study in Latin American Studies

Students devise a research question and carry out a program of independent research with a specialist on a topic in the area of Latin American Studies.

Prerequisites: Third year standing and consent of the Director.

MAY BE REPEATED FOR CREDIT

Law LAW

Instruction offered by members of the Faculty of Law.

First Year Curriculum

All courses are compulsory.

Law 400 **F(3-0)(5 credits)**

Constitutional Law

The basic elements of Canadian constitutional law. The nature of constitutions and constitutional processes; principles of constitutional interpretation; constitutional amendment; Federal-Provincial distribution of legislative powers including the federal general power, natural resources and public property, provincial property and civil rights, trade and commerce, provincial taxation, transportation, communications, and criminal law; the Canadian Charter of Rights and Freedoms including principles of limitation, remedies, interpretation, application, fundamental freedoms, democratic and language rights, mobility rights, legal rights, equality rights, and aboriginal people's rights.

Law 401 **H(2-0)(2 credits)**

Legal Perspectives

An introduction to legal and judicial reasoning. An examination of various legal theories including natural law, positivist, Realist, liberal, feminist and other legal perspectives.

Law 402 **F(3-0)(5 credits)**

Contracts

A legal and policy analysis of the basic principles and fundamental concepts of the law of contracts as they relate to commercial and consumer transactions. The formation of contracts including offer and acceptance, and consideration; estoppel; privity; terms of contract, including exemption clauses; standard form contracts; bailment; mistake, misrepresentation and unconscionability; termination, including the doctrine of frustration; breach and remedies for breach; dispute resolution processes. Emphasis is placed not only on a knowledge of rules and principles, their historical derivation, rationale, efficacy and social validity, but also upon their creative use to both avoid and resolve disputes.

Law 403 **H(3-0)(3 credits)**

Legislation, Administration and Policy

The fundamentals of the legislative process: policy development, legislative drafting, public bill process, statutory interpretation. The interaction of law and policy in the development of legislation, statutory interpretation and the work of administrative tribunals. The fundamentals of the administrative process: subordinate legislation; administrative institutions, forms of dispute resolution, delegation, discretion, process and judicial review. Substantive law connections are made with other first year courses. The functions of the lawyer within these processes are examined, including issues of professional responsibility. Emphasis is placed on skill development in oral advocacy and drafting both legislation and private law documents.

Law 404 **F(3-0)(5 credits)**

Property

An examination of the fundamental concepts of property law and the types of property interests recognized by Anglo-Canadian law. The historical evolution of property concepts; the basic concepts of possession, ownership and title; estates and other interests in land such as joint and concurrent ownership, easements, covenants, licences, mortgages, future interests and perpetuities; the landlord and tenant relationship; the land titles system of registration of title to land; the social constraints upon property use and disposition; and property rights of aboriginal peoples.

Law 405 **H(3-2T)(3 credits)**

Legal Communication and Research

A series of classes, tutorials and exercises designed to introduce students to the basic forms of legal communication and research in Canada. Introduction to and practice with specific forms of legal communication, including the case comment, the memorandum of fact and law, and oral advocacy. Introduction to and practice with legal bibliography and legal research, concentrating on the use of Canadian materials, including computer databases.

Note: This course is graded CR, D, or F.

Law 406 **F(3-0)(5 credits)**

Torts

An analysis and critique of the law of torts, primarily the law of negligence, with personal injury as the main focus, although other torts will also be introduced. The nature of tort law and its process; an anatomy of the law of negligence - the nature and extent of liability, defences, remedies, and the assessment of damages; intentional torts; economic torts; strict liability; bailment; the impact of private insurance on the tort system; alternative forms of compensation.

Law 410 **F(2-0)(4 credits)**

Crime: Law and Procedure

An anatomy of criminal conduct and the law's treatment of it utilizing a limited range of criminal offences. The designation of human conduct as criminal and a consideration of the social, cultural and political forces involved; the development of the criminal process in English common law, its translation to Canada and embodiment in the Criminal Code; the substantive elements of a criminal offence including both the physical and mental elements; the common law and code defences; procedural, tactical, ethical and evidential problems associated with criminal prosecution at both the pre-trial and trial stages; the sentencing process; the position at law of the victim.

Second Year Curriculum

Full-time students are required to select a pattern of subjects from 500- and 600-level courses which together with Law 500, Law 501 and Law 503

amount to no more than 32 credits for the year and no less than 29 credits. The total for each session shall not exceed 17 credits, nor be less than 14 credits. In certain circumstances the credit maximums may be exceeded with permission of the Associate Dean. Part-time students in the second year of the LLB program are required to select a pattern of subjects which together with Law 500, Law 501 and Law 503 amount to no more than 32 credits for the second year of the LLB program and no less than 29 credits. The total for part-time students for each session shall not be less than 7 credits.

Third Year Curriculum

Full-time students are required to select a pattern of subjects from 500- and 600- level courses which together with Law 607, Law 629 and Law 639 amount to no more than 32 credits for the year and no less than 29 credits. The total for each session shall not exceed 17 credits nor be less than 14 credits. In certain circumstances the credit maximums may be exceeded with the permission of the Associate Dean. Part-time students in the third year of the LLB program are required to select a pattern of subjects which together with Law 607, Law 629 and Law 639 amount to no more than 32 credits for the third year of the LLB program and no less than 29 credits. The total for part-time students for each session shall not be less than 7 credits. Part-time students shall take Law 607, Law 629 and Law 639 in the final year of their part-time legal studies program.

Law 500 **F(3-0)(5 credits)**

Civil Evidence and Procedure

An examination of the process whereby private claims are prepared, brought to court and tried. Consideration is given to the laws, rules and practices according to which a claim is handled from the moment of initial client contact until the conclusion of the trial. The rationale of the adversary trial as an official method of dispute resolution is examined. Finally, a theoretical introduction to the laws of evidence is coupled with an analysis of the major principles of rules of evidence applicable in civil trials. Emphasis is laid on the development of skills in the drafting of pleadings, the negotiation and settlement of claims and the use of the rules of evidence.

Law 501 **H(2-1)(3 credits)**

Interviewing, Negotiation and Counselling

The development of interpersonal skills and sensitivity essential to legal practice in all its forms. Emphasis is laid on skill in interpersonal communication, both verbal and non-verbal; on eliciting and evaluating information from clients; on short-term crisis counselling; on appropriate referral of clients to counselling or community resources for long-term counselling; and on an appreciation of the utility and dynamics of negotiation. The development of skills is tested and evaluated by simulated exercises using a variety of substantive and functional contexts.

Note: This course is graded CR, D or F.

Law 503 **H(3-0)(3 credits)**

The Administrative Process

An examination of the nature and development of the Canadian administrative process, including the making of the rules and regulations; policy directives and other internal government controls; and judicial review of decisions and rules of public authorities including procedural fairness, review of scope and correctness of decisions, remedies, and implications of the Canadian Charter of Rights and Freedoms.

Law 509 **H(4-0)(4 credits)**

Business Associations

An introduction to the law as it relates to the corporation. The historical development of the corporation as a legal person is examined, including the growth of statute law as a medium for facilitating and regulating the corporate entity. The entire spectrum of the corporation's existence is considered. Amongst the questions which are raised are the nature of the corporation, the extent of its powers, how it operates and is controlled. Special emphasis is laid on the rights and duties of directors and shareholders of corporations and the inter-play between the Board of Directors and shareholders and between majority and minority shareholders.

Law 511 **H(3-0)(3 credits)**

The Criminal Process

An examination of the process whereby criminal proceedings are initiated, prepared for trial, introduced into court, and litigated. Selected topics are viewed in depth to demonstrate the complex of formal and informal variables which may affect the ultimate outcome of the criminal trial. These may include: arrest and the right to silence; remand and bail; informations and indictments; the modes of trial; pre-trial proceedings; plea bargains; special evidence problems, the impact of the Charter of Rights and Freedoms. Particular emphasis is laid upon official methods of collecting evidence, and to problems in the use of expert and technological evidence at trial.

Law 515 **H(3-0)(3 credits)**

The Family

An analysis of the legal principles regulating the rights and responsibilities of the members of the family. Areas covered include constitutional power, marriage, marriage contracts, common law marriage, child neglect and abuse, custody and access, guardianship, adoption, separation, divorce, nullity, spousal and child maintenance, matrimonial property. Stress is placed on the process of family law and an examination of an appropriate role for lawyers or judges in relation to family law problems.

Law 517 **H(3-0)(3 credits)**

Labour Law

The purpose of labour law is to regulate one of the most fundamental aspects of our society - the employment relationship. Introduces the three regimes that regulate the employer-employee relationship in Canada today - the common law of the contract of employment, the collective bargaining regime and the statutory regulation of employment - and, in a limited way, to the historical, economic and sociological forces underlying these regimes. Emphasizes the status of the parties, the incidents of the employment relationship, the scope of management rights, prohibited discriminatory practices in the workplace, and the bases and modes of redress for discipline and dismissal from employment.

Law 519 **H(3-0)(3 credits)**

Jurisprudence

A critical inquiry into the nature and functions of law and justice. Following an introduction to the classic views on the pervasive problem in defining Law and Justice, including natural law, legal positivism, sociological jurisprudence and legal realism, the focus shifts to contemporary theorists. Parallel to the analysis of ideas is an examination of the various institutional processes for making, interpreting and applying law within which problems of injustice have to be addressed.

Law 521 **H(3-0)(3 credits)**

Real Estate Transactions

An examination of the legal techniques of land development stressing the Alberta situation. Included are the purchase and sale of property; mortgaging and other ways to finance land transactions; and commercial leasing arrangements. The Land Titles Act is studied as it relates to land development. Emphasis is placed on the transactional process of transferring and financing land for development.

Law 523 **H(3-0)(3 credits)**

Natural Resources Law

An examination of the law relating to petroleum and natural gas, water, minerals and forests. Emphasis is placed upon oil and gas law, including industry background; the nature of oil and gas interests and interpretation of Crown and freehold leases; other industry contracts; surface rights acquisition, compensation and reclamation; and an overview of Federal and Provincial government regulation of the Oil and Gas Industry. The water law section deals with acquisition and protection of water rights and reviews the legal basis for major water developments. The focus of the mineral law section is the development of coal resources in the province, as well as consideration of the acquisition and development of bituminous sands, hard minerals, clay, marl and aggregates. In forest law attention is directed to competing forest land uses including grazing, recreation and wilderness preservation. Environmental protection including legislative standards and assessment requirements are covered functionally as a regulatory system applicable to various main types of natural resource development and use.

Law 527 **H(4-0)(4 credits)**

Taxation Law and Policy

An examination of the basic principles of income tax law in Canada. This involves consideration of the purpose of the taxation system, an introduction to the methodology by which to understand the language of the Income Tax Act, and a survey of the contents of the Act. Specific areas of tax law and practice which are covered include the process by which income is taxed, the difference between income and taxable income, employment income, business income, capital gains, the taxation of non-residents and the administration and enforcement of the Act.

Law 531 **H(2-0)(2 credits)**

Environmental Law

Interdisciplinary studies under instructors from the Faculties of Law and Environmental Design. Lectures and readings on ecological principles, economics, economic analysis in environmental policy, public and private law concepts, selected issues (e.g. information access, environmental assessment). Independent directed research by multi-disciplinary student teams; presentation of results.

Law 533 **H(3-0)(3 credits)**

Wills and Estates

The preparation, execution, interpretation, and administration of wills; testamentary capacity; alteration, revocation and republication of wills; intestate succession; dependants'relief; and estate administration.

Law 535 **H(3-0)(3 credits)**

Commercial Transactions II: Secured Transactions

The legal principles and practices connected with the securing of debt through charges on personal property. The Personal Property Security Act is the main focus. Bank Act security is also considered. A transactional basis is used to illustrate the application of the relevant principles and expose the various skills related to secured transactions problems.

Law 537 **H(2-0)(2 credits)**

Commercial Transactions I: Sale of Goods

This course examines the doctrine, practice and policy of the domestic trade in goods. It focuses on the allocation of risk regulated by provincial Sale of Goods legislation and a variety of consumer protection legislation. The course also considers the evolving Agreement on Internal Trade, including the economic theory behind eliminating trade barriers within Canada, its effect on the exchange of goods, services and labour and its links to labour mobility and environmental protection issues.

Law 539 **H(2-0)(2 credits)**
(formerly Law 649.03)

Immigration and Refugee Law

The basic principles, policies and procedures that govern the area of immigration and refugee law, including: the history of Canadian immigration and refugee law; the development of the concept and definition of a refugee; the law of refugee status; selection and admission of immigrants, visitors, students; inadmissible and removable classes; exemptions and minister's permits; appeals and judicial review in the federal court, including Charter issues. The roles of lawyers, officials, decision-makers, non-governmental organizations will be explored in classes, placements and observations.

Law 541 **H(3-0)(3 credits)**

Business Taxation

The provisions of the Income Tax Act applicable to business organizations. Particular emphasis is given to the taxation of corporations and their shareholders. Topics covered include: the classification of corporations for tax purposes; the taxation of corporate income; the taxation of corporate distributions; the taxation of various types of corporate reorganizations; and the taxation of partnerships.

Prerequisites or Corequisites: Law 509 and 527 or consent of the Faculty.

Law 543 **H(2-0)(2 credits)**

Intellectual Property

The main forms of intellectual property including patents, copyright and trademarks. Other topics include trade secrets, confidentiality and licensing agreements.

Law 545 **H(3-0)(3 credits)**

Debtor/Creditor Relations

The legal relationship between debtor and creditor including prejudgment creditors remedies, the execution process, receivership, consumer and commercial arrangements and bankruptcy.

Law 547 **H(3-0)(3 credits)**

Legal Protection of Human Rights

A survey of national and provincial human rights laws and practice as distinct from the Charter of Rights and Freedoms; and the main international human rights instruments and standards.

Law 549 **H(3-0)(3 credits)**

International Law

The elements of public international law including the role of customary law, the law of treaties, recognition enforcement problems and the roles and powers of international organizations. In exploring these areas the focus of resource development, environmental control and arms limitations is utilized.

Law 551 **H(3-0)(3 credits)**

Restitution and Fiduciary Obligations

The principles of restitution and fiduciary duty as independent sources of obligation in Canadian Law. Coverage includes restitutionary claims based on mistake, coercion, benefits conferred without request, ineffective transactions and wrongful acts. The nature and origin of the fiduciary relationship; new and traditional categories of fiduciaries; the duties of fiduciaries; equitable and common law remedies and associated limitations problems.

Law 553 **H(3-0)(3 credits)**

Insurance Law

The basic principles of law relating to the various types of insurance, e.g. fire, life, sickness and accident, motor vehicle and liability. Topics include the nature and formation of the insurance contract, the role of insurance agents, insurable interest, misrepresentation and non-disclosure, the rights of third parties against the insurer.

Law 555 **H(4-0)(4 credits)**

University of Oslo Exchange

A summer exchange program with the University of Oslo, Norway, run in conjunction with the University of North Dakota, Faculty of Law. Credit for the course will be applied in the Fall Session immediately following the exchange.

Prerequisite: Consent of the Faculty.

Law 557 **H(2-0)(2 credits)**

The Law of Financial Institutions

Examines the regulation of financial institutions. The primary focus is on banking law and a consideration of the evolving nature of banking (including constitutional matters), the governance and regulation of banks in contrast to "near banks," the bank-customer relationship, the payment system, fiduciary obligations, lending transactions, and derivative products.

Law 601 **H(2-0)(2 credits)**

Advanced Criminal Law

In depth examination of selected areas of criminal law with an emphasis on substantive issues. Topics may include: double jeopardy, police entrapment, conspiracy, corporate crime, theft and related offences, impaired driving and breathalyser offences, plea negotiations, ethical aspects of practising criminal law, mistake of law as a defence, juveniles and the criminal process. Reference is made to special evidential and procedural problems associated with the chosen topics.

Prerequisite or Corequisite: Law 511 or consent of the Faculty.

Law 603 **H(2-0)(2 credits)**

Advanced Labour Law

Examines the process of resolving disputes arising out of the interpretation and application of collective agreements by way of grievance and arbitration procedures. Topics include pre-arbitration procedures, arbitrability, the arbitration tribunal and hearing, arbitral remedies, and the enforcement and judicial review of arbitration awards. Selected issues in grievance determination will be studied such as discipline, discharge, seniority, promotion, work assignment, contracting out, technology change and management rights.

Prerequisite or Corequisite: Law 517 or consent of the Faculty.

Law 605 **H(2-0)(2 credits)**

Advanced Oil and Gas Law

Selected problems in oil and gas law including special industry contractual problems (farm out, joint operating and royalty agreements), and legislative and regulatory issues. In dealing with the latter, emphasis is laid upon the law and practice of the Alberta Department of Energy and Natural Resources, the Federal Department of Energy, Mines and Resources, the E.R.C.B., the Public Utilities Board and the N.E.B.

Prerequisite or Corequisite: Law 523 or consent of the Faculty.

Law 607 **Q(1-0)(1 credit)**

Advanced Legal Research

Advanced legal research including recent developments in technological and electronic legal research. The emphasis is on advanced legal research skills required for successful legal practice.

Law 609 **H(3-0)(3 credits)**

Canadian Legal History

Selected topics in the history of the development of law and legal institutions in Canada, with particular reference to the Northwest Territories and the early legal history of Alberta. Topics are chosen to reflect the interests of the students, and course work includes research in the original court records.

Law 613 **H(3-0)(3 credits)**

Conflict of Laws

An examination of the doctrines and rules governing the disposition of legal disputes which cut across provincial or national boundaries. Topics covered include jurisdiction, distinctions between substantive and procedural rules, the recognition and enforcement of foreign judgments, domicile, proof of foreign law and the choice of law rules relating to areas of private law - torts, contracts, property, succession and family law.

Law 619 **H(2-0)(2 credits)**

Estate Planning

The elements of estate planning including: the use of trusts; the transfer of interests in businesses; planning for spouses, farmers, and disabled people. The impact of the Income Tax Act on estate planning will be considered.

Prerequisite or Corequisite: Law 527 or consent of the Faculty.

Law 627 **H(2-0)(2 credits)**

Land Use Planning

Provincial and municipal powers and arrangements for regulating land use. Among the topics considered are municipal legislative procedures, general plans, design briefs, development control, zoning and subdivision controls, as well as judicial supervision or review of these regulatory processes.

Law 629 **H(2-0)(2 credits)**

Trial Evidence and Procedure

An examination of the particular problems and requirements of litigation with the focus on the trial and criminal law evidence; topics will include relevance; character evidence; self-serving evidence; the trial structure; witnesses and experts; examination-in-chief and cross-examination; documentary evidence; views; verdicts and judgements; costs and appeals.

Law 631 **H(3-0)(3 credits)**

Commercial Transactions III: Payment Mechanisms

Examines a variety of methods for paying for goods and services in both the domestic and international sales context, focusing on negotiable instruments (primarily promissory notes), letters of credit, and electronic funds transfers. The course will also include some of the following payment mechanisms: bills of exchange, cheques, credit cards, debit cards, guarantees, performance bonds, and new payment mechanisms as they emerge in the marketplace. In addition to the law regulating each payment mechanism and the place of each in a variety of sales transactions, the course will include a drafting component.

Law 633 **H(2-0)(2 credits)**

Advanced Contracts and Torts

An examination of the appropriate province of the law of contract and the law of tort, with special emphasis upon the historical development of contractual and tortious liability; the availability of contractual and tortious claims arising out of pre-contractual negotiations; the possibility of concurrent or alternative liability in contract and tort arising out of the performance of a contract; the advantages or disadvantages, and the effects, of claiming in contract or tort; and the encroachment of tort upon contract's preserve.

Law 635 **H(2-0)(2 credits)**

Aboriginal Law

A survey of issues in aboriginal law; topics include: law of aboriginal societies and recognition of aboriginal custom; self-determination and other applicable principles of international law; self-government; common law recognition of aboriginal title; treaties; the fiduciary duty of the Crown; constitutional entrenchment of aboriginal and treaty rights; application of provincial law: Indian Act, land surrenders and exemptions from seizure and taxation; aboriginal justice systems.

Law 637 **H(2-0)(2 credits)**

Energy Law

Selected legal issues related to the energy industry, including the stages of research and exploration, development and production, transportation, marketing and consumption. Emphasis is on the relevant fiscal systems and regulatory processes, particularly in the national and international context.

Law 639 **H(2-0)(2 credits)**

Trial Advocacy

Simulated trial practice using various substantive law fields; discoveries and pre-trial settlement negotiations; supervised preparation of all trial documentation; filing requirements for trial; concludes with full trial moot.

Note: This course is graded CR, D or F.

Law 641 **H(2-0)(2 credits)**

Remedies

The nature and scope of the relief available to a party who has established a substantive right; topics may include statutory remedies; common law remedies in tort and contract including damages and declaratory relief; and the main equitable remedies of injunction and specific performance.

Law 643 **H(3-0)(3 credits)**

Trusts

The concept of the trust and its development in Equity; its relationship to other legal concepts; various types of trusts; constituting, administering and terminating the trust; trustee duties and powers; variation of trusts; breach of trust and the doctrine of tracing; with some attention to the modern uses of the trust and its statutory modifications.

Law 649 **H(2-0)(2 credits)**

Law and Contemporary Problems

The impact of a variety of contemporary issues upon the law and legal institutions; law reform and the development of new legal structures to accommodate change in society.

MAY BE REPEATED FOR CREDIT

Law 651 **H(0-2)(2 credits)**

Directed Research I

A supervised research project involving the in-depth examination of a legal problem or area of concern not normally covered in a substantive or procedural course and which provides the basis for an article, research paper, brief, memorial, draft legislation, etc. Admission to this course depends on the availability of a Faculty member to supervise the particular projects.

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Law 653 **H(0-3)(3 credits)**

Directed Research II

A supervised research project involving the in-depth examination of a legal problem or area of concern not normally covered in a substantive or procedural course and which provides the basis for an article, research paper, brief, memorial, draft legislation, etc. Admission to this course depends on the availability of a Faculty member to supervise the particular projects.

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Law 655 **H(2-0)(2 credits)**

The Legal Profession and Ethics

The Canadian legal profession from sociological and legal perspectives, focusing on the roles lawyers play in our legal system. Conflicts between and among those roles, and conflicts between "official ethics" and broader ethical values are explored.

Note: Credit for both Law 655 and Sociology 501 (The Legal Profession) will not be allowed.

Law 657 **H(2-0)(2 credits)**

Law and Medicine

The focus is on legal aspects of frontier developments in medical practice including professional confidentiality, birth technology, prolongation of life, human experimentation, mental illness, determination of competency and fitness to stand trial, transplantation, genetics, rights of the unborn child and sterilization. The seminar format will involve a number of practitioners from both Law and Medicine.

Law 659 **H(3-0)(3 credits)**

Corporate Finance and Securities

The financing of business entities, and their reorganization; particular emphasis on securities regulation.

Prerequisites or Corequisites: Law 509 and Law 535 or consent of the Faculty.

Law 661 **H(2-0)(2 credits)**

Advanced Business Transactions

Selected topics in the field of business transactions including: franchising, builders' liens, sale of goods, applied contracts (e.g. contracts in an international setting, commercial leasing, purchase and sale of business), and competition law.

Law 663 **H(2-0)(2 credits)**

Dispute Resolution

Various dispute resolution processes and the role of lawyers. The focus is on mediation and arbitration, but hybrid processes (mediation/arbitration and mini-trials both private and judicial), pre-trial conferences, and the design of dispute resolution systems (preventative lawyering) are included. The seminar addresses "how" and also "what" is being done in dispute resolution. Political, social, and cultural dimensions of dispute resolution, and particularly mediation, will be introduced. Role playing and simulations will be used.

Prerequisite or Corequisite: Law 501 or consent of the Faculty.

Law 665 **H(2-0)(2 credits)**

International Trade Law

The public law framework for international trade. Emphasis will be placed on the FTA, NAFTA, and GATT. Topics to be covered include basic principles of international trade law, anti-dumping and countervail actions, and dispute resolution.

Law 667 **H(2-0)(2 credits)**

Advanced Constitutional Law

Selected topics in constitutional law. Course content will vary, but will cover fundamental principles represented by sections 1, 7, 15, 24, and 52 of the Constitution Act, 1982.

Law 669 **H(2-0)(2 credits)**

Mooting and Clinical Studies

Preparation for and participation in approved external competitive moots including the Gale Cup Moot and the Alberta Challenge Moot or participation in an approved clinical experience in an area not otherwise the subject of a clinical course.

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Law 671 **H(2-0)(2 credits)**

Advanced Environmental Law

Selected topics in Environmental Law. Topics to be covered may include the law and practice of environmental impact assessment; the law of protected areas and protected species; sustainable development; biodiversity; global warming; command and control regulations vs. market based emissions control measures.

Prerequisite or Corequisite: Law 531.

Law 673 **H(3-0)(3 credits)**

Jessup Moot

Preparation for and participation in the Philip C. Jessup International Law Moot Court Competition.

Prerequisite: Consent of the Faculty.

Law 675 **H(2-0)(2 credits)**

Western Canada Trial Competition

Preparation for and participation in the Western Canada Trial Competition.

Prerequisite: Consent of the Faculty.

Law 679 **H(2-0)(2 credits)**

Feminist Legal Theory

A critical inquiry into the nature and function of law from a variety of different perspectives within feminist legal theory; the role of rights and of legal discourse, and the possibilities and limitations of law as a strategy for social transformation.

Law 681 **H(3-0)(3 credits)**

Current Legal Problems

The impact of a variety of contemporary issues upon the law and legal institutions; law reform and the development of new legal structures to accommodate change in society.

MAY BE REPEATED FOR CREDIT

Law 683 **H(2-0)(2 credits)**

Advanced Family Law

Selected topic in Family Law such as division of pensions, international family law and the law relating to children (including regulatory aspects e.g. Child Welfare). Current developments in law reform and social policy change will be addressed. Short placements may be offered.

Prerequisite or Corequisite: Law 515 or consent of the Faculty.

Law 685 **H(2-0)(2 credits)**

Business Clinical Seminar

A clinical seminar in the practice of business law. Supervised clinical experience will be gained through appropriate placements.

Prerequisite or Corequisite: Law 509 or consent of the Faculty.

Law 687 **H(2-0)(2 credits)**

Criminal Justice Clinical Seminar

A clinical seminar considering the law and practice of the criminal justice system, involving simulated exercises and/or placements.

Prerequisite or Corequisite: Law 511 or consent of the Faculty.

Law 689 **H(2-0)(2 credits)**

Family Law Clinical Seminar

A clinical seminar in elements of family law practice. The clinical experience may be obtained through simulated exercises, supervised handling of files and/or placements. Topics include Chambers advocacy, marital dispute consultations and drafting of a settlement.

Prerequisite or Corequisite: Law 515 or consent of the Faculty.

Law 691 **H(2-0)(2 credits)**

Natural Resources Clinical Seminar

A clinical seminar involving placements in any one of the following practice areas: energy law, resources law, water law, and environmental law.

Prerequisites or **Corequisites:** One of Law 523 or 531; plus one of Law 605, 637, 671 or 649.01; or consent of the Faculty.

Law 701 **H(3-0)(3 credits)**

Legal Process, Education and Research Seminar

Empirical research and methodology, as well as techniques of multi-disciplinary research. A forum for discussion and analysis of legal process and education theories and methods. This course will be taught over two sessions.

Law and Society LWSO

Instruction offered under the direction of the Faculty of Communication and Culture. For information contact the Program Director or the Academic Programs Office, 220-6343.

Additional interdisciplinary courses are offered under the course headings African Studies, Canadian Studies, Central and East European Studies, Communications Studies, Development Studies, East Asian Studies, General Studies, Latin American Studies, Leisure, Tourism and Society, Museum and Heritage Studies, Northern Planning and Development Studies, Science, Technology and Society, South Asian Studies, and Women's Studies.

Junior Course

Law and Society 201 **H(3-0)**

Introduction to Legal Studies

Overview of the role of law in society. Examination of different concepts of law. Study of legal rules, institutions, processes and personnel in social context. Discussion of construction and exercise of the power of law. Emphasis on Canadian law and legal system.

Senior Courses

Law and Society 335 **H(3-0)**

Equality Issues

An examination of the ability of the law to guarantee equality. Issues of gender, racial and class equality will be explored. Topics may include employment law, civil law, criminal law, reproductive rights and family law. All material is studied as it pertains to the Canadian legal culture.

Law and Society 401 **H(3-0)**

Special Topics in Law and Society

An examination of selected topics in Law and Society. See Master Timetable for current topic(s).

MAY BE REPEATED FOR CREDIT

Law and Society 412 **F(3S-0)**

Law and Society

Advanced level seminar for development of an interdisciplinary critical approach to law and its place in Canadian society. The emphasis in most years will be on tort law, taught with the aid of a legal casebook. Examines tort law as a social construct. In some years, the course will take a more general approach to the examination of the ability of law to satisfy the needs of Canadian society. Students should check with the Program Director to ascertain the course direction in any given year.

Prerequisites: Law and Society 201 and 335.

Note: Not open to students with credit in Law and Society 512.

Note: Until August 15, preference in enrollment is given to students who have declared a Major in Law and Society.

Law and Society 501 **H(3-0)**

Research in Selected Topics

Supervised individual study of a special topic.

Prerequisites: Consent of the Law and Society Director and the Associate Dean (Academic).

Note: Students should contact the Office of the Associate Dean (Academic) prior to the first day of classes to arrange an independent study course.

MAY BE REPEATED FOR CREDIT

Law and Society 591 **H(3S-0)**

Research Methods

Seminar focussed on introducing students to research methods using legal and law-related sources. Students will be supervised in the research and writing of a legal memorandum and in documents related to that memorandum. In most years, focus will be on a problem in tort law. Some accommodation will be made for students who covered a different area of law in Law and Society 412. The role of various types of legal documents in dealing with society's problems will be assessed.

Prerequisite: Law and Society 412.

Note: Students may be required to attend court proceedings outside of class time which will be considered part of the course evaluation.

Leisure, Tourism and Society LTSO

Instruction offered under the direction of the Faculty of Communication and Culture. For information contact the Program Director or the Academic Programs Office, 220-6343.

Additional interdisciplinary courses are offered under the course headings African Studies, Canadian Studies, Central and East European Studies, Communications Studies, Development Studies, East Asian Studies, General Studies, Latin American Studies, Law and Society, Museum and Heritage Studies, Northern Planning and Development Studies, Science, Technology and Society, South Asian Studies, and Women's Studies.

Senior Courses

Leisure, Tourism and Society 309 **H(3-0)**
(Tourism and Hospitality Management 309)

Introduction to Leisure, Tourism and Society

An interdisciplinary introduction to the concepts, methods and practices of leisure, recreation and tourism studies.

Leisure, Tourism and Society 401 **H(3-0)**

Special Topics in Leisure, Tourism and Society

See the Master Timetable for current topic(s).

MAY BE REPEATED FOR CREDIT

Leisure, Tourism and Society 501 **H(3-0)**

Research in Selected Topics

Supervised individual study of a special topic.

Prerequisites: Consent of the Leisure, Tourism and Society Director and the Associate Dean (Academic).

Note: Students should contact the office of the Associate Dean (Academic) prior to the first day of classes to arrange an independent study course.

MAY BE REPEATED FOR CREDIT

Leisure, Tourism and Society 591 **H(3S-0)**
(formerly Leisure, Tourism and Society 409)

Senior Seminar in Leisure, Tourism and Society

Advanced seminar for the interdisciplinary consideration of selected topics in Leisure, Tourism and Society.

Prerequisites: Leisure, Tourism and Society 309 and Geography 327; or consent of the Faculty.

Note: Restricted to students in the Leisure, Tourism and Society Major and Minor programs. Until August 15, preference in enrollment is given to students who have declared a Major in Leisure, Tourism and Society.

Linguistics LING

Instruction offered by members of the Department of Linguistics in the Faculty of Social Sciences.

Department Head – R.W. Murray

Note: A student may not register in any Linguistics course unless a grade of at least "C-" has been achieved in each prerequisite for that course.

Junior Courses

Linguistics 201 **H(3-0)**

Introduction to Linguistics I

A survey of basic linguistic concepts, including: universals of language; articulatory phonetics and phonology of English and other languages; words and meaning; linguistic rules and the formation of sentences.

Note: Not open to students with credit in Linguistics 205 or 207.

Linguistics 203 **H(3-0)**

Introduction to Linguistics II

Language in historical and social contexts: writing systems; language change; language families and areas; elements of sociolinguistics and psycholinguistics; Canadian bilingualism.

Prerequisite: Linguistics 201.

Note: Not open to students with credit in Linguistics 205 or 207.

Linguistics 209 **H(3-0)**

Wordcraft

A general interest course providing an introduction to the study of language. Topics covered may include the history of English, the origins and structure of English words, language policy, bilingualism, signed languages, language in popular culture as represented in film and literature.

Note: Not open to students with credit in Linguistics 201/203 or 205/207. Does not count towards the Linguistics major.

Senior Courses

Linguistics 301 **H(3-0)**

English Syntax

Introduction to syntax, using the structure of English as an illustration. Emphasis on tree-drawing and basic argumentation skills. Topics may include: syntactic categories; grammatical, thematic, and structural relations; syntactic movement.

Prerequisite: Linguistics 201 or 205/207.

Linguistics 303 **H(3-0)**

Phonology I

Theory and practice of phonological analysis: the classical phoneme; distinctive features and their organization; methods of analysis; underlying and surface representations; rules and derivations.

Prerequisite: Linguistics 201 or 205/207.

Linguistics 309 **H(3-0)**

Language and Power

The nature of the linguistic resources used to create, enhance and justify positions of dominance or subordination, or to influence and persuade populations. Examples drawn from the discourse of gender and ethnic relations, government and business.

Linguistics 311 **H(3-0)**
(formerly Linguistics 411)

Second Language Acquisition

Linguistic perspectives on second language acquisition and their implications for second language teaching.

Prerequisites: Linguistics 201/203 or 205/207.

Linguistics 313 **H(3-0)**
(formerly Linguistics 413)

Classroom-Oriented Second Language Research

Second language acquisition research that focuses on the second language learner in a variety of formal learning environments.

Prerequisites: Linguistics 201/203 or 205/207.

Linguistics 319 **H(3-0)**
(formerly Linguistics 409)

Introduction to Semantics

Introduction to the study of meaning in language. What is meaning and how is it expressed linguistically? How does context affect meaning and how do speakers use language to communicate information? Specific topics include: word meaning, concepts, reference, ambiguity, tense and aspect, mood and modality, and pragmatics. Discusses the meaning of logical function words (connectives and quantifiers) by providing a basic introduction to propositional logic and predicate logic.

Prerequisite: Linguistics 201 or 205/207.

Linguistics 321 **H(3-0)**

Modern English Grammar

A comprehensive exploration of contemporary English. The course is based on modern linguistic analysis, but also includes traditional grammatical terminology, as well as language change, attitudes to language varieties and problems in usage.

Note: Not open to students with credit in Linguistics 301. Does not count towards the Linguistics major.

Linguistics 323 **H(3-0)**

Language in Advertising

An investigation of the nature of commercial messages from the perspective of linguistic theory. Topics may include truth and falsity, implication, ambiguity, and context-dependence.

Linguistics 331 **H(3-0)**

First Language Acquisition

An overview of major issues and developmental patterns in child language acquisition.

Prerequisites: Linguistics 201/203 or 205/207 or Psychology 205.

Note: Students without Linguistics 201/203 will have to complete some supplemental reading in phonetics.

Linguistics 339 **H(3-0)**
(formerly Linguistics 449)

Psycholinguistics

Cognitive and neuropsychological foundations of language behaviour, with reference to linguistic theory. Topics include language production, comprehension, and acquisition. Survey of major experimental methodologies.

Prerequisite: Linguistics 203.

Linguistics 341 **H(3-2)**

Phonetics I

Intensive practice in the perception, production and transcription of speech sounds accompanied by an introduction to the physiology and acoustics of speech.

Prerequisite: Linguistics 201 or 205/207.

Note: Until August 15, preference in enrollment is given to students who have declared a Major in Linguistics. Linguistics 341 should be taken either before or concurrently with Linguistics 303.

Linguistics 349 **H(3-0)**

Language and Mind

An overview of central issues in the study of language and its relationship to the human mind. Topics may include the nature/nurture debate, human specialization for language, and theories of mental representation.

Prerequisite: Linguistics 203.

Linguistics 353 **H(3-0)**

Historical Linguistics

Central topics in the study of language change including: principles and methods of linguistic reconstruction; universals, typologies, and the explanation of language change; sources of language change with a consideration of acquisitional and sociolinguistic factors.

Prerequisites: Linguistics 201/203 or 205/207.

Linguistics 373 **H(3-0)**

Introduction to Sociolinguistics

Social differentiation of language in terms of the gender, socio-economic status and geographical distribution of speakers.

Prerequisites: Linguistics 201/203 or 205/207.

Linguistics 381 **H(3-0)**
(English 381)

The History of English

An introduction to important changes and stages in the history of English including its Indo-European and Germanic origins and a consideration of Modern English grammar and orthography from a historical perspective.

Prerequisites: Linguistics 201/203 or 205/207.

Linguistics 401 **H(3-0)**

Syntactic Analysis I

A theoretically grounded approach to syntax using data from a variety of languages. Constructing and evaluating syntactic hypotheses. May involve collecting data from a native speaker of a foreign language.

Prerequisite: Linguistics 301.

Linguistics 403 **H(3-0)**

Phonology II

Recent issues in phonological theory.

Prerequisite: Linguistics 303.

Linguistics 407 **H(3-0)**

Morphology

An introduction to the study of word-structure. Inflectional and derivational morphology; various morphological processes; morphology on the grammatical and phonological levels. Practical problems in word analysis.

Prerequisite: Linguistics 301 or 303.

Linguistics 431 **H(3-0)**

Child Language: Syntax and Morphology

Current topics in the fields of syntactic and morphological acquisition.

Prerequisites: Linguistics 203 and 301.

Linguistics 433 **H(3-0)**

Child Language: Phonology and the Lexicon

Current topics in the fields of phonological and lexical acquisition.

Prerequisites: Linguistics 203 and 303.

Linguisitcs 437 **H(3-0)**

Introduction to Speech-Language Pathology

A comprehensive overview of the subject including: basic components of speech and language, normal language development, communication disorders, and current professional issues.

Prerequisite: Linguistics 341.

Note: Not open to students with credit in Linguistics 599.15.

Linguistics 441 **H(3-2)**

Phonetics II

Recognition and transcription of segmental and suprasegmental phones paralleled by study of human vocal tract anatomy and laboratory work in the acoustic analysis of speech.

Prerequisite: Linguistics 341.

Linguistics 455 **H(3-0)**
(formerly Linguistics 355)

Typology

Study of the unity and diversity of the world's languages. How do the grammars of individual languages differ from each other, and in what ways are they all alike? Which characteristics are common across languages, and which are rare? An overview of the methodology and main results of typological research. Students work with data from unfamiliar languages.

Prerequisites: Linguistics 201/203 or 205/207, and Linguistics 301.

Linguistics 477 **H(3-0)**

Structure and Interpretation of Discourse

An investigation of the form and interpretation of sentences in discourse. Topics may include anaphora, presupposition, intonation, and coherence.

Prerequisites: Linguistics 301 and 319.

Note: Not open to students with credit in Linguistics 599.14.

Linguistics 505 **H(2-2)**
(formerly Linguistics 405)

Field Methods

Principles and techniques of collecting, editing and analysing elicited linguistic data and associated problems. Practical experience with language consultant(s).

Prerequisites: Linguistics 203, 301 and 303.

Linguistics 511 **H(3-0)**

Syntactic Analysis II

A survey of current work in syntactic theory.

Prerequisite: Linguistics 401.

Linguistics 519 **H(3-0)**
(Philosophy 519)

Formal Semantics of Natural Language

Central issues in the logical semantics of natural language, focusing on topics such as quantification, scope, and the interpretation of pronouns.

Prerequisite: Philosophy 279 or 377; or consent of the Department. Philosophy 307 or 407 or Linguistics 319 recommended.

Note: Not open to students with credit in Linguistics 509.

Linguistics 525 **H(3-0)**

Topics in Second-Language Acquisition

Linguistic theory applied to a variety of second-language learning/teaching situations. Theoretical orientation and specific language treated will vary from time to time.

Prerequisite: One of Linguistics 311, 313, 411, 412, or 413; or consent of the Department.

MAY BE REPEATED FOR CREDIT

Linguistics 531 **H(3-0)**

Survey of Amerindian Languages

A survey of the indigenous languages of the Americas, including classifications of language families and structural analysis of selected languages.

Prerequisites: Linguistics 203 and either Linguistics 301 or 303.

Linguistics 541 **H(3-0)**

Indo-European Linguistics

An introduction to the comparative study of the older stages of the principal Indo-European languages, and the reconstruction of the proto-language.

Prerequisite: Linguistics 353 or consent of the Department.

Linguistics 551 **H(3-0)**

Linguistic Analysis

Linguistic analysis of a language or language family.

Prerequisite: Linguistics 301 or 303 or consent of the Department.

Note: Consult Department regarding topics offered in any given year.

MAY BE REPEATED FOR CREDIT

Linguistics 598 **F(3S-0)**

Independent Research

Open only to Honours students who are in the last year of their program. Students are expected to carry out a specific research project under the supervision of a staff member and submit a thesis acceptable to the Department.

Linguistics 599 **H(3S-0)**

Conference Course

Directed research in areas of special interest to advanced students.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599. Admission to all 600-level courses is with consent of the Department in addition to any other prerequisites which may be stated.

Linguistics 611 **H(3-0)**

Advanced Syntactic Analysis I

Prerequisite: Linguistics 511 or consent of the Department.

Linguistics 613 **H(3-0)**

Advanced Phonological Analysis I

Prerequisite: Linguistics 403.

Linguistics 631 **H(3-0)**

Topics in Linguistic Theory

Seminar in any area of theoretical linguistics, including phonetics, phonology, morphology, syntax, and semantics.

631.01. Phonetics

631.02. Phonology

631.03. Morphology

631.04. Syntax

631.05. Semantics

Prerequisite: Consent of the Department.

Note: Consult the Department regarding topics offered in any given year as topics vary. Not offered every year.

Linguistics 633 H(3-0)

Topics in Language Acquisition

Seminar in language acquisition.

633.01. First Language Acquisition

633.02. Second Language Acquisition

Prerequisite: Consent of the Department

Note: Consult the Department regarding topics offered in any given year as topics vary. Not offered every year.

Linguistics 635 H(3-0)

Analysis of a Language or Language Family

Seminar in the analysis of a selected language or language family

Prerequisite: Consent of the Department.

Note: Consult the Department regarding topics offered in any given year as topics vary. Not offered every year.

MAY BE REPEATED FOR CREDIT

Linguistics 651 H(3-0)

Topics in Historical Linguistics

Seminar in historical linguistics.

Note: Consult the Department regarding topics offered in any given year as topics vary. Not offered every year.

MAY BE REPEATED FOR CREDIT

Linguistics 697 H(3-0)

Thesis Research Development

Linguistics 699 H(3S-0)

Conference and Reading Course

MAY BE REPEATED FOR CREDIT

Linguistics 711 H(3-0)

Advanced Syntactic Analysis II

Linguistics 713 H(3-0)

Advanced Phonological Analysis II

Management Information Systems MGIS

Instruction offered by members of the Haskayne School of Business.

Management Information Systems Chairperson – R. Murch

Note: Students have the opportunity to take courses offered by the Haskayne School of Business without the stated prerequisites, with the written permission of the Associate Dean (Undergraduate Programs) as appropriate, upon the recommendation of the instructor of the course. However, should a student fail to achieve satisfactory standing in any course for which the stated prerequisite(s) is (are) lacking, he/she may be required to successfully complete the stated prerequisite(s) prior to being permitted to repeat the course. Students are required to have consent of the Haskayne School of Business Office before registering in 600-level courses offered by the Haskayne School of Business.

Students pursuing a Management Information Systems concentration are required to complete an approved Computer Science course on programming which teaches a structured programming language (such as Pascal). Please consult the MGIS Chairperson or the Associate Dean (Undergraduate Programs), for the currently approved list of such courses. Students should register for one of these courses as a senior option in the first session of their third year if it has not been taken as an option in Year One or Two. Only students pursuing the Management Information Systems concentration may consider this as a Senior Course.

Senior Courses

Management Information Systems 317 H(3-1) (formerly Management Information Systems 323)

Introduction to Management Information Systems

Computer-based Management Information systems, and how such information systems support decision-making at all levels of management. The development, organization, management control, and evaluation of information systems activities, and the societal implications of the use of the computer in business. Concepts are linked to business applications through case examples and project assignments involving the business community.

Prerequisites: Admission to the Haskayne School of Business, second year standing, Management Studies 291, and Computer Science 203.

Management Information Systems 321 H(3-1)

Information Systems in Business Organizations

Introduction to information technology (IT) concepts in relation to the business environment. Understanding the components of IT such as hardware, software, communications and systems development.

Prerequisite: Second year standing.

Note: This course is not available for credit towards the Bachelor of Commerce degree. Until August 15, preference in enrollment is given to students who have declared a Management and Society minor.

Management Information Systems 331 H(3-1)

Database Processing Systems

Database design and development skills built through real-life problems. Conceptual understanding of database design. Practical experience using design tools, such as the entity-relationship technique, and industry-leading database software. Implementing a database with a query language to answer managerial questions.

Prerequisite: Management Information Systems 317.

Management Information Systems 333 H(3-2)

Information Systems Analysis and Design

Analysis and design steps in information systems development. Analysis and description of information flows in an organization. Systems development methodologies and tools. System selection acquisition, implementation and evaluation.

Prerequisite: Management Information Systems 317.

Management Information Systems 455 H(2-2)

Management Information Systems Field Project

Structured and supervised experience in assessing the feasibility, developing and/or implementing of business information systems. Student project teams are assigned to field projects in organizations.

Prerequisites: Third year standing, Management Information Systems 317 and one other senior Management Information Systems course.

Management Information Systems 461 H(3-0)

Telecommunications Basics

Basic telecommunications and data communications concepts relevant to organizations. Fundamentals of analog and digital signalling and transmission. Wide and local area networking. Protocols and standards; telecommunication applications. The role of the Internet in organizations.

Prerequisites: Third year standing and Management Information Systems 317.

Management Information Systems 463 H(3-0)

Management Issues in Information Systems

Problems of managing the corporate information systems activity. Relationship between the information systems function and the corporation. Strategic role of information systems in achieving the organization goals. Diffusion of innovation. Managing end-user computing. Emerging managerial issues.

Prerequisites: Third year standing and Management Information Systems 317.

Management Information Systems 465 H(3-0)

Enterprise Resource Planning

Basics of organization wide information systems. Exploration of technology, processes and management principals.

Prerequisites: Third year standing and Management Information Systems 317.

Note: Credit for both Management Information Systems 465 and 557.02 will not be allowed.

Management Information Systems 467 H(3-0)

Electronic Commerce

Investigation of emerging technologies in electronic communication. Discussion of electronic commerce tools, business principles and systems development.

Prerequisites: Third year standing and Management Information Systems 317.

Note: Credit for both Management Information Systems 467 and 557.01 will not be allowed.

Management Information Systems 557 H(3-0)

Selected Topics in Management Information Systems

Discussion of current or special interest topics in Management Information Systems from a managerial orientation.

Prerequisites: Third year standing and Management Information Systems 317.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Management Information Systems 601 H(3-1) (formerly Management Information Systems 631)

Management Information Systems

The fundamental role of information systems (IS) and technologies (IT) in leading and managing effective organizations. Strategic, operational and control aspects of IS. Interfaces with decision processes and functional areas of business. Development, organization, management control, evaluation and societal implications of IS activities. Concepts are linked to competence in effective organizational practices through a variety of instructional approaches including case examples, action-learning student projects, laboratory and tutorial exercises.

Management Information Systems 725 H(3-0)

e-Technology

Investigation of emerging technologies in electronic communication. Discussion of electronic commerce tools, business principles and systems development.

Prerequisite: Management Information Systems 601.

Management Information Systems 735 H(3-0)

Information Systems Analysis and Design

Instruction, practice, and application of systems analysis and design techniques. Examination of systems development life cycle for managerial control purposes. Development of standards for systems work. Management systems concepts for computer and information system implementation. Behavioural aspects of user/analyst interface.

Prerequisite: Management Information Systems 601 or 631.

Management Information Systems 737 H(3-0)

Data Base Administration

Examination of the data structures relevant for business information systems and their implementation under Data Base Management System. Consideration of the data base administration function and organizational implications of data base systems are covered.

Prerequisite: Management Information Systems 601 or 631.

Management Information Systems 743 H(3-0)

Telecommunications

Basic telecommunications and data communications concepts relevant to organizations. Fundamentals of analog and digital signalling and transmission. Wide and local area networking. Protocols and standards; telecommunication applications. The role of the Internet in organizations.

Prerequisite: Management Information Systems 601.

Management Information Systems 797 H(3S-0)

Advanced Seminar in Management Information Systems

Prerequisite: Consent of the business school.

MAY BE REPEATED FOR CREDIT

PhD Course

Management Information Systems 799 H(3S-0)

Doctoral Seminars in Management Information Systems

799.01. PhD Seminar I in Management Information Systems

799.02. PhD Seminar II in Management Information Systems

799.03. PhD Seminar III in Management Information Systems

799.04. PhD Seminar IV in Management Information Systems

Management Studies MGST

Instruction offered by members of the Haskayne School of Business.

Junior Course

Management Studies 291 H(3-3)

Introduction to Business

Introduces the functional areas of business and the integration of these areas for effective and efficient operation of organizations in a variety of sectors. Emphasizes effective team work skills, research skills, and decision-making skills, using experiential learning modules to study the problems and issues encountered by organizations. Provides foundation for Senior Courses in the Haskayne School of Business.

Note: Not open to students with credit in Policy and Environment 201.

Senior Courses

Management Studies 391 H(3-0)

Research and Analysis for Decision Making

Use of data-driven analysis to guide managerial decision-making. Why, when and how one can obtain and organize data, how to analyze the data to obtain information and use this knowledge to make informed decisions.

Prerequisites: Admission to the Haskayne School of Business, second year standing, Mathematics 249 or 251 or equivalent, Statistics 217, Computer Science 203 and Management Studies 291.

Note: Not open to students with credit in Operations Management 353.

Management Studies 491 H(3-3)

Organizational Change and Innovation

Identify and evaluate human and financial resource implications of organizational change. Specific emphasis on innovation, information systems and conflict resolution.

Prerequisites: Admission to the Haskayne School of Business, third year standing, Finance 317, Human Resources and Organizational Dynamics 317, Management Information Systems 317, Marketing 317, Operations Management 317.

Management Studies 511 H(3-0)

Leadership Skills; Student Business Start-up

Provides general management skills through hands-on facilitation of a new business start-up. Teaching business basics to elementary school students and guiding them through the start-up, running and shut-down phases of a fundraising business.

Prerequisites: Admission to the Haskayne School of Business, consent of the business school and fourth year standing.

Note: Not open to students with credit in Management Studies 597.13.

Management Studies 559 H(3-0)

Selected Topics in Management

Examination of selected topics in management.

Prerequisites: Admission to the Haskayne School of Business and third year standing.

MAY BE REPEATED FOR CREDIT

Management Studies 571 H(3-3)

Management of International Trade

Concepts and skills required to conduct international transactions in goods and services, including contracts, transportation, financing, insurance, customs clearance, compliance with import/export regulations and dispute resolution.

Prerequisites: Admission to the Haskayne School of Business and third year standing.

Management Studies 591 H(3-0)

Strategic Management

Analysis of competitive situations from the general management point of view, including fit between key environmental forces and the firm's resources, and changes in these over time. Formulating and implementing strategy based on that analysis. Developing and leveraging a firm's core competencies to gain long-term sustainable advantage.

Prerequisites: Fourth year standing, Accounting 317 or 321, Strategy and General Management 301, Management Studies 391, Human Resources and Organizational Dynamics 317 or 323, Management Information Systems 317, Finance 317, Marketing 317, Operations Management 317.

Note: Not open to students with credit in Policy and Environment 591.

Management Studies 597 H(3-0)

Directed Study in Management Studies

In-depth study in one of the functional areas of business.

Prerequisites: Admission to the Haskayne School of Business and fourth year standing.

Note: May be repeated once for credit.

Graduate Courses

Management Studies 611 H(3-0)

Managerial Economics

Introduction to economic models for business decision making. Models from microeconomics are applied to provide insight in understanding costs, pricing, industry structure, and competitive interaction. Information economics is used to illustrate principal-agent problems that commonly arise in a business context. Macroeconomic models of supply and demand are applied to illustrate how government policy affects inflation and exchange rates.

Management Studies 613 H(3-0)

Business Analytics

The transformation of raw data into useful information for decision-making. Quantitative

models are implemented with spreadsheets to develop skills in generating managerial insight from data and in dealing with uncertainty. Topics covered include basic probability and statistics, decision trees, regression analysis, optimization, and simulation.

Management Studies 615 **H(3-0)**

Strategic Business Analysis

Introduction to strategic analysis. Integration of learning from various management disciplines through a "field experience" study of a business firm.

Management Studies 701 **H(3-0)**

Research Methods in Management

Research design and techniques in management that will prepare students to conduct their research projects.

Management Studies 741 **H(3-0)**

Business Process Improvement and Creative Problem Solving

Business process improvement and creative problem solving as critical components of competitiveness. The adjective "business" is used to indicate that the course emphasizes improvements in non-manufacturing processes (of relevance to all organizations) in such areas as development, distribution, financial accounting/planning, order entry, personnel, and purchasing. Topics covered include the relationship to Total Quality Management and Time-Based Competition, incremental versus radical improvement, selection of key processes for study (including bench-marking and the role of capacity constraints), process flow diagramming, Pareto analysis, cause-and-effect analysis, statistical control charts, affinity diagrams, and steps in creative problem solving. Team exercises and projects make up a substantial portion of the course.

Prerequisite: Operations Management 601 or equivalent.

Management Studies 743 **H(3-0)**

International Logistics

The management functions of physical distribution, procurement and production are examined in a global context. Management of these activities must reflect the major structural changes taking place in the world. Increasing growth in international trade heightens the level of international purchasing and logistics activities, demanding that the future manager exploit global sourcing and production opportunities and configure a supply chain management system that provides excellent, cost-effective service on a world-wide basis. Both theoretical and practical approaches are applied to the wide array of topics in global manufacturing, sourcing and distribution.

Prerequisite: Operations Management 601 or equivalent.

Management Studies 781 **H(3-0)**

Philosophy of Science in Management Studies

Historical and critical perspectives of classical issues in philosophy of science, nature of scientific explanation, confirmation of scientific theories, theories of truth, distinctions between science and non-science.

Prerequisite: Consent of the business school.

Note: Not open to students with credit in Management Studies 790.

Management Studies 783 **H(3-0)**

Advanced Research Methodology and Methods

Research methodology relevant to examination and testing of theoretical and applied issues in management. The development and testing of research concepts; research operations, designs and analysis.

Prerequisite: Consent of the business school.

Note: Not open to students with credit in Management Studies 790.

Management Studies 791 **H(2S-2)**

Management Education Seminar

Nature, role and function of universities, and business schools, business school relations, curricular and course design, instructional techniques, instructional tools, teaching styles, career planning and professional ethics.

Prerequisite: Consent of the business school.

Note: Half course offered over two sessions. Doctoral students whose supervisors are members of the Haskayne School of Business are required to register in this seminar in both terms of the second year of doctoral studies.

NOT INCLUDED IN GPA

Management Studies 792 **F(1-2)**

Research Development

Development of research skills through participation in a well defined project under the direct supervision of an experienced researcher.

Prerequisite: Management Studies 781 or 783 or equivalent.

Management Studies 793 **H(3S-0)**

Conceptual Frameworks of the Enterprise

An investigation of frameworks and philosophies influencing managerial thought and the examinations of their impact on decision making, operations and results. Emphasis is placed on the generalist's point of view and a framework for synthesis.

Prerequisite: Consent of the business school.

Management Studies 797 **H(3-0)**

Directed Graduate Study in Management

Coverage of various topics on the basis of student and faculty interest.

Prerequisite: Consent of the business school.

MAY BE REPEATED FOR CREDIT

PhD Course

Management Studies 799 **H(3-0)**

Topics in Management Studies

799.01. Qualitative Methodologies for Organization and Management Research

Manufacturing Engineering ENMF

Instruction offered by members of the Department of Mechanical and Manufacturing Engineering.

Director of Manufacturing Engineering Program – R.W. Brennan

Senior Courses

Manufacturing Engineering 401 **H(3-2)**

Computer-Aided Design and Graphics

Hardware and software for computer-aided design. Engineering drawing principles and standards. Geometric transformation and projection. Curve modelling, surface modelling, and solid modelling. Visual realism. Animation, assembly, tolerancing, and data exchange. Automatic product design.

Prerequisites: Engineering 313 and 335.

Manufacturing Engineering 405 **H(3-1T-3/2)**

Mechanics of Materials

Special topics in structural members: shear centre, unsymmetric bending, torsion of non-circular thin-walled members. Stiffness analysis of complex structures. The variety of material behaviour. Introduction to virtual work and energy methods. Stability of equilibrium. Buckling. Applications.

Prerequisite: Engineering 317.

Manufacturing Engineering 407 **H(3-2)**

Human Behaviour in Organizations

Social learning theory. Motivation and performance. Group dynamics. Interpersonal communication. Decision making. Power and authority. Leadership. Team Building. Conflict resolution. Negotiation. Occupational stress. Coping skills.

Note: Laboratory work will emphasize situational role-playing, simulation and case studies.

Manufacturing Engineering 411 **H(3-2)**

Quality Assurance

Estimation and inference using sampling. Acceptance sampling (operating characteristic curves, sampling plans). Statistical process control (variable and attribute control charts). Process capability analysis. Process improvement tools and strategies. Product function analysis (QFD, DFM, concurrent engineering). Product parameter selection (DOE, Taguchi methods). Quality economics. Quality management philosophies. Quality standards.

Prerequisite: Engineering 319.

Manufacturing Engineering 415 **H(3-2)**

Integrated Manufacturing Systems I

Introduction to integrated manufacturing systems. Materials flow and facility layout. Group technology. Computer-aided process planning. Forecasting. Inventory management and control. Production planning and control (MRP, JIT, TOC). Production activity control systems.

Manufacturing Engineering 417 **H(3-2/2T-2/2)**

Manufacturing and Production Processes

The role and characterization of manufacturing technology within the manufacturing enterprise. Overview of deformation processes, joining processes, consolidation processes, material-removal processes, and material alteration processes. Process selection and planning.

Prerequisite: Engineering 313.

Manufacturing Engineering 501 **H(3-2)**

Modelling and Simulation of Manufacturing Systems

General modelling of production systems. Spreadsheet modelling for capacity analysis. Fundamentals of discrete-event simulation including: key concepts; simulation world views; the simulation study life cycle. Modelling and programming aspects of discrete-event simulation including: verification and validation; simulation animation; interfacing simulation software with other systems. Statistical aspects of discrete-event simulation including: random number and random variate generation; input process modelling; output analysis; variance reduction techniques. Applications of discrete-event simulation to the design and analysis of manufacturing systems.

Prerequisites: Engineering 319 and Manufacturing Engineering 415.

Manufacturing Engineering 503 **H(3-2)**

Computer Numerically Controlled Machines

CNC machine tools, controllers and devices. CNC programming. Planning for CNC operations. Adaptive CNC machine control. Design for CNC manufacture. CNC in computer integrated manufacturing systems. Electric discharge machines and coordinate measuring machines. Sculptured surface machining.

Prerequisite: Manufacturing Engineering 417.

Manufacturing Engineering 505 **H(3-3/2)**

Robotics

Kinematics, statics, dynamics and control of robot arms. Robot actuators, drives, sensors, and vision. Applications of robots. Laboratories: task planning and programming of industrial robots.

Prerequisite: Mechanical Engineering 473.

Manufacturing Engineering 507 **H(3-3)**

Organization and Technical Management in Manufacturing

Manufacturing functions. Manufacturing business and financial models. Strategic role of technology. Technology forecasting and planning. Product life cycles. Functional architecture and structured product design. Product configuration management. Technical organizations and their structures. Organization design for technical functions. Resources, projects and activities. Project planning, costing, and control. Technical project evaluation. Organization of non-technical functions. Purchasing, inventory control, marketing and accounting. Human resource management. Due to the emphasis on real world case studies, not all subject areas will be covered in any given year.

Note: The laboratory work will emphasize case studies and projects related to manufacturing organizations.

Manufacturing Engineering 509 **H(3-2)**

Integrated Manufacturing Systems II

Manufacturing strategy and competitive manufacturing. Queuing theory and its application to manufacturing systems analysis (including rapid modelling tools). Linear programming and its application to manufacturing systems problems. Scheduling problems in manufacturing. Supply chain modelling and integration. Enterprise resource planning systems.

Prerequisite: Manufacturing Engineering 415.

Manufacturing Engineering 512 **F(3-3)**

Manufacturing Engineering Design Methodology and Application

The preliminary and detailed design of a mechanical/manufacturing system with the emphasis on design for manufacturing, concurrent design, human factors, cost analysis, and material selection. Additional topics include design methodology and general design principles for manufactureability, design for forming, design for assembly, material removal, joining, assembly and assurance. Applications of formal design methods including concurrent design, decision processes and probabilistic design to mechanical components and manufacturing systems. Principles of design for manufacture and application to casting, forming, material removal, and joining processes. Material selection and cost analysis. The design project may be sponsored by industry or the department. Also an emphasis is given to writing the design proposal, the final design report, and presentation to a committee from the department and industry.

Prerequisite: Fourth year standing.

Manufacturing Engineering 513 **H(3-2)**

Artificial Intelligence in Manufacturing

Introduction of artificial intelligence; knowledge-based systems, state space representation, search strategies, knowledge representation, and reasoning with uncertainty; fuzzy sets, membership functions and operations, fuzzy relations, and fuzzy reasoning; neural networks, basic neuron modelling, multi-layer perceptron, self-organizing networks and adaptive resonance theory; genetic algorithms, fundamentals of genetic algorithms, and genetic algorithms for optimization and search; applications of artificial intelligence in design and manufacturing

Prerequisite: Engineering 335.

Manufacturing Engineering 515 **H(3-1T-3/2)**

Computer-Based Control for Manufacturing

Basic concepts of analogue and digital control. Computer control systems. Programmable logic controllers. Digital control of single-input single-output (SISO) and multi-input multi-output (MIMO) systems. Intelligent control systems.

Prerequisite: Mechanical Engineering 461.

Manufacturing Engineering 519 **H(3-2)**

Special Topics in Manufacturing Engineering

Advanced topics in Manufacturing Engineering.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Manufacturing Engineering 521 **H(70 hours)**

Manufacturing Practicum

Review of material removal and solidification mechanisms, measurement systems, tolerancing. Operation and characterization of material removal processes and specific machines including saws, lathes, drills, milling machines as well as adjunct processes such as layout and inspection. Expendable mould casting processes including pattern design, mould making, melting and pouring practice. Process planning and evaluation. Design for manufacture. Workshop operations and safety.

Manufacturing Engineering 527 **H(3-2)**

Production and Project Engineering

Contract law and the tendering process. Cost analysis. Critical Path Method of scheduling including network diagrams, manpower levelling, and minimizing project cost. Industrial Engineering work measurement techniques.

Manufacturing Engineering 529 **H(3-2)**

Introduction to Microelectromechanical Systems

Microelectromechanical systems (MEMS) and devices including microsensors and microactuators. Principles of operation, material properties, fabrication techniques including surface and bulk micromachining, IC-derived microfabrication techniques, sensing and actuation principles, sensor dynamics issues, circuit and system issues, packaging, calibration and testing. Illustrative examples include (1) micromachined inertial sensors and actuators for manufacturing processes, (2) microactuator arrays for “smart surfaces,” (3) biosensors for medical applications, and (4) transducers for aerospace applications.

Prerequisite: Mechanical Engineering 461.

Manufacturing Engineering 533 **H(3-3/2)**

Elements of Automation

Digital circuits, microprocessor arithmetic, design, programming, and interfacing; I/O devices; sensors and actuators; work cells and production lines; automatic process control; laboratory: design and programming of mobile robots.

Graduate Courses

Manufacturing Engineering 601 **H(3-0)**

Artificial Intelligence Applications in Manufacturing

Artificial intelligence; expert systems, system components and architecture, knowledge representation, search techniques, uncertainty; AI planning, problem representation, solution methods; programming languages and expert system shells for developing expert systems; introduction of neural networks, basic neuron model, multilayer perception, self organizing networks, adaptive resonance memory. Applications to design, manufacturing planning and robotics.

Manufacturing Engineering 605 **H(3-0)**

Planning and Control of Computer Integrated Manufacturing

Advanced techniques for the design, planning, and control of integrated manufacturing systems. Course elements include: a framework for manufacturing planning and control; data flow and structured modelling methodologies; hierarchical models of manufacturing; cellular manufacturing organization; databases and communications; forecasting, demand management, capacity planning and master production scheduling; materials requirements planning, manufacturing resource planning, Just-in-Time manufacture, and Optimized Production Technology; control of independent demand inventory items; production activity control, shop floor control, scheduling, order release and dispatching; simulation in planning and control.

Manufacturing Engineering 611 **H(3-0)**

Multi-Agent Systems

Historical background; types and definitions of agents; knowledge representation and reasoning; agent theories, architectures and languages; possible world model and alternatives; symbolic, reactive and hybrid architectures; agent communication; coordination, cooperation, negotiation and planning; agent frameworks; example multi-agent systems are considered throughout the course.

Manufacturing Engineering 613 H(0-3S)

Research Seminar I

Reports on studies of the literature or of current research. This course is compulsory for all MSc and thesis-route MEng students and must be completed before the thesis defence.

Manufacturing Engineering 617 H(3-0)

Real-time Distributed Control Systems

Shop floor control systems. Programmable logic controller (PLC) concepts, languages and models (e.g., IEC 61131-3). Real-time distributed control models (e.g., IEC 61499, RT-UML). Intelligent control: real-time distributed control system design; safety-critical system issues; reconfiguration issues.

Manufacturing Engineering 619 H(3-0)

Special Problems in Manufacturing Engineering

Designed to provide graduate students, especially at the PhD level, with the opportunity of pursuing advanced studies in particular areas under the direction of a faculty member. Students would be required to consider problems of an advanced nature.

Manufacturing Engineering 621 H(3-0)

Optimization Methods with Robotics Applications

Designed for graduate and senior undergraduate students interested in advanced topics in robotics. Based on the students' research topics, contents may vary. These include: fundamental theory in robotics, mathematical toolbox for optimization, differential kinematics, kinematics and actuation redundancy, optimal control, cooperating manipulators, redundancy in force sensing and sensor fusion.

Manufacturing Engineering 682 F(3-0)

Engineering Design Methodology and Pedagogy

The role of design methodology in the product realization process; the role of design methodology in engineering design training of novice designers; design as programme integration; instructional methods; design education literature; the role of learning styles, teamwork, project-centred learning; managing training methods; tool-based learning.

Manufacturing Engineering 698 F(0-4)

Graduate Project

Individual project in the student's area of specialization under the guidance of the student's supervisor. A written proposal, one or more written progress reports, and a final written report are required. An oral presentation is required upon completion of the course. Open only to students in the MEng (courses only) program.

Manufacturing Engineering 713 H(0-3S)

Research Seminar II

Reports on studies of the literature or of current research. This course is compulsory for all PhD students and must be completed before the candidacy examination.

Marine Science MRSC

Formal courses in Marine Biology are to be offered at the Western Canadian Universities Marine Biological Station situated at Bamfield on the Pacific Coast of Vancouver Island, B.C. Instructors will generally be drawn from the staffs of the participating universities (University of Alberta, University of Calgary, University of British Columbia, Simon Fraser University, University of Victoria).

Appropriate courses at the 300 level (or higher) in Biology, Botany and/or Zoology are prerequisite to these courses.

Each full course will last six weeks (plus four days travelling time) with an average of 50 hours weekly of lectures, laboratories, tutorials and field trips.

Fall Program: The Western Canadian Universities Marine Biological Society offers an integrated program of courses in Marine Biology at the Bamfield Marine Station. Attendance at the program requires residence at Bamfield Marine Station for an entire Fall term. Details are available from the Department of Biological Sciences.

Application to register must be made to the Bamfield Committee. For further information students should consult the Department of Biological Sciences.

†Numbers in parentheses are the course numbers listed by the Bamfield Marine Station. In many cases these courses have been renumbered to fulfill University of Calgary requirements. The courses listed below are not necessarily offered every year. Other courses and specific titles in special topics courses will be offered yearly. Students are requested to check current listings in the Department of Biological Sciences.

Senior Courses

Marine Science 420

Marine Phycology

A survey of the marine algae, with emphasis on the benthic forms in the vicinity of the Bamfield Marine Station. Lectures, laboratory work, field collecting, identification and observation. The study of living specimens is emphasized both in the laboratory and in the field.

Marine Science 430

Marine Ecology

An analytical approach to biotic associations in the marine environment. Opportunities will be provided for study of the intertidal realm in exposed and protected areas and of beaches and estuaries in the vicinity of the Bamfield Marine Station; plankton studies and investigations of the subtidal and benthic environments by diving and dredging are envisaged.

Marine Science 440
(Marine Science 411†)

Comparative Invertebrate Embryology

A study of developmental patterns in marine representatives of most major and minor invertebrate phyla. Lecture topics will include fertilization and embryonic development as well as larval structure, behaviour and metamorphosis. Laboratory work will include methods and techniques of obtaining and handling of gametes, preparation and maintenance of larval cultures and observations on development. Various pelagic larvae collected from the plankton will be studied and some experimental work will be included.

Marine Science 450
(Marine Science 435†)

Introduction to Biological Oceanography

The biology of the oceans; supporting coverage of relevant physics and chemistry; plankton biology, community structure and life histories and influencing environmental factors. Collections will be made from sheltered inlets through Barkley Sound to offshore waters; field and laboratory studies of plankton organisms.

Marine Science 451
(Marine Science 450†)

Principles of Aquaculture

Interdisciplinary introduction to the principles underlying the commercial cultivation of aquatic plants and animals emphasizing marine systems. The course will include working site-visits to a range of commercial farms and Research and Development facilities.

Prerequisite: Biology 233.

Marine Science 500
(Marine Science 400†)

Directed Studies

Directed studies under the supervision of a member of the faculty. Involves a research project approved by the supervisor in the field of interest of the student, and will be designed to take maximum advantage of the laboratory and/or field opportunities offered by the Bamfield Marine Station.

Marine Science 501
(Marine Science 402†)

Special Topics in Marine Biology

This course will be offered, as opportunities arise, by distinguished scientists visiting at the Bamfield Marine Station who are prepared to offer a course extending over a 3 week period.

MAY BE REPEATED FOR CREDIT

Marine Science 502
(Marine Science 401†)

Special Topics in Marine Biology

This course will be offered, as opportunities arise, by distinguished scientists visiting at the Bamfield Marine Station who are prepared to offer a course extending over a 6-week period.

MAY BE REPEATED FOR CREDIT

Marine Science 503
(Marine Science 454†)

Special Topics in Aquaculture

Examination of the culture techniques for selected groups of aquatic plants, animals or microorganisms. Participants will be expected to complete a project which examines some aspect of applied science relevant to commercial culture.

Prerequisite: Marine Science 451.

MAY BE REPEATED FOR CREDIT

Marine Science 505
(Marine Science 460†)

Special Topics in Aquacultural Applied Science

Examination of the principles underlying the application of selected areas of scientific information to commercial aquaculture. Participants will be expected to complete a written project.

Prerequisite: Marine Science 451.

MAY BE REPEATED FOR CREDIT

Marine Science 507 **H(0-6)**

Directed Studies

Directed studies under the supervision of a member of the faculty. Involves a research project approved by the supervisor in the field of interest of the student, and will be designed to take maximum advantage of the laboratory and/or field opportunities offered by the Bamfield Marine Station.

Marine Science 509
(Marine Science 470†)

Directed Research in Aquaculture

Design and execution of a research project in the field of aquaculture under the supervision of a scientist working in association with the Bamfield Station. A written report is a requirement.

Prerequisite: Marine Science 451.

Marine Science 511 **H(3S-0)**
(Marine Science 480†)

Papers and Seminar in Marine Science

The purpose of this course is to provide a forum for students to integrate the knowledge they are obtaining from the other courses in this program. It will be a combination of presentations by resident and visiting researchers followed by discussion, discussion of original papers selected by the instructor(s), and short critiques of original papers by each student.

Prerequisites: Students are expected to have completed 2 years of a Biology program. Others may be admitted by permission of the instructor in consultation with the Bamfield Marine Station.

Marine Science 515 **H(3-3)**
(Marine Science 415 †)

Structure and Function in Marine Animals

This course will use marine invertebrates and vertebrates to explore the structural plans of animals in a functional framework. Rather than providing a comprehensive survey of diversity in the animal kingdom, specific taxa will be chosen that exemplify specific systems (e.g., respiratory, skeletal, nervous, etc.). The major taxa will be discussed together with minor groups that have peculiarities that are of general biological importance. This course will combine the disciplines of classification, evolution, morphology, biomechanics, physiology and biochemistry. The emphasis placed on each discipline will depend on the interests of the instructor. Fieldwork will be integrated with the laboratory exercises.

Prerequisites: Students are expected to have completed 2 years in a Biology program and to have successfully completed introductory courses in organismal diversity, physiology, cell biology and/or biochemistry. Others may be admitted by permission of the instructor in consultation with the Bamfield Marine Station.

Marine Science 525 **H(3-3)**
(Marine Science 425†)

Ecological Adaptations of Seaweeds

An exploration of morphological, physiological, genetic and reproductive adaptations of seaweeds to their natural and man-altered environments. Daily lectures and laboratory exercises will complement frequent field observations.

Prerequisites: Students are expected to have completed 2 years in a Biology program and to have successfully completed courses in organismal diversity, introductory genetics, cell biology and/or biochemistry. Statistics is recommended. Others may be admitted by permission of the instructor in consultation with the Bamfield Marine Station.

Marine Science 537 **H(3-3)**
(Marine Science 437†)

Population and Community Ecology of Marine Organisms

An introduction to the concepts of marine plant, animal and community ecology. Emphasis will be on organism/physical and chemical environmental interactions, organismal interactions, and concepts of biological diversity. Daily lectures and laboratory exercises will be complemented by frequent field excursions.

Prerequisites: Students are expected to have completed 2 years in a Biology program. Statistics is recommended. Others may be admitted by permission of the instructor in consultation with the Bamfield Marine Station.

Marine Science 540
(Marine Science 440†)

Biology of Marine Birds

A study of the interrelationship of birds and the marine environment. Lectures will emphasize the systematics and ecological relationships, behaviour, life histories, movements and conservation of marine birds. Census techniques and methods of study of marine birds in the field will be considered. Seabird identification, classification, orphology, plumage and molt will be examined in the laboratory.

Prerequisite: Zoology 377.

Marine Science 544
(Marine Science 445†)

Biology of Marine Mammals

A survey course covering systematics and distribution of marine mammals, their sensory capabilities and physiology, with special emphasis on the Cetacea. The course will include field work in the vicinity of Barkley Sound and will include an independent field study.

Prerequisite: Zoology 377.

Marine Science 546
(Marine Science 446†)

Comparative Ethology

A comparative study of marine animals (vertebrate and invertebrate) emphasizing behavioural description, underlying physiological mechanisms, the biological significance of behaviour and behavioral evolution. The course will include independent laboratory and field studies.

Prerequisites: Zoology 375, 377 and Biology 313. **Note:** Completion of Zoology 461 and either 463 or 465 prior to this course will be of definite advantage.

Note: Credit for both Zoology 567 and Marine Science 546 will not be allowed.

Marine Science 572
(Marine Science 410†)

Marine Invertebrate Zoology

A survey of the marine phyla emphasizing natural history, morphology and systematics of the local invertebrate fauna. The course will include lectures, laboratory work, field collection, identification and observation. The study of living specimens is emphasized both in the laboratory and in the field.

Marine Science 574
(Marine Science 412†)

Biology of Fishes

Classification, physiology, ecology, behaviour and zoogeography of fishes with particular emphasis on those in the marine environment of the British Columbia coast. Involves some field projects.

Marine Science 582
(Marine Science 413†)

Biology of Marine Molluscs

An advanced course of selected topics emphasizing functional morphology, ecology and evolution. Field trips will be undertaken to survey the representative molluscs of the Bamfield region. Students will be expected to complete an independent field or laboratory study of selected molluscs.

Prerequisite: Marine Science 572 (410) or equivalent.

Graduate Courses

Enrollment in any Graduate Course requires consent of the Department.

600-level courses are available with permission to undergraduate students in the final year of their programs.

Special Graduate Courses: Each year the Western Canadian Universities Marine Biological Society offers short (one-week) intensive courses especially for graduate students interested in Marine Biology. Topics vary from year to year. Details are available from the Department of Biological Sciences.

Marine Science 600
(Marine Science 500†)

Directed Studies

A course of directed studies under the supervision of a member of faculty, involving a research project approved by the supervisor. Each study will be designed to take maximum advantage of laboratory and/or field opportunities offered by the Bamfield Marine Station.

Marine Science 601
(Marine Science 502†)

Special Topics (3 weeks)

Courses of a specialized nature offered, as opportunities arise, by distinguished scientists visiting the Bamfield Marine Station.

Marine Science 602
(Marine Science 501†)

Special Topics (6 weeks)

Courses of a specialized nature offered, as opportunities arise, by distinguished scientists visiting the Bamfield Marine Station.

Marketing MKTG

Instruction offered by members of the Haskayne School of Business.

Marketing Chairperson – J. Agarwal

Note: Students have the opportunity to take courses offered by the Haskayne School of Business without the stated prerequisites, with the written permission of the Associate Dean (Undergraduate Programs), as appropriate, upon the recommendation of the instructor of the course. However, should a student fail to achieve satisfactory standing in any course for which the stated prerequisite(s) is (are) lacking, he/she may be required to successfully complete the

stated prerequisite(s) prior to being permitted to repeat the course. Students are required to have consent of the Haskayne School of Business Office before registering in 600-level courses offered by the Haskayne School of Business.

Senior Courses

Marketing 317 **H(3-2)**

Foundations of Marketing

An introductory marketing course designed for management students to introduce the principles and practices of marketing. Topics will cover basic marketing concepts, societal issues, and the decision-making process of marketers in developing marketing strategies and plans. The focus of the course will be on the implementation of specific product, pricing, distribution and communication strategies for specific market situations.

Prerequisites: Admission to the Haskayne School of Business, Management Studies 291 and second year standing.

Corequisite: Management Studies 391.

Note: Not open to students with credit in Marketing 367.

Marketing 341 **H(3-0)**

Introduction to Marketing

An introductory marketing course designed for non-Management students to introduce the broad principles and practices of marketing from both an organizational and societal perspective. Topics will cover basic marketing concepts, societal issues, and the decision process of marketers in developing, pricing, promoting and distributing their products.

Note: Not available for credit toward the Bachelor of Commerce Degree. Until August 15, preference in enrollment is given to students who have declared a Management and Society minor.

Marketing 431 **H(3-0)**

Retail Management

A strategic approach to the retail industry. Managing the retail operation, including site selection, store design, consumer behaviour in retail situations, buying, inventory management, and visual merchandising. The role of retailing in the global economy.

Prerequisites: Third year standing and Marketing 317.

Marketing 433 **H(3-0)**

Business-To-Business Marketing

Marketing management and theory applied to the purchase of products and services by organizations. Topics include industrial market dynamics, organizational buying behaviour, relationship development, technology, and the importance of innovation.

Prerequisites: Third year standing and Marketing 317.

Marketing 435 **H(3-0)**

Marketing Communications

Evaluations of the roles of various communication tools including advertising, sales promotion, personal selling and public relations.

Prerequisites: Third year standing and Marketing 317.

Marketing 449 **H(3-0)**

Sales Management

Strategic and managerial aspects of professional selling and sales force management. Topics include sales forecasting, recruitment, training, motivation, compensation and territory management, CRM, integration of technology, sales professionalism/ ethics.

Prerequisites: Third year standing and Marketing 317.

Marketing 465 **H(3-0)**

Marketing Research

Understanding how to conduct and evaluate research for management decision making. Emphasis on research design, measurement concepts, sample design, fieldwork, statistical concepts, data analysis and reporting research findings. Practical application by doing a field research study.

Prerequisites: Third year standing and Marketing 317.

Marketing 467 **H(3-0)**

International Marketing

A course on the environment and basic principles underlying the design and implementation of marketing strategies across national boundaries. Topics will follow the decision process of international marketers in researching the environment, planning the entry strategy and designing their activities on product, distribution, promotion and pricing.

Prerequisites: Third year standing and Marketing 317.

Marketing 477 **H(3-0)**

Product Management

An in-depth examination of product management issues facing organizations. This includes strategic innovation, product portfolio, new product/service development, brand management, and diffusion of technology.

Prerequisites: Third year standing and Marketing 317.

Marketing 479 **H(3-0)**

Management of Marketing Channels

Development and maintenance of relationships between firms and their channel partners with an emphasis on the competitive advantage that such relationships offer. Topics include strategic channel design, channel evaluation, the role of channel partners in product/service development demand forecasting, pricing for competitive advantage and inventory control.

Prerequisites: Third year standing and Marketing 317.

Note: Not open to students with credit in Marketing 433.

Marketing 483 **H(3-0)**

Buyer Behaviour

Study of factors influencing buyer decision making, processes and purchase behaviour. Topics include understanding buyer motivation, personality, learning and attitudes as well as the influence of culture, social class, groups, and situational contexts.

Prerequisites: Third year standing and Marketing 317.

Marketing 487 **H(3-0)**

Services Marketing

Application of the managerial practices and theory related to services marketing. Topics include management and measurement of service quality, service recovery. The linking of customer measurement to performance measurement, and cross-function issues through integration of marketing with disciplines such as operations and human resources.

Prerequisites: Third year standing and Marketing 317.

Marketing 493 **H(3-0)**

Market Planning

Market planning is explored in the context of overall corporate strategy. Integrates the aspects of the market mix into formal planning systems. The focus of the course is on strategic responses to changing customer needs and competitive activities.

Prerequisites: Fourth year standing and Marketing 317.

Graduate Courses

Marketing 601 **H(3-0)**

Marketing Management

An introductory course on marketing management with an emphasis on marketing concept as the focus of business strategy. The decision variables as well as functional frameworks used by marketing managers are emphasized by concentrating on the relationship between business and consumers.

Note: Credit for both Marketing 601 and 661 will not be allowed.

Marketing 735 **H(3-0)**

Marketing Communications

Evaluation of strategic roles of a variety of communication disciplines - such as advertising, direct response advertising, sales promotion and public relations - and how companies combine those disciplines to provide clarity, consistency, and maximum impact.

Prerequisite: Marketing 601 or 661.

Marketing 741 **H(3-0)**

Business-To-Business Marketing

Management issues in the marketing of products and services to business, government and industrial customers. Topics include organizational buying behaviour, industrial market segmentation, demand analysis and sales forecasting, development and implementation of an industrial marketing mix.

Prerequisite: Marketing 601 or 661.

Marketing 761 **H(3-0)**

Buyer Behaviour

Study of factors influencing buyer decision-making processes and purchase behaviours, with implications for marketing practice.

Prerequisite: Marketing 601 or 661.

Marketing 763 **H(3-0)**

Marketing Research

Study of research as a process for gathering market information to aid problem solving. Steps in the research process reviewed include problem

definition, research design, data collection, data analysis and report preparation.

Prerequisite: Marketing 601 or 661.

Marketing 783 **H(3-0)**

Services Marketing and Management

Study of processes and practices relevant to strategic firms using service for competitive advantage. Focuses on the integration of marketing, operations, and human resources from the consumer's perspective.

Prerequisite: Marketing 601 or 661.

Note: Credit for both Marketing 783 and 789.01 will not be allowed.

Marketing 785 **H(3-0)**

New Venture Marketing

The development of new products with emphasis both upon product design and market feasibility.

Prerequisite: Marketing 601 or 661.

Marketing 789 **H(3S-0)**

Seminar in Marketing Management

Intensive study and discussion of current literature and research with respect to selected, advanced topics in marketing.

Prerequisite: Marketing 601 or 661 or consent of the business school.

MAY BE REPEATED FOR CREDIT

Marketing 793 **H(3-0)**

Strategic Market Planning

Strategic market planning in a corporate context. Developing marketing plans and understanding implementation. Examining the market management process.

Prerequisite: Marketing 601 or 661.

Marketing 795 **H(3-0)**

International Marketing

Design and implementation of marketing strategies across countries. Focuses on the global marketing environment and decision issues on foreign market entry, local marketing and global management of marketing activities.

Prerequisite: Marketing 601 or 661.

Marketing 797 **H(3S-0)**

Advanced Seminar in Marketing

Prerequisite: Consent of the business school.

MAY BE REPEATED FOR CREDIT

PhD Course

Marketing 799 **H(3S-0)**

Doctoral Seminars in Marketing

799.01. Philosophy of Marketing

799.02. Current Topics in Marketing

799.03. Seminar in Marketing

Mathematics MATH

Instruction offered by members of the Department of Mathematics and Statistics in the Faculty of Science.

Department Head – T. Bisztriczky

Note: For listings of related courses, see Actuarial Science, Applied Mathematics, Pure Mathematics, and Statistics.

Mathematics 011 **E(8 hours)**

Ready for Calculus: Review of High School Mathematics (Based on Diagnostic Tests)

Manipulation of algebraic expressions and functions, polynomial, distance, lines, circles, trigonometric functions, logarithms and exponents.

Note: Open to all students.

NOT INCLUDED IN GPA

Mathematics 012 **E(8 hours)**

Review of Mathematics 249/251

Reviews Mathematics 249/251 material for students enrolled in Mathematics 253 or 263. Students will receive a set of review problems on Mathematics 249/251 material and will work on these problems in a tutorial setting. Instructors will be available to answer questions.

Note: Open to all students.

NOT INCLUDED IN GPA

Mathematics 013 **E(8 hours)**

Eigenvalues and Eigenvectors

A supplement to Mathematics 211 material for students who require Mathematics 221 for their programs. Could also serve as a review of these particular topics for students who have completed Mathematics 221 or equivalent.

Note: Open to students with credit in Mathematics 211 or 221 or equivalent.

NOT INCLUDED IN GPA

Mathematics 014 **E(16 hours)**

Multivariate Topics from Applied Mathematics 219

Multiple Integration and applications.

Prerequisite: Consent of the Department of Mathematics and Statistics or the Faculty of Engineering.

Note: Designed to rectify a deficiency for those students whose Calculus I and II courses did not cover the multivariate topics from Applied Mathematics 219.

NOT INCLUDED IN GPA

Mathematics 017 **E(8 hours)**

Topics from Applied Mathematics 217

Inverse functions and inverse trigonometric functions. Hyperbolic and inverse hyperbolic functions. Indeterminate forms. Applications of integration.

Prerequisite: Consent of the Department.

Note: Designed to rectify a deficiency for those students whose first Calculus course did not cover some of the topics from Applied Mathematics 217.

NOT INCLUDED IN GPA

Mathematics 021 **E(8 hours)**

Solve it with S-Plus

Intended for students who have little or no experience with the statistical language S-Plus which is used in a number of Statistics courses. The focus of the course is on the basics: manipulating data, graphing data, writing simple functions. Prior experience with either UNIX or S-Plus is not required.

Note: Open to all students in second year or higher. Limited enrollment.

NOT INCLUDED IN GPA

Mathematics 032 **E(8 hours)**

Introduction to Mathematical Software

A hands-on course involving on-line calculations, graphics, programs and sources of error in the basic packages of Maple, Mathematica, and Matlab.

Note: Open to all students.

NOT INCLUDED IN GPA

Mathematics 041 **E(8 hours)**

Induction and Recursion

Simple examples illustrating implications. Principle of induction with examples from number theory, combinatorics, geometry, etc. Recursion and its relation to induction.

Note: Open to all students. Strongly recommended for students planning to take Mathematics 271.

NOT INCLUDED IN GPA

Junior Courses

Note: Students who have not studied mathematics for some time are strongly advised to review high school material thoroughly prior to registering in any junior level mathematics course.

Mathematics 205 **H(3-1)**

Mathematical Explorations

A mathematics appreciation course. Topics selected by the instructor to provide a contemporary mathematical perspective and experiences in mathematical thinking. May include historical material on the development of classical mathematical ideas as well as the evolution of recent mathematics.

Prerequisite: Mathematics 30 or Pure Mathematics 30.

Note: For students whose major interests lie outside the sciences. Highly recommended for students pursuing an Elementary School Education degree.

Note: It is not a prerequisite for any other course offered by the Department of Mathematics and Statistics, and cannot be used for credit towards any Major or Minor program in the Faculty of Science except for a major in General Mathematics.

Mathematics 211 **H(3-1T-1)**

Linear Methods I

Linear equations. Matrices. Vectors. Elements of coordinate geometry. Complex numbers. Determinants. Applications.

Prerequisite: A grade of 70 per cent or higher in Mathematics 30 or Pure Mathematics 30.

Note: Credit for both Mathematics 211 and 221 will not be allowed.

Note: See the paragraph titled Mathematics Diagnostic Test in the Program section of this Calendar.

Mathematics 221 **H(3-1T-1)**

Linear Algebra for Scientists and Engineers

Systems of equations and matrices, vectors, matrix representations, and determinants. Complex numbers, polar coordinates. Eigenvalues, eigenvectors. Applications in the physical sciences.

Prerequisite: A grade of 70 per cent or higher in Mathematics 30 or Pure Mathematics 30.

Note: Credit for both Mathematics 221 and 211 will not be allowed.

Note: See the paragraph titled Mathematics Diagnostic Test in the Program section of this Calendar.

Mathematics 249 **H(4-1T-1)**

Introductory Calculus

Algebraic operations. Functions and graphs. Limits, derivatives, and integrals of exponential, logarithmic and trigonometric functions. Fundamental theorem of calculus. Applications.

Prerequisite: A grade of 70 per cent or higher in Mathematics 30 or Pure Mathematics 30.

Note: Not open to students with 60% or higher in Mathematics 31, except with special departmental permission.

Note: See the paragraph titled Mathematics Diagnostic Test in the Program section of this Calendar.

Mathematics 251 **H(3-1T-1)**

Calculus I

Functions and graphs, transcendental functions. Limits, derivatives, and integrals of exponential, logarithmic and trigonometric functions. Fundamental theorem of calculus. Applications.

Prerequisite: A grade of 70 per cent or higher in Mathematics 30 or Pure Mathematics 30 and a grade of 50 per cent or higher in Mathematics 31.

Note: Credit for both Mathematics 251 and either 249 or Applied Mathematics 217 will not be allowed.

Note: This course provides the basic techniques of differential calculus as motivated by various applications. Students performing sufficiently well in a placement test may be advised to transfer directly to Mathematics 253 or 263.

Note: See the paragraph titled Mathematics Diagnostic Test in the Faculty section of this Calendar.

Mathematics 253 **H(3-1T-1)**

Calculus II

Inverses of trigonometric functions. Methods of integration, improper integrals. Separable differential equations, first and second order linear differential equations, applications.

Prerequisite: Mathematics 249 or 251 or Applied Mathematics 217.

Note: Credit for both Mathematics 253 and either 263 or Applied Mathematics 219 will not be allowed.

Note: Mathematics 253 or 263 is a prerequisite for many 300-level courses in Pure Mathematics, Applied Mathematics, Statistics and Actuarial Science. Students in programs offered by the Department of Mathematics and Statistics are strongly recommended to take Mathematics 263.

Mathematics 263 **H(4-1T-1)**

Enriched Calculus II

Inverses of trigonometric functions. Methods of integration, improper integrals. Separable differential equations, first and second order linear differential equations, applications. Enrichment topics include an introduction to a rigorous theory of Calculus.

Prerequisite: Mathematics 249 or 251 or Applied Mathematics 217.

Note: Credit for both Mathematics 263 and either 253 or Applied Mathematics 219 will not be allowed.

Note: Strongly recommended for students in programs offered by the Department of Mathematics and Statistics.

Mathematics 271 **H(3-1T-1)**

Discrete Mathematics

Proof techniques. Sets and relations. Induction. Counting and probability. Graphs and trees.

Prerequisite: Mathematics 211 or 221.

Note: Philosophy 279 or 377 is highly recommended to complement this course.

Note: Mathematics 041 is highly recommended as preparation.

Senior Courses

Mathematics 311 **H(3-1T)**

Linear Methods II

Vector spaces and subspaces. Linear independence. Matrix representation of linear transformations. Eigenvalues and eigenvectors. Quadratic forms. Inner products. Gram-Schmidt orthogonalization.

Prerequisite: Mathematics 211 or 221.

Mathematics 321 **H(3-1T)**

Mathematical Probability

Sample spaces. Discrete probability. Discrete and continuous random variables. Standard distributions. Mathematical expectation and variance. Moments and moment generating functions. Central limit theorm. Functions of random variables. Introduction to statistical inference.

Prerequisite: Mathematics 253 or 263 or Applied Mathematics 219.

Mathematics 323 **H(3-1T)**

Introduction to Mathematical Statistics

Bivariate distributions. Sampling distributions. Chi-squared, F and t distributions. Estimation. Hypothesis tests (proportions, means, variance, chi-square). Method of moments. Maximum likelihood estimators. Neyman-Pearson lemma. Likelihood ratio tests. Elementary regression and correlation.

Prerequisite: Mathematics 321.

Corequisite: Mathematics 353.

Mathematics 331 **H(3-1T)**

Multivariate Calculus

Systems of ordinary differential equations. Calculus of functions of several variables. Introduction to vector analysis, theorems of Green, Gauss and Stokes.

Prerequisite: Mathematics 253 or 263 or Applied Mathematics 219 and either 221 or both 211 and 013.

Note: Credit for both Mathematics 331 and either 353 or Applied Mathematics 309 will not be allowed.

Note: This course is not a member of the list of courses constituting the fields of Actuarial Science, Applied Mathematics, Pure Mathematics, or Statistics and cannot normally be substituted for Mathematics 353 in degree programs in any of those fields.

Mathematics 349 **H(3-1T)**

Calculus III

Infinite sequences and series. Polar coordinates, parametric equations, arc length. Vector geometry, differentiation of vector-valued functions. Partial differentiation.

Prerequisites: Mathematics 253 or 263 or Applied Mathematics 219; and Mathematics 211 or 221.

Mathematics 353 **H(3-1T)**

Calculus IV

Applications of partial differentiation, multiple integrals, vector calculus including Stokes' and the Divergence Theorems.

Prerequisite: Mathematics 349.

Note: Credit for both Mathematics 353 and either 331 or Applied Mathematics 309 will not be allowed.

Mathematics 401 **H(3-0)**

Special Topics

Higher level topics which can be repeated for credit.

Prerequisite: Consent of the Department.

Note: This course is designed to add flexibility to completion of an undergraduate pure mathematics or general mathematics program.

MAY BE REPEATED FOR CREDIT

Mathematics 403 **H(3-0)**

Topics in Mathematics for Economics

Techniques of integration. Multiple integrals. Analysis of functions. Continuity. Compact sets. Convex sets. Separating hyperplanes. Lower and upper hemi-continuous correspondences. Fixed point theorems, Optimal control.

Prerequisite: Mathematics 253 or 263 or Applied Mathematics 219 or both Economics 387 and 389.

Mechanical Engineering ENME

Instruction offered by members of the Department of Mechanical and Manufacturing Engineering in the Faculty of Engineering.

Department Head – P. Gu

Director (Mechanical Engineering Program) – J. Pieper; Director (Manufacturing Engineering Program) – R.W. Brennan; Director (Graduate Studies and Research) – J. Ronsky

Mechanical Engineering 001 **H(32 hours)**

Mechanical and Manufacturing Engineering Block Course

Special topics in Mechanical and Manufacturing Engineering. Research and industry presentations, software training, informational sessions, and field trips as resources permit.

Note: Presented during block week in the Fall Session over 4 days. All Mechanical and Manufacturing Engineering students must complete this course at least once prior to graduation. Students are encouraged to complete this course as soon as possible after acceptance into the Department.

NOT INCLUDED IN GPA

Senior Courses

Mechanical Engineering 341 **H(3-1.5T-3/2)**

Fundamentals of Fluid Mechanics

Basic principles of mechanics of fluids. Fluid statics: forces on surfaces, buoyancy, stability. The continuity, energy and momentum equations and their application to a variety of problems in mechanical engineering. External flows and flow through pipes, jet propulsion and flow measurement. Dimensional analysis and physical similarity.

Prerequisites: Engineering 201, 349 (or 249) and Applied Mathematics 219.

Mechanical Engineering 421 **H(3-3/2)**

Materials I

Fundamentals of materials science with emphasis on the structure of materials and structure/property relationships: atomistic models; equilibrium phase diagrams; kinetics and nonequilibrium transformation diagrams; thermal-mechanical processing; microstructure formation and control; ductility mechanisms; material selection; and an introduction to fracture.

Note: Completion of Physics 269 or 369, Chemistry 209, Engineering 311 and 317 prior to this course will be of definite advantage.

Mechanical Engineering 461 **H(3-3/2)**

Mechatronics

An introduction to electromechanical components and systems including: electromagnetic devices; mechanical and fluidic devices; modelling of physical systems; system linearization; introduction to feedback; analogue and digital control, fuzzy logic and expert system control.

Prerequisite: Engineering 325.

Mechanical Engineering 471 **H(3-2)**
(formerly Mechanical Engineering 581)

Heat Transfer

Modes of heat transfer; conduction, convection, radiation. Conduction in plane walls and cylinders. Conduction-convection systems, fins. Principles of convection. Empirical and practical relations for forced convection heat transfer. Natural convection. Condensation and boiling heat transfer. Heat exchangers. The log-mean temperature difference method.

Prerequisites: Engineering 311, Mechanical Engineering 341.

Mechanical Engineering 473 **H(3-2)**

Fundamentals of Kinematics and Dynamics of Machines

Basic mechanisms and linkages in machinery. Position, velocity, acceleration and dynamic forces in planar mechanisms. Cam design and dynamic analysis. Gears and gear trains. Planetary trains.

Prerequisite: Engineering 249 or 349.

Mechanical Engineering 479 **H(3-1T-3/2)**

Mechanics of Materials I

Special topics in structural members: shear centre, unsymmetric bending, torsion of non-circular thin-walled members. Stiffness analysis of complex structures. The variety of material behaviour. Introduction to virtual work and energy methods. Stability of equilibrium. Buckling.

Prerequisite: Engineering 317.

Mechanical Engineering 485 **H(3-3/2)**

Mechanical Engineering Thermodynamics

Review of fundamentals; thermodynamic properties; flow and non-flow processes; Carnot cycle; Rankin cycle including reheat and regeneration. Engine gas cycles including simple gas turbines; gas turbines with reheat, intercooling and heat exchange. Reciprocating air compressors and expanders. Steam plants. Applications of humidity considerations; heat-pump and refrigeration cycles and their performance criteria. One-dimensional steady flow through nozzles. Combustion processes, chemical equilibrium, dissociation.

Prerequisite: Engineering 311.

Mechanical Engineering 493 **H(3-3)**

Machine Component Design

Introduction to the principles of design. Design for stiffness, strength, and endurance. Surface contacts, wear, and lubrication. Tolerances and fits. Design and selection of mechanical elements such as shafts, bolted joints, welded joints, hydrodynamic bearings, ball and roller bearings, gears, belts, brakes, clutches, and springs.

Prerequisite: Engineering 317.

Mechanical Engineering 495 **H(3-3/2)**

Fluid Mechanics

Fluid statics, kinematics and dynamics of fluid flow, energy equation and Bemoulli's equation. Stream and potential functions, potential flow. Introduction to boundary layer theory, flow in pipe systems. Introduction to compressible flow.

Prerequisites: Engineering 311, Mechanical Engineering 341.

Mechanical Engineering 519 **H(3-2)**

Special Topics in Mechanical Engineering

Advanced topics in Mechanical Engineering.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Mechanical Engineering 521 **H(3-3/2)**

Materials II

Fundamentals and applications of materials science to engineering design: welding metallurgy; deformation and strength behaviour of real materials; failure analysis; high strength fiber composites; fracture mechanics; fatigue; and creep.

Prerequisite: Mechanical Engineering 421.

Note: Completion of Mechanical Engineering 479 and 493 prior to this course will be of definite advantage.

Mechanical Engineering 538 **F(3-3)**

Mechanical Engineering Design Methodology and Application

Preliminary and detailed design of a mechanical system with the emphasis on the design process as it is associated with mechanical engineering. Topics include design methodology and general design principles for engineers, computer aided design, modelling simulation, decision making processes, reliability, embodiment, detailed drawing and product life-cycle design. The design project may be sponsored by industry or the department. Also, an emphasis is given to writing the design proposal, the final design report and presenting these to a committee from the department and industry.

Prerequisite: Fourth year standing.

Mechanical Engineering 547 **H(3-2)**

Finite Element Method

Review of basic concepts in the Theory of Elasticity. Stress, strain, equilibrium. Stress-strain relations. The principle of virtual work and its use in deriving exact and approximate equilibrium equations. Example: beam theory. Matrix analysis of framed structures. The stiffness method. Solution of problems with the aid of the digital computer. The finite element method and other discretization procedures. The 4-node plane stress rectangular element. Shape functions. Derivation of stiffness matrix by means of the principle of virtual work. Isoparametric elements, completeness. Numerical integration of scheme. Programming Considerations. Solution of problems with the aid of a computer. Additional topics: Dynamics, heat transfer, fluid dynamics.

Prerequisite: Mechanical Engineering 479

Mechanical Engineering 560 **F(1-3)**

Mechatronics Design Laboratory

A hands-on laboratory experience in the design and analysis of electro-mechanical components. Introduction to the design of microprocessor-controlled electromechanical systems. Emphasis will be on laboratory projects in which small teams of students will configure, design, and implement a succession of mechatronic systems. Laboratories cover topics such as aliasing, quantization, electronic feedback, power amplifiers, digital logic, encoder interfacing, and motor control in a building succession leading to more sophisticated use of equipment for prototyping and design of commercially viable products. Lectures will complement the laboratory experience with comparative surveys, operational principles, and integrated design issues associated with the spectrum of mechanism, electronics, and control components.

Prerequisite: Mechanical Engineering 461.

Mechanical Engineering 583 **H(3-2)**

Mechanical Systems in Buildings

Fundamentals of heating, ventilating, and air conditioning systems in buildings. Heating and cooling loads. Codes, regulations, and standards. System selection, generation equipment, heat exchangers, distribution and driving systems, terminal units, controls and accessories, and cost estimating. Energy efficiency and renewable energy applications. Elevators and escalators.Lifting devices. Sewage systems.

Prerequisites: Mechanical Engineering 471 and 485

Mechanical Engineering 585 **H(3-1T-3/2)**

Control Systems

Modelling of physical systems; controller architecture and performance specification in the time and frequency domains; Routh-Hurwitz stability; Bode plots and Nyquist stability; pole-zero diagrams and Root locus plots; Proportional/Integral/Derivative (PID) control and dynamic compensation; state space formulations: analogous sampled-data and digital control concepts for a number of control system design techniques.

Prerequisite: Mechanical Engineering 461.

Mechanical Engineering 587 **H(3-1T)**

Mechanics of Materials II

The general state of stress. Formulation of general equilibrium equations. Analytical solution of special problems. Application of energy methods to torsion

problems including, thick-walled cylinders, stability of columns. Analysis of flat plates. Stress concentrations, fracture, fatigue, and contact stresses.

Prerequisite: Mechanical Engineering 479.

Mechanical Engineering 593 H(3-2)

Energy Systems

Energy resources. Energy conservation and management. Thermal power plants, internal and external combustion engines. Introduction to fuel technology and processing. Alternative energy systems: hydroelectric, solar, wind, nuclear, magnetohydrodynamics, thermoelectrics, thermionics, photo-voltaic, fuel cells.

Prerequisites: Mechanical Engineering 471 and 485.

Mechanical Engineering 595 H(3-3/2)

Gas Dynamics

Fundamentals of one-dimensional gas dynamics. Isentropic and non-isentropic flows, applications of dynamical similarity to shock waves. Oblique shocks, supersonic nozzles, flows with friction or heat transfer. Introduction to computational fluid dynamics (CFD).

Prerequisite: Mechanical Engineering 495.

Mechanical Engineering 597 H(3-1T-3/2)

Turbomachinery

Performance of turbomachines, machine selection, Reynolds number and scale effects. Two dimensional flow in turbomachines, degree of reaction and vector diagrams; flow irreversibilities and loss coefficients; pump, compressor and turbine efficiencies. Design of pumps, fans, centrifugal compressors, axial-flow compressors, and axial-flow turbines. Combination of machines with pipes or ducts.

Prerequisite: Mechanical Engineering 495.

Mechanical Engineering 599 H(3-2)

Vibrations and Machine Dynamics

Lagrangian equations: application to mechanical systems. Basic vibration theory: free and forced vibration of single- and multidegree-of-freedom systems; damping in machines; vibration absorbers. Balance of rotating machinery: sources of unbalance, rigid rotors, flexible rotors, critical speeds, balancing principles.

Prerequisite: Mechanical Engineering 473.

Graduate Courses

Mechanical Engineering 603 H(3-0)

Physical Fluid Dynamics

Physical phenomena of incompressible fluid motion for a variety of flows, e.g. pipe and channel flow, flow past a cylinder, and convection in horizontal layers. The derivation of the basic equations of fluid mechanics using Cartesian tensor notation. High and low Reynolds number flows including some solutions of the viscous flow equations, inviscid flow, and elementary boundary layer theory. Thermal free convective flows.

Mechanical Engineering 605 H(3-0)

Combustion Processes

Review of thermodynamics and chemical kinetics of combustion. Fluid mechanics, heat and mass transfer in combustion phenomena. Autoignition and source ignition, flames and detonation. Quenching and explosion hazards, flammability and detonation limits. Heterogeneous combustion, combustion practical systems, combustion as affecting pollution and efficiency, some experimental combustion methods.

Mechanical Engineering 607 H(3-0)

Mechanics of Compressible Flow

One-dimensional steady and unsteady motion with application to the analysis of supersonic nozzles, diffusers, flow in conduits with friction, shock tubes. Two-dimensional flow of ideal fluid. Small perturbation theory, method of characteristics with application to design of supersonic nozzles. Waves in two-dimensional flow.

Mechanical Engineering 613 H(0-3S)

Research Seminar I

Reports on studies of the literature or of current research. This course is compulsory for all MSc and thesis-route MEng students and must be completed before the thesis defence.

NOT INCLUDED IN GPA

Mechanical Engineering 615 H(3-0)

Instrumentation

The main topics covered are commonly used techniques for the measurement of temperature, pressure, velocity, mass-flow, concentration in binary and other mixtures, heat transfer rate and heat flux, calorific value of fuels, viscosity, thermal conductivity and diffusion coefficients. In addition, attention is given to flow visualization techniques and to the recording and handling of experimentally obtained data by various means including automatic recorders, high-speed photography and analog-to-digital data converters.

Mechanical Engineering 619 H(3-0)

Special Problems

Designed to provide graduate students, especially at the PhD level, with the opportunity of pursuing advanced studies in particular areas under the direction of a faculty member. Students would be required to consider problems of an advanced nature.

Mechanical Engineering 625 H(3-0)

Unsteady Gas Dynamics

Origins of unsteady flow; one-dimensional unsteady flow in pipes and ducts; simplified method of analysis, method of characteristics; boundary conditions for method characteristics analyses; graphical and numerical procedures for solving the characteristics equations; application of solution techniques for practical problems; pressure exchangers and other devices utilizing unsteady flow.

Mechanical Engineering 629 H(3-0)

Fuel Science and Technology

Review origins of fuels, reservoir technology and geology. Past, present and future energy supply and demand. Classification of fuels. Physical and chemical properties. Fuel handling and fire hazards. Requirements of conventional and non-conventional power and heating plants. Ecological and efficiency considerations. Some non-conventional fuels.

Mechanical Engineering 631 H(3-0)

Numerical Methods for Engineers

Introduction, mathematical modelling, sources of errors in the process of numerical analysis and solution methodology; Elements of numerical analysis, Taylor series, round-off error, truncation error, concept of stability, consistency and convergence; Linear algebra, normal forms, Gauss elimination method, LU-decomposition, tridiagonal systems of equations; iterative methods, Jacobi, Gauss-Seidel, SOR, SSOR methods, conjugate gradient methods and preconditioning and principles of the multi-grid methods; Elliptic “equilibrium” equation, Laplace and Poisson equations, finite difference and finite control volume concepts and stability analysis; Parabolic equations: explicit, implicit and Crank-Nicolson methods, time-splitting method, method of lines, Stability analysis; Hyperbolic equations; Introduction to other methods; future challenging problems.

Mechanical Engineering 633 H(3-0)

Mathematical Techniques for Engineers

Application of mathematical techniques to the solution of ordinary and partial differential equations arising in engineering problems. Methods that will be considered are: separation of variables, method of characteristics, transform methods and complex variable methods.

Mechanical Engineering 637 H(3-0)

Thermal and Cogeneration Systems

Fundamentals of thermodynamics, fluid mechanics and heat transfer; thermal and energy systems, heat exchangers, co-generation; Second law of thermodynamics and concept of entropy generation and thermo-economics; Environmental issues and pollution control; Renewable energy system; Co-generation design; Heat exchanger design; Energy storage systems; Optimization process.

Mechanical Engineering 639 H(3-0)

Numerical Methods for Computational Fluid Dynamics

Review of solution techniques for ordinary differential equations. Stability, consistency and convergence. Order of accuracy. Fourier methods for stability. Numerical techniques for one,- two- and three-dimensional linear parabolic problems. Courant condition. Implicit and semi-implicit schemes. Boundary conditions for parabolic problems. Techniques for linear hyperbolic problems. CFL condition. Characteristics, domain of dependence and domain of influence. Boundary conditions for hyperbolic problems. Nonlinear conservation laws. The Burger’s equation as a test problem. Strong and weak solutions. Conservative and integral forms. Conservative schemes. Entropy condition. Godunov theorem and flux limiters. Godunov, ENO and TVD schemes. Implementation in gas dynamics.

Mechanical Engineering 641 H(3-0)

Advanced Control Systems

Introduction to multivariable systems; state space models; analysis of linear systems; stability; Cayley-Hamilton theorem; controllability and observability; state feedback control; pole placement designs; introduction to linear optimal control and estimation; Kalman filtering; separation theorem and duality; standard forms for Q-parametrized controllers; performance specifications; controller reduction concepts; introduction to robust control.

Mechanical Engineering 643 **H(3-0)**

Optimal and Adaptive Control

Discrete time and sampled-data system models and properties; discrete time domain controller design principles; system identification using least-squares analysis; self-tuning control; indirect adaptive control; model reference adaptive control; sliding mode control in continuous and discrete time; optimal design of sliding mode controllers; sensitivity functions and their role in control theoretic performance specification; robust stability and robust performance objectives; Kharitonov stability.

Mechanical Engineering 645 **H(3-0)**

Robotics and Vision Systems

An introduction to robotics. Kinematics, statics, dynamics, and control of robot arms. Digital image processing and robot vision. Robot programming and applications. Project: design of mechanisms or software related to these topics.

Mechanical Engineering 647 **H(3-0)**

Combustion in Gas Turbines

Basic design features of combustion chambers, their types and requirements for aero and industrial applications; combustion fundamentals relevant to gas turbines; aerodynamics; fuel types and fuel injection systems; ignition, flame stabilization, heat transfer, combustion efficiency and how they affect performance and emissions.

Mechanical Engineering 653 **H(3-0)**

Continuum Mechanics in Engineering

Review of generalized tensors in index and diadic notation; kinematics of nonlinear deformation; deformation and strain tensors and their invariants; equations of motion; various stress and pseudostress tensors; basic laws on continuum mechanics; constitutive theory; application of principles to deal materials, including solids and fluids.

Mechanical Engineering 655 **H(3-0)**

Analysis of Shells and Plates

General linear and nonlinear equations of the theories of thin shells. Approximate, membrane, and shallow shell theories. Plates as special cases of the shell. Finite elements for plates and shells. Stability and optimum design of plates and shells. Stress concentrations and local loads. Large deflections and limit loads. Applications to the design of pipelines, large containers, pressure vessels, and other mechanical structures.

Mechanical Engineering 661 **H(3-0)**

Corrosion Science

Electrochemical thermodynamics. Kinetics of electrode processes. Experimental polarization curves. Instrumentation and experimental procedures. Passivity. Galvanic, pitting, crevice and intergranular corrosion. Corrosion-deformation interactions. Atmospheric corrosion. Oxidation and high temperature corrosion. Protection techniques. Materials selection and design.

Mechanical Engineering 663 (Medical Science 663)(Kinesiology 663) **H(3-0)**

Advanced Biomechanics

Theoretical and applied aspects of biomechanics in the acquisition and performance of sport skills.

Prerequisite: Consent of the Faculty.

Mechanical Engineering 665 **H(3-0)**

Mechanical Behaviour of Materials

The physical and mechanical metallurgy of material behaviour; failure by yielding; ductile and brittle fracture; fracture mechanics and design; strong solids, strengthening mechanisms, strength-structure relationships; elementary dislocation mechanics; application of theory to fatigue, creep, and their interactions.

Mechanical Engineering 667 **H(3-0)**

Fracture Mechanics

Basic fracture theory, failure criteria, overview of fracture mechanics, brittle and ductile failure, crack tip parameters, geometric considerations, methods of analysis, fracture toughness and testing standards. Applications in design, fatigue subcritical crack growth, creep and impact.

Mechanical Engineering 669 **H(3-0)**

Fatigue of Materials

History and origin of fatigue. Stress life, strain life and fracture mechanics approaches. Low and high cycle fatigue. Low and high temperature fatigue. Combined stresses, initiation, and propagation of cracks. Environmental and statistical effects. Testing techniques and variables. Design and specific material behaviour. Mechanisms of fatigue.

Mechanical Engineering 681 **H(3-0)**

Mechanical Engineering Design Methodology

The analysis of problems in mechanical design, systematic design methodology and associated techniques. Design assurance. Concurrent design with respect to design for manufacture and design for assembly. Parametric design. Knowledge-based design systems.

Mechanical Engineering 682 **F(3-0)**

Engineering Design Methodology and Pedagogy

The role of design methodology in the product realization process; the role of design methodology in engineering design training of novice designers; design as programme integration; instructional methods; design education literature; the role of learning styles, teamwork, project-centred learning; managing training methods; tool-based learning.

Mechanical Engineering 683 **H(3-0)**

Applications of 3D Rigid Body Mechanics in Biomechanics

Applications of 3D motion analysis and rigid body mechanics to musculoskeletal system locomotion, and movement. Experimental, theoretical and numerical methods for optical motion imaging, 3D analysis of joint kinematics and kinetics, joint angle representations, prediction of joint forces, data analysis and filtering, error propagation, inverse and forward dynamics approaches, and applications to clinical and orthopaedic engineering.

Mechanical Engineering 685 (Medical Science 685) (Kinesiology 685) **H(3-3)**

Biomechanics of Human Movement

Introduction to the measuring methods (accelerometry, goniometry, film and film analysis, video systems) of biomechanical analysis of human movement (force and force distribution). Description of the mechanical properties of bone, tendon, ligaments, cartilage, muscles and soft tissues. The relation between structure and function of biomaterials. Introduction to descriptive analysis of human movement.

Prerequisite: Consent of the Faculty.

MechanicalEngineering 698 **F(0-4)**

Graduate Project

Individual project in the student's area of specialization under the guidance of the student's supervisor. A written proposal, one or more written progress reports, and a final written report are required. An oral presentation is required upon completion of the course. Open only to students in the MEng (courses only) program.

Mechanical Engineering 701 **H(3-0)**

Advanced Mechanical Vibrations

Free and forced vibrations of discrete and continuous linear systems: oscillators, rods, beams, membranes and plates; analytical and numerical methods. Nonlinear vibrations of simple systems: classification and nonlinearities, phase diagrams, methods of analysis. Random vibrations of discrete systems: introduction to random processes, linear and non-linear response to random forces, methods of analysis.

Prerequisite: Mechanical Engineering 601, or equivalent.

Mechanical Engineering 713 **H(0-3S)**

Research Seminar II

Reports on studies of the literature or of current research. This course is compulsory for all PhD students and must be completed before the candidacy examination.

NOT INCLUDED IN GPA

Medical Physics MDPH

Instruction offered by members of the Department of Physics and Astronomy in the Faculty of Science.

Department Head – R.B. Hicks

Note: For listings of related courses, see Applied Physics, Astronomy, Astrophysics, Physics, and Space Physics.

Graduate Courses

Medical Physics 623 **H(3-0)**

Radiotherapy Physics I

Concepts basic to the use of radiation for treatment of cancer patients. Dose quantities, calculation systems, protocols and measurement. Treatment machines. Planning external beam and brachytherapy treatments. Time-dose fractionation relationships. Special techniques and therapies. Exotic particle therapy including protons and neutrons.

Medical Physics 625 **H(3-2)**

Radiotherapy Physics II

Clinical application of Radiotherapy Physics I concepts. X-ray CAT imaging, MRI, SPECT and PET in application to radiotherapy. Real-time portal imaging and MLC. HDR and LDR brachytherapy. CT simulation and 3-D treatment planning. Verification systems and quality assurance. A major component of this course consists of clinical laboratory exercises with instrumentation.

Prerequisite: Medical Physics 623.

Medical Science MDSC

Instruction offered by members of the Faculty of Medicine.

Students contemplating taking any of these medical science courses are advised to contact the course coordinator(s) through the Bachelor of Health Sciences program office or the office of the Associate Dean Graduate Science Education

Medical Science 001 **E(10 hours)**

Biomedical Methods I: DNA and Protein Analysis

A hands-on introduction to methods used in the analysis of nucleic acids and proteins, including isolation, purification and quantitation, electrophoresis and blotting, polymerase chain reaction and sequencing.

Medical Science 002 **E(10 hours)**

Biomedical Methods II: Cell Culture and Microscopy

A hands-on introduction to the techniques of cell culture and light and fluorescence microscopy.

Junior Courses

Medical Science 201 **H (3-1T)**

Human Anatomy and Physiology

Integrated topics on the structure and function of human organ systems with major emphasis on application to nursing and other paramedical disciplines.

Prerequisite: Consent of the Faculty of Medicine.

Medical Science 203 **H(3-0)**

Inquiry I Introduction to Inquiry

An introduction to active learning from the context of health and health research. Provides the exposure to the types of skills needed for all the subsequent inquiry courses.

Prerequisite: Admission to the BHSc Honours program.

NOT INCLUDED IN GPA

Medical Science 205 **H(3-0)**

Inquiry II

An introduction to the social, ethical, and philosophical underpinnings of health and health research.

Prerequisites: Medical Science 203 and admission to the BHSc Honours program.

Senior Courses

Medical Science 303 **H(3-0)**

Inquiry III

"Inquiry - From Cell to Society" is one of a series of conceptual, inquiry-based courses promoting an interdisciplinary approach to the presentation and discussion of a number of broad-ranging topics impacting both the biomedical and social science arenas. Using one of these topics during each session as the central theme, students will examine the 'whole' through a series of different 'lenses.' Perspective and discussion on each topic will span 'cell to society' by addressing facets of the topic pertaining to a number of levels that may include subcellular, cellular, tissue/organ, individual, family, community, society and the national and global socio-economic environment.

Prerequisites: Medical Science 205 and admission to the BHSc Honours program.

Medical Science 305 **H(3-0)**

Inquiry IV

"Inquiry - From Cell to Society" is one of a series of conceptual, inquiry-based courses promoting an interdisciplinary approach to the presentation and discussion of a number of broad-ranging topics impacting both the biomedical and social science arenas. Using one of these topics during each session as the central theme, students will examine the 'whole' through a series of different 'lenses.' Perspective and discussion on each topic will span 'cell to society' by addressing facets of the topic pertaining to a number of levels that may include subcellular, cellular, tissue/organ, individual, family, community, society and the national and global socio-economic environment.

Prerequisites: Medical Science 303 and admission to the BHSc Honours program.

Medical Science 401 **H(3-0)**

Bioinformatics

This introductory course will familiarize students with algorithms and search engines used to analyze nucleic acid and protein sequences and structures.

Prerequisite: One full-course equivalent in Computer Science at the 300 level or one full-course equivalent in Biological Sciences at the 300 level or consent of the Department.

Medical Science 402 **F(3-3)**

Organismal Biology

Organismal structure from the cellular to the organism level focusing on vertebrates with a particular emphasis on humans. Topics covered include cell biology, histology, vertebrate development and anatomy. This course is inquiry based and will consist of lectures, small group sessions and interactive laboratory sessions.

Prerequisites: Biology 231 and 331 or consent of the Department.

Medical Science 403 **H(3-0)**

Inquiry V

"Inquiry - From Cell to Society" is one of a series of conceptual, inquiry-based courses promoting an interdisciplinary approach to the presentation and discussion of a number of broad-ranging topics impacting both the biomedical and social science arenas. Using one of these topics during each session as the central theme, students will examine the 'whole' through a series of different 'lenses.' Perspective and discussion on each topic will span 'cell to society' by addressing facets of the topic pertaining to a number of levels that may include subcellular, cellular, tissue/organ, individual, family, community, society and the national and global socio-economic environment.

Prerequisites: Medical Science 305 and admission to the BHSc Honours program.

Medical Science 405 **H(3-0)**

Inquiry VI

"Inquiry - From Cell to Society" is one of a series of conceptual, inquiry-based courses promoting an interdisciplinary approach to the presentation and discussion of a number of broad-ranging topics impacting both the biomedical and social science arenas. Using one of these topics during each session as the central theme, students will examine the 'whole' through a series of different 'lenses.' Perspective and discussion on each topic will span 'cell to society' by addressing facets of the topic pertaining to a number of levels that may include subcellular, cellular, tissue/organ, individual, family, community, society and the national and global socio-economic environment.

Prerequisites: Medical Science 403 and admission to the BHSc Honours program.

Medical Science 501 (Biology 501) **H(3-0)**

The Physiological and Biophysical Basis of Pharmacology

Basic principles of pharmacology, and pharmacology of the peripheral nervous system.

Prerequisites: Consent of the Faculty and one of Zoology 463, 465, Biochemistry 443 or Chemistry 354.

Medical Science 502 **F(3-3)**

Integrative Human Physiology

Physiological principles of organ systems including cardiovascular, respiratory, central nervous, renal, gastrointestinal, and reproductive systems. Physiology of development and aging. This course is designed for first-year graduate students and senior undergraduate students in the sciences and engineering.

Prerequisite: Consent of the Faculty.

Medical Science 503 (Biology 503) **H(3-0)**

Medicinal Chemistry - Drug Discovery and Design

Pharmaceutical development process, including the physiochemical and pharmacological principles of drug action. Historical and regulatory aspects of prescription drugs. Selected drugs of special interest discovered in the 20th century and new approaches to drug discovery and design for the 21st century - including expression cloning, gene therapy, transgenics and small molecule mimetics.

Prerequisite: Chemistry 451 or Medical Science 501 (Biology 501) or Biochemistry 531 or consent of the Faculty.

Medical Science 504 **F(0-6)**

Research Project I

First of a set of capstone research courses in the Bachelor of Health Sciences. To be conducted through any one of the basic research departments. Students would be expected to spend a minimum of 15 hours/week conducting research. Culminates with a Research Symposium Day during which students present and defend their research before an audience of peers and mentors, share their research with the faculty and staff at large through poster presentations and submit a written research thesis.

Prerequisite: After consultation with a faculty member who will supervise the chosen problem, an approval form obtained from the Bachelor of Health Sciences Office must be signed by the Assistant Dean (Undergraduate Science Education) before a student can register.

Note: Full course offered in single session only.

Medical Science 506 **F(0-6)**

Research Project II

Second capstone research course in the Bachelor of Health Sciences. To be conducted through any one of the basic research departments. Students would be expected to spend a minimum of 15 hours/week

conducting research. Culminates with a Research Symposium Day during which students present and defend their research before an audience of peers and mentors, share their research with the faculty and staff at large through poster presentations and submit a written research thesis.

Prerequisite: Medical Science 504.

Note: Full course offered in single session only.

Medical Science 507 **H(3-3)**

Special Problems in Medical Science

Lectures, seminars, term papers and training in theoretical and/or laboratory methods. After consultation with a faculty member who will supervise the chosen problem, an approval form obtained from the Graduate Sciences Education Office must be signed by the Associate Dean (Graduate Sciences Education) before a student can register.

Medical Science 508 **F(3-3)**

The Physiological and Biophysical Basis of Pharmacology

Basic principles of pharmacology and pharmacology of primary organ systems.

Prerequisites: Medical Science 402 and Biochemistry 443.

Medical Science 509 **H(3-3)**

Proteomics

An introductory course to familiarize students with techniques used for protein identification and proteome analysis, including one and two-dimensional gel electrophoresis, mass spectrometry and the databases and search engines used in the identification of expressed proteins.

Prerequisites: Biochemistry 443 and Biology 331.

Medical Science 511 **H(3-0)**

Instrumental Analysis

An overview of the analytical laboratory instruments used in research and the diagnosis and treatment of human disease.

Medical Science 515 **H (3-0)**
(Biology 515)

Cellular Mechanisms of Disease

The cellular and molecular mechanisms underlying basic human disease processes and how these can be influenced by lifestyle and environmental factors. The ways in which this knowledge can be used in the laboratory diagnosis of disease.

Prerequisites: Biochemistry 443 and Biology 331.

Medical Science 528 **F(0-6)**

Independent Studies in Medical Science

Original and independent thought, practical research and the completion of written and oral reports. After consultation with a faculty member who will supervise the chosen problem, an approval form obtained from the Graduate Sciences Education Office must be signed by the Associate Dean (Graduate Sciences Education) before a student can register.

Medical Science 537 **H(3-0)**
(Biochemistry 537)

Nucleic Acids

Chemical structure and physical characterization of nucleic acids. DNA topology. DNA transcription and replication. Nucleic acid-protein interaction as related to transcription and chromatin structure. Cloning of DNA and analysis of recombinant DNA molecules.

Prerequisite: Biochemistry 443.

Medical Science 553 **H(3-0)**
(Biochemistry 553)

Clinical Biochemistry

Correlation of the biochemistry of the different organs of the body with their structure and function; the control of production and mechanism of action of the different hormones; iron, calcium and lipoprotein metabolism; and biochemical measurements of body fluid constituents in the investigation of disease.

Prerequisite: Biochemistry 443.

Medical Science 561 **H(3-0)**
(Cellular, Molecular and Microbial Biology 561)

Cancer Biology

Advances in methodology and in theoretical concepts have permitted continuing breakthroughs in our understanding of the organismal, cellular and molecular biology of cancer cells, and in the development of novel strategies for cancer prevention, diagnosis and treatment. These advances will be presented in a comprehensive overview of cancer including issues of demographics and incidence, causation and detection, origins and progression and therapeutic approaches. Emphasis will be placed on the cell and molecular biology of cancer and on the interaction of the cancer cell with the host organism.

Prerequisites: Biochemistry 443, Biology 331, and Cellular, Molecular and Microbial Biology 411.

Graduate Courses

Medical Science 601 **H(3-3)**

Topics in Cell Biology

Topics will include changes in the organization of nuclear and cytoplasmic components during the cell cycle.

Prerequisite: Consent of the Faculty.

Medical Science 603 **H(3-1)**
(Biology 603)

Biology of Laboratory Animals

The course is based on the Canadian Council of Animal Care Syllabus "Basic Principles of Laboratory Animal Science for Research Scientists." In addition to the study of common, research, farm and exotic animals, topics covered include ethical considerations, regulation and legislation, animal models, animal facilities and husbandry, hazard control, surgery, anaesthesiology, euthanasia and post-mortem examinations. Practical sessions will provide experience in handling and restraint of specific laboratory animals, injections, blood collection, anaesthesiology and surgery.

Prerequisite: Consent of the Faculty.

Note: Enrollment in this course is restricted to graduate students who will do research utilizing animals.

Medical Science 605 **H(3-0)**
(Computer Science 605)

Information Storage and Processing in Biological Systems

Examination of complex biological systems; concepts and fundamentals of biological solutions to information storage and processing: modelling and computer simulation of biological systems; information storage in biological molecules; genetic networks; hierarchical organization of biological information processing in signal transduction, development, evolution, and ecology; biological control systems.

Prerequisite: Consent of the Faculty.

Medical Science 609 **H(3-0)**
(Biochemistry 609)

Gene Expression

The flow of genetic information from DNA to final protein product. The subject will be covered in two courses offered in alternating years: gene structure and regulation of transcription, including gene structure and organization, chromatin structure, regulation of transcription and post-translational processing; and the activity of genes during development including stored messenger ribonucleoprotein particles and translational control in gametes, the switch from maternal to zygote genome control of development in early embryos and the molecular basis of morphogenesis and differentiation.

609.01. Gene Structure and Regulation of Transcription

609.02. Genes and Development

Prerequisite: Medical Science 537 (Biochemistry 537) or equivalent and consent of the Faculty.

Note: Credit for both Medical Science 609.01 and 607.01 will not be allowed.

Note: Credit for both Medical Science 609.02 and 751.14 will not be allowed.

Medical Science 612 **F(3-3)**

Medical Microbiology

The basic principles of medical microbiology and pathogenesis of infectious disease and of clinically important pathogens. Emphasis will be on bacteriology and virology, but will also include parasitology and mycology. The laboratory will provide an introduction to advanced laboratory methods in microbiology including those currently used in clinical, basic, and applied (biotechnology) research.

Prerequisites: Cellular, Molecular and Microbial Biology 241 and 343 or equivalent or consent of the Faculty.

Medical Science 613 **H(3-0)**

Advanced Studies in Microbiology

Specialized topics including basic principles of infection; spread, prevention and control of infectious diseases; mechanisms of and approaches to study bacterial pathogenesis; mechanism, methodology and modelling of gene expression.

613.01. Epidemiology of Infectious Diseases

613.02. Pathogenesis of Microbial Disease

613.05. Regulation of Gene Expression in Bacteria.

Prerequisite: Medical Science 612 or Cellular, Molecular and Microbial Biology 421 or 521 or consent of the Faculty.

Medical Science 615 **H(3-0)**

Biomembranes

Molecular organization and physical properties of biomembranes; structure and function of membrane transport proteins; membrane interactions and biogenesis.

Prerequisite: Biochemistry 443 or consent of the Faculty.

Medical Science 619 **H(3-0)**

Neurosciences

Introductory neuroscience courses covering aspects of cellular, molecular, and systems physiology, neuroanatomy, and neurodevelopment.

619.01. Cellular and Molecular Neuroscience

619.02. Systems Neuroscience

619.03. Developmental Neuroscience

Prerequisite: Consent of the Faculty.

Medical Science 621 **H(3-0)**

Principles of Drug Action

The action of chemicals and drugs on biological systems ranging from subcellular particles to the intact organism.

621.01. Basic Principles of Pharmacology

621.03. Principles of Toxicology

Prerequisites: Zoology 461 and Biochemistry 441 and 443 or consent of the Faculty.

Medical Science 623 **H(3-1T)**

Respiratory Science

Respiratory physiology; aspects of morphology, biochemistry and pharmacology necessary to an understanding of respiration.

623.01. Pulmonary Mechanics and Gas Exchange

623.02. Respiratory Muscle Physiology and Control of Breathing

623.03. Respiratory Science: Basic

623.04. Respiratory Science: Applied

Prerequisite: Zoology 463 or 465 or consent of the Faculty.

Medical Science 627 **H(3-0)**

Endocrinology

Normal endocrine physiology and biochemistry. Mechanisms and principles of departure from normal endocrine homeostasis.

627.02. Advanced Endocrinology

627.03. Selected Topics in Advanced Endocrinology

Prerequisite: Zoology 597 or consent of the Faculty.

Medical Science 629 **H(3-0)**

Cardiovascular Dynamics

Includes topics such as basic physiologic mechanisms including excitation-contraction coupling, mechanics, energetics, and cardiovascular control; major diseases entities as a means of illustrating pathologic alterations in normal physiologic mechanisms; or a systematic in-depth examination of the chemicals that affect the cardiovascular system.

629.01. Cardiovascular Physiology

629.02. Cardiovascular Pathophysiology

629.03. Cardiovascular Pharmacology

Prerequisite: Consent of the Faculty.

Medical Science 631 **H(3-0)**

Muscle Physiology

Contractile processes, excitation-contraction coupling, the control of contraction and energetics in smooth, cardiac and skeletal muscle. Molecular studies of the contractile process and of the process of excitation contraction coupling.

Prerequisite: Consent of the Faculty.

Medical Science 635 **H (3-0)**

Psychosocial Oncology

Focuses on developing the understanding in health care practitioners of the central concepts related to caring for cancer patients and their families. In doing so, makes use of lectures, readings, video tapes, case discussions, and current research.

Prerequisite: Consent of the Faculty.

Note: Credit for both Medical Science 635 and 645.14 will not be allowed.

Medical Science 637 **H(3-0)**

Gastrointestinal Physiology

Physiology of the functional organization of the gastrointestinal (GI) tract at all levels from the cell to the intact system; movement of nutrients from gut to other organs and integrative physiology of energy flux; immunology of the gut with emphasis on B-lymphocytes and mast cells; relevance of basic physiological processes to experimental medicine, pathophysiology and therapeutics.

637.01. Organization and Function of the GI Tract

637.04. Gastrointestinal Pathophysiology

Prerequisite: Consent of the Faculty.

Medical Science 638 **H(3-0)**

Mucosal Pathophysiology

An independent study course that focuses on the physiology and pathophysiology of the gastrointestinal tract, lung and other mucosal tissues. A particular emphasis will be placed on inflammatory processes in these tissues, and how they contribute to symptom generation and tissue dysfunction. Involves independent research on the part of the students, small group tutorials, written assignments and laboratory exercises. The course will be divided into three sections.

Prerequisite or Corequisite: Medical Science 637.01 recommended.

Medical Science 639 **H(3-0)**

Immunology

Introductory and advanced courses in immunology that cover humoral and cellular immunity and the inflammatory response at the cellular, molecular, and whole organism level. Basic mechanisms that lead to immunity or to inflammatory responses. The contribution of immunological and inflammatory processes in the immunopathogenesis of disease.

639.01. Principles of Immunology

639.02. Cellular and Molecular Immunology

639.03. Immunological Basis of Disease

639.04. Inflammation

Prerequisite: Consent of the Faculty.

Note: Credit for both Medical Science 639.01 and 755.01 will not be allowed.

Note: Credit for both Medical Science 639.02 and 641.01 will not be allowed.

Note: Credit for both Medical Science 639.03 and 641.02 will not be allowed.

Note: Credit for both Medical Science 639 and 639.04 will not be allowed.

Medical Science 641 **H(3-0)**

Genetics

Advanced courses that provide in depth coverage of the research discipline of genetics, including the areas of cytogenetics, genomics, metabolic genetics, mouse genetics, population genetics, and human and medical genetics.

641.01. Advanced Genetics

641.02. Advanced Human Cytogenetics

641.04. Genomics

Prerequisite: Consent of the Faculty.

Medical Science 643 **H(3-2)**

Biostatistics

Fundamental principles and methods for analyzing data arising from the life sciences. Topics include: one and two sample methods for continuous, categorical and survival data; design and analysis of randomized experiments; regression, including multiple linear and logistic regression.

643.01 Biostatistics I

643.02 Biostatistics II

Prerequisite: Consent of the Faculty.

Medical Science 645 **H(3-0)**

Health Care

The components of the health care system; the structure and function of the Canadian health care system and issues in the organization of health care delivery; environmental and psycho-sociocultural factors in health, illness and health care; specific problems and issues in health care.

645.01. Health Care System

645.02. Determinants of Health

645.03. Environmental Health

645.04. Introduction to Community Health Sciences

645.05. Community Mental Health: Theory, Research Approaches and Prevention

645.06. Health Protection

645.07. Occupational Health I

645.08. Health Services for the Elderly

645.10. Health Care Management

645.11. Occupational Health II

645.12. Health Promotion

645.13. Health of Canadian Aboriginal Peoples

645.15. Health Policy

645.16. Global Health and Development

Prerequisite: Consent of the Faculty.

Medical Science 647 **H(3-1)**

Epidemiology

Principles and methods of descriptive, analytic and experimental epidemiology. Epidemiological

methods specific to certain health conditions and the preventive strategies available for various health conditions.

647.01. Health Research Methods I: Fundamentals of Epidemiology

647.05. Epidemiology of Cancer

647.07. Hospital Epidemiology

647.08. Psychiatric Epidemiology

Prerequisites: Medical Science 643.01 and/or consent of the Faculty.

Medical Science 649 **H(1-3)**

Practicum in Community Medicine

Clinical or laboratory-based practicum for students enrolled in certain programs of the Department of Community Health Sciences.

649.01. Practicum in Community Medicine

649.02. Practicum in Hospital Epidemiology

Prerequisite: Consent of the Faculty.

NOT INCLUDED IN GPA

Medical Science 651 **H(3-0)**

Health Promotions

"Health promotion is the process of enabling people to increase control over and to improve their health." The following courses are intended to assist graduate students in putting this Ottawa Charter definition into practice.

651.01. Planning for Health Promotion

651.02. Health Promotion for Women

Prerequisite: Consent of the Instructor.

Medical Science 657 **H(3S-0)**

Telehealth and E-health

Explores many aspects of e-health, beginning with an initial focus on telehealth. Reflects a range of practice-based activities and research areas in e-health including business plan development, implementation and evaluation of clinical and learning applications.

657.01. Introduction to Telehealth and Telehealth Research

Prerequisite: Consent of the Faculty.

Medical Science 659 **H(3-0)**

Methods in Health Research

An introduction to research design, sampling, measurement, data collection and data analysis applied to health research including evaluation research.

659.02. Health Research Methods II

659.03. Health Program Planning and Evaluation

659.04. Introduction to Clinical Trials

659.05. Qualitative Health Research

Prerequisites: Medical Science 643.01 and consent of the Faculty.

Note: Credit for both Medical Science 659.05 and Sociology 713.01 will not be allowed

Medical Science 663 **H(3-0)**
(Kinesiology 663) (Mechanical Engineering 663)

Advanced Biomechanics

Theoretical and applied aspects of biomechanics in the acquisition and performance of sport skills.

Prerequisite: Consent of the Faculty.

Medical Science 670 **F(0-6)**

Practicum in Biomedical Technology

A laboratory-based full course carried out in an academic or industrial setting for a period of at least ten weeks. Students have an opportunity to apply the principles and methods of investigation learned during the Master of Biomedical Technology program and carry out related research in one of the Faculty of Medicine laboratories or in an industrial setting.

Prerequisite: Consent of the Faculty.

Note: Completion of all other course requirements in Master of Biomedical Technology program is normally required prior to registration for this course.

Medical Science 671 **H(0-6)**

Techniques in Medical Science

Introduction to the theory of operation of electronic devices commonly used in biophysical studies including principles of amplifiers and filters, micro- and patch electrode techniques and computer-laboratory interfacing.

Prerequisite: Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Medical Science 672 **H(3S-0)**

Seminars in Biotechnology Business Aspects

Aspects involved in taking an original scientific idea or discovery all the way to a start-up company will be covered. Lecturers discuss commercialization, venture capital, business plan, patents and law, marketing.

Prerequisite: Consent of the Faculty.

Note: Admission to the Master of Biomedical Technology program is required for enrollment in this course.

NOT INCLUDED IN GPA

Medical Science 673 **H(0-3T)**

Introduction to Biomedical Technology

A series of sessions designed to provide students with practical knowledge and understanding in library information retrieval and informatics, introduction to bioinformatics, animal care regulations, radiation safety, intellectual property, bioethics.

Prerequisite: Consent of the Faculty.

Note: Admission to the Master of Biomedical Technology program is normally required for enrollment in this course.

Note: A one-week block course that is completed before the start of regular class session.

NOT INCLUDED IN GPA

Medical Science 674 **F(3-1T-3)**

Integrated Systems Course

The principles of physiology, pharmacology, microbiology and immunology. Lectures in the two courses are in parallel and fully integrated. Both courses are required components of the MBT program. The goal of the course, with an emphasis on molecular mechanisms in health and disease, is to provide students with the skills to interface with individuals in these disciplines in the biotechnology industry. Complemented by laboratory exercises, demonstrations, special lectures that provide industry perspectives in these disciplines and CD-Rom based tutorials.

674.01. Principles of Physiology and Pharmacology

674.02. Principles of Microbiology and Immunology

Prerequisite: Consent of the Faculty.

Note: Admission to the Master of Biomedical Technology program is required for enrollment in this course.

Medical Science 675 **H(2-3T)**

Bioinformatics Resources for the Biologist

This introductory graduate level course will familiarize biologists with algorithms and search engines used to analyze nucleic acid and protein sequences and structures.

Prerequisite: Consent of the Faculty.

Medical Science 679 **H(3-0)**
(Economics 679)

Health Economics I

Applies basic concepts from economics to the examination of health and health care policy issues such as why we have the kind of health care system we have, various aspects of health care reform, promotion of health, and evaluation in interventions.

Prerequisite: Consent of the Faculty.

Medical Science 683 **H(3-0)**

The Biology and Therapy of Human Cancer

The biology of human cancer and the scientific basis of cancer therapy will be reviewed in a parallel series of lecture seminars. An overview of cancer at the molecular, cellular and clinical levels with topics ranging from basic theories of cancer biology to the rationale of multidisciplinary care of the cancer patient.

683.01. Introduction to Cancer Biology

683.02. Molecular Mechanisms of Cancer

683.04. Molecular Cell Biology

Prerequisite: Consent of the Faculty.

Medical Science 685 **H(3-3)**
(Mechanical Engineering 685) (Kinesiology 685)

Biomechanics of Human Movement

Introduction to the measuring methods (accelerometry, goniometry, film and film analysis, video systems) of biomechanical analysis of human movement (force and force distribution). Description of the mechanical properties of bone, tendon, ligaments, cartilage, muscles, and soft tissues. The relation between structure and function of biomaterials. Introduction in descriptive analysis of human movement.

Prerequisite: Consent of the Faculty.

Medical Science 687 **H(3-3)**
(Kinesiology 687)

Biomechanical Modelling

Mechanics of a particle, a system of particles, a rigid body and of systems of rigid bodies as applied to human movement. Modelling of the human body in specific cases with emphasis on advantages and disadvantages of different approaches. Application of models in research projects.

Prerequisite: Consent of the Faculty.

Medical Science 689 **H(3-0)**

Medical Imaging

Introduction to the theory and practical applications of medical imaging. Specific courses focus on an overview of modern diagnostic imaging techniques (689.01), as well as advanced study of specific techniques including magnetic resonance imaging

(689.02) and medical image processing (689.03).

689.01. Medical Imaging Techniques

689.02. Advanced Magnetic Resonance Imaging

689.03. Advanced Medical Image Processing

689.99. Medical Imaging Project

Prerequisite: Consent of the Faculty.

Note: Courses are open to interested graduate students in medicine, engineering, and science and to appropriately prepared undergraduate students enrolled in computer engineering, electrical engineering, and physics.

Medical Science 705 **H(3-0)**

Advanced Methods in Health Research

Advanced health research designs and measurement techniques.

Prerequisite: Medical Science 659.02.

Medical Science 707 **H(2S-12)**

Family Therapy Practicum

The development of conceptual and experiential expertise in working therapeutically with families.

707.01. Family Therapy I

707.02. Family Therapy II

Prerequisite: Consent of the Faculty.

NOT INCLUDED IN GPA

Medical Science 709 **H(3-2)**

Advanced Epidemiology

Topics to include causal inference, epidemiologic measures, induction latent period, internal and external validity, control of confounding variables and interaction between study factors.

Prerequisite: Medical Science 647.01.

Medical Science 717 **H(150 hours)**

Functional Genomics Technologies

An intensive "hands on" laboratory course supplemented with lectures that provides experience and theory underlying current techniques used in functional genomics research. Methods include DNA microarrays, bioinformatics analysis of DNA and protein sequences, retro-recombinant screening, gene marker and mutation analysis, gene product interactions and yeast two-hybrid screens, site-specific mutagenesis, mamallian expression systems and in situ hybridization. More conventional molecular biology methods involving plasmid preparation, Northern and Southern blotting techniques, PCR technology, restriction digestions, subcloning of DNA fragments, and others are included.

Prerequisites: Registration in the Master of Biomedical Technology program or one of Medical Science 537, 609.01, 609.02, 613.05 or equivalent, and consent of the Faculty.

Prerequisite or Corequisite: Medical Science 537 (Biochemistry 537) or equivalent.

Medical Science 731 **H(1S-4)**

Medical Education

The design, planning, teaching and evaluation of courses in the health science disciplines. Practical experience in teaching methods and curriculum development. Intended for graduate students, faculty and resident physicians, and approved for study credit by the College of Family Physicians of Canada.

731.01. Teaching Methods in the Medical Sciences

731.02. Curriculum Design and Evaluation in the Medical Sciences

731.03. Medical Educational Measurement

731.04. Adult Learning as Applied to Health Professional Education

Prerequisite: Consent of the Faculty.

NOT INCLUDED IN GPA

Medical Science 743 **H(3-2)**

Biostatistics III

Advanced methods in research design and data analysis in community health: recent advances in sampling and modelling techniques.

Prerequisites: Medical Science 643.01 and 643.02.

Medical Science 751 **H(3-0)**

Topics in Medical Science

751.02. Cellular and Molecular Pathogenic Mechanisms of Diabetes

751.03. Biostatistics

751.07. The Physiological Development of the Fetus and Newborn

751.09. Ion Channel Diseases

751.12. Ionic Channels of Excitable Membranes

751.15. Receptors

751.18. Neural Control of Posture and Movement

751.30. Joint Injury and Disease Biological Focus

751.31. Joint Injury and Disease Biomechanical Focus

751.40. Introduction to Model Systems

751.41. Critical Perspectives in Proteomics

Prerequisite: Consent of the Faculty.

Medical Science 755 **H(1-6)**

Directed Study

Lectures, seminars, term papers or training in theoretical and/or laboratory methods at the advanced level in the medical sciences.

Prerequisite: Consent of faculty member who will supervise the chosen study.

MAY BE REPEATED FOR CREDIT

In addition to the numbered and titled courses shown above, the department may offer advanced level Graduate Courses specifically designed to meet the needs of individuals or small groups of students at the advanced doctoral level. These courses are numbered in the series 800.01 to 899.99. Such offerings are, of course, conditional upon the availability of staff resources.

Medicine MDCN

Instruction offered by members of the Faculty of Medicine.

First Year Courses

Medicine 302 **F(4-2)**

Principles for Medicine Course

An introduction to the Curriculum using five clinical presentations to demonstrate integration of basic science and behavioural science principles most relevant to the approach and solution of selected clinical problems.

Medicine 305 **H(4-2)**

Cardiovascular System

The cardiovascular system in health and disease.

Medicine 307 **H(4-2)**

Respiratory System

The respiratory system in health and disease.

Medicine 308 **F(4-2)**

Blood System

The blood system in health and disease.

Medicine 310 **F(4-2)**

Renal-Electrolyte System

The renal-electrolyte system in health and disease.

Medicine 312 **F(4-2)**

Musculoskeletal and Skin System

The musculoskeletal and skin system in health and disease.

Medicine 313 **H(4-0)**

Integrative I Course

Integration of basic science and clinical information across organ systems with an emphasis on clinical problem-solving ability through the generation and testing of diagnostic hypotheses.

Medicine 314 **F(4-2)**

Endocrine-Metabolic System

The endocrine and metabolic systems in health and disease.

Medicine 320 **F(0-4)**

Medical Skills

The medical skills required by students learning to optimize the physical, mental, emotional, and social well-being of patients (and self). Components include Communication, Physical Examination, Clinical Correlations, , Ethics, Culture, Health and Wellness, and Well Physician.

Medicine 340 **F(0-4)**

Research Methods and Evidence Based Medicine

Students will learn to critically appraise the scientific and clinical literature by reviewing papers and presenting findings in small group sessions. Students will learn clinical epidemiology, research biostatistics , informatics, evidence based medicine and research methods by a combination of lectures, small group sessions and independent study time. Independently or in small groups, students write and critique a research proposal. Students with proposals of high quality are encouraged to complete the project in Year II in the course Applied Evidence Based Medicine (Medicine 440).

Second Year Courses

Medicine 402 **F(4-2)**

Independent Learning

The student selects an area of medicine of particular interest for more in depth study. Studies may be

done in centres other than Calgary. Students are encouraged to consider experiences in third world medicine through the International Electives Program. All experiences must be evaluated by a preceptor.

Medicine 408 **F(4-2)**

Gastrointestinal System

The gastrointestinal system in health and disease.

Medicine 410 **F(4-2)**

Neurosciences

Essentials of neurological structure and function.

Medicine 412 **F(4-0)**

Human Development

The normal development, including behavioural, health problems and care requirements of the infant and child. The response of health care delivery systems to the physical and psychological needs of the family. Physical and psychological aspects of the aging process and the challenge to health care systems posed by health problems of the elderly.

Medicine 413 **H(4-0)**

Integrative II Course

Integration of basic science and clinical information across organ systems with an emphasis on clinical problem-solving ability through the generation and testing of diagnostic hypotheses.

Medicine 414 **F(4-2)**

Reproductive System

The reproductive system in health and disease.

Medicine 420 **F(0-4)**

Medical Skills

The medical skills required by students learning to optimize the physical, mental, emotional, and social well-being of patients (and self). Components include Communication, Physical Examination, Clinical Correlations, Informatics, Ethics, Culture, Health and Wellness, and Well Physician.

Medicine 426 **F(4-0)**

The Mind

The biopsychosocial approach to mental disorder.

Medicine 440 **F(0-4)**

Applied Evidence Based Medicine

Applied Evidence Based Medicine provides an opportunity to explore in depth, an area of particular interest to each student. Students under the supervision of a preceptor may complete a research project initiated in Medicine 340. Others may pursue a clinical experience utilizing critical appraisal skills to address questions related to prognosis, investigation and/or treatment. Alternatively, students may pursue supervised electives in such areas as History of Medicine, Pathology, Health Economics, Community Health, Palliative Care, Rehabilitation Medicine, etc.

Third Year Courses

Clinical experience given in hospitals and other health care facilities. This experience will be integrated with teaching programs which will include the application of science to problems of health and disease.

The clinical clerkship must include a twelve-week rotation in Internal Medicine (Medicine 504.01), eight weeks of Surgery (four weeks General Surgery 506.01 plus four weeks from surgical subspecialties 506.02-506.10), six weeks of Paediatrics (General Paediatrics 508.01), six weeks of Psychiatry (General Psychiatry 510.01), six weeks of Obstetrics and Gynaecology (General Obstetrics and Gynaecology 512.01), four weeks of Family Medicine (General Family Medicine 502.01), and two weeks of Anaesthesia (General Anaesthesia 516.01). Students will select additional studies from the courses below so that the total period of studies constitutes fifty-four weeks, including a minimum of forty-six weeks of clinical studies.

Medicine 502

Family Medicine

502.01. General Family Medicine Offered in a four-week block.

Medicine 504

Internal Medicine

504.01. General Medicine

504.02. Cardiology

504.03. Dermatology

504.04. Endocrinology and Metabolism

504.05. Gastroenterology

504.06. Hematology

504.07. Immunology

504.08. Infectious Diseases

504.09. Intensive Care (I.C.U.)

504.11. Nephrology

504.12. Neurology

504.13. Oncology

504.14. Clinical Pharmacology

504.15. Pulmonary Medicine

504.16. Rheumatology

504.18. Physical Medicine and Rehabilitation

These are offered in four-week blocks except 504.01 which is offered in a twelve-week block.

Medicine 506

Surgery

506.01. General Surgery

506.02. Ear, Nose and Throat

506.03. Neurosurgery

506.04. Ophthalmology

506.05. Orthopaedics

506.06. Paediatric Surgery

506.07. Plastic and Reconstructive Surgery

506.08. Sports Medicine

506.09. Thoracic Surgery

506.10. Urology

These are offered in two- to four-week blocks except 506.01 which is offered in a four-week block.

Medicine 508

Paediatrics

508.01. General Paediatrics

508.02. Neonatology

508.03. Paediatric Cardiology

508.04. Paediatric Endocrinology

508.06. Paediatric Neurology

508.08. Paediatric Emergency

508.09. Paediatric Oncology

508.10. Paediatric Infectious Diseases

508.11. Paediatric Intensive Care

These are offered in four-week blocks except 508.01 which is offered in a six-week block.

Medicine 510

Psychiatry

510.01. General Psychiatry

Offered in a six-week block.

Medicine 512

Obstetrics and Gynaecology

512.01. General Obstetrics and Gynaecology

512.02. High Risk Obstetrics

512.04. Gynaecologic Oncology

Medicine 514

Other Clerkship Electives

514.02. Emergency

514.04. Geriatrics

514.05. Genetics

514.06. Pathology

514.07. Community Health

514.08. Radiology

514.12. International Health

Medicine 516

Anaesthesia

516.01 General Anaesthesia Offered in a two-week block.

Medicine 520

Medical Skills

The medical skills required by students learning to optimize the physical, mental, emotional, and social well-being of patients (and self). Components include Communication, Physical Examination, Clinical Correlations, Informatics, Ethics, Culture, Health and Illness, and Well Physician. These components run as a theme throughout the entire clerkship program.

Museum and Heritage Studies MHST

Instruction offered under the direction of the Faculty of Communication and Culture. For information contact the Program Co-ordinator or the Academic Programs Office, 220-6343.

Additional interdisciplinary courses are offered under the course headings African Studies, Canadian Studies, Central and East European Studies, Communications Studies, Development Studies, East Asian Studies, General Studies, Latin American Studies, Law and Society, Leisure, Tourism and Society, Northern Planning and Development Studies, Science, Technology and Society, South Asian Studies, and Women's Studies.

Junior Course

Museum and Heritage Studies 201 H(3-0)

Introduction to Museum and Heritage Studies

Introduces the field of Museum and Heritage Studies by examining heritage sites, museums, art galleries, zoos, natural parks and others. Traditional institutions will be examined along with new forms, including virtual museums.

Note: Students may be required to attend off-campus events outside of class time.

Senior Courses

Museum and Heritage Studies 301 H(2-2)

Introduction to Heritage Conservation

Lectures and hands-on exercises concerning conservation of the natural and built environments, documents and rare books, metal objects and works of art.

Note: Not open to students with credit in General Studies 301.03.

Note: Until August 15 preference in enrollment is given to students enrolled in the Museum and Heritage Studies Minor program.

Note: Students may be required to attend off-campus events outside of class time.

Museum and Heritage Studies 303 H(2-2)

Introduction to Audience Development for Museums

Students will be introduced to five different areas of Audience Development and how audience development is affected by museum education, museum marketing strategies, evaluation and assessment of audience, the use of technology in museums, as well as how audience is affected by museum and community relationships.

Note: Not open to students with credit in General Studies 301.07.

Note: Until August 15 preference in enrollment is given to students enrolled in the Museum and Heritage Studies Minor program.

Note: Students may be required to attend off-campus events outside of class time.

Museum and Heritage Studies 331 H(2-1)
(formerly Museum and Heritage Studies 431)

Critical Issues in Museum and Heritage Studies

Critical issues in Museum and Heritage Studies, focussing on the ideological foundations of collecting institutions, including museums and archives, the basis of the built and natural heritage, the existence of collections and the concepts of curatorial authority, collecting, preservation and interpretation.

Prerequisite: Museum and Heritage Studies 201.

Note: Students may be required to attend off-campus events outside of class time.

Museum and Heritage Studies 433 H(0-3S)
(formerly Museum and Heritage Studies 531)

Advanced Seminar in Museum and Heritage Studies

Course content will range from exhibit development, cultural and aboriginal tourism, to organizational change in heritage institutions, advanced material culture studies, business ideology and the cultural sector, pedagogy and the interpretation process in the museum.

Prerequisite: Museum and Heritage Studies 331 or consent of the Program Director.

Note: Students may be required to attend off-campus events outside of class time.

Museum and Heritage Studies 533 H(0-6)

Practicum

Work in a local museological or heritage institution under a professional supervisor. Students must contact the Program Co-ordinator at least three weeks prior to the start of term for a placement interview.

Prerequisites or Corequisites: Museum and Heritage Studies 331 and consent of the Program Director.

Note: Students must contact the instructor/practicum co-ordinator at least three weeks prior to the start of classes to arrange for placement at a hosting institution.

Graduate Courses

Museum and Heritage Studies 601 H(3-0)

Foundations of Museum and Heritage Studies

A foundation course including the presentation and discussion of the theory and practice of museums, the built environment, parks and zoos.

Note: Students may be required to attend Field trips.

Museum and Heritage Studies 603 H(3-0)

Management of Museums and Heritage Institutions

Examines the concept of mission statement, policy and procedures, governance, staff, physical plant, funding - both government and non-government - and marketing. Lectures and discussions around case studies will be used.

Prerequisite: Museum and Heritage Studies 601 or consent of the Program Director.

Note: Students may be required to attend Field trips.

Museum and Heritage Studies 611 H(3-0)

Collecting in Museums and Heritage Institutions

An examination of collections management: policy, acquisition, deaccessioning, evaluation, conservation, storage, security, travelling, insurance, copyright and tax law.

Prerequisite: Consent of the Program Director.

Note: Students may be required to attend Field trips.

Museum and Heritage Studies 613 H(3-0)

Exhibiting in Museums and Heritage Institutions

An exploration of past practices and contemporary approaches to exhibiting providing students with the theoretical and practical tools they need to create exhibitions for today's audiences.

Prerequisite: Consent of the Program Director.

Note: Students may be required to attend Field trips.

Museum and Heritage Studies 615 H(3-0)

Learning in Museums and Heritage Institutions

An exploration of historical and current theory and practice in the educational functions of museum and heritage institutions.

Prerequisite: Consent of the Program Director.

Note: Students may be required to attend Field trips.

Museum and Heritage Studies 621 H(3-0)

Technology for Museums and Heritage Institutions

An exploration of traditional technologies used in museum and heritage work and how new digital and electronic media are influencing practice.

Prerequisite: Consent of the Program Director.

Note: Students may be required to attend Field trips.

Museum and Heritage Studies 680 F(0-6)

Practicum

A 160 hour practicum experience in a museum or heritage institution including a major, experiential project.

Prerequisite: Consent of the Program Director.

Note: Some travel may be necessary to complete the project.

NOT INCLUDED IN GPA

Museum and Heritage Studies 690 F(0-6)

Master's Project

A research project, required of all Masters Students involving the application of research, concepts and theories to a museum or heritage topic of interest to the student.

Prerequisite: Consent of the Program Director.

Note: Some travel may be necessary.

Music Education MUED

Instruction offered by members of the Department of Music in the Faculty of Fine Arts.

Department Head – M. Edwards

Senior Courses

Music Education 315 H(3-2)

Music Techniques in the Elementary School I

An introduction to the philosophy and teaching of elementary school music with particular emphasis on the primary grades.

Prerequisite: Music Theory and Composition 203 or consent of the Department.

Music Education 317 H(3-2)

Music Techniques in the Elementary School II

Continuation of Music Education 315.

Prerequisite: Music Education 315 or consent of the Department.

Music Education 331 H(2-1)

Conducting I

Basic conducting techniques with the use of the baton; simple and condensed scores for selected choral and instrumental works.

Prerequisites: Music Theory and Composition 203 and 221.

Music Education 333 **H(2-1)**

Conducting II

Continuation of Music Education 331; the full score and more difficult choral and instrumental works.

Prerequisite: Music Education 331 or consent of the Department.

Music Education 391 **H(2-2)**

Brass Techniques

Performing and teaching techniques for brass instruments.

Prerequisites: Music Theory and Composition 203 and admission to the Secondary School Music Route or consent of the Department.

Music Education 393 **H(2-2)**

Woodwind Techniques

Performing and teaching techniques for woodwind instruments.

Prerequisites: Music Theory and Composition 203 and admission to the Secondary School Music Route or consent of the Department.

Music Education 397 **H(2-2)**

Percussion Techniques

Performing and teaching techniques of percussion instruments: snare drum, tympani and mallet instruments. Not open to percussion majors.

Prerequisites: Music Theory and Composition 203 and admission to the Secondary School Music Route or consent of the Department.

Music Education 405 **H(3-1)**

Choral Music in the School I

Prerequisite: Admission to the Secondary or Elementary Route in the BMus program or consent of the Department.

Music Education 407 **H(3-1)**

Choral Music in the School II

Prerequisite: Music Education 405 or consent of the Department.

Music Education 409 **H(3-2)**

Instrumental Music in the Secondary School I

Prerequisite: Music Education 333 and two of Music Education 391, 393, 397 or consent of the Department.

Music Education 411 **H(3-2)**

Instrumental Music in the Secondary School II

Prerequisite: Music Education 409 or consent of the Department.

Music Education 501 **H(2-2)**

Practicum in Secondary Music Education I

Supervised practical application of techniques of planning and teaching music.

Prerequisites: Music Education 405 and 407 or consent of the Department.

Music Education 503 **H(2-2)**

Practicum in Secondary Music Education II

Continuation of Music Education 501.

Prerequisite: Music Education 501 or consent of the Department.

Music Education 511 **H(2-2)**

Practicum in Elementary Music Education I

Supervised practical application of techniques of planning and teaching music.

Prerequisite: Music Education 317 or consent of the Department.

Music Education 513 **H(2-2)**

Practicum in Elementary Music Education II

Continuation of Music Education 511.

Prerequisite: Music Education 511 or consent of the Department.

Music Education 555 **H(3-0)**

Independent Study

Individual study in a selected music education area.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Education 571 **H(3-0)**

Culture Studies and World Musics in the Classroom

Topics include the performance of dance, music and song from around the world.

Prerequisites: Music Theory and Composition 203, Music Education 315 and 317, or consent of the Department.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Music Education 601 **H(2-2)**

Kodaly: Musicianship I

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 603 **H(3-0)**

Kodaly: Principles and Practice I

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 605 **H(3-0)**

Kodaly: Folk Music Studies and Choral Materials I

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 607 **H(2-2)**

Kodaly: Musicianship II

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 609 **H(3-0)**

Kodaly: Principles and Practice II

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 611 **H(3-0)**

Kodaly: Folk Music Studies and Choral Materials II

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 613 **H(2-2)**

Kodaly: Musicianship III

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 615 **H(3-0)**

Kodaly: Principles and Practice III

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 617 **H(3-0)**

Kodaly: Folk Music Studies and Choral Materials III

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 621 **H(3-0)**

Scoring I for the Symphonic Band and Wind Ensemble

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 623 **H(3-0)**

Conducting I the Symphonic Band and Wind Ensemble

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 625 **H(3-0)**

Literature I for the Symphonic Band and Wind Ensemble

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 627 **H(3-0)**

Scoring II for the Symphonic Band and Wind Ensemble

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 629 **H(3-0)**

Conducting II for the Symphonic Band and Wind Ensemble

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 631 **H(3-0)**

Literature II for the Symphonic Band and Wind Ensemble

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 633 **H(3-0)**

Scoring III for the Symphonic Band and Wind Ensemble

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 635 **H(3-0)**

Conducting III for the Symphonic Band and Wind Ensemble

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 637 **H(3-0)**

Literature III for the Symphonic Band and Wind Ensemble

Prerequisite: Consent of the Department.

Note: Offered in three weeks during the Summer Session.

Music Education 655 **H(3-0)**

Independent Study

Individual study in a selected music education area.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Education 671 **H(3-0)**

Selected Topics in School Music

Selected topics with emphasis upon practical application relevant to the field of music education. Various topics are regularly offered under this title, such as early childhood, Kodaly pedagogy, administration of school music programs and techniques of school music supervision.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Education 695 **H(2-4)**

Practicum in School Music I

Practical application of teaching techniques studied in graduate level school music courses. Will include various topics such as early childhood, Kodaly, choral and instrumental.

Music Education 697 **H(2-4)**

Practicum in School Music II

Continuation of Music Education 695.

Music Education 755 **H(3-0)**

Independent Study

Individual directed study in an area of Music Education (doctoral level).

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Education 771 **H(3-0)**

Selected Topics in Music Education

Selected topics with emphasis upon practical application relevant to the field of Music Education. Possible topics may include early childhood musical development, Kodaly pedagogy, folk music studies, choral and instrumental pedagogy and the role of new technologies within the discipline.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music History and Literature MUHL

Instruction offered by members of the Department of Music in the Faculty of Fine Arts.

Department Head – M. Edwards

General interest courses in music history, which may be taken by non-music majors:

209 211 281 309 311
331 333

Junior Courses

Music History and Literature 201 **H(3-2)**

Introduction to Music History

An overview of the history of music through contact, by means of listening and analysis, with representative works from antiquity to the present, and an introduction to the basic music research tools and reference materials of writing about music.

Note: Open to students accepted as music majors and minors on the basis of the entrance audition and to qualified students from other areas with consent of the Department.

Music History and Literature 209 **H(3-0)**

Music Past and Present

Directed listening to and study of important music of the past and present. Content may vary from year to year. Intended for non-majors.

Note: Attendance at off-campus performances may be required.

Note: Credit for this course not applicable to majors or minors in music.

Music History and Literature 211 **H(3-0)**

Music and the Humanities

Study of the interrelationship of music and the humanities in a broad cultural and historical framework. Content may vary from year to year. Intended for non-majors.

Note: Attendance at off-campus performances may be required.

Note: Credit for this course not applicable to majors or minors in music.

Music History and Literature 281 **H(3-0)**

Jazz History

Directed listening and analysis of jazz forms from the early beginnings of jazz to the present. Styles examined range from Early Jazz to Jazz-Rock Fusion. Major figures considered include: Louis Armstrong, Duke Ellington, Count Basie, Lester Young, Charlie Parker, Miles Davis and John Coltrane.

Senior Courses

Music History and Literature 309 **H(3-0)**

Music and Popular Culture

Survey and specific examination of popular music and culture, ranging from classical styles to rock, within an historical and sociological context. The course will examine the meaning and messages of popular music, and its impact on present-day culture. Topics may include The Beatles and Rolling Stones, Rock and Roll, Black Music, jazz, music and media, blues, Sinatra, Broadway and others.

Note: Available to music majors and minors for credit as a non-music option with consent of the Department.

MAY BE REPEATED FOR CREDIT

Music History and Literature 311 **H(3-0)**

Composers and Musical Cultures

In-depth study of selected composers, their music, and their relationship to intellectual history (i.e. Mozart and the French Revolution), and/or examinations of specific western and non-western musical cultures (i.e. Music in India, Music in post-war Germany) and their impact. Attendance at relevant musical concerts and lectures may be required.

Note: Available to Music majors and minors with consent of the Department.

MAY BE REPEATED FOR CREDIT

Music History and Literature 331 **H(3-0)**

Early Canadian Music

Music by Canadians. A survey from pre-Confederation to 1945 including folk-music heritage.

Music History and Literature 333 **H(3-0)**

Contemporary Canadian Music

Music by Canadians. A survey since 1945.

Music History and Literature 341 **H(3-0)**

History of Musical Style I: Medieval and Renaissance Music

Music from antiquity to 1550.

Prerequisites: Music History and Literature 201 and Music Theory and Composition 201 or consent of the Department.

Music History and Literature 343 **H(3-0)**

History of Musical Style II: Baroque Music

Music from 1550 to 1700.

Prerequisites: Music History and Literature 201 and Music Theory and Composition 201 or consent of the Department.

Music History and Literature 345 **H(3-0)**

History of Musical Style III: Pre-Classic and Classic Music

Music from 1700 to 1800.

Prerequisites: Music History and Literature 201 and Music Theory and Composition 203, or consent of the Department.

Music History and Literature 347 **H(3-0)**

History of Musical Style IV: Nineteenth-Century Music

Music from 1800 to 1900.

Prerequisites: Music History and Literature 201 and Music Theory and Composition 301, or consent of the Department.

Music History and Literature 349 **H(3-0)**

History of Musical Style V: Music since 1900.

Music since 1900.

Prerequisites: Music History and Literature 201 and Music Theory and Composition 303, or consent of the Department.

Music History and Literature 351 **H(3-0)**

Musical Cultures of the World/Ethno-musicological Perspectives on Music

Focuses on a detailed ethno-musicological examination of non-western traditions.

Prerequisite: Music History and Literature 201.

Music History and Literature 551 **H(3-0)**

Research Techniques and Bibliography of Music

Exploring the basic reference materials and techniques for musical research in all areas.

Prerequisites: Music History and Literature 201, and any three courses from Music History and Literature 341, 343, 345, 347, 349, and Music Theory and Composition 303; or consent of the Department.

Music History and Literature 553 **H(3-0)**

Introduction to Musicology

Exploring the nature, scope, and methodology of the discipline of musicology.

Prerequisites: Music History and Literature 201, and any three courses from Music History and Literature 341, 343, 345, 347, 349, and Music Theory and Composition 303; or consent of the Department.

Music History and Literature 555 **H(3-0)**

Independent Study

Individual study in a selected music history area.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music History and Literature 571 **H(3-0)**

Selected Topics in Music History

A specific musical medium or genre: may include chamber music literature, symphonic literature, dramatic literature and program music.

Prerequisites: Music History and Literature 201, and any three courses from Music History and Literature 341, 343, 345, 347, 349, and Music Theory and Composition 303; or consent of the Department.

MAY BE REPEATED FOR CREDIT

Music History and Literature 573 **H(3-0)**

Studies in the Music of Selected Composers

Specific composers or groups of composers; may include Beethoven, Debussy, the Second Viennese School, etc.

Prerequisites: Music History and Literature 201, and any three courses from Music History and Literature 341, 343, 345, 347, 349, and Music Theory and Composition 303; or consent of the Department.

MAY BE REPEATED FOR CREDIT

Music History and Literature 596 **F(1-4)**

Honours Project

A major project with an emphasis upon historical and/or cultural issues.

Prerequisites: Two half courses in Music History and Literature at the 400 or 500 level or consent of the Department.

Note: Restricted to students in the BA Honours (Music) program.

Music History and Literature 598 **F(1-4)**

Senior Project

Major project in music history and literature.

Prerequisites: Two half courses in Music History and Literature at the 400 or 500 level or consent of the Department.

Graduate Courses

Music History and Literature 603 **H(3-0)**

Pro-Seminar in Music for Graduate Students

Selected works of music from the middle ages to the present in an analytical and historical context.

Prerequisite: Consent of the Department.

Note: Required course for all MMus and MA (Musicology) students.

Music History and Literature 651 **H(3-0)**

Research Techniques and Bibliography of Music

Exploring the basic reference materials and techniques for musical research at the graduate level.

Prerequisite: Consent of the Department.

Note: Required course for all MMus and MA (Musicology) students.

Music History and Literature 655 **H(3-0)**

Independent Study

Individual study in a selected area of musicology.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music History and Literature 671 **H(3-0)**

Selected Topics in Musicology

Various topics such as history of music theory, analysis, notation, or performance practice may be offered. Consult the timetable for current topic.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music History and Literature 771 **H(3-0)**

Selected Topics in Musicology

Various topics in the field of Musicology (doctoral level).

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Performance MUPF

Instruction offered by members of the Department of Music in the Faculty of Fine Arts.

Department Head – M. Edwards

Students are cautioned that notwithstanding the given prerequisite, registration in any of the performing ensembles is subject to the approval of the ensemble director.

Music Performance 001 **(0-2)**

Music Listening I

NOT INCLUDED IN GPA

Music Performance 002 **(0-2)**

Music Listening II

NOT INCLUDED IN GPA

Music Performance 003 **(0-2)**

Music Listening III

NOT INCLUDED IN GPA

Music Performance 004 **(0-2)**

Music Listening IV

Note: The above activity courses offer practical experience in music listening and are only open to BMus, BA (Music) and BA Honours (Music) students. Only one course is offered per year. Credit for four courses is required for graduation.

NOT INCLUDED IN GPA

Junior Courses

Music Performance 201 **H(0-6)**

Chamber Choir I

Performing experience in the Chamber Choir.

Note: Open to music majors and minors, open to other students with consent of the Department. This course meets for three hours per week during the Fall and Winter Sessions. Audition required. When students pass the audition successfully, consent of the Department is required prior to registration.

Music Performance 203 **H(0-6)**

Women's Choir I

Performing experience in the Women's Choir.

Note: Open to music majors and minors, open to other students with consent of the Department. This course meets for three hours per week during the Fall and Winter Sessions. Audition required. When students pass the audition successfully, consent of the Department is required prior to registration.

Music Performance 205 **H(0-6)**

University Chorus I

Performing experience in the University Chorus. Open to the University community. Audition required. When students pass the audition successfully, consent of the Department is required prior to registration.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 211 **H(0-6)**

Symphonic Band I

Performing experience in the Symphonic Band.

Note: Open to music majors and minors, open to other students with consent of the Department. This course meets for three hours per week during the Fall and Winter Sessions. Audition required. When students pass the audition successfully, consent of the Department is required prior to registration.

Music Performance 213 **H(0-6)**

Wind Ensemble I

Performing experience in the Wind Ensemble.

Note: Open to music majors and minors, open to other students with consent of the Department.
Note: This course meets for three hours per week during the Fall and Winter Sessions. Audition required. When students pass the audition successfully, consent of the Department is required prior to registration.

Music Performance 215 **H(0-6)**

University Orchestra I

Performing experience in the University Orchestra.

Note: Open to music majors and minors, open to other students with consent of the Department.
Note: This course meets for three hours per week during the Fall and Winter Sessions. Audition required. When students pass the audition successfully, consent of the Department is required prior to registration.

Music Performance 221 **H(0-6)**

Early Music Ensemble I

Performance of instrumental and vocal music written before 1750.

Note: Open to music majors and minors, open to other students with consent of the Department.
Note: This course meets for three hours per week during the Fall and Winter Sessions. Audition required. When students pass the audition successfully, consent of the Department is required prior to registration.

Music Performance 223 **H(0-6)**

Vocal Jazz Ensemble I

Performance of popular vocal literature.

Note: Open to music majors and minors, open to other students with consent of the Department.
Note: This course meets for three hours per week during the Fall and Winter Sessions. Audition required. When students pass the audition successfully, consent of the Department is required prior to registration.

Music Performance 225 **H(0-8)**

Instrumental Jazz Ensemble I

Performance in a jazz combo or band.

Note: Open to music majors and minors, open to other students with consent of the Department.
Note: This course meets for four hours per week during the Fall and Winter Sessions. Audition required. When students pass the audition successfully, consent of the Department is required prior to registration.

Music Performance 227 **H(0-6)**

New Music Ensemble I

Performance of chamber music written since 1960.

Note: Open to music majors and minors, open to other students with consent of the Department.
Note: This course meets for three hours per week during the Fall and Winter Sessions. Audition required. When students pass the audition successfully, consent of the Department is required prior to registration.

Music Performance 229 **H(0-6)**

World Music Ensemble I

Performing experience of various world music traditions.

Note: Open to music majors and minors, open to other students with consent of the Department.
Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 241 **H(0-4)**

Chamber Music I

Performance of music for small ensembles.

Note: Open to music majors and minors, open to other students with consent of the Department.
Note: This course meets for two hours per week during the Fall and Winter Sessions.

Music Performance 251 **H(1-4)**

Second Instrument Study I

Applied instruction on second instrument or voice. Students electing to study a second instrument are normally expected to study the same instrument for a minimum of two years.

Prerequisite: Open to music majors with consent of the Department.

Note: This course meets for one-half lecture and two laboratory hours per week during the Fall and Winter Sessions.

Music Performance 271 **H(0-5)**

Class Piano I

Functional approach to the piano. Open to music majors and minors only.

Note: Credit for this course not applicable to BMus degree.

Music Performance 273 **H(0-5)**

Class Piano II

Continuation of Music Performance 271. Open to music majors and minors only.

Prerequisite: Music Performance 271 or consent of the Department.

Note: Credit for this course not applicable to BMus degree.

Music Performance 291 **H(1-3)**

Performance Practicum I

Applied instruction in instrument or voice. Open only to students in the Bmus program and music minors after successful audition.

Music Performance 293 **H(1-3)**

Performance Practicum II

Continuation of Music Performance 291. Open to music majors and minors.

Prerequisite: Music Performance 291 or consent of the Department.

Senior Courses

Music Performance 301 **H(0-6)**

Chamber Choir II

Continuation of Music Performance 201.

Prerequisite: Music Performance 201 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 303 **H(0-6)**

Women's Choir II

Continuation of Music Performance 203.

Prerequisite: Music Performance 203 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 305 **H(0-6)**

University Chorus II

Continuation of Music Performance 205. A brief audition is required.

Prerequisite: Music Performance 205 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 311 **H(0-6)**

Symphonic Band II

Continuation of Music Performance 211.

Prerequisite: Music Performance 211 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 313 **H(0-6)**

Wind Ensemble II

Continuation of Music Performance 213.

Prerequisite: Music Performance 213 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 315 **H(0-6)**

University Orchestra II

Continuation of Music Performance 215.

Prerequisite: Music Performance 215 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 323 **H(0-6)**

Vocal Jazz Ensemble II

Continuation of Music Performance 223.

Prerequisite: Music Performance 223 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 325 **H(0-8)**

Instrumental Jazz Ensemble II

Continuation of Music Performance 225.

Prerequisite: Music Performance 225 or consent of the Department.

Note: This course meets for four hours per week during the Fall and Winter Sessions.

Music Performance 327 **H(0-6)**

New Music Ensemble II

Continuation of Music Performance 227.

Prerequisite: Music Performance 227 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 329 **H(0-6)**

World Music Ensemble II

Continuation of Music Performance 229.

Prerequisite: Music Performance 229 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 341 **H(0-4)**

Chamber Music II

Continuation of Music Performance 241.

Prerequisite: Music Performance 241 or consent of the Department.

Note: This course meets for two hours per week during the Fall and Winter Sessions.

Music Performance 351 **H(1-4)**

Second Instrument Study II

Continuation of Music Performance 251. Open only to music majors.

Prerequisite: Music Performance 251.

Note: This course meets for one-half lecture and two laboratory hours per week during the Fall and Winter Sessions.

Music Performance 383 **H(2-4)**

Applied Jazz Studies I

A group performance course in applied jazz studies designed to complement classical training.

Prerequisites: Music Performance 293 and admission to the Jazz Studies Route.

Note: This course meets for one lecture and two laboratory hours per week during the Fall and Winter Sessions.

Music Performance 391 **H(1-3)**

Performance Practicum III

Continuation of Music Performance 293. Open to students in the BMus program.

Prerequisite: Music Performance 293. (Students admitted to the Performance Route must have attained a "B-" or better.)

Music Performance 393 **H(1-3)**

Performance Practicum IV

Continuation of Music Performance 391. Open to students in the BMus program.

Prerequisite: Music Performance 391. (Students admitted to the Performance Route must have attained a "B-" or better.)

Music Performance 401 **H(0-6)**

Chamber Choir III

Continuation of Music Performance 301.

Prerequisite: Music Performance 301 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 403 **H(0-6)**

Women's Choir III

Continuation of Music Performance 303.

Prerequisite: Music Performance 303 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 405 **H(0-6)**

University Chorus III

Continuation of Music Performance 305. A brief audition is required.

Prerequisite: Music Performance 305 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 411 **H(0-6)**

Symphonic Band III

Continuation of Music Performance 311.

Prerequisite: Music Performance 311 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 413 **H(0-6)**

Wind Ensemble III

Continuation of Music Performance 313.

Prerequisite: Music Performance 313 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 415 **H(0-6)**

University Orchestra III

Continuation of Music Performance 315.

Prerequisite: Music Performance 315 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 423 **H(0-6)**

Vocal Jazz Ensemble III

Continuation of Music Performance 323.

Prerequisite: Music Performance 323 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 425 **H(0-8)**

Instrumental Jazz Ensemble III

Continuation of Music Performance 325.

Prerequisite: Music Performance 325 or consent of the Department.

Note: This course meets for four hours per week during the Fall and Winter Sessions.

Music Performance 429 **H(0-6)**

World Music Ensemble III

Continuation of Music Performance 329.

Prerequisite: Music Performance 329 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 441 **H(0-4)**

Chamber Music III

Continuation of Music Performance 341.

Prerequisite: Music Performance 341 or consent of the Department.

Note: This course meets for two hours per week during the Fall and Winter Sessions.

Music Performance 469 **H(4-0)**

Professional Seminar in Music Performance I

Practical experience in music performance in a team teaching master class format.

Prerequisites: Music Performance 393 and admission to the Performance Route.

Note: This course meets for two hours per week during the Fall and Winter Sessions.

Music Performance 481 **H(2-2)**

Jazz Improvisation I

Basic improvisation in the jazz idiom, stressing improvisational tools, melody, rhythm, and ear development for the blues progressions. Open only to BMus students.

Prerequisite: Music Theory and Composition 203 or consent of the Department.

Music Performance 491 **H(1-3)**

Performance Practicum V

Continuation of Music Performance 393. Open to students in the BMus program.

Prerequisite: Music Performance 393. (Students admitted to the Performance Route must have attained a "B-" or better.)

Music Performance 493 **H(1-3)**

Performance Practicum VI

Continuation of Music Performance 491. Open to students in the BMus program.

Prerequisite: Music Performance 491. (Students admitted to the Performance Route must have attained a "B-" or better.)

Music Performance 498 **F(1-4)**

Junior Performance Project

Applied instruction in instrument or voice in connection with junior recital.

Prerequisites: Admission to the Performance Route and must have attained a "B-" or better in Music Performance 393.

Music Performance 501 **H(0-6)**

Chamber Choir IV

Continuation of Music Performance 401.

Prerequisite: Music Performance 401 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 503 **H(0-6)**

Women's Choir IV

Continuation of Music Performance 403.

Prerequisite: Music Performance 403 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 505 **H(0-6)**

University Chorus IV

Continuation of Music Performance 405. A brief audition is required.

Prerequisite: Music Performance 405 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 511 **H(0-6)**

Symphonic Band IV

Continuation of Music Performance 411.

Prerequisite: Music Performance 411 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 513 **H(0-6)**

Wind Ensemble IV

Continuation of Music Performance 413.

Prerequisite: Music Performance 413 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 515 **H(0-6)**

University Orchestra IV

Continuation of Music Performance 415.

Prerequisite: Music Performance 415 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 517 **H(0-4)**

Opera Workshop

Practical experience related to the performance of opera; focusing on operatic styles, music theatre exercises and participation in various stage duties.

Note: Open to music and drama majors, open to other students with consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Performance 523 **H(0-6)**

Vocal Jazz Ensemble IV

Continuation of Music Performance 423.

Prerequisite: Music Performance 423 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 525 **H(0-8)**

Instrumental Jazz Ensemble IV

Continuation of Music Performance 425.

Prerequisite: Music Performance 425 or consent of the Department.

Note: This course meets for four hours per week during the Fall and Winter Sessions.

Music Performance 529 **H(0-6)**

World Music Ensemble IV

Continuation of Music Performance 429.

Prerequisite: Music Performance 429 or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Performance 541 **H(0-4)**

Chamber Music IV

Continuation of Music Performance 441.

Prerequisite: Music Performance 441 or consent of the Department.

Note: This course meets for two hours per week during the Fall and Winter Sessions.

Music Performance 555 **H(3-0)**

Independent Study

Individual study in a selected performance area.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Performance 569 **H(4-0)**

Professional Seminar in Music Performance II

Continuation of Music Performance 469.

Prerequisites: Music Performance 469 and admission to the Performance Route.

Note: This course meets for two hours per week during the Fall and Winter Sessions.

Music Performance 571 **H(3-0)**

Topics in Music Performance

Various topics such as applied music literature, piano, wind or string pedagogy, or vocal pedagogy, phonetics.

Prerequisite: Consent of the Department.

Note: Open only to BMus and BA (Music) students.

MAY BE REPEATED FOR CREDIT

Music Performance 581 **H(2-2)**

Jazz Improvisation II

A continuation of Music Performance 481. Improvisation in the jazz idiom, stressing improvisational tools, melody, rhythm, and ear development for selected progressions. Open only to BMus students.

Prerequisite: Music Performance 481.

MAY BE REPEATED FOR CREDIT

Music Performance 591 **H(1-3)**

Performance Practicum VII

Continuation of Music Performance 493. Open to students in the BMus program with consent of the Department.

Prerequisite: Music Performance 493.

Music Performance 593 **H(1-3)**

Performance Practicum VIII

Continuation of Music Performance 591. Open to students in the BMus program with consent of the Department.

Prerequisite: Music Performance 591.

Music Performance 598 **F(1-4)**

Senior Performance Project

Applied instruction in instrument or voice in connection with senior recital.

Prerequisites: Admission to the Performance Route and must have attained a "B-" or better in Music Performance 498.

Graduate Courses

Music Performance 632 **F(2-3)**

Advanced Choral Conducting

Prerequisite: Consent of the Department.

Music Performance 634 **F(2-3)**

Advanced Instrumental Conducting

Prerequisite: Consent of the Department.

Music Performance 641 **H(0-4)**

Advanced Chamber Ensemble I

Intensive coaching in departmental chamber ensembles.

Prerequisite: Consent of the Department.

Music Performance 643 **H(0-4)**

Advanced Chamber Ensemble II

Continuation of Music Performance 641.

Prerequisite: Music Performance 641 or consent of the Department.

Music Performance 655 **H(3-0)**

Independent Study

Individual study in a selected performance area.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Performance 657 **H(0-3)**

Studies at the Banff Centre

Advanced music studies. Although the Banff Centre does not provide credit course instruction, students with advanced experience in music at the Banff Centre may apply for graduate-level credit from the University of Calgary.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Music Performance 671 **H(3-0)**

Topics in Music Performance

Various topics such as applied music literature, applied pedagogy, accompanying, phonetics and others.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Performance 691 **H(2-3)**

Advanced Performance Practicum I

Applied instruction in instrument or voice.

Prerequisite: Consent of the Department.

Music Performance 693 **H(2-3)**

Advanced Performance Practicum II

Continuation of Music Performance 691.

Prerequisite: Music Performance 691 or consent of the Department.

Music Theory and Composition MUTC

Instruction offered by members of the Department of Music in the Faculty of Fine Arts.

Department Head – M. Edwards

Junior Courses

Music Theory and Composition 201 **H(3-0)**

Materials of Music I

Part-writing and analysis of diatonic music.

Note: Open to students accepted as music majors and minors on the basis of the entrance audition and to qualified students from other areas with consent of the Department.

Music Theory and Composition 203 **H(3-2)**

Materials of Music II

Part-writing and analysis with an emphasis on diatonic harmony and modulation in the music of the eighteenth century.

Prerequisite: Music Theory and Composition 201 or consent of the Department.

Music Theory and Composition 221 **H(0-6)**

Musicianship I

Development of skills in rhythm, intonation and sightsinging. Performance of two-part contrapuntal exercises with diatonic modulation.

Note: Open only to students accepted as music majors and minors on the basis of the entrance audition or consent of the Department.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Senior Courses

Music Theory and Composition 301 **H(3-2)**

Materials of Music III

Part-writing and analysis with an emphasis on chromatic harmony and modulation in the music of the nineteenth century.

Prerequisite: Music Theory and Composition 203 or consent of the Department.

Music Theory and Composition 303 **H(3-2)**

Materials of Music IV

Part-writing and analysis with an emphasis on the music of the twentieth century.

Prerequisite: Music Theory and Composition 301 or consent of the Department.

Music Theory and Composition 321 **H(0-6)**

Musicianship II

Further development of skills in rhythm, intonation and sightsinging. Performance of two-part contrapuntal exercises with chromatic modulation. Introduction to atonal exercises.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Theory and Composition 331 **H(2-1T-3)**

Computer Applications in Music

Use of computers in music composition, performance, education and interdisciplinary media.

Prerequisite: Consent of the Department.

Music Theory and Composition 385 **H(0-6)**

Jazz Musicianship

Musicianship in the jazz idiom, stressing the aural perception of jazz scales and modes, seventh-chord and harmonic extensions, common jazz progressions and jazz rhythms.

Prerequisite: Music Theory and Composition 221.

Note: This course meets for three hours per week during the Fall and Winter Sessions.

Music Theory and Composition 391 **H(3-0)**

Composition I

Basic compositional techniques, and study of selected twentieth century compositions.

Prerequisite: Music Theory and Composition 203 or consent of the Department.

Music Theory and Composition 393 **H(3-0)**

Composition II

Continuation of Music Theory and Composition 391.

Prerequisite: Music Theory and Composition 391 or consent of the Department.

Music Theory and Composition 471 **H(3-0)**

Form and Analysis

Investigations into hierarchical relations in music. Study of how various levels of musical structure relate in order to form a whole.

Prerequisite: Music Theory and Composition 303.

Music Theory and Composition 473 **H(3-0)**

Advanced Harmonic Analysis

Investigation of the expanded harmonic resources and analytical systems used by composers from the late 19th Century to the present.

Prerequisite: Music Theory and Composition 303.

Music Theory and Composition 475 **H(3-0)**

Counterpoint

Practical study of contrapuntal technique, including species counterpoint and 18th Century counterpoint.

Prerequisite: Music Theory and Composition 303.

Music Theory and Composition 477 **H(3-0)**

Orchestration

Practical study of instrumentation and scoring, including orchestral and wind ensemble textures.

Prerequisite: Music Theory and Composition 303.

Music Theory and Composition 479 **H(3-0)**

Electroacoustic Music

Practical study of electroacoustic and computer music with an emphasis on creative work in the medium.

Music Theory and Composition 491 **H(3-0)**

Composition III

Continuation of Music Theory and Composition 393.

Prerequisite: Music Theory and Composition 393 or consent of the Department.

Music Theory and Composition 493 **H(3-0)**

Composition IV

Continuation of Music Theory and Composition 491.

Prerequisite: Music Theory and Composition 491 or consent of the Department.

Music Theory and Composition 555 **H(3-0)**

Independent Study

Individual study in a selected theory or composition area.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Theory and Composition 575 **H(3-0)**

Selected Topics in the Materials of Music Composition

Advanced practical study of compositional techniques selected from such subjects as: electroacoustic music, orchestration, counterpoint, fugue and materials of twentieth century music.

Prerequisites: Music Theory and Composition 303 and consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Theory and Composition 577 **H(3-0)**

Selected Topics in Music Theory

Advanced topics in music theory selected from such subjects as: analysis of tonal music, analysis of post-tonal music, rhythmic analysis, acoustics, analysis of selected repertoire and critical approaches to music theory.

Prerequisites: Music Theory and Composition 303 and consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Theory and Composition 581 **H(3-1)**

Jazz Harmony

Detailed study of the harmonic materials of jazz.

Prerequisite: Music Theory and Composition 303 or consent of the Department.

Music Theory and Composition 596 **F(1-4)**

Honours Project

A major project with an emphasis upon analytic or creative issues.

Prerequisites: Two half courses in Music Theory and Composition at the 400 or 500 level; or Music Theory and Composition 493; or consent of the Department.

Note: Restricted to students in the BA Honours (Music) program.

Music Theory and Composition 598 **F(1-4)**

Senior Project

Major project in theory or composition.

Prerequisites: Two half courses in Music Theory and Composition at the 400 or 500 level; or Music

Theory and Composition 493; or consent of the Department.

Graduate Courses

Music Theory and Composition 655 H(3-0)

Independent Study

Individual study in a selected theory or composition area.

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Theory and Composition 671 H(2-2)

Seminar in Music Analysis

Various analytical topics such as set theory and reductive analysis may be offered. Consult the Department for current topic(s).

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Theory and Composition 673 H(3-1)

Selected Topics in Theory and Composition

Various topics such as orchestration, advanced counterpoint, and acoustics may be offered. Consult the Department for current topic(s).

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Theory and Composition 675 H(3-0)

Pedagogy of Music Theory

Refining ideas about music theory and its teaching, while developing and strengthening teaching skills.

Prerequisite: Consent of the Department.

Note: Required course for all PhD (Composition) students.

Music Theory and Composition 691 H(2-2)

Composition Seminar

Prerequisite: Consent of the Department.

Music Theory and Composition 695 H(2-2)

Composition

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Theory and Composition 755 H(3-0)

Independent Study

Individual study in a selected theory or composition area (doctoral level).

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Theory and Composition 775 H(3-0)

Advanced Topics in Theory and Composition

Various topics (doctoral level).

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT

Music Theory and Composition 795 H(3-0)

Composition

Individual study in musical composition (doctoral level).

Prerequisite: Consent of the Department.

MAY BE REPEATED FOR CREDIT