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RICHARD POUND, LLD *Concordia University*

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For the complete list of faculty members, please consult the Department website.

Location*Loyola Campus*

Richard J. Renaud Science Complex, Room: SP 165

514-848-2424, ext. 3327

Department Objectives

The Department of Exercise Science is committed to teaching and research in the areas of exercise, health, and physical activity while emphasizing the 1) fields of athletic therapy and 2) kinesiology and clinical exercise physiology. The curriculum permits students to explore the biomechanical and physiological responses to physical activity of healthy individuals and persons with a variety of pathologies and disabilities. Lectures and laboratories are combined with supervised involvement in research, and community and professional activities. Students are provided with an education which is compatible with obtaining employment in the health and fitness field or continuing their studies in health-related professional or graduate schools.

The BSc Honours, Specialization, and Major programs in Exercise Science and the Bachelor of/Baccalaureate in Science in Athletic Therapy (BScAT) provide students with the opportunity to acquire essential knowledge and a strong foundation in the field of exercise science. Students are exposed to a concentrated series of courses that incorporate the application of biological sciences to exercise, physical activity, and health-related areas including athletic therapy and kinesiology and clinical exercise physiology.

The fundamental concepts associated with the BSc in Kinesiology and Clinical Exercise Physiology (KCEP) include the adaptation of traditional exercise forms, assessment techniques, and training protocols which address the needs of individuals with a disease or functional disability (e.g. heart disease, diabetes, neurological disorders). Students entering the field of KCEP acquire an appreciation of persons with a disability, their lifestyle, and their exercise possibilities. The form of exercise application ranges from adapted physical activities to competitive sports.

The BSc in Athletic Therapy (BScAT) is accredited by the Canadian Athletic Therapists Association (CATA) and is directed toward the preparation of students seeking to become a Certified Athletic Therapist in Canada (CAT[C]). A CAT(C) is devoted to the health care of physically active individuals. The scope of practice of the CATA includes prevention, immediate care, and reconditioning of musculoskeletal injuries. Some of the techniques used to accomplish prevention of injury are postural evaluation, conditioning, and providing prophylactic support. Immediate care and rehabilitation of musculoskeletal injury consist of injury assessment, first aid and emergency care, exercise and modality therapy, and preparing individuals for safe return to physical activity or athletic participation. Student members (certification candidates) of the CATA must fulfill the academic and practical requirements of a program accredited by the CATA in order to enter the CATA certification exam process. The Department of Exercise Science offers one of seven such programs in Canada.

While the BSc major offers core applied-science, health, and fitness courses, the BSc honours also introduces undergraduate students to research concepts and protocols. The BSc in Athletic Therapy (BScAT) and BSc in Kinesiology and Clinical Exercise Physiology (KCEP) offer courses providing a theoretical knowledge base in the respective areas of study.

NOTE: Exercise Science labs may require physical contact and/or skin exposure with another classmate while learning assessment, treatment, exercise techniques, and equipment placement. The labs manifest important and necessary scenarios to prepare the student for future professional employment. All labs, and parts thereof, in the Department of Exercise Science are mandatory. If participation in some labs is deemed problematic, the laboratory instructor, the course professor, and/or Chair of the Department of Exercise Science must be contacted as early as possible.

Programs

Students are required to complete the appropriate profile for entry into the Exercise Science programs (see §31.002 — Programs and Admission Requirements — Profile). Students entering the major, Athletic Therapy, and Kinesiology and Clinical Exercise Physiology programs should refer to §16.3.10 — Academic Performance, and §31.003.1 — AGPA Requirements. Students considering entry into the honours program should refer to §31.003 — Degree Requirements which includes the honours regulations for the Faculty of Arts and Science.

Application Procedures

All newly admitted students enter the BSc Major in Exercise Science. Admission to the BSc Honours in Exercise Science, BSc in Athletic Therapy (BScAT) or BSc in Kinesiology and Clinical Exercise Physiology is by internal transfer only. Upon completion of a specified list of courses, any student may submit a request for an internal transfer.

Eligibility Requirements for Internal Transfer

To be eligible to transfer from the BSc Major into the BSc Honours program, students must: 1) complete all Exercise Science courses in Stage I of the major, 2) have an assessment GPA of at least 3.30 for all program and elective courses, 3) have a cumulative GPA of at least 3.30 for all program and elective courses, and 4) have letter grades of C or above in all program and elective courses.

To be eligible to transfer from the BSc Major into the BSc in Athletic Therapy (BScAT) or the BSc in Kinesiology and Clinical Exercise Physiology, students must complete all Exercise Science courses in Stage I of the major with a minimum cumulative GPA of 3.00.

NOTE: Students who fail to meet the internal transfer requirements from the major to the honours, Athletic Therapy, or Kinesiology and Clinical Exercise Physiology program have two options. The first option is to remain in the major for the duration of their studies. The second option is to repeat some Exercise Science courses in Stage I of the major until the transfer requirements have been met.

Stage Eligibility Requirements

The major, honours, and Kinesiology and Clinical Exercise Physiology (KCEP) programs are composed of three stages, whereas the Athletic Therapy (AT) program has four stages. To be eligible to register for courses in the next stage of a given program, students must complete all of the courses in a previous stage of their program. Please refer to the course maps that follow summarizing the courses students are required to take in each stage of the respective programs. Students who fail to complete all the science prerequisites by the end of Stage II are prevented from progressing to the next stage of their program. In addition, it is strongly recommended that these students contact their academic advisor. The science prerequisite courses include BIOL 201³; CHEM 205³, 206³; MATH 203³, 205³; PHYS 204³, 205³, 206³, 224¹, 225¹, 226¹ or their equivalents. Please note that PHYS 204 and 224 or their equivalents must be taken before registering for EXCI 351.

Stage Requirements of the Major Program

To be eligible to register for courses in Stage II of the major, students must complete all Exercise Science courses in Stage I of the major and be in acceptable standing (see §16.3.10 and §31.003.1).

To be eligible to register for courses in Stage III of the major, students must complete all Exercise Science courses in Stage II of the major and be in acceptable standing (see §16.3.10 and §31.003.1).

Stage Requirements of the Honours Program

To be eligible to register for courses in Stage II of the honours, students must satisfy the honours internal transfer requirements.

To be eligible to register for courses in Stage III of the honours, students must: 1) have an assessment GPA of at least 3.30 for all program and elective courses, 2) have a cumulative GPA of at least 3.30 for all program and elective courses, and 3) have letter grades of C or above in all program and elective courses.

Stage Requirements of the KCEP Program

To be eligible to register for courses in Stage II of the KCEP, students must satisfy the KCEP program internal transfer requirements.

To be eligible to register for courses in Stage III of the KCEP, students must: 1) complete all Exercise Science courses in Stage II of the KCEP with a minimum cumulative GPA of 3.00, and 2) maintain a minimum cumulative GPA of 3.00 in all KCEP courses (Stages I and II).

Stage Requirements of the AT Program

To be eligible to register for courses in Stage II of the AT, students must satisfy the AT program internal transfer requirements.

To be eligible to register for courses in Stage III of the AT, students must: 1) complete all Exercise Science courses in Stage II of the AT with a minimum cumulative GPA of 3.00, and 2) maintain a minimum cumulative GPA of 3.00 in all AT program courses (Stages I and II).

To be eligible to register for courses in Stage IV of the AT program, students must: 1) complete all Exercise Science courses in Stage III of the AT program with a minimum cumulative GPA of 3.00, and 2) maintain a minimum cumulative GPA of 3.00 in all AT program courses (Stages I, II, and III).

Students are responsible for satisfying their particular degree requirements.

The superscript indicates credit value.

78 BSc Honours in Kinesiology and Clinical Exercise Physiology

Stage I

24 CATA 262³, 263³; EXCI 252³, 253³, 254³, 258³, 259³; KCEP 210³

Stage II

24 EXCI 310³, 322³, 351³, 352³, 360³; KCEP 311³, 349³, 383³

Stage III

24 EXCI 421³, 426⁶, 445³, 460³; KCEP 411³, 449³, 483³

6 Chosen from EXCI 420³, 440³, 451³, 453³, 455³, 458³, 461³, 471³

NOTE: Students seeking admission to the honours program must apply to the Department Honours Committee normally following the completion of 24 program credits. Students must meet the Faculty of Arts and Science regulations concerning the honours program. For additional information concerning programs and courses, students should consult the Department.

102 BSc Honours in Athletic Therapy

Stage I

24 CATA 262³, 263³; EXCI 252³, 253³, 254³, 258³, 259³; KCEP 210³

Stage II

27 CATA 337³, 339³, 348³, 365⁶; EXCI 310³, 351³, 352³, 360³

Stage III

21 CATA 437³, 439³, 462³, 475⁶; EXCI 322³, 460³

3 Chosen from EXCI 420³, 440³, 451³, 453³, 461³; KCEP 311³, 411³

Stage IV

24 CATA 441³, 485³, 495³; EXCI 421³, 426⁶, 445³, 471³

3 Chosen from CATA 447³; EXCI 455³, 458³, 461³; MANA 300³

NOTE: Students seeking admission to the honours program must apply to the Department Honours Committee normally following the completion of 24 program credits. Students must meet the Faculty of Arts and Science regulations concerning the honours program. For additional information concerning programs and courses, students should consult the Department.

60 BSc Honours in Exercise Science

Stage I

24 CATA 262³, 263³; EXCI 252³, 253³, 254³, 258³, 259³; KCEP 210³

Stage II

15 EXCI 310³, 322³, 351³, 352³, 360³

Stage III

- 18 EXCI 420³, 421³, 426⁶, 445³, 460³
3 Chosen from EXCI 440³, 451³, 453³, 455³, 458³, 461³, 471³

NOTE: Students seeking admission to the honours program must apply to the Department Honours Committee normally following the completion of 24 program credits. Students must meet the Faculty of Arts and Science regulations concerning the honours program. For additional information concerning programs and courses, students should consult the Department.

96 BSc in Athletic Therapy (BScAT)

Stage I

- 24 CATA 262³, 263³; EXCI 252³, 253³, 254³, 258³, 259³; KCEP 210³

Stage II

- 27 CATA 337³, 339³, 348³, 365⁶; EXCI 310³, 351³, 352³, 360³

Stage III

- 18 CATA 437³, 439³, 462³, 475⁶; EXCI 460³
6 Chosen from EXCI 420³, 440³, 451³, 453³, 461³; KCEP 311³, 411³

Stage IV

- 15 CATA 441³, 485³, 495³; EXCI 445³, 471³
6 Chosen from CATA 447³; EXCI 455³, 458³, 461³, 492³; MANA 300³

69 BSc in Kinesiology and Clinical Exercise Physiology

Stage I

- 24 CATA 262³, 263³; EXCI 252³, 253³, 254³, 258³, 259³; KCEP 210³

Stage II

- 21 EXCI 310³, 351³, 352³, 360³; KCEP 311³, 349³, 383³

Stage III

- 15 EXCI 445³, 460³; KCEP 411³, 449³, 483³
9 Chosen from EXCI 420³, 440³, 451³, 453³, 455³, 458³, 461³, 471³, 492³

45 BSc Major in Exercise Science

Stage I

- 24 CATA 262³, 263³; EXCI 252³, 253³, 254³, 258³, 259³; KCEP 210³

Stage II

- 12 EXCI 310³, 351³, 352³, 360³

Stage III

- 6 EXCI 445³, 460³
3 Chosen from EXCI 420³, 440³, 451³, 453³, 455³, 458³, 461³, 471³, 492³

Courses

CATA:

CATA 262 Emergency Care in Sport and Exercise (3 credits)

Prerequisite: EXCI 253 previously or concurrently; enrolment in an Exercise Science program. This course identifies common emergency situations in the athletic environment, and provides theoretical and practical components of management skills to safely deal with these situations. Specific signs and symptoms of basic emergency conditions are discussed. Planning of events to prepare for sport-related emergencies and administration of initial emergency techniques are included. Lectures and laboratory.

NOTE: The Corporation des thérapeutes du sport du Québec (CTSQ) accepts successful completion of this course as equivalent to a first aid course which is a partial requirement towards provincial recognition as a Level I Sport First Aider.

CATA 263 Principles of Athletic Therapy (3 credits)

Prerequisite: CATA 262; enrolment in an Exercise Science program. The course considers topics in athletic therapy from professional, preventive, and pathological perspectives. The course deals with injury classification, clinical flexibility, strength testing, cryotherapy, and sports dermatology. Preventive techniques such as pre-season physical examinations, protective equipment, hazard recognition, and taping techniques are also addressed. Acute and chronic pathologies associated with physical activity, as well as issues including sudden death and communicable diseases in athletics, and the adolescent athlete are discussed. Lectures and laboratory.

NOTE: Students who have received credit for EXCI 263 or 335 may not take this course for credit.

CATA 337 Assessment of the Upper and Lower Extremities (3 credits)

Prerequisite: Successful completion of Stage I* in the major; enrolment in the BScAT. This course examines normal function of the upper and lower extremities of the human body. Abnormal function and various pathologies of these structures are addressed in depth. Making use of principles based on applied anatomy and physiology, students learn about clinical assessment procedures and implementation of evaluation methods addressing orthopaedic dysfunction. Types of surgical procedures are discussed. Lectures and laboratory.

NOTE: Students who have received credit for CATA 338 may not take this course for credit.

**Stage I consists of CATA 262, 263; EXCI 252, 253, 254, 258, 259; KCEP 210.*

CATA 339 *Rehabilitation of the Upper and Lower Extremities* (3 credits)

Prerequisite: CATA 337 previously or concurrently; successful completion of Stage I* in the major; enrolment in the BScAT. This course examines concepts in the rehabilitation process including tissue healing, and introduces students to various exercise protocols and manual techniques specific to the upper and lower extremities. Students learn how to implement safe and effective rehabilitation protocols to address orthopaedic dysfunction of these areas. Patient education to facilitate rehabilitation, documentation treatment plans and treatment outcomes are addressed. Lectures and laboratory.

NOTE: Students who have received credit for CATA 338 may not take this course for credit.

**Stage I consists of CATA 262, 263; EXCI 252, 253, 254, 258, 259; KCEP 210.*

CATA 348 *Therapeutic Modalities in Sports Medicine* (3 credits)

Prerequisite: CATA 337, 339; successful completion of Stage I* in the major; enrolment in the BScAT. Students are introduced to the parameters of therapeutic modalities and their physiological effects. Various modalities such as heat, cold, ultrasound, muscle stimulation, interferential current and Transcutaneous Electrical Nerve Stimulation (T.E.N.S.) are examined. For each modality, topics include instrumentation, set-up, and practical application. Basic concepts of manual treatment approaches, such as mobilizations, myofascial release, traction, and massage, are introduced. Indications and contraindications and precautions for all treatments are presented. Lectures and laboratory.

NOTE: Students who have received credit for EXCI 348 or 448 may not take this course for credit.

**Stage I consists of CATA 262, 263; EXCI 252, 253, 254, 258, 259; KCEP 210.*

CATA 365 *Athletic Therapy Field Internship I* (6 credits)

Prerequisite: Successful completion of Stage I* in the major; enrolment in the BScAT; permission of the Department. This course offers students the opportunity to work in an emergency or preventive setting with a sports team, although some clinical component may be introduced. Students must be certification candidates of the Canadian Athletic Therapists Association (CATA) and the Corporation des thérapeutes du sport du Québec (CTSQ). This course involves a commitment of 400 hours over two terms. Weekly seminars with agency supervisors are mandatory.

NOTE: Students who have received credit for CATA 390 may not take this course for credit.

**Stage I consists of CATA 262, 263; EXCI 252, 253, 254, 258, 259; KCEP 210.*

CATA 437 *Assessment of the Hip, Spine and Pelvis* (3 credits)

Prerequisite: Completion of Stage II* in the BScAT. CATA 337, 339; enrolment in BScAT. This course examines normal function of the hip, spine, and pelvis of the human body. Abnormal function and various pathologies of these structures are addressed in depth. Making use of principles based on applied anatomy and physiology, students learn about clinical assessment procedures and implementation of evaluation methods addressing orthopaedic dysfunction. Surgical procedures are discussed. Lectures and laboratory.

NOTE: Students who have received credit for CATA 438 may not take this course for credit.

**Stage II consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.*

CATA 439 *Rehabilitation of the Hip, Spine and Pelvis* (3 credits)

Prerequisite: CATA 437 previously or concurrently; completion of Stage II* in the BScAT. This course examines concepts in rehabilitation, introducing the students to various exercise protocols and manual techniques specific to hip, spine, and pelvis. Students learn how to implement advanced, safe, and effective rehabilitation protocols to address orthopaedic dysfunction of these areas. Lectures and laboratory.

NOTE: Students who have received credit for CATA 438 may not take this course for credit.

**Stage II consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.*

CATA 441 *Concepts in Manual Therapy* (3 credits)

Prerequisite: Completion of Stage III* in the BScAT. This course provides students with an understanding of the fundamental theory and practical basis for using various manual therapy techniques to keep athletes competition-ready, to help in their recovery from injury, and to improve their performance. The course explains various techniques in detail and describes the procedures involved in conducting effective treatment sessions. Muscle Energy, Active Release, Myofascial Release, and Sports Massage are some of the techniques discussed, demonstrated, and practised. Determining goals and organization of a treatment session, and the choice and application of techniques are also discussed. The goal of the course is to help athletic therapists determine the most appropriate manual therapy techniques for a variety of orthopaedic pathologies. Lectures and laboratory.

**Stage III consists of CATA 437, 439, 462, 475; EXCI 460 and two chosen from EXCI 420, 440, 451, 453, 461; KCEP 311, 411.*

CATA 447 *Special Topics in Athletic Therapy* (3 credits)

Prerequisite: Completion of Stage II* in the BScAT. This course focuses on recent research outcomes and new issues in athletic therapy specific to prevention, assessment, and rehabilitation of athletic injuries. The course content varies within the domains of the Canadian Athletic Therapists Association depending upon the most current issues such as surgical techniques, new medications, advanced assessment and modality techniques, and issues related to professional development and the workplace environment. Information is presented from a variety of courses and disciplines to enhance the knowledge base received from core Athletic Therapy courses. Lectures only.

**Stage II consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.*

CATA 462 *Advanced Emergency Care* (3 credits)

Prerequisite: Completion of Stage II* in the BScAT. This course completes the preparation of Athletic Therapy students in the area of emergency care of sports-related injury. It identifies the less common and more complicated emergency situations experienced

in the athletic therapy setting. Advanced theoretical and practical components are presented. This course develops the ability of the student to care for the athlete beyond the initial stages of emergency management and towards advanced life support.

Lectures and laboratory.

*Stage II consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.

CATA 475 Athletic Therapy Clinical Internship I (6 credits)

Prerequisite: Completion of Stage II* in the BScAT. Students must be certification candidates of the Canadian Athletic Therapists Association and the Corporation des thérapeutes du sport du Québec. The course offers a minimum 400-hour supervised work opportunity. Under the supervision of a Certified Athletic Therapist, students are shown basic administrative skills as seen in private rehabilitation clinics or within the Department of Exercise Science.

NOTE: Students who have received credit for CATA 480 may not take this course for credit.

*Stage II consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.

CATA 485 Athletic Therapy Field Internship II (3 credits)

Prerequisite: Completion of Stage III* in the BScAT. This course offers students the opportunity to work in an emergency or preventive setting with a sports team, although some clinical component may be introduced. Students must be certification candidates of the Canadian Athletic Therapists Association (CATA) and the Corporation des thérapeutes du sport du Québec (CTSQ). This course involves a minimum commitment of 200 hours over one or two terms. Weekly seminars with agency supervisors are mandatory.

NOTE: Students who have received credit for CATA 390 may not take this course for credit.

*Stage III consists of CATA 437, 439, 462, 475; EXCI 460 and two chosen from EXCI 420, 440, 451, 453, 461; KCEP 311, 411.

CATA 495 Athletic Therapy Clinical Internship II (3 credits)

Prerequisite: Completion of Stage III* in the BScAT. Students must be certification candidates of the CATA and the CTSQ. The course offers a supervised period of work in a rehabilitation or athletic therapy clinic, for a minimum of 200 hours including a weekly seminar.

NOTE: Students who have received credit for CATA 480 may not take this course for credit.

*Stage III consists of CATA 437, 439, 462, 475; EXCI 460 and two chosen from EXCI 420, 440, 451, 453, 461; KCEP 311, 411.

EXCI:

EXCI 202 The Body Human: Form and Function (3 credits)

This course provides insight into the manner in which common injuries and diseases impact on the anatomical structures and functional systems of the body. The various medical treatments and procedures available to maintain or restore the structural and functional integrity of the body are also addressed. Conditions of a cardiovascular, pulmonary, neuromuscular, metabolic and oncologic nature are discussed.

NOTE: Students who have received credit for this topic under an EXCI 298 number may not take this course for credit.

NOTE: Exercise Science students may not take this course for credit.

EXCI 204 Food for Sport (3 credits)

The course introduces students to a basic understanding of how the digestive system functions, and then examines the role of diet on sport performance. Students learn about the impact of the major food stuffs (carbohydrates, fats, proteins, vitamins, minerals, water) on performance outcomes. The use of ergogenic aids commonly used to enhance sport performance are also discussed with respect to their effectiveness. Caloric balance, diet and body composition are also discussed relevant to specific sport requirements.

NOTE: Students who have received credit for this topic under an EXCI 298 number may not take this course for credit.

NOTE: Exercise Science students may not take this course for credit.

EXCI 206 The Science of Sport (3 credits)

The course introduces basic and practical knowledge of human movement in sports and physical activity. Anatomical and physiological knowledge pertinent to body movement is presented in simple and meaningful terms. Biomechanical concepts and principles applied to body movement in different sports and physical activities are also addressed. Consideration is also given to nutritional aspects and injury prevention in sport and exercise.

NOTE: Students who have received credit for this topic under an EXCI 298 number may not take this course for credit.

NOTE: Exercise Science students may not take this course for credit.

EXCI 218 Physical Growth and Maturation (3 credits)

This course considers normal and abnormal growth and maturation patterns of the musculoskeletal, neural, hormonal, cardiovascular, and respiratory systems of the body. In addition, socialization and psychosocial development processes with relevance to an exercise or sports environment are examined. These patterns and processes are investigated from childhood through adolescence and adulthood. Lectures only.

NOTE: Exercise Science students may not take this course for credit.

EXCI 233 Current Issues in Personal and Community Health (3 credits)

This course presents an overview of factors influencing personal and community health. Students are exposed to prevalent physical and mental health issues from biological, psychological, and sociological points of view. Health-related consequences

of alcohol abuse, drugs, birth control, sedentary lifestyle, eating disorders, and communicable diseases are among the topics considered. Lectures only.

NOTE: Exercise Science students may not take this course for credit.

EXCI 251 **Fundamentals of Health and Physical Activity (3 credits)**

The basic and contemporary issues of health and physical activity are discussed. General topics regarding the benefits of physical activity are examined from anatomical and physiological perspectives. Upon completion, students are able to apply the principles of fitness and wellness to their own lives, to assess their current level of fitness and wellness, to create plans for changing their lifestyle to reach wellness, and to monitor their progress using the health-related components of physical fitness: body composition, cardiovascular endurance, muscular strength and endurance, and flexibility. Lectures only.

NOTE: Exercise Science students may not take this course for credit.

EXCI 252 **Introduction to Physical Activity, Health and Fitness (3 credits)**

Prerequisite: Enrolment in an Exercise Science program. This course focuses on the fundamentals of fitness assessment and the design of individualized exercise programs compatible with the responsibilities of a health/fitness instructor. Topics of study include screening clients for fitness testing and physical activity participation; the selection of appropriate tests to assess the health-related components of physical fitness such as body composition, cardiovascular endurance, muscular strength, local muscular endurance, and flexibility; interpretation of test results; and the application of exercise principles in the design of safe and effective individualized exercise prescriptions of the apparently healthy client. Lectures and laboratory.

NOTE: Students who have received credit for EXCI 261 and 342 may not take this course for credit.

EXCI 253 **Human Anatomy I: Musculoskeletal Anatomy (3 credits)**

Prerequisite: Enrolment in an Exercise Science program. The major focus of this course covers the anatomy of the musculoskeletal system and accompanying (peripheral) circulatory and neurological systems. It also addresses introductory terminology and tissue differentiation. The structures are examined through approaches of surface anatomy, current and traditional media and/or cadaver examination. Lectures and laboratory.

EXCI 254 **Human Anatomy II: Systemic Anatomy (3 credits)**

Prerequisite: EXCI 253; enrolment in an Exercise Science program. The major focus of this course covers the anatomy of the central circulatory and central respiratory systems. It also addresses the anatomy of the brain and spinal column as well as the integumentary, digestive, and urogenital systems. The structures are examined through approaches of surface anatomy, current and traditional media and cadaver examination. Lectures and laboratory.

EXCI 258 **Human Physiology I: Musculoskeletal, Neuromuscular, and Bioenergetic Systems from Rest to Exercise (3 credits)**

Prerequisite: EXCI 253 previously or concurrently; enrolment in an Exercise Science program. This course reviews the functional organization of the musculoskeletal system, the peripheral neural influence to the muscular system, and the basic metabolic pathways underlying the bioenergetics of these systems. Related physiological adaptations during rest and exercise are discussed. Lectures and laboratory.

NOTE: Students who have received credit for EXCI 257 or 358 may not take this course for credit.

EXCI 259 **Human Physiology II: Cardiovascular and Respiratory Systems from Rest to Exercise (3 credits)**

Prerequisite: EXCI 254 previously or concurrently; enrolment in an Exercise Science program. This course focuses on the fundamental mechanisms of the cardiovascular and respiratory systems. In addition, adaptations of these systems to acute and chronic exercise as well as environmental factors are discussed. Lectures and laboratory.

NOTE: Students who have received credit for EXCI 357 or 358 may not take this course for credit.

EXCI 298 **Selected Topics in Exercise Science (3 credits)**

EXCI 299 **Selected Topics in Exercise Science (6 credits)**

Specific topics for these courses, and prerequisites relevant in each case, are stated in the Undergraduate Class Schedule.

EXCI 310 **Research Methods (3 credits)**

Prerequisite: Completion of Stage I* in the major. This course provides students with a general overview of investigative research and the nature of scientific inquiry. Students receive instruction in critical inquiry and appraisal, research design, research ethics, and the role research plays in the development of professional practice/skills. Finally, this course provides the necessary knowledge and practical experience to enable students to plan and run an experimental project, including an understanding of the process of data collection, analysis, interpretation, and presentation. Lectures only.

NOTE: Students who have received credit for EXCI 250 may not take this course for credit.

*Stage I consists of CATA 262, 263; EXCI 252, 253, 254, 258, 259; KCEP 210.

EXCI 322 **Statistics for Exercise Science (3 credits)**

Prerequisite: EXCI 310 previously or concurrently; successful completion of Stage I* of the major; enrolment in the honours; or permission of the Department. This course builds on students' experience derived from EXCI 310 to advance their knowledge of the research process by providing details of statistical techniques and methods that are common in exercise science. Lectures only.

*Stage I consists of CATA 262, 263; EXCI 252, 253, 254, 258, 259; KCEP 210.

EXCI 351 Introduction to the Biomechanics of Human Movement (3 credits)

Prerequisite: PHYS 204, 224 or equivalent; completion of Stage I* of the major. The primary focus of this course concentrates on the mechanical principles of human movement. Fundamental principles of kinematics and kinetics are examined in a theoretical and practical context. Lectures and laboratory.

*Stage I consists of CATA 262, 263; EXCI 252, 253, 254, 258, 259; KCEP 210.

EXCI 352 Essentials of Exercise Testing and Training in Athletic Populations (3 credits)

Prerequisite: Completion of Stage I* in the major. This course utilizes the students' background knowledge of anatomy, physiology, biomechanics, exercise physiology, and exercise programming to design pre-season, in-season, and post-season conditioning programs for elite athletes in a variety of sports. Most importantly, this course focuses on the importance of applying scientific principles of training in the design of exercise programs for elite athletes. The importance of skill-related (i.e. speed, agility, and power) and health-related components (i.e. cardio-respiratory endurance, and muscle strength) of physical fitness relative to performance is emphasized in this course. Some of the topics covered include ergogenic aids, regulation of skeletal muscle mass, periodization, aerobic endurance and resistance exercise training, and plyometrics. Lectures and laboratory.

NOTE: Students who have received credit for EXCI 452 may not take this course for credit.

*Stage I consists of CATA 262, 263; EXCI 252, 253, 254, 258, 259; KCEP 210.

EXCI 360 Neural and Hormonal Control of Human Systems (3 credits)

Prerequisite: Completion of Stage I* in the major. Basic principles of the neural control of human movement, including reference to the sensory systems (visual, auditory, vestibular, proprioceptive and kinesthetic) are discussed. Topics of hormonal influences affecting musculoskeletal, cardiovascular, respiratory systems and metabolism are included. Lectures only.

NOTE: Students who have received credit for EXCI 355 may not take this course for credit.

*Stage I consists of CATA 262, 263; EXCI 252, 253, 254, 258, 259; KCEP 210.

EXCI 398 Selected Topics in Exercise Science (3 credits)

EXCI 399 Selected Topics in Exercise Science (6 credits)

Specific topics for these courses, and prerequisites relevant in each case, are stated in the Undergraduate Class Schedule.

EXCI 420 Physical Activity Epidemiology (3 credits)

Prerequisite: Completion of Stage II* in the major, honours, KCEP or BScAT. This course surveys the health-related aspects of exercise, physical activity, and physical fitness from the perspective of epidemiology. Topics include an introduction to the epidemiological process, the relationship between physical activity and disease (e.g. cardiovascular disease, obesity, cancer, mental illness), the biological mechanisms for healthy adaptations to physical activity, the behavioural determinants of physical activity, and public policy implications of the current literature.

NOTE: Students who have received credit for this topic under an EXCI 498 number may not take this course for credit.

*Stage II of major consists of EXCI 310, 351, 352, 360.

Stage II of honours consists of EXCI 310, 322, 351, 352, 360.

Stage II of KCEP consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.

Stage II of BScAT consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.

EXCI 421 Honours Seminar: Current Topics in Health and Exercise Science (3 credits)

Prerequisite: EXCI 322; enrolment in an honours program or permission of the Department. Using a combination of guest speakers and student presentations, this seminar is geared to critically examining current issues and methods in health and exercise science. Its emphasis is on theoretical and/or methodological issues as they relate to selected topics from these areas. Examples of topics include ethical issues and new emerging theories in health and exercise science, and utility of a particular research technique or methodology. Lectures only.

NOTE: Students who have received credit for EXCI 424 or 425 may not take this course for credit.

EXCI 426 Honours Thesis (6 credits)

Prerequisite: EXCI 421 previously or concurrently; enrolment in an honours program and completion of Stage II* in the honours. This course requires the student to propose and conduct a study and submit a thesis according to a recognized and approved scientific journal format. The work is supervised by a thesis chair selected by the student from within the Department.

*Stage II consists of EXCI 310, 322, 351, 352, 360.

EXCI 440 Current Developments in the Biochemistry of Exercise (3 credits)

Prerequisite: Completion of Stage II* in the major, honours, KCEP or BScAT. This course offers an in-depth examination of the current topics and literature in biochemistry, cellular and molecular biology, and physiology as they relate to the adaptations associated with physical activity, exercise training, or disease. The course is designed to integrate knowledge from the disciplines of Exercise Science, Biochemistry, and Biology, to facilitate the synthesis and evaluation of new ideas, and to promote the effective oral and written communication of these ideas.

NOTE: Students who have received credit for this topic under an EXCI 498 number may not take this course for credit.

*Stage II of major consists of EXCI 310, 351, 352, 360.

Stage II of honours consists of EXCI 310, 322, 351, 352, 360.

Stage II of KCEP consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.

Stage II of BScAT consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.

EXCI 445 Nutrition in Exercise and Sport (3 credits)

Prerequisite: Completion of Stage II* in the major, honours, KCEP or BScAT. This course provides an overview of the anatomy and in-depth study of the physiology of the digestive system prior to examining the significance of carbohydrates, lipids, and proteins as essential nutritional requirements for physical activity and optimal performance. The importance of trace minerals and vitamins is also discussed. Specific issues such as the use of nutritional beverages, ergogenic aids, eating disorders, and nutritional concerns of athletes are some of the topics presented. Lectures only.

*Stage II of major consists of EXCI 310, 351, 352, 360.

Stage II of honours consists of EXCI 310, 322, 351, 352, 360.

Stage II of KCEP consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.

Stage II of BScAT consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.

EXCI 451 Clinical Biomechanics (3 credits)

Prerequisite: Completion of Stage II* in the major, honours, KCEP or BScAT. This course addresses biomechanical aspects of the most common structural and neurological abnormalities of the spine resulting in pathological gait. It also addresses the mechanics of tissue and joint injury of the head, neck, torso, and extremities. Lectures only.

*Stage II of major consists of EXCI 310, 351, 352, 360.

Stage II of honours consists of EXCI 310, 322, 351, 352, 360.

Stage II of KCEP consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.

Stage II of BScAT consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.

EXCI 453 Stress, Health and Disease (3 credits)

Prerequisite: Completion of Stage II* in the major, honours, KCEP or BScAT. This course is an introduction to the role stress plays in health and disease. Topics dealt with in this seminar-based course include defining and measuring stress, the relationship between stress and disease (e.g. cardiovascular disease, asthma, cancer, infectious illness), the pathophysiology of stress, and current issues and controversies in behavioural medicine.

NOTE: Students who have received credit for EXCI 320 or for this topic under an EXCI 398 number may not take this course for credit.

*Stage II of major consists of EXCI 310, 351, 352, 360.

Stage II of honours consists of EXCI 310, 322, 351, 352, 360.

Stage II of KCEP consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.

Stage II of BScAT consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.

EXCI 455 Physical Activity, Health and Aging (3 credits)

Prerequisite: Completion of Stage II* in the major, honours, KCEP or BScAT. This course addresses the health status, physical fitness, exercise patterns, and effectiveness of exercise prescription for the well elderly and those exhibiting symptoms of chronic diseases which commonly accompany the aging process. Lectures and laboratory.

*Stage II of major consists of EXCI 310, 351, 352, 360.

Stage II of honours consists of EXCI 310, 322, 351, 352, 360.

Stage II of KCEP consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.

Stage II of BScAT consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.

EXCI 458 Pediatric Exercise Science (3 credits)

Prerequisite: Completion of Stage II* in the major, honours, KCEP or BScAT. This course introduces students to the anatomical, physiological, and psychosocial issues related to exercise and physical activity in children. Topics include influence on growth and health, injury potential, endurance exercise, weight training, youth in sport, competitive and collaborative play, stress in childhood, and the strategies for improving exercise habits of children. Lectures only.

*Stage II of major consists of EXCI 310, 351, 352, 360.

Stage II of honours consists of EXCI 310, 322, 351, 352, 360.

Stage II of KCEP consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.

Stage II of BScAT consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.

EXCI 460 Integrative Human Physiology (3 credits)

Prerequisite: Completion of Stage II* in the major, honours, KCEP or BScAT. This course uses physiological homeostasis and the function of major organ systems as its basis. Students learn how the different systems act in an integrative fashion and how the body adjusts to various challenges to the maintenance of homeostasis. The focus is on five specific organ systems — the neural, muscular, cardiovascular, respiratory and renal systems. Students learn how these systems interactively function during health, exercise and disease.

*Stage II of major consists of EXCI 310, 351, 352, 360.

Stage II of honours consists of EXCI 310, 322, 351, 352, 360.

Stage II of KCEP consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.

Stage II of BScAT consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.

EXCI 461 Pharmacology for Sport and Exercise (3 credits)

Prerequisite: Completion of Stage II* in the major, honours, KCEP or BScAT. This course provides the latest information on over-the-counter and prescription medications commonly used in sport. It offers a sound review of pharmacology and pharmacokinetic principles and explores the latest practice implications for certified athletic therapists and exercise specialists. The course includes

indications, contraindications, and side effects of common therapeutic medications used in sport. Class discussions also cover natural products and the effects of their interactions with prescription and non-prescription pharmaceuticals.

**Stage II of major consists of EXCI 310, 351, 352, 360.*

Stage II of honours consists of EXCI 310, 322, 351, 352, 360.

Stage II of KCEP consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.

Stage II of BScAT consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.

EXCI 471 Pain Management Strategies (3 credits)

Prerequisite: Completion of Stage II* in the major, honours, KCEP or BScAT. This course relates theory and research to the practical experiences of client/athletic-practitioner interactions, relationships, and interventions. It addresses pain management principles as they relate to illness, injury, and rehabilitation. Lectures only.

**Stage II of major consists of EXCI 310, 351, 352, 360.*

Stage II of honours consists of EXCI 310, 322, 351, 352, 360.

Stage II of KCEP consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.

Stage II of BScAT consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.

EXCI 492 Independent Study in Exercise Science (3 credits)

Prerequisite: Completion of Stage II* in the major, honours, KCEP or BScAT. This course provides an opportunity to conduct a small-scale scientific research project under the supervision of a faculty member from the Department. In consultation with a faculty member, the student selects a topic, formulates a research methodology, collects data, analyzes the results, and writes a formal research report.

NOTE: Students who have received credit for EXCI 491 may not take this course for credit.

**Stage II of major consists of EXCI 310, 351, 352, 360.*

Stage II of honours consists of EXCI 310, 322, 351, 352, 360.

Stage II of KCEP consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.

Stage II of BScAT consists of CATA 337, 339, 348, 365; EXCI 310, 351, 352, 360.

EXCI 498 Advanced Topics in Exercise Science (3 credits)

Prerequisite: Permission of the Department.

EXCI 499 Advanced Topics in Exercise Science (6 credits)

Specific topics for these courses, and prerequisites relevant in each case, are stated in the Undergraduate Class Schedule.

KCEP:

KCEP 210 Principles of Clinical Exercise Physiology (3 credits)

Prerequisite: Enrolment in an Exercise Science program. This course considers topics in kinesiology and clinical exercise physiology from historical, professional, and applied perspectives. Introduction of exercise training principles and movement activity as the basis for patient rehabilitation and recovery programs in chronic diseases are discussed. The course deals with disease classification, basic intervention concepts, and preventive approaches. Ten observation hours are required for students who wish to transfer to the KCEP program.

NOTE: Students who have received credit for EXCI 210 may not take this course for credit.

KCEP 311 Pathophysiology in Clinical Exercise Science I (3 credits)

Prerequisite: Successful completion of Stage I* in the major; enrolment in the KCEP. This course reviews pathophysiology, medical intervention techniques, and medication profiles of the most common neuromuscular and orthopaedic diseases and disabilities. Lectures only.

NOTE: Students who have received credit for EXCI 423 may not take this course for credit.

**Stage I consists of CATA 262, 263; EXCI 252, 253, 254, 258, 259; KCEP 210.*

KCEP 349 Assessment, Interpretation, and Rehabilitation in Neuromuscular Physiology (3 credits)

Prerequisite: KCEP 311 previously or concurrently; successful completion of Stage I* in the major; enrolment in the KCEP. This course focuses on the assessment and rehabilitation of neurological, neuromuscular, and musculoskeletal fitness in the clinical setting. Measurement and interpretation of normal and abnormal responses for individuals with common neurological, neuromuscular and musculoskeletal diseases and disabilities are discussed and performed. Lectures and laboratory.

NOTE: Students who have received credit for EXCI 380 may not take this course for credit.

**Stage I consists of CATA 262, 263; EXCI 252, 253, 254, 258, 259; KCEP 210.*

KCEP 383 Kinesiology and Clinical Exercise Physiology Internship I (3 credits)

Prerequisite: Successful completion of Stage I* in the major; enrolment in the KCEP. This course provides students the opportunity to observe and participate in physical activity programming offered for special populations (i.e. persons with neurological and physical impairments) in a supervised setting. This course involves a commitment of 120 hours including a weekly seminar.

NOTE: Students who have received credit for EXCI 383 may not take this course for credit.

**Stage I consists of CATA 262, 263; EXCI 252, 253, 254, 258, 259; KCEP 210.*

KCEP 411 Pathophysiology in Clinical Exercise Science II (3 credits)

Prerequisite: Completion of Stage II* in the KCEP. This course reviews pathophysiology, medical intervention techniques, and medication profiles of the most common cardiovascular, respiratory, oncologic and metabolic diseases. Lectures only.

NOTE: Students who have received credit for EXCI 422 may not take this course for credit.

**Stage II consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.*

KCEP 449 Physical Fitness Assessment, Exercise Prescription and Rehabilitation in Special Populations (3 credits)

Prerequisite: Completion of Stage II* in the KCEP. This course focuses on the assessment of cardiorespiratory fitness and body composition in a clinical setting. Measurement and interpretation of normal and abnormal responses for individuals with the most common cardiovascular, respiratory, oncologic, and metabolic diseases are performed and discussed. Lectures and laboratory.

NOTE: Students who have received credit for EXCI 450 may not take this course for credit.

**Stage II consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.*

KCEP 483 Kinesiology and Clinical Exercise Physiology Internship II (3 credits)

Prerequisite: Completion of Stage II* in the KCEP. The course offers a supervised period of work as activity leader/exercise specialist in a hospital or rehabilitation centre assisting in performing physiological evaluations, designing exercise programs, and animating physical activities. The course involves a commitment of 120 hours including a weekly seminar.

NOTE: Students who have received credit for EXCI 483 may not take this course for credit.

**Stage II consists of EXCI 310, 351, 352, 360; KCEP 311, 349, 383.*
