

BMG COURSES

BGEN 7000 - Research Seminar MSc

Consists of presentations of the student's current research. For Master's students only. 1.0 credit hours.

BGEN 7020 – Proteins

(Formerly 137.702) Three hours per week, one term. Purification, bioinformatics, characterization, expression, structure, folding and engineering of proteins. 3.0 credit hours.

BGEN 7030 – Enzymology

(Formerly 137.703) Two hours per week, one term. Kinetics and mechanisms of action of enzymes. 3.0 credit hours.

BGEN 7040 - Seminars in Human Genetics

(Formerly 137.704) Current topics in human genetics including media, research, gene discovery, advances in treatment and therapies, personalized medicine and their influence on clinical care. Inter-professional collaboration and other professional issues related to genetic counselling will also be addressed. Guest lectures will be followed by case-based learning where students work collaboratively through scenarios related to the guest lecture. Prerequisites: Students must be in a graduate program in genetics/related discipline or be a medical genetics resident. 3.0 credit hours

BGEN 7070 - Special Topics in Human Genetics

(Formerly 137.707) An assignment, tutorial and discussions course taken only through consultation with the head of the department. The topics will vary depending upon students' needs and interests, and may include specialized topics not available in regular course offerings. 3.0 credit hours.

BGEN 7090 - Principles and Practice of Human Genetics

(Formerly 137.709) Lectures, tutorials and assignments designed to review major topics in human genetics and give practical experience in the analysis and interpretation of human genetics data and critical review of published work. 3.0 credit hours.

BGEN 7120 - Laboratory Methods in Human and Medical Genetics

(Formerly 137.712) A seminar and assignment course covering an outline of the methods currently in use in human and medical genetic diagnostic and research laboratories. The principles of cell culture, cytogenetic, molecular and biochemical genetic techniques that are used in the diagnosis of human genetic disease and the study of human variation will be reviewed. Students will undertake a practical assignment and write a report. Prerequisite: 125.709 or consent of instructor. 3.0 credit hours

BGEN 7130 - Genetic Epidemiology of Human Populations

Lectures, tutorials, and assignments on key concepts, principles, and their applications in mapping the genetic loci/variants for monogenic and complex human diseases/traits. Prerequisite: BGEN 7090 or consent of instructor. 3.0 credit hours.

BGEN 7142 - Clinical Genetics 1

Clinical applications and principles of single gene, multifactorial, nontraditional inheritance teratogenic causes of disease. Focus on the role of the genetic counsellor in the clinical setting, including history and practice of genetic counselling, genetic counselling skills and case documentation. 3.0 credit hours

BGEN 7144 - Clinical Genetics 2

Clinical application and principles in advance concepts of genetic disease. Focus on the expanded role of the genetic counsellor in the clinical setting including application of role playing for genetic counselling students. Pre-requisite: BGEN 7142 Clinical Genetics – 1. 3.0 credit hours

BGEN 7160 - Theory and Practice of Genetic Counselling

(Formerly 137.716) Advanced theoretical and practical aspects of genetic counselling. Ethics, grief, and cultural awareness will be explored in the context of genetic counselling practice. OSCE style case scenarios. Term paper. Prerequisite: Enrolled in the BMG MSc Genetic Counselling Program. 3.0 credit hours

BGEN 7180 - Clinical and Molecular Cytogenetics

(Formerly 137.718) Cytogenetic methodology; chromosome architecture; karyotype interpretation; indications for referral; chromosome syndromes and anomalies; prenatal diagnosis; chromosomal basis of oncogenesis; flow cytometry; immunogenetics; fluorescent in situ hybridization; the application of molecular technology to chromosome analysis. Prerequisite: 125.709 or consent of instructor. 3.0 credit hours.

BGEN 7200 - Topics in Biochemistry 1

(Formerly 137.720) Advanced study and reading on two topics chosen by the course director in consultation with the student's supervisor. Topics include but are not limited to Neurochemistry, Lipids, Carbohydrates, Biomembranes, Inborn Errors, and Cytoskeleton Proteins. 3.0 credit hours.

BGEN 7210 - Topics in Biochemistry 2

(Formerly 137.721) Advanced study and reading on two topics chosen by the course director in consultation with the student's supervisor. Topics include but are not limited to Neurochemistry, Lipids, Carbohydrates, Biomembranes, Inborn Errors, and Cytoskeleton Proteins. 3.0 credit hours.

BGEN 7250 - Gene Expression and Epigenetics

Three hours per week, one term. Chromatin structure. Epigenetic regulation of transcription. Gene expression regulation. Bioinformatics. 3.0 credit hours.

BGEN 7260 - Cellular and Molecular Biochemistry

(Formerly 137.726) Three hours per week, one term. Recent research advances on the study of cellular components, assembly and organization of plasma membrane components, cell signaling, and cell cycle. 3.0 credit hours.

BGEN 7270 - Introduction to Genetic Counselling Clinic Rotation

This rotation will allow students to observe and participate in various genetic counselling settings. Participation will allow for skill development and practical application of genetic counselling fundamentals. Pre-requisite: acceptance into the MSc Genetic Counselling program. Course graded Pass/Fail. 4.0 credit hours

BGEN 7280 - Advanced Genetic Counselling Clinic Rotation

This rotation will provide year two students full participation in various genetic counselling settings. Students will be able to use advanced genetic counselling skills, building on their skill set from the previous introduction to genetic counselling clinical rotation course. Prerequisite: BGEN 7270. Course graded Pass/Fail. 4.0 credit hours

BGEN 8000 - Research Seminar PhD

Consists of presentations of the student's current research. For PhD students only. 1.0 credit hours

IMED 7096 - Stem Cell Biology: Introduction to the Principles of Regenerative Medicine

Stem Cell Biology focuses on current knowledge of stem cell biology and regenerative medicine. We will discuss different conceptual aspects of stem cell properties and potency with a solid coverage of fundamental concepts including stem cell niches and microenvironment. We will further highlight the importance of stem cells in relation to human diseases including cancer (cancer stem cells), spinal cord injury, stem cell modeling of neurological disorders, and transplantation. Finally, this course will have an informative session on important ethical issues surrounding embryonic stem cells. This course is suitable for a broad range of graduate students with relevant research interests in stem cell biology and regenerative medicine. Prerequisite: A basic course in Biology or consent of the instructor(s). 1.5 credit hours.

IMED 7098 - Cancer Stem Cell Concepts and Therapeutic Applications

This course will introduce normal and cancer stem cell concepts, with an emphasis on the hierarchical of tumours and the diverse roles of tissue microenvironment in sculpting tumour cell phenotypes. Also, targeting of putative cancer stem cells will be discussed in the context of developing novel treatment strategies. Prerequisite: Undergraduate course in cell biology or consent of instructor(s). 1.5 credit hours.

IMED 7110 - Foundations of Scientific Teaching in Bioscience Education

This course has been designed to provide doctoral students with an overview of evidence-based principles of learning and teaching, and to enable them to incorporate these principles into the scientific teaching theory, within the context of Bioscience education. The course also prepares the students, as future faculty, to think about learning and teaching as a scholarly endeavor. 1.5 credit hours.

IMED 7120 - Medical Biochemistry

Biochemistry of carbohydrates, lipids, proteins and nucleic acids focused on those areas relevant to structure and function of the human body and disease processes. All students are expected to have completed an introductory biochemistry course. The course will consist of lectures, tutorials, and assigned studies. 3.0 credit hours.

IMED 7130 - Foundations in Human Population and Evolutionary Genetics

This course will examine how human evolutionary history and sociogenic processes have shaped contemporary patterns of genetic variation, how we can use these patterns to understand the histories and relationships of contemporary human populations, and appropriate methods to assay and interpret these genetic variation patterns. Prerequisite: Incoming students must have passed the graduate Medical Genetics (IMED 7170) course or its undergraduate equivalent, Introduction to Human Genetics (BGEN 3020), or equivalent course prior to taking this course. 1.5 credit hours.

IMED 7140 - Advanced Topics in Human Population and Evolutionary Genetics

This course will examine the latest genetic evidence on the origins and evolution of anatomically modern humans and their peopling of the world, the coevolution of genes and culture, and the emergence and dispersal of genetic risk factors for Mendelian and complex diseases and traits that afflict contemporary human populations. Prerequisite: Incoming students must have passed the Foundations in Human Population and Evolutionary Genetics (IMED 7130) or an equivalent course prior to taking this course. 1.5 credit hours

IMED 7170 - Medical Genetics

Designed to introduce graduate students to the field of human genetics. Both basic science and clinical issues will be discussed in this course. 3.0 credit hours.

IMED 7200 - Cancer Biology

(Formerly 165.720) One hour per week on the basic (cellular and molecular) and clinical (diagnostic and treatment) aspects of cancer. Students will give one seminar and submit an essay on an assigned topic. Prerequisite: consent of instructor. 3.0 credit hours.

IMED 7210 - Epigenetics in Development and Human Diseases

Emphasis on current understanding about the dynamic mechanisms that instruct when and where genomic DNA is turned on or off. We will discuss the epigenetic mechanisms that control differentiation of specialized cell types during development. Additionally, this course will highlight recent advancements on the impact of epigenetics in neurodevelopmental diseases with regards to the etiology, progression, diagnosis and treatment. In this respect, application of stem cell biology in regenerative medicine, genome-wide genetic-epigenetic strategies and gene therapy approaches will be discussed. Prerequisite: A basic course in biology, or consent of instructor. 1.5 credit hours.

IMED 7242 - Nucleic Acids: Structure and Function in Normal Development and Diseases

This course is designed to provide students with a basic knowledge on nucleic acids structure and function. It will highlight how DNA and RNA contribute to the mechanisms and underlying normal development as well as pathologies including cancer and genetic diseases. To be fully beneficial for the student, it is highly recommended that this course be taken together with IMED 7244. 1.5 credit hours.

IMED 7244 - Nucleic Acids: Manipulation in Biomedical Research

This course is designed to provide students with a basic knowledge on nucleic acids manipulation. It will highlight how DNA and PNA can be modified and used in Biomedical Research. To be fully beneficial for the student, it is highly recommended that this course be taken together with IMED 7242. 1.5 credit hours.

IMED 7280 - Medical Computational Biology

Medical Computational Biology provides the basic knowledge necessary for students to pursue research in the use of computational methods in biomedical research. The course will focus on concepts necessary for applying computation to genomics, transcriptomics and proteomics experimental data and their application to topics relevant to human health. This course is suitable for a broad range of students with interest in large scale biomedical research. Prerequisites: a basic course in biology and mathematics or the consent of the instructor(s). 3.0 credit hours.

IMED 7290 - Developmental Biology

(Formerly 165.729) Emphasizes current principles of organ system development and its application to transgenic approaches to gene function in the context of a whole, developing organism. Prerequisites: IMED 7090 (or 165.709) or ZOO L 2150 (or 022.215) and/or ZOO L 3070 (or 022.307) or consent of instructor. 3.0 credit hours.

IMED 7300 - Microscopy, Optics, Imaging and Analysis in Health Research

Theory and practice of modern microscopy, optics, molecular imaging, and analyses used in health research. Participants will gain in depth knowledge through seminars by local and external experts in the field and by hands-on laboratory work in preparing samples for imaging and analyses. Images will be acquired using equipment at the Genomic Centre for Cancer Research and Diagnosis at the Manitoba Institute of Cell Biology. Students will also participate in interactive tutorials and journal club. 3.0 credit hours.

IMED 7302 - Advanced Molecular Imaging

Seminar course in which students will learn about innovative methods and advanced analyses of molecular imaging in biomedical research including 2-dimensional and 3-dimensional fluorescent in situ hybridization, live-cell imaging, spectral imaging, and multi-colour imaging. Students will participate in hands-on laboratory exercises, interactive tutorials and journal club. 3.0 credit hours.

IMED 7304 - Functional Genomics and Whole Genome Analyses

Seminar course in which students will learn about functional genomics and approaches to whole genome analyses using array technologies. Course content will be delivered by local and external experts in the field. Students will participate in hands-on laboratory exercises with micro-array platforms and computer-based data analyses, interactive tutorials and journal club. 3.0 credit hours.