The information published in this Graduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2020-2021 academic year, including the Summer Semester 2020, Fall Semester 2020 and the Winter Semester 2021.

For your convenience the Graduate Calendar is available in PDF format.

If you wish to link to the Graduate Calendar please refer to the Linking Guidelines.

The University is a full member of:
- Universities of Canada

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Revision Information:

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<tr>
<td>May 25, 2020</td>
<td>Initial Publication</td>
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<tr>
<td>June 3, 2020</td>
<td>Revision 1</td>
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Disclaimer

The information published in this Graduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2020-2021 academic year, including the Summer Semester 2020, the Fall Semester 2020 and the Winter Semester 2021.

The University reserves the right to change without notice any information contained in this calendar, including but not limited to that related to tuition and other fees, standards of admission, course delivery or format, continuation of study, and the offering or requirements for the granting of, degrees or diplomas in any or all of its programs. The publication of this calendar does not bind the University to the provision of courses, programs, schedules of study, or facilities as listed herein.

The University will not be liable for any failure or delay in performance arising out of any cause or causes beyond its reasonable control. Such causes may include but are not limited to fire, strike, lock-out, inability to procure materials or trades, war, mass-casualty event, flood, local, regional or global outbreak of disease or other public health emergency, social distancing or quarantine restriction, legislative or regulatory requirements, unusually severe weather, failure of public utility or common carrier, or attacks or other malicious act, including but not limited to attacks on or through the internet, or any internet service, telecommunications provider or hosting facility.

In March 2020 the World Health Organization declared a global pandemic of the virus leading to COVID-19. The Governments of Canada, the Province of Ontario, and local Governments responded to the pandemic with legislative amendments, controls, orders, by-laws, requests and requirements (collectively, the “Governmental Response”). It is uncertain how long the pandemic, and the related Governmental Response, will continue, and it is unknown whether there may be a resurgence of the virus leading to COVID-19 or any mutation thereof (collectively, the “Virus”) and resulting or supplementary renewed Government Response. Without limiting the foregoing paragraph, the University shall not be liable for costs associated with any failure or delay in performance arising out of:

a. the continued spread of the Virus;
b. the continuation of or renewed Governmental Response to control the spread of the Virus; and
c. a University decision, made on an organization-wide basis and in good faith, to control the spread of the Virus, even if exceeding the then current specific Government Response.

In particular, the COVID-19 pandemic may necessitate a revision of the format of course offerings such that courses are offered in whole or in part on an alternate delivery model to in-person classes. Tuition and mandatory fees have been set regardless of the method of instruction and will not be refunded in the event instruction occurs remotely for any part of the academic year.

Dates or times of performance including the Schedule of Dates may be extended as appropriate and the University will notify students promptly of the existence and nature of such delay and shall, so far as practicable, use reasonable efforts to minimize and mitigate any such delay or non-performance.

In the event of a discrepancy between a print version (downloaded) and the Web version, the Web version will apply.

The University of Guelph reaffirms section 1 of the Ontario Human Rights Code, 1981, which prohibits discrimination on the grounds of race, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, handicap, age, marital status or family status.

The university encourages applications from women, aboriginal peoples, visible minorities, persons with disabilities, and members of other under-represented groups.
Introduction

Collection, Use and Disclosure of Personal Information

Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act (FIPPA) http://www.e-laws.gov.on.ca/DBLaws/Statutes/English/90f31_e.htm. This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes. Certain personal information is disclosed to external agencies, including the Ontario Universities Application Centre, the Ministry of Advanced Education and Skills Development, and Statistics Canada, for statistical and planning purposes, and is disclosed to other individuals or organizations in accordance with the Office of Registrarial Services Departmental Policy on the Release of Student Information. For details on the use and disclosure of this information call the Office of Registrarial Services at the University at (519) 824-4120 or see https://www.uoguelph.ca/registrar/.

Statistics Canada - Notification of Disclosure

For further information, please see Statistics Canada's web site at http://www.statcan.gc.ca and Section XIV Statistics Canada.

Address for University Communication

Depending on the nature and timing of the communication, the University may use one of these addresses to communicate with students. Students are, therefore, responsible for checking all of the following on a regular basis:

Email Address

The University issued email address is considered an official means of communication with the student and will be used for correspondence from the University. Students are responsible for monitoring their University-issued email account regularly.

Home Address

Students are responsible for maintaining a current mailing address with the University. Address changes can be made, in writing, through Registrarial Services.

Name Changes

The University of Guelph is committed to the integrity of its student records, therefore, each student is required to provide either on application for admission or on personal data forms required for registration, their complete, legal name. Any requests to change a name, by means of alteration, deletion, substitution or addition, must be accompanied by appropriate supporting documentation.

Student Confidentiality and Release of Student Information Policy Excerpt

The University undertakes to protect the privacy of each student and the confidentiality of their record. To this end the University shall refuse to disclose personal information to any person other than the individual to whom the information relates where disclosure would constitute an unjustified invasion of the personal privacy of that person or of any other individual. All members of the University community must respect the confidential nature of the student information which they acquire in the course of their work. Complete policy at https://www.uoguelph.ca/secretariat/office-services/university-secretariat/university-policies.
Graduate Degree Learning Outcomes

On May 27, 2013, the University of Guelph Senate approved the following five University-wide Learning Outcomes as the basis from which to guide the development of graduate degree programs, specializations and courses:

1. Critical and Creative Thinking
2. Literacy
3. Global Understanding
4. Communication
5. Professional and Ethical Behaviour

These learning outcomes are also intended to serve as a framework through which our educational expectations are clear to students and the broader public; and to inform the process of outcomes assessment through the quality assurance process (regular reviews) of programs and departments.

An on-line guide to the learning outcomes, links to the associated skills, and detailed rubrics designed to support the development and assessment of additional program and discipline-specific outcomes, are available for reference on the Learning Outcomes website.

Critical and Creative Thinking

Critical and creative thinking is a concept in which one applies logical principles, after much inquiry and analysis, to solve problems with a high degree of innovation, divergent thinking and risk taking. Those mastering this outcome show evidence of integrating knowledge and applying this knowledge across disciplinary boundaries. Depth and breadth of understanding of disciplines is essential to this outcome. At the graduate level, originality in the application of knowledge (master’s) and undertaking of research (doctoral) is expected.

In addition, Critical and Creative Thinking includes, but is not limited to, the following outcomes: Independent Inquiry and Analysis; Problem Solving; Creativity; and Depth and Breadth of Understanding.

Literacy

Literacy is the ability to extract information from a variety of resources, assess the quality and validity of the material, and use it to discover new knowledge. The comfort in using quantitative literacy also exists in this definition, as does using technology effectively and developing visual literacy.

In addition, Literacy includes, but is not limited to, the following outcomes: Information Literacy, Quantitative Literacy, Technological Literacy, and Visual Literacy.

Global Understanding

Global understanding encompasses the knowledge of cultural similarities and differences, the context (historical, geographical, political and environmental) from which these arise, and how they are manifest in modern society. Global understanding is exercised as civic engagement, intercultural competence and the ability to understand an academic discipline outside of the domestic context.

In addition, Global Understanding includes, but is not limited to, the following outcomes: Global Understanding, Sense of Historical Development, Civic Knowledge and Engagement, and Intercultural Competence.

Communication

Communication is the ability to interact effectively with a variety of individuals and groups, and convey information successfully in a variety of formats including oral and written communication. Communication also comprises attentiveness and listening, as well as reading comprehension. It includes the ability to communicate and synthesize information, arguments, and analyses accurately and reliably.

In addition, Communication includes, but is not limited to, the following outcomes: Oral Communication, Written Communication, Reading Comprehension, and Integrative Communication.

Professional and Ethical Behaviour

Professional and ethical behaviour requires the ability to accomplish the tasks at hand with proficient skills in teamwork and leadership, while remembering ethical reasoning behind all decisions. The ability for organizational and time management skills is essential in bringing together all aspects of managing self and others. Academic integrity is central to mastery in this outcome. At the graduate level, intellectual independence is needed for professional and academic development and engagement.

In addition, Professional and Ethical Behaviour includes, but is not limited to, the following outcomes: Teamwork, Ethical Reasoning, Leadership, Personal Organization and Time Management, and Intellectual Independence.
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Human Health and Nutritional Sciences

The Human Health and Nutritional Sciences Graduate Program offers MSc degrees by thesis, MSc degrees by coursework and project, and PhD degrees. The three fields are listed below.

- Biomechanics
- Nutrition, Exercise and Metabolism
- Nutritional and Nutraceutical Sciences

See the department website for additional information.

Administrative Staff

Chair
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Associate Chair
Lindsay E. Robinson (336B Animal Science/Nutrition Bldg., Ext. 52297) lrobinso@uoguelph.ca

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Assistant Graduate Program Coordinator for MSc by Coursework and Project Program
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Andra Williams (352 Animal Science/Nutrition Bldg., Ext. 56356) cbshihsgrad@uoguelph.ca

CBS Graduate Admissions Secretary
Karen White (3479 Science Complex, Ext. 52730) cfbsgrad@uoguelph.ca

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William J. Better
t BSc, PhD Missouri - Associate Professor

Stephen H.M. Brown
BHK, MHK Windsor, PhD Waterloo - Associate Professor

Jamie Burr
BA Western, MSc, PhD York - Associate Professor

Andrea L. Clark
BSc Loughborough, PhD Calgary - Assistant Professor

Alison M. Duncan
BASc Guelph, MSc Toronto, PhD Minnesota - Professor

David J. Dyck
BSc, MSc, PhD Guelph - Professor

Graham P. Holloway
BA McMaster, MSc Waterloo, PhD Guelph - Associate Professor

Lorraine C. Jadeski
BSc Guelph, MSc Waterloo, PhD Western - Associate Professor

David W.L. Ma
BSc, PhD Alberta - Professor

Philip J. Millar
BSc, MSc, PhD McMaster - Assistant Professor

Jennifer M. Monk
BSc, PhD Guelph - Assistant Professor

Coral L. Murrant
BSc, PhD Guelph - Professor and Chair

David M. Mutch
BSc Queen’s, PhD Lausanne - Associate Professor

Genevieve S. Newton
Doctor of Chiropractic Nat’l U of Health Sciences (Chicago), MSc, PhD Guelph - Associate Professor

Geoffrey A. Power
BKin, MSc Memorial, PhD Western - Associate Professor

Kerry L. Ritchie
BSc, PhD Guelph - Associate Professor

Lindsay E. Robinson
BSc Acadia, PhD Alberta - Associate Professor and Associate Chair

Jeremy A. Simpson
BSc, Guelph, PhD Queen's - Associate Professor

Lawrence L. Spreit
BSc Waterloo, MSc York, PhD McMaster - Professor

John Z. Srbel
BSc Toronto, DC Canadian Memorial Chiropractic College, PhD Guelph - Associate Professor

Lori A. Vallis
BSc, MA Ottawa, PhD Waterloo - Associate Professor

Amanda J. Wright
BSc, PhD Guelph - Associate Professor

David C. Wright
BPE Calgary, MSc Arizona State, PhD Ball State - Professor

John L. Zettel
BS Waterloo, MSc, PhD Toronto - Associate Professor

Associated Graduate Faculty

Michael McBurney
BSc Carleton, MSc, PhD Cornell - Nutrition Consultant, Guelph

Dan Ramdath
BSc Toronto, MSc, PhD West Indies - Manager/Clinical Research Scientist (Human Nutrition), Guelph Food Research Centre, Agriculture and Agri-Food Canada

MSc Program

The MSc program is offered in: 1) biomechanics; 2) nutrition, exercise and metabolism; and 3) nutritional and nutraceutical sciences. The focus is on physical activity and diet as powerful lifestyle determinants of human health. The interaction between genetics and environmental factors determines human health and lifestyle is a major component of our environment.

Our graduate programs offer advanced experiential learning experiences in the broad areas of nutritional and nutraceutical sciences, general and exercise physiology and biomechanics within the focus of lifestyle, genetics and human health. Within these broad fields, the Department of Human Health and Nutritional Sciences addresses the issues at the level of the individual, not community or populations. The research efforts are focused on understanding the basic underlying biological aspects of health, which are further applied to understanding aging, neurological/sensory disorders and osteoarthritis, and chronic diseases such as cancer, cardiovascular disease, obesity, and type II diabetes.

The Department offers programs of study leading to an MSc by thesis and an MSc by coursework and project. Within the MSc thesis program students must complete a minimum of 1.5 graduate credits and defend an acceptable thesis which comprises a scientific and practical contribution to the field. Within the MSc coursework program students must complete a minimum of 4.5 graduate credits which include credits for research experience.

Admission Requirements

To be considered, applicants must meet the requirements of a four-year honours science degree with a minimum 75% average during the final two years or 4 semesters of undergraduate study. Applicants must have completed a course in statistics. Each applicant must obtain the support of a faculty member willing to serve as their advisor.

Admission may be granted in September, January or May. Completed applications should be received by the expected date of admission. Applications from international students should be uploaded at least eight months prior to the expected date of admission. Applications from Canadian students should be uploaded at least one full semester (four months) before the expected date of admission.

All components of the application, including transcript(s), graduate certificate(s), grading scale(s), language test results, assessment forms, a statement of interest and the name of the faculty advisor must be uploaded no later than two months after an application is submitted through the OUAC portal. Applications that are incomplete after this time period will be closed.

Admission Process

Graduate student applications to programs in the College of Biological Science are handled by the Office of the Associate Dean, Research (ADR). Before submitting an application, applicants are strongly encouraged to review the information found on the CBS-ADR website to learn more about the application process.

Complete application submission instructions may also be found on the Office of Graduate Studies webpage or in the Graduate Calendar.

Program Requirements

Students enroll in one of two study options: 1) thesis, or 2) coursework and major research project.

Thesis

Students must complete and defend an acceptable thesis which comprises a scientifically defensible account of the student's research on a particular, well-defined research problem or hypothesis. Such research should begin with the practical expectation that it could be completed and the thesis defended in not more than 5 semesters. Paramount to the notion of acceptability of the thesis is its quality with respect to problem identification, the approach used to address the problem, and the evaluation of the results.

In addition they must successfully complete courses totalling not fewer than 1.5 graduate credits. The graduate credits of course work will consist of:
Thesis Requirements
Submission and defence of an acceptable dissertation complete the requirements for a PhD. An acceptable dissertation comprises a report of the candidate's research on a particular and well-defined research problem or hypothesis. It should represent a significant contribution to knowledge in that field. Emphasis is placed on the quality of the work, judged by the expression of mature scholarship and critical judgment in the dissertation. Dissertation approval implies that it could be published in reputable, refereed journals in its field.

Interdepartmental Programs
Students may wish to participate in the interdepartmental programs in Bioinformatics or Biophysics

Collaborative Specializations
Students may wish to participate in the collaborative specializations in One Health, Neuroscience or Toxicology

Courses

HHNS*6000 Students Promoting Awareness of Research Knowledge S,F,W [0.25]
This course provides the student with an opportunity to study a topic of choice and integrates selected research topics pertaining to the importance of research as a determinant of health throughout the life span. Distinction will be drawn between the metabolic basis of nutrient essentiality and the health protective effects of nutraceuticals.

HHNS*6130 Advanced Skeletal Muscle Metabolism in Humans W [0.50]
This course considers the relation of nutraceuticals, functional foods, designer foods, medical foods and food additives to foods and drugs. The course emphasizes the development and commercialization of nutraceuticals.

HHNS*6320 Advances in Human Health and Nutritional Sciences Research S,F,W [0.50]
This course prepares students to develop an innovative product or service from concept to market entry considering regulatory, product development, safety/efficacy and market readiness issues. The course applies and integrates the concepts defined in HHNS*6400

HHNS*6400 Applied Functional Foods and Nutraceuticals W [1.00]
This course examines how the energy provision pathways in human skeletal muscle and associated organs meet the energy demands of the muscle cell during a variety of metabolically demanding situations.

HHNS*6440 Nutrition, Gene Expression and Cell Signalling W [0.50]
This course emphasizes the role nutrients play as modulators of gene expression at the molecular level. The mechanisms by which nutrients modulate gene expression through specific cell signalling cascades are examined. (offered annually)
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<th>Course Code</th>
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<tr>
<td>HHNS*6500</td>
<td>Cardiovascular and Respiratory Physiology</td>
<td>This course will use both review articles and the primary literature to build a broad base of understanding of the cardiovascular and respiratory systems as well as explore current research in specific areas in this knowledge paradigm. Further, this course will build research skills through by strengthening critical analysis skills and both oral and written communication skills through learning about the cardiovascular and respiratory system and how they integrate. Department(s): Department of Human Health and Nutritional Sciences</td>
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<tr>
<td>HHNS*6700</td>
<td>Nutrition, Exercise and Metabolism</td>
<td>A discussion of recent concepts in the relationships among nutrition, exercise and metabolism. Information from the molecular to the whole-body level will be presented with a focus on understanding nutrition and exercise in the human. Emphasis is placed on the development and testing of experimental hypotheses in these areas of research. Department(s): Department of Human Health and Nutritional Sciences</td>
</tr>
<tr>
<td>HHNS*6710</td>
<td>Advanced Topics in Nutrition and Exercise</td>
<td>Advanced topics will be presented to establish an in-depth understanding of current investigations in nutrition and exercise. Based on the integrated understanding of nutrition and exercise developed in HHNS*6700, the focus of this course will be to develop the student's ability to independently analyze original research investigations. Department(s): Department of Human Health and Nutritional Sciences</td>
</tr>
<tr>
<td>HHNS*6800</td>
<td>Research Frontiers in Integrative Biomechanics and Neurophysiology</td>
<td>This course will provide students with a breadth of knowledge and understanding across the research frontiers pursued by the integrative biomechanics and neurophysiology group. Students will be given opportunity to practice and improve oral and written communication skills and provide constructive feedback to their peers. Additionally, this class will engage students in dialogue around topics pertinent to designing and conducting successful experiments such as hypothesis generation and ethical and practical considerations. Department(s): Department of Human Health and Nutritional Sciences</td>
</tr>
<tr>
<td>HHNS*6810</td>
<td>Research Methods in Integrative Biomechanics and Neurophysiology</td>
<td>This course develops a comprehensive understanding of methods and analysis related to research in biomechanics &amp; neuroscience. Critical evaluation and application of basic signal to noise processing and electromyography is a priority. The course uses labs, assignments, and critical review of primary literature articles to develop a strong research foundation. Scientific writing and oral communication skills are emphasized via written reports and presentations, and numeracy throughout the course in data and lab assignments. Department(s): Department of Human Health and Nutritional Sciences</td>
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<tr>
<td>HHNS*6820</td>
<td>Research Methods in Integrative Biomechanics and Neurophysiology II</td>
<td>This course develops a comprehensive understanding of methods and analysis related to research in biomechanics &amp; neuroscience. Critical evaluation and application of 3D kinematics and programming/modelling is a priority. The course uses labs, assignments, and critical review of primary literature articles to develop a strong research foundation. Scientific writing and oral communication skills are emphasized via written reports and presentations, and numeracy throughout the course in data and lab assignments. Prerequisite(s): HHNS*6810 Department(s): Department of Human Health and Nutritional Sciences</td>
</tr>
<tr>
<td>HHNS*6910</td>
<td>Basic Research Techniques and Processes</td>
<td>Working with a faculty advisor, students will gain experience in basic aspects of scientific research. This will be accomplished through experience of one or more components of the scientific method in a laboratory setting. Objective outcomes will be evaluated and will include documentation of the experience in a written report. Restriction(s): Restricted to HHNS MSc. course work and project students. Department(s): Department of Human Health and Nutritional Sciences</td>
</tr>
<tr>
<td>HHNS*6920</td>
<td>Applied Research Techniques and Processes</td>
<td>Under the supervision of a faculty advisor, students will gain practical experience in discipline-specific aspects of research. This will be accomplished through experience in a pre-arranged practicum in an applied setting. Objective outcomes will be evaluated and will include documentation of the experience in a written report. Restriction(s): Restricted to HHNS MSc. course work and project students. Department(s): Department of Human Health and Nutritional Sciences</td>
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