## Human Biology

### 1 Major Program Modifications (Significant Alterations to Existing Program Component)

#### Human Biology Major

<table>
<thead>
<tr>
<th>Start Session:</th>
<th>Summer 2017</th>
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<tbody>
<tr>
<td><strong>Current Calendar Description:</strong></td>
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<tr>
<td><strong>New Calendar Description:</strong></td>
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<tr>
<td><strong>HMB: Human Biology</strong></td>
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Human Biology is a transdisciplinary field concerned with the study of human health from a biological, sociological, and evolutionary perspective. Research in human biology focuses on impact that genetic variations, development, physical fitness, and nutrition have on the general health of populations and how this compares across cultures and through history. The objective of the HMB: Human Biology major program is to provide students with a solid foundation in the life sciences as it relates to human biology and to facilitate the integration of concepts from across the social sciences and humanities, and to equip them with quantitative skills essential to research and success in this field.

| Current Admission Requirements: | |
| New Admission Requirements: | |
| **Current Enrolment Requirements:** | |

This is a Type 1 open enrolment program. Students are permitted to enrol in the major during the program enrolment cycle as soon as they have earned 4.0 FCE. It is recommended students complete their first year life science requirements before entering the major.

| New Enrolment Requirements: | |

This is a Type 1 open enrolment program. Students are permitted to enrol in the major during the program enrolment cycle when they have earned 4.0 FCE. It is recommended that students complete the programs required 100-level courses before entering the major program.

| Current Completion Requirements: | |

**Required Courses (8.0 FCE)**

<table>
<thead>
<tr>
<th>First-Year Life Sciences</th>
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<tbody>
<tr>
<td>1. BIO120H1, BIO130H1</td>
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<tr>
<td>2. (CHM135H1, CHM136H1)/(CHM138H1, CHM139H1)/CHM151Y1 <em>(transfer credits will be accepted in lieu of the chemistry requirements only if they carry a direct exclusion to a pre-approved chemistry course)</em></td>
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<tr>
<td>3. MAT135H1/PHY131H1/PHY151H1</td>
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Year 2: Foundations in human biology

| 4. HMB204H1 | |
| 5. BIO230H1/BIO255H1, BIO220H1 | |
6. BCH210H1
7. HMB265H1/BIO260H1

Year 3: Selected topics in human biology with greater depth and self-directed learning

8. 1.5 FCE from courses that focus on the structure and function of the human body: HMB302H1/ ANA300Y1/ IMM340H1/ IMM350H1/ MGY377H1/ MGY378H1/ CSB351Y1/ PSL300H1/ PSL301H1

9. 0.5 FCE from courses that focus on the social, economic and political perspectives of human biology: HMB303H1/ HMB306H1/HMB325H1/ ANT208H1 HST209H1/ HST211H1/HST440H1/ JSU237H1/ JNH350H1/ NEW335H1/ NFS284H1/ PHL281H1/ PSY201H1/ SOC243H1/ SOC244H1/ SOC246H1/ SOC309Y1/ SOC363H1/STA220H1/ UNI103Y1

Year 4: Advanced topics in human biology that emphasize primary research and critical analysis

10. 0.5 FCE from depth courses related to human biology: HMB314H1/ HMB322H1 HMB323H1/ HMB325H1/ HMB342H1/ ANA301H1/ BIO270H1/ BCH311H1/ BCH340H1/ BIO271H1/ CSB325H1/ CSB345H1/ CSB346H1/ EEB255H1/ EEB318H1/ EEB319H1/ EEB323H1/ EEB324H1/ EEB325H1/ EEB365H1/ EEB375H1/ EHJ352H1/ IMM350H1/ LMP363H1/ NFS284H1/ NFS382H1/ PCL362H1/ PSY371H1/ PSY372H1


n.b. At least 0.5 FCE must be at the 400-level; students are not permitted to be enrolled in more than one Human Biology major program

New Completion Requirements:

Required Courses (8.0 FCE, including at least 0.5 FCE at the 400-level)

Chemical and Physical Foundations of Biological Systems
1. (CHM135H1, CHM136H1)/(CHM138H1, CHM139H1)/ CHM151Y1 Transfer credits will be accepted in lieu of the chemistry requirements only if they carry a direct exclusion or equivalency to a pre-approved chemistry course
2. MAT135H1/ PHY131H1/ PHY151H1
3. BCH210H1

Biological Foundations of Living Systems
4. BIO120H1, BIO130H1
5. HMB204H1
6. BIO220H1
7. BIO230H1/ BIO255H1
8. HMB265H1/ BIO260H1
9. PSL300H1, PSL301H1
10. 1.0 FCE from: HMB302H1/ANA300Y1/ ANA301H1/ CSB351Y1/ IMM340H1/ IMM350H1/ MGY377H1/ MGY378H1
LMP363H1/ LMP402H1/ LMP403H1/ LMP406H1/ MIJ485H1/ MGY377H1/ MGY378H1/ MGY470H1/ NFS284H1/ NFS382H1/ NFS400H1/ NFS485H1/ NFS486H1/ NFS487H1/ NFS488H1/ NFS489H1/ NFS490H1/ PCL362H1/ PCL473H1/ PSL420H1/ PSL421H1/ PSY371H1/ PSY372H1/ PSY399H1/ PSY440H1/ PSY460H1/ PSY470H1/ PSY471H1/ PSY494H1

*N: A research project from a different unit may be accepted with prior written approval from Human Biology if the course is not counting toward a different program.

Human Biology Major Notes:
1. Courses can only count toward one requirement, even if listed as options to multiple requisites of the program.
2. Not all courses listed have priority enrolment for Human Biology majors. Students are responsible for checking priority of courses and meeting course prerequisites for courses they wish to take.
3. The Human Biology major cannot be paired with any other Human Biology Program managed major program.

Academic Context:
The Human Biology major program has been revised to emphasize fundamental concepts in human biology. The program takes an interdisciplinary approach that integrates genetics, physiology, and psychology through courses in HMB as well as courses that are offered through other departments and programs.

Students graduating with a major in the Human Biology program will be able to communicate effectively with the public, NGOs, private sector, and government on the basic principles of health and disease and issues surrounding its societal implications. Students will also be able to specialize by pursuing research through graduate studies, further training as health care professionals, or pursuing advanced degrees in social work, public policy, business, or law.

Learning Outcomes:
Students enter the program at the end of their first year after establishing a foundation in organic biology and chemistry as well as physical chemistry. Students will build on this foundation with foundation courses (HMB204H1, HMB265H1, BIO230H1, BCH210H1, PSL300H1, and PSL301H1) that are designed to provide a broad overview of their respective subject areas, all of which supply the foundation to the study of human biology.

As students progress through their studies, they will take a more in-depth courses that will cover a wide range of topics relevant to studies of human biology: histology (HMB302H1) topics related to health systems (HMB322H1), and higher-year course of the students choosing relating to health systems and/or disease systems (all of which have heavy critical analysis components surrounding current primary research and feature assessments such as grant proposals and literature reviews). These courses focus on particular aspects relevant to human biology and build on knowledge gains in foundation courses and work to present to students a comprehensive analysis of the field of human biology.

Specific learning outcomes remain as they were proposed in the 2015 major modifications:
By the end of this program, students will be able to:
1. Demonstrate an understanding of the fundamental concepts in human biology.
2. Identify and analyze data from human biology research from the primary literature.
3. Understand and apply appropriate quantitative techniques needed to examine human biology related data.
4. Identify and evaluate contemporary sociological and ethical perspectives on human biology research.
5. Write and speak effectively about human biology issues to both scientific and broader audiences.

The current proposal is to further clarify how these outcomes are delivered to students enrolled in the Human Biology major.

Depth of Knowledge:
Introductory courses are designed to expose students to fundamental concepts in genetics (HMB265H1/BIO260H1) and other life sciences, human biology (HMB204H1), molecular biology (BIO230H1/BIO255H1) and biochemistry (BCH210H1). These courses provide a core knowledge base in these areas from which students will build. Students are then introduced to more advanced courses and take a full year of courses on human structure (HMB302H1, ANA300Y1, CSB351Y1) and function (PSL300H1, PSL301H1). Further depth in these subjects is available in 300-level in courses that focus on epidemiology (HMB342H1), or principles of pathobiology (LMP363H1). Other advanced courses complement these specialized topics by integrating concepts from other fields, such as global health and human rights (HMB303H1). Students are also encouraged to engage in specialized courses in the genetics of human disease (HMB441H1), advanced nutrition (NFS484H1), inflammation and infection (LMP402H1), and exercise and mental health (HMB473H1).

Critical and Creative Thinking:
Students engage in critical thinking early on in the program. For example, in HMB265H1/BIO260H1 and HMB204H1, there are assignments and tests that focus on the application of course concepts and information through problem-based or case-based learning, whereas written assignments and oral presentations are based on the synthesis and critical analysis of information and techniques from both primary and review articles. As with all life science programs, the integration of primary research findings into all of our courses, but especially in 300- and 400-level courses, is a critical component of the student learning experience. Students are taught how to interpret and critically analyze research as well as develop the skills in synthesizing information from multiple sources. The program also uses creative ways to facilitate reflective thinking. For example, in HMB471H1, students engage in a semester-long self-test lab to assess the effects of stress control techniques on performance. Moreover, HMB440H1 integrates community engaged learning as a primary method for teaching students about neurobiology of dementia and its societal implications.

**Information Literacy:**

Students learn effective written and oral strategies for communicating their analyses and critiques. For example, seminar courses often require students to be creative and persuasive in developing research grant proposals in translational medicine (HMB402H1). Team-based learning and peer evaluations, either in class or online, are also integrated in several different courses, such as HMB302H1 where students work in pairs or small groups where students engage in peer learning and evaluation. Seminar presentations or poster presentations are common among most advanced courses and this enables students to develop key skills in explaining, discussing, critically analyzing and synthesizing research findings in an oral presentation format. Students also have opportunities to cultivate an ability to interact and debate issues in a group setting with guest speakers that are experts in their fields, preparing them with communication skills that will be useful in a professional workplace.

In order to complete written and oral assignments, students are required to learn to use Internet based search engines (e.g. PubMed, Google Scholar, Ensembl, Allen Brain Atlas, etc.) to acquire relevant information from the primary literature, and genome and gene expression databases. In HMB302H1, students engage in peer teaching and evaluation facilitated by social media and access to an online image database. Students are typically evaluated on their effective gathering and use of this information through enhanced citations, and the ability to use PowerPoint, Keynote, blogs and other presentation formats.

**Quantitative Reasoning:**

While many courses will integrate quantitative analysis and reasoning, such as genetic mapping and allele frequencies in populations (HMB265H1), or statistically analyzing altered physical parameters due to exercise (HMB471H1).

**Social and Ethical Responsibility:**

Several courses will introduce students to some of the bioethical, social and health policy issues and controversies surrounding specific topics in health and disease, including prenatal diagnosis (HMB360H1) and AIDS (HAJ453H1). The overall objective is to challenge students to think about the benefits of health and disease research, and the limits of these benefits, on society, including medicine, law and biotechnology.

**An Integrative, Inquiry Based Activity:**

Seminar courses at the 400-level provide a major opportunity for students to integrate knowledge from across a spectrum of health and disease related courses. Students in the major program are encouraged to complete a full-year research project course or a summer research project course (HMB496Y1/ HMB499Y1), although this is not a requirement. Students will typically identify suitable supervisors in hospital research institutes or campus-based laboratories and research groups. Research project course oversight includes a HMB faculty advisor that facilitates the placements, guide workshops on research presentation skills or apply statistical analyses (in collaboration with Department of Statistical Sciences), as well as organize research presentation days (with research faculty to serving as assessors). Students gain invaluable first-hand experience integrating their knowledge of health and disease and other related subjects, learn to apply their quantitative reasoning and analytical skills, practice effective communication and team-based learning, and learn about ethical standards in research.

**Program Delivery:**

**Method:** In Class; Online

**Mode:** Full Time; Part Time

**Brief Description of the Proposal:**
Modification of how Calendar listing is organized, for better clarity of program requirements. The total number of FCE has remained the same. Courses allowed for the program at the higher levels has been reviewed and revised to better reflect courses that are directly related to the study of human biology as opposed to general life sciences.

Details of Proposed Change:

1.0 FCE in function (PSL300H1 and PSL301H1) and 1.0 FCE in structure (HMB302H1/ ANA300Y1/ ANA301H1/ CSB3351Y1/ IMM340H1/ IMM350H1/ MGY377H1/ MGY378H1) is now required. Previously, students could do 1.5 FCE in either/or. As it is the units view that a student studying general human biology should be well-versed in both function and structure of the human body, we wish to ensure all students have this background. Further, many upper-year HMB courses where Human Biology students receive priority enrolment required PSL300H1 and/or PSL301H1, but it was not a required prerequisite, making pre-requisite checks difficult based on the student argument that as a non-required course, unfair to not accept IMM350H1 or ANA301H1 in lieu of PSL301H1, etc. This modification will allow us to resolve this unintentional hidden pre-requisite issue.

Beyond this, the only two changes were to merge the the final two requisite lines (0.5 FCE each of higher year life science courses) and to delete the requisite that required "0.5 FCE from courses that focus on the social, economic and political perspectives of human biology: HMB303H1/ HMB306H1/HMB325H1/ ANT208H1 HST209H1/ HST211H1/HST440H1/ JSU237H1/ JNH350H1/ NEW335H1/ NPS284H1/ PHL281H1/ PSY201H1/ SOC243H1/ SOC244H1/ SOC246H1/ SOC309Y1/ SOC363H1/STA220H1/ UNI103Y1.". This was done to accommodate for the 0.5 FCE required for function (as before function/structure was 1.5 either/or, and with this proposal it would now be 1.0 FCE in structure and function totaling 2.0 FCE).

Rationale:

The Human Biology Program completed a self-study in March 2014 that the program and the Faculty of Arts & Science has been steadily working on the recommendations to enhance the overall quality of the program. Many of the recommendations have already been put into effect: our smallest program (Health Care Ethics major) has been closed for further admissions and a proposal to formally close the program will be put forward in October 2017, we have signed a MOA giving the School of the Environment full ownership of the Environment and Health major and specialist (ASMAJ0365 and ASSPE0365) and have agreed to continue teaching and supporting the capstone requirement course for the specialist program: JEH455H1 (Topics in Environment & Health) and giving Environment and Health students enrolment priority in a number of our courses.

One of the first acts was a revision of the Health & Disease (ASMAJ2013 & ASSPE2013), Neuroscience (ASMAJ1472 and ASSPE1472), and our then-Genes, Genetics, and Biotechnology, now Fundamental Genetics and its Applications program (ASMAJ1050 and ASSPE1050), and Human Biology (ASMAJ2035) programs to better align the programs with the teaching strengths of the unit, the resources of the unit, and the course offerings within the Faculty of Arts & Science. These modifications came into effect in 2015-2016.

This realignment of four of our five programs has benefited the program as a whole and our students greatly, and have allowed us to see more clearly where there are gaps in the program structure and program objectives, as well as allowing us to see how to better align the programs with their objectives, as outlined in 2015.

Since then, we have consulted with the Dalla Lana School of Public Health on pedagogy revisions for our Global Health major and Specialist (ASMAJ25757 and ASSPE2575), and have consulted with our faculty and staff to better assess pedagogy gaps and inconsistencies in program structure and pressure points within our programs in terms of enrollment and student outcomes. Many of the gaps/alignment were due to lack of lab space, staff, support, or lack of faculty to teach core courses.

Even in the 2015 major modification proposal, it was outlined that HMB has been working closely with [the Cell Systems and Biology Department], [the Department of Ecology and Evolutionary Biology] and the [Faculty of Arts & Science] to expand and modernize lab course offerings in the planned renovations of the [Ramsay Wright] teaching labs. However, at the time of the proposal, the labs were not yet constructed. Construction began in spring 2015 and they are currently nearing completion. HMB teaching labs will be ready for full-time use by September 2017. As such, we wish to utilize these labs in our HMB courses to better meet listed course objectives for the benefit of our students.

Sine many of the recommendations from the external review have been met, and now that HMB has more staff support including 2 lab technicians, a more clear vision, our own teaching labs (which will allow us to use the space more frequently), and have been approved to hire an appointed faculty member starting in July 2017 (the search is currently ongoing) who will allow us to offer more course sections of some of our courses without overburdening teaching assignments, we would like to make further revisions to better meet objectives outlined in 2014.

The proposed restructuring of all of our programs is the next step in further defining improvements and innovations first initiated in 2015-2016.

Impact that the proposal may have on students or other academic units/divisions:

Impact on other units should be minimal as enrolment is not planned to increase. The majority of the courses required
in the program are the same course requirement/requirement options as the current neuroscience major. Impact on our unit should also not increase as we have increased staff support.

Currently the enrolment into the fundamental genetics and its applications major is 768, with a two year average of 765. We are not anticipating a large change in enrollment.

Consultation:

Director Dr. Melanie Woodin has consulted extensively with Vice-Deans Pamela Klassen and Poppy Lockwood as well as with faculty within the Human Biology program.

After consultations with Biochemistry in January 2017, we have eliminated the option to use CHM247H1 in lieu of BCH210H1.

After the Life Science Planning Meeting in January 2017, we have added EHJ352H1 to the list of upper year Human Biology courses students may take toward this program completion. This was accidental oversight which has now been rectified. This was the only feedback received at this meeting.

Diversity:

The re-design of the human biology major program ensures all students receive a solid foundation in the wide scope of human biology. HMB works closely with Accessibility Services, and accommodations requested are met. This will not change. Further, many of our faculty work to offer a variety of assignments that better provide to a variety of learners in their courses.

Resource Implications:

Current support is adequate.

Faculty and TA Support:

Current support is adequate.