

Request for Calendar Change Form

Tracking No:
(Senate Secretary's Office
use only)

Date:

To	Secretary of Senate	
From	Name(Dean):	Faculty
	<input type="text" value="Andrew Dean"/>	<input type="text" value="Science and Environmental Studies"/>
	Department the change relates to	
	<input type="text" value="HBSc Applied Biomolecular Science (Biology)"/>	
	Contact Person	
	<input type="text" value="H. Schraft, Biology"/>	

Is the proposed calendar change Undergraduate

Instructions:

1. In all cases please complete and attach section 1 and 2
2. If the calendar change affect other departments/schools/faculties complete and attach section 3
3. If the answer to any of the questions below is yes, explain. Attach separate sheets with reference to the question

- | | | |
|--|---------------------------------|---|
| 1. Do the proposed changes affect other departments/ schools/faculties in terms of their calendar change? | Yes
<input type="checkbox"/> | No
<input checked="" type="checkbox"/> |
| 2. Is a transition plan needed for student in progress? | Yes
<input type="checkbox"/> | No
<input checked="" type="checkbox"/> |
| 3. Are the proposed changes likely to affect student enrollment in your department/school/faculty? | Yes
<input type="checkbox"/> | No
<input checked="" type="checkbox"/> |
| 4. Are the proposed changes likely to affect student enrollment in other departments/schools/faculties at Lakehead University? | Yes
<input type="checkbox"/> | No
<input checked="" type="checkbox"/> |
| 5. Will the proposed changes require additional teaching space and/or teaching staff and/or equipment and/or other resources? | Yes
<input type="checkbox"/> | No
<input checked="" type="checkbox"/> |
| 6 Will the proposed changes affect existing teaching loads within your department/school/faculty? | Yes
<input type="checkbox"/> | No
<input checked="" type="checkbox"/> |
| 7. Will the proposed changes increase demand for teaching support services such as the library, computing services and technical staff ? | Yes
<input type="checkbox"/> | No
<input checked="" type="checkbox"/> |
| 8. Will the proposed change require direct or in-kind support from outside the academic unit? | Yes
<input type="checkbox"/> | No
<input checked="" type="checkbox"/> |
| 9. Do the proposed changes include change in course(s) which is/are required core course(s) for a major? | Yes
<input type="checkbox"/> | No
<input checked="" type="checkbox"/> |
| 10. Do the proposed changes include a change in course which is service/required course(s) in another program? | Yes | No |

11. Do the proposed changes include change in course(s) which is/are open elective available to any student in any program? Yes No

12. Do the proposed changes include change in course(s) which is/are elective in a major i.e. restricted to students in a major? Yes No

Signatures:

Date approved by faculty council

Section 1

Description of the Proposed Calendar Change:

1. Changes to the "List of Recommended Courses"
2. Change to the prerequisites of APBI/BIOL 3135
3. Addition of a four year BSc Applied Bio-Molecular Science

Rationale of the Proposed Calendar Change(s):

(Corresponding to Section 2 where required)

1

Two changes to the List of Recommended Courses are required:

- Delete the course "Biology 3713 - Microbial Physiology", as this course is no longer offered.
- Add the course "Applied Bio-Molecular Science 3135/Biology 3135 Molecular Genetics". This course has been added to the calendar last year, but its addition to the list of recommended course was missed. This course builds on the material covered in the required APBI courses Biology 2910, 2171, 2230, and 2711 and is thus highly recommended for APBI Majors who want to advance their knowledge in molecular biology and cellular mechanisms of genetic processes.

2

When the course Applied Bio-Molecular Science 3135/Biology 3135 was submitted for addition to the calendar last year, the prerequisites had been set to match requirements of the Applied Bio-Molecular Science Program. In its first offering, we have become aware that students majoring in Biology have difficulties meeting the prerequisites as they have only room for one Biology elective in second year. Molecular Genetics requires two 2nd year courses that are electives for Biology Majors (Biol 2711 and Biol 2910). To meet the old requirements, Biology Majors would have to take the additional 2nd year Biology course in year three. To avoid this, and give Biology Majors more flexibility to meet prerequisites, either Biol 2910 OR Biol 3252/Chem 3251 are listed as prerequisite options. The course Biol 3252/Chem 3251 will provide the students with the laboratory experience needed for the Molecular Genetics laboratory.

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This is a non-direct entry program, it is only a fall-back for those students who can not meet the B average required for the Honors Program. Students can NOT be admitted to this program directly from high-school. Occasionally, students in the HBSc Program fail to meet the required B average for the Honors Program. In all cases so far, the students were in their third or fourth year and had

been following the APBI program requirements. There exists no other four year BSc Program at Lakehead University with similar requirements and these students can thus not meet requirements to graduate with a 4 year degree.

Section 2

Existing Calendar Entries:
(Page reference based on hard copy or URL based on electronic version of calendar)

Proposed Calendar Entries/Addition/ Deletion
-If only addition, specify page number and placement in university calendar
-If only deletion, write Deleted

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List of Recommended Courses
 Anthropology 3136 - Forensic Anthropology
 Anthropology 3139/Biology 3139 - Molecular Anthropology II
 Anthropology 3312 - Medical Anthropology I
 Anthropology 3317 - Medical Anthropology II
 Anthropology 4219 - Human Skeletal and Dental Biology
 Anthropology 4417 - DNA in Forensic Science
 Anthropology 4419 - Ancient DNA
 Anthropology 4429 - Ancient DNA Internship
 Anthropology 4430 - Molecular Paleopathology
 Anthropology 4450 - Forensic and Archaeological Microscopy
 Applied Bio-Molecular Science 4650/Biology 4650 - Issues in Biotechnology
 Applied Bio-Molecular Science 4710/Chemistry 4710 - Advanced Research Methodology
 Applied Bio-Molecular Science 4811 - Tutorial or Research Project I
 Applied Bio-Molecular Science 4813 - Tutorial or Research Project II
 Biology 3010/Kinesiology 3010 - Physiology of Exercise I
 Biology 3151 - Biogeography
 Biology 3250 - Comparative Animal Physiology I
 Biology 3251 - Comparative Animal Physiology II
 Biology 3330 - Molecular Biology of Development
 Biology 3470 - Plant Physiology and Biotechnology
 Biology 3475 - Alpine Plant Physiology
 Biology 3610/Environmental Studies 3610 - Environmental Biology
 Biology 3671 - Evolutionary Concepts
 Biology 3711 - Pathogenic Microbiology
 Biology 3713 - Microbial Physiology
 Biology 3770 - Biology of Food Safety
 Biology 3990 - Research Internship I
 Biology 3991 - Research Internship II
 Biology 4230 - Cancer Biology
 Biology 4710 - Limnology
 Biology 4711 - Applied and Environmental

Anthropology 3136 - Forensic Anthropology
 Anthropology 3139/Biology 3139 - Molecular Anthropology II
 Anthropology 3312 - Medical Anthropology I
 Anthropology 3317 - Medical Anthropology II
 Anthropology 4219 - Human Skeletal and Dental Biology
 Anthropology 4417 - DNA in Forensic Science
 Anthropology 4419 - Ancient DNA
 Anthropology 4429 - Ancient DNA Internship
 Anthropology 4430 - Molecular Paleopathology
 Anthropology 4450 - Forensic and Archaeological Microscopy
 Applied Bio-Molecular Science 3135/Biology 3135 Molecular Genetics
 Applied Bio-Molecular Science 4650/Biology 4650 - Issues in Biotechnology
 Applied Bio-Molecular Science 4710/Chemistry 4710 - Advanced Research Methodology
 Applied Bio-Molecular Science 4811 - Tutorial or Research Project I
 Applied Bio-Molecular Science 4813 - Tutorial or Research Project II
 Biology 3010/Kinesiology 3010 - Physiology of Exercise I
 Biology 3151 - Biogeography
 Biology 3250 - Comparative Animal Physiology I
 Biology 3251 - Comparative Animal Physiology II
 Biology 3330 - Molecular Biology of Development
 Biology 3470 - Plant Physiology and Biotechnology
 Biology 3475 - Alpine Plant Physiology
 Biology 3610/Environmental Studies 3610 - Environmental Biology
 Biology 3671 - Evolutionary Concepts
 Biology 3711 - Pathogenic Microbiology
 Biology 3770 - Biology of Food Safety
 Biology 3990 - Research Internship I
 Biology 3991 - Research Internship II
 Biology 4230 - Cancer Biology
 Biology 4710 - Limnology
 Biology 4711 - Applied and Environmental Microbiology
 Biology 4770 - Food Microbiology
 Chemistry 3131 - Analytical Chemistry II

Microbiology
Biology 4770 - Food Microbiology
Chemistry 3131 - Analytical Chemistry II
Forestry 3450/Biology 3450 - Biology of the Fungi
Physics 2311 - Introduction to Optics
Physics 3511 - Biological Physics
One full course equivalent thesis course selected from: Anthropology 4901, Biology 4101, Chemistry 4901 (Students must also take Chemistry 4111 if the Chemistry thesis is chosen), or Physics 4501

Forestry 3450/Biology 3450 - Biology of the Fungi
Physics 2311 - Introduction to Optics
Physics 3511 - Biological Physics
One full course equivalent thesis course selected from: Anthropology 4901, Biology 4101, Chemistry 4901 (Students must also take Chemistry 4111 if the Chemistry thesis is chosen), or Physics 4501

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Applied Bio-Molecular Science 3135/Biology 3135
Molecular Genetics
3-3; 0-0
Prerequisite: Biology 2171, 2230, 2711, and 2910 or permission of the instructor
Isolation and indentification of genes, analysis of gene structure, gene expression and its regulation, with emphasis on molecular genetics of prokaryotic microorganisms and their viruses. Major topics covered include: mutagenesis, conjugation, recombination, gene regulation, plasmids, transposons, bacteriophage and genomics.
Limited enrolment

Applied Bio-Molecular Science 3135/Biology 3135
Molecular Genetics
3-3; 0-0
Prerequisite: Biology 2910 or Biology 3352/Chemistry 3251, Biology 2171, 2230, and 2711; or permission of the instructor

Isolation and indentification of genes, analysis of gene structure, gene expression and its regulation, with emphasis on molecular genetics of prokaryotic microorganisms and their viruses. Major topics covered include: mutagenesis, conjugation, recombination, gene regulation, plasmids, transposons, bacteriophage and genomics.
Limited enrolment

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None

2. BSc (Applied Bio-Molecular Science Major)
Four Year program
This program is designed for Applied Bio-Molecular Science students who lack the required B major average to complete the four year HSc. Students may not enter the BSc before Third Year.

Years One to Four:
Course requirements are the same as for the four year HSc program, with the exception that students in the BSc program are not eligible to register in a thesis course (Anthropology 4901, Biology 4101, or Chemistry 4901).

Note:

In order to remain in the program, students must maintain at least an overall C average in the program, calculated as described for the HSc

program. Students should refer to the Faculty of Science and Environmental Studies regulations, page 169.

Section 3

The Faculty(ies) affected by the proposed calendar change

Science and Environmental Studies

I have been consulted regarding the attached calendar change and understand the academic and budgetary implication on my Dept./School/Faculty.

I agree to this calendar change proposal

Yes

No

Name:

Dr. A. Dean

Faculty:

Science and Environmental Studies

Date:

Signature of Dean

Proposed 4-Year BSc Applied Biomolecular Science

Answers to questions in Academic Plan, Section II.B.2.

What specific learning outcomes will be achieved by students who complete the proposed program of study?

See attached complete Learner Outcome Templates

What methods will be used to assess student learning? How will student learning assessment be embedded in the curriculum?

Student learning is assessed in each course through graded assignments, short tests and quizzes, formal written exams and also through graded formal seminars and presentations.

What specific methods or approaches will be used to assess graduate (completer) outcomes?

How will the institution determine the extent to which the academic program meets the objectives previously outlined?

Faculty participating in the Applied Biomolecular Science Program keep in contact with many of the Program's Graduates who provide important feedback on their career progression and successes.

Is a licensure examination associated with this field of study?

No licensure examination associated with Applied Bio-Molecular Science.

How will the collected information be used to improve teaching, advising, and cocurricular activities to enhance student learning?

Faculty participating the ABMS Program meet regularly as a group to discuss how the Program's goals are met. If required, adjustments are made to course delivery or to the program through a calendar change.

Many of the ABMS faculty participate in undergraduate teaching workshops (at Lakehead and also through professional societies such as the American Society of Microbiology).

The ABMS Program Coordinator makes regular use of email lists to inform students about events of interest, such as Seminars, Biology Club activities, annual Biotechnology Symposium.

**Lakehead University's
commitment to ...**

Educating students who are aware of ... environmental responsibilities

***Environmental responsibility** considers the bioethical implications of human activities and their impact on the physical environment. Environmentally responsible entities voluntarily avoid practices that might adversely affect the use and enjoyment of the planet's resources by future generations, and take self-regulatory actions that protect and improve the environment as a whole. Individual environmental responsibility encompasses an individual's values and decision-making processes that guide behaviour. Environmental responsibility can be considered a sub-set of social responsibility.*

**4 Y BSc ABMS
Program Learner
Outcomes**

An understanding of the basic principles of life systems.

A comprehensive appreciation of bio-molecular processes that govern biological systems.

A high standard of literacy in the biomolecular sciences.

**Integrated into current
courses of the program**

Biol. 1110, 1130 – Plant Biology and Animal Biology. Students learn how plants and animals are adapted to their environment.

Biol. 2230, 2711, 3251, 3252 – Cell Biology, Biology of Microorganisms, Biochemistry I & II
Students learn how biological systems function at the molecular and cellular level and how changes in the environment can dramatically influence the balance of these systems.

All ABMS majors must also take 4.5 FCE's from a list of restricted electives. Many of these courses (e.g. APBI 4650, Biol 3330, 3470, 3610, 3770,, 4710, 4711 – Issues in Biotechnology, Mol. Biol of Development, Plant Phys. and Biotech., Env. Biology, Food Safety, Limnology, Appl. and Env. Microbiol.) place emphasis on linking changes in the environment at the macroscale with effects observed at the cellular level. The course incorporate various case-studies to teach environmental responsibility, such as carbon-cycles, climate change, bioremediation, genetically modified organisms, antimicrobial resistance, pesticides

Lakehead University's
commitment to ...

Educating students who are recognized for ... independent critical thinking

Independent Critical Thinking involves using individually held knowledge and personal reflection to evaluate evidence and explanations on a particular topic and arrive at a judgement for its application to a particular situation

Examples of independent critical thinking skills that are present in course curricula may include but are not limited to

- *Formulating and supporting a position during a class debate*
- *Analysing the effect of a person or event*
- *Applying a theory or framework to contemporary situation*

4 Y BSc ABMS
Program Learner
Outcomes

Development of critical thought, reflective experience, and an appreciation of biomolecular sciences in a wider context.

A set of contemporary skills in research and critical thinking that can be used to solve basic and applied problems in biomolecular science.

Integrated into current
courses of the program

Biol. 2171 – Genetics. Students are required to use problem solving techniques to assess outcomes of various genetic manipulations.

Biol 2711 – Biology of Microorganisms. Students are required to prepare and present a talk on a specific Microbiology topic of emerging public interest; for example, methanogenesis and global warming, prion diseases, legionnaire's disease

All ABMS majors must take 4.5 FCE's from a list of restricted electives. Many of these courses incorporate class discussions and debates on controversial issue(s) into the curriculum. Examples are genetically modified organisms, use of pesticides and antimicrobials.

Independent study electives include APBI 4811 & 4813 – Tutorial or Research I & II and Biol 3990 & 3991 Research Internship I & II. In these courses students examine specific questions on subjects of interest under the guidance of a faculty member. Results are presented in a seminar or poster for discussion.

**Lakehead University's
commitment to ...**

Educating students who are recognized for leadership

Leadership may be defined as an interactive process between two or more individuals directed toward accomplishing particular goals and outcomes

Examples of leadership experiences that are embedded in course curricula may include but are not limited to

- *Completing group projects*
- *Participating in Service Learning projects*
- *Engaging in class discussions*
- *Facilitating group discussions or activities*

**4 Y BSc ABMS
Program Learner
Outcomes**

Development of critical thought and team working skills.
Appreciation of biomolecular sciences in a wider context.

**Integrated into current
courses of the program**

Biol. 2171 – Genetics. Students work together during tutorial sessions to better understand genetic problems and solutions.

Biol. 2711 – Biology of Microorganisms. Students work in groups during the laboratory sessions to examine microbiological problems.

Biol. 2910 – Laboratory Biology. Students must work in groups under a laboratory environment to learn laboratory techniques and develop team working skills.

All ABMS majors must take 4.5 FCE's from a list of restricted electives. Many of these courses require group work; for example, APBI 4650, APBI 3135, Biol 3770, Biol 3470, Biol 4710 – Issues in Biotechnology, Molecular Genetics, Food Safety, Plant Physiol. and Biotechnology, Limnology.

**Lakehead University's
commitment to ...**

Educating students who are who are aware of social ... responsibilities

***Social responsibility** asks entities (government, corporation, organization or individual) to be aware of the impact of their actions on (particularly disadvantaged) members of society, act with concern and sensitivity; and collaborate with affected parties to create innovative and proactive solutions to societal (and environmental) challenges. Social responsibility is voluntary rather than legal and includes refraining from activities that create negative outcomes and acting in ways that protect and improve the welfare of people, communities, and society as a whole. Social responsibility is often linked to Corporate Social Responsibility (CSR).*

**4Y BSc ABMS
Program Learner
Outcomes**

Development of critical thought, reflective experience, and an appreciation of biological sciences in a wider context.

**Integrated into current
courses of the program**

Biol. 1130 – Plant Biology. Students participate in exercises that demonstrate the importance of local plant cultivation for food security in the Thunder Bay community .

All ABMS majors must take 4.5 FCE's from a list of restricted electives. Biol. 3470 – Plant Physiology and Biotechnology, a course included on this list, integrates Food Security into its curriculum. Many other courses on this list have social topics as part of their curriculum; for APBI 4650, Biol 3770, Biol 3470, Biol 3610 – Issues in Biotechnology, Food Safety, Plant Physiol. and Biotechnology, Environmental Biology.