AGENDA ITEM NO: 11.1

UNIVERSITY COUNCIL
ACADEMIC PROGRAMS COMMITTEE
REQUEST FOR DECISION

PRESENTED BY: Susan Detmer, chair, Academic Programs Committee

DATE OF MEETING: April 16, 2020

SUBJECT: Arts and Science Program Template – Bachelor of Science [Biomedical Science]

DECISION REQUESTED: It is recommended:

That Council approve the new Arts and Science Program template for the Bachelor of Science [Biomedical Science], effective May 2021.

PURPOSE: University Council has the authority to approve new templates for degrees or degree-level programs.

CONTEXT AND BACKGROUND:

The College of Arts and Science, in partnership with the College of Medicine, is recommending a new program template to house the Biomedical Sciences majors, the B.Sc. (BMSC). This new template will allow for the introduction of new admissions requirements for this set of majors, which is important, as the Biomedical Science majors require Chemistry 30, Biology 30, and Foundations of Math 30 with a grade of 70% or higher to help ensure student success in the first year of the program. Administratively, it would not be possible to have different admissions requirements for the Biomedical Science majors if they continued to be under the existing template, as it is not possible to have two sets of admissions requirements for a single degree program.

The template articulates the course requirements for all BMSC majors and the courses required for each area of focus within the major.

Although the B.Sc. (BMSC) degrees will be conferred by the College of Arts and Science, both the College of Arts and Science and the College of Medicine are proposing that they both be represented on the parchments for B.Sc. (BMSC) degrees. This would involve having the signature of both deans appear on the parchment. This will provide distinction and representation of the inter-college partnership that is necessary to offer the Biomedical Science majors, and will illustrate the partnership roles that both colleges play in educating the students in these programs.
FURTHER ACTION REQUIRED:
University Senate will be asked to confirm the changes to admission requirements for the undergraduate biomedical science programs at its April 25, 2020 meeting.

ATTACHMENTS:

1. Bachelor of Science, Biomedical Science [B.Sc. (BMSC)] – Program Template
Proposal for Academic or Curricular Change

PROPOSAL IDENTIFICATION

Title of proposal: Bachelor of Science (Biomedical Science) [B.Sc.(BMSC)] – Program Template

Fields of Specialization:
- Biochemistry, Microbiology, and Immunology
- Biomedical Foundations
- Biomedical Neuroscience
- Cellular, Physiological, and Pharmacological Sciences
- Interdisciplinary Biomedical Sciences (proposed)

Level(s) of Concentration: Honours, Four-year, and Three-year

Degree College: Arts and Science

Contact person(s) (name, telephone, fax, e-mail):

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Proposed date of implementation: May 2021
Creation of a new degree template to house the Biomedical Sciences programs (Biochemistry, Microbiology and Immunology; Biomedical Foundations; Biomedical Neuroscience; Cellular, Physiological, and Pharmacological Science; and the proposed Interdisciplinary Biomedical Sciences major) will allow the link between these majors to be apparent, and will allow the introduction of new admissions requirements for this set of majors.

The majors listed are all offered in partnership with the College of Medicine, whose faculty offer most of the courses in the Major Requirement for each. The addition of "Biomedical Science" to the degree type serves both to highlight this partnership, as well as helping students understand the general category into which these majors fall.

The separation of the Core Requirement, from the Major Requirement, helps to clarify which courses are part of all of the Biomedical Science majors. This both helps form a group identity, and reinforces the plan that students need not select a major until they have taken most or all of these courses.

Administratively, it is not possible to have two sets of admission requirements for the same degree. The Biomedical Sciences majors require each of Chemistry 30, Biology 30, and Foundations of Math 30, with a grade of 70% or higher, as this is considered to be necessary for students to have a reasonable chance of success in the first year of the program. The creation of a separate template allows these admissions standards to be applied for this degree. (Students who do not meet these admissions standards, but do meet the standards for other Arts & Science programs, may be admitted to another degree, and then work toward transfer into a B.Sc. (BMSC) major if they so choose.)

Though these degrees will be conferred by the College of Arts and Science, Arts and Science and the College of Medicine are jointly requesting that the parchments for this degree be signed by the Dean of each College. This will provide a continuing representation of the inter-college partnership that is necessary to offer these programs, as well as provide students with a tangible symbol of the involvement of both colleges in their education.
Bachelor of Science (Biomedical Science) Program Template (90/120 credit units)

<table>
<thead>
<tr>
<th>Science - Type M (B.Sc. (BMSC))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum of 6 cu in one subject may be used for M1, M2, and junior courses in M3.</td>
</tr>
</tbody>
</table>

1. **College Requirement**
   - 6 credit units of English Language Writing
   - 3 credit units of Indigenous Learning
   - 3/6 credit units of Quantitative Reasoning

2. **Breadth Requirement**
   - 3 credit units non-Science courses

3. **Cognate Requirement**
   - BIOL 120.3
   - CHEM 112.3
   - CHEM 115.3
   - PHYS 115.3
   - PHYS 117.3 or PHYS 125.3
   - PHIL 140.3
   - 3 credit units from HLST 110.3; PSY 120.3; PSY 121.3; SOC 111.3; SOC 112.3

4. **Core Requirement**
   - BMSC 200.3
   - BMSC 207.3
   - BMSC 208.3
   - BMSC 210.3
   - BMSC 220.3
   - BMSC 230.3
   - BMSC 240.3
   - CHEM 250.3

5. **Major Requirement**
   - **Honours**—33 or more senior credit units, in a Science major, selected to complete the requirements of a 57 or more credit unit major.
   - **Four-year**—30 or more senior credit units in a Science major, selected to complete the requirements of a 54 or more credit unit major.
   - **Three-year**—18 or more senior credit units in a Science major, selected to complete the requirements of a 30 or more credit unit major.
### Electives Requirement

- **B.Sc. Four-year & Honours**— Electives as required, subject to the condition that of the 120 credit units required for the degree, at least 66 credit units must be at the senior level.

- **B.Sc. Three-year**— Electives as required, subject to the condition that of the 90 credit units required for the degree at least 42 credit units must be at the senior level.

- Biochemistry, Microbiology and Immunology; Biomedical Foundations; Biomedical Neuroscience; Cellular, Physiological, and Pharmacological Sciences; Interdisciplinary Biomedical Sciences

### Academic Policies

#### Residency requirement:

*This program type will have the same residency requirements as other Arts & Science degrees:*

Students must complete from the University of Saskatchewan:

- at least one-half of the overall coursework required for their degree or certificate, including at least two-thirds of the senior credit units required (to the nearest highest multiple of 3 credit units), and
- at least two-thirds of the coursework required in the student’s major subject (to the nearest highest multiple of 3 credit units).

#### Graduation standard:

*This program will follow the existing graduation standards for B.Sc. programs:

#### Completion of Degree Requirements

To qualify for graduation, students must complete both the degree requirements for their program type (as described in the section on Arts & Science Degree Programs) and must complete the course requirements for their major or interdisciplinary program (as described in the Programs section). The student may also have completed the requirements for a minor or recognition or both. The required Cumulative Weighted Average (C.W.A.) must be achieved.

#### Required Cumulative Weighted Average (C.W.A.)

All University of Saskatchewan courses attempted which credit towards an Arts & Science degree are used in the calculation of the Overall C.W.A. and the Subject C.W.A. Failures are included if the course has not been retaken as described under Repeating Courses. Students may not use a grade from another university to replace a University of Saskatchewan grade.
The graduation standards for degrees or certificates are:

<table>
<thead>
<tr>
<th>Degree or Certificate</th>
<th>C.W.A.</th>
<th>C.W.A. in subject*</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. or B.Sc. Three-year</td>
<td>60.0%</td>
<td>62.5%</td>
</tr>
<tr>
<td>B.A., B.A.&amp;Sc., B.Mus. or B.Sc. Four-year</td>
<td>60.0%</td>
<td>62.5%</td>
</tr>
<tr>
<td>B.A., B.A.&amp;Sc., B.F.A., B.MUS. or B.Sc. Honours</td>
<td>70.0%</td>
<td>70.0%</td>
</tr>
<tr>
<td>Degree Level Certificate</td>
<td>n/a</td>
<td>62.5%</td>
</tr>
</tbody>
</table>

“Subject” means the major subject, the minor subject, the recognition subject, and the courses listed as a “major” for an interdisciplinary program. Courses included in the subject average may appear in the Distribution Requirements or the Major Requirement of a specific program. For a Degree Level Certificate, the “subject” includes all courses listed as part of the program requirements.

Alternate Graduation Standards

All students who do not meet the overall or the subject graduation standards are eligible to receive a degree or certificate if they meet the alternate graduation standards on courses taken from the University of Saskatchewan as follows:

**Major subject:** For the B.A. or B.Sc. Three-year degree an average of 62.5% is required on at least 24 credit units of senior courses. All senior courses attempted in the major subject must be included.

For the B.A. or B.Sc. Four-year degree an average of 65% is required on at least 30 credit units of senior courses. All senior courses attempted in the major subject must be included.

For the B.F.A. degree, students with an average of 75% overall on the last 60 or more credit units attempted (including Regular, and Spring and Summer Sessions), and an average of 70% in the prescribed courses of the major will, on the recommendation of the department and approval of the College, be awarded their degree.

**Overall C.W.A.:** For the B.A. or B.Sc. Three-year or the B.A. or B.Sc. Four-year degree or certificate an overall C.W.A. of at least 62.5% is required on the last 60 credit units or more attempted (including complete Regular, and Spring and Summer Sessions).

The student must also meet the regular or alternate graduation standards in the major subject.

**Minor and Recognition:** There is no alternate graduation standard for minors and recognition. The subject C.W.A. of 62.5% must be achieved if these designations are to be awarded.

Degrees with Distinction

Students in the B.Mus. Four Year, B.A. Three-year or Four-year, or B.Sc. Three-year or Four-year programs, who earn a minimum C.W.A. of 75% are awarded their degrees with Distinction; those who earn a minimum C.W.A. of 80% are awarded Great Distinction.

Students who do not achieve Distinction or Great Distinction based on the standards noted in the previous section, will also be considered under the alternate standards. Students who achieve a minimum C.W.A. of 77.5% on the last 60 or more credit units attempted will be awarded their degrees with Distinction. Students who achieve a minimum C.W.A. of 82.5% on the last 60 or more credit units attempted (including complete Regular, and Spring and Summer Sessions) will be awarded their degrees with Great Distinction.

Both the standards and alternate standards for Distinction or Great Distinction must be achieved on University of Saskatchewan courses which credit toward the Arts & Science degree.
Degrees with Honours

Honours Standard: Students who have completed an Honours Program with a C.W.A. of 70% and an average of 70% in the prescribed courses of the subject of honours will, on the recommendation of the department and approval of the College, be awarded their degree with honours.

High Honours Standard: Students with a C.W.A. average of 75% and an average of 80% in the prescribed courses in the subject of honours will, on the recommendation of the department and approval of the College, be awarded their degree with high honours.

Alternate Honours Standard: Students with a C.W.A. of 75% overall on the last 60 or more credit units attempted (including complete Regular, and Spring and Summer Sessions), and an average of 70% in the prescribed courses of the subject of honours will, on the recommendation of the department and approval of the College, be awarded their degree with honours.

Alternate High Honours Standard: Students with a C.W.A. of 80% on the last 60 or more senior credit units attempted (including complete Regular, and Spring and Summer Sessions), and a minimum C.W.A. of 80% in the major will be awarded their degree with High Honours.

Students who have already completed all program requirements for an Honours degree but did not achieve the C.W.A. graduation standard required for Honours, are not permitted to take or retake courses to upgrade to an Honours degree under this policy.

Departmental recommendations based on a comprehensive examination, or other quantitative aspects of the student's performance, shall have a weight of no more than 6 credit units in the calculation of a student's C.W.A.

Both the standards and the alternate standards for honours and high honours must be achieved on all University of Saskatchewan courses which credit toward the Arts & Science degree.

Program(s): Bachelor of Science Biomedical Sciences) Admission Qualifications:

- Regular Admission – High School (less than 18 credit units of transferable post-secondary):
  - Grade 12 standing or equivalent.
  - Chemistry 30; Biology 30 and Math Foundations 30 (or equivalents) with a minimum grade of 70% in each of these courses. Physics 30 is recommended. No deficiencies allowed.
  - Minimum average of 70% on five subject high school average (see Admissions calculation and average (April 2004).
  - Proficiency in English.

- Regular Admission – post-secondary (18 credit units or more transferable post-secondary):
  - Minimum average of 60% on 18 or more transferable credit units from a recognized and/or accredited post-secondary institution; average calculated on all attempted courses which are transferable to the College of Arts & Science.
  - Chemistry 30; Biology 30, Math Foundations with a minimum grade of 70% in each of these courses. Physics 30 is recommended.
  - Proficiency in English.

Selection Criteria:

- Regular Admission: Academic average – 100% weighting
  - Average is calculated using five high school subjects or on 18 or more transferable credits.
Categories of Applicants:

Regular Admission

Admissions is based upon students meeting the admissions qualifications criteria for the regular admissions criteria for high school and post-secondary as listed above.

Access Programs:  
**Post-Secondary – ASAP-BMSC Pathways Program**

Available to University of Saskatchewan Arts & Science students who are registered in the ISAP-BMSC program and who are transferring to the BSc (BMSC). Admission to the BMSC is based upon successful completion of the ISAP-BMSC pathways program, with a program average of at least 60%. In addition, students must have completed the following courses (or their equivalents): Biology 30, Chemistry 30, Foundations of Math 30.
Multi-year Budget and Financial Analysis

The College of Medicine (CoM) and the College of Arts and Sciences (A/S) have reviewed and analyzed the multi-year financial implications for this new program. In the partnership between the two colleges, two key principles were foundational to this analysis:

- Revenues should flow to where the costs are incurred (to support collaboration and efficient use of university and college resources)
- This program has the opportunity and capacity for growth within the realms of existing resources

Our multi-year analysis progressed in three areas as follows:

1. **Review of revenues of the program**

Working with Institutional Planning and Assessment (IPA), our two colleges worked to model tuition revenues to determine if this program would negatively affect either of the colleges. Through this analysis, a portion of which is shown below, both Colleges are satisfied that the tuition/revenue satisfies the principles of our collaboration and does not disadvantage either college from an academic delivery perspective.

![TABBS Bio Medical Program Analysis](image)
Below is the resulting tuition analysis for the current PHPY major and the proposed CPPS major showing only a minor change in tuition flowing to the colleges. Both CoM and A/S are satisfied this supports the program.

### Current PHPY Major

<table>
<thead>
<tr>
<th>Program Summary</th>
<th>Weighted FLE (WFLE)</th>
<th>% of WFLE</th>
<th>WFLE per Year</th>
<th>Tuition</th>
<th>% of Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts and Science</td>
<td>2.78</td>
<td>50%</td>
<td>0.69</td>
<td>$13,782</td>
<td>54%</td>
</tr>
<tr>
<td>Ag &amp; Bio</td>
<td>0.05</td>
<td>1%</td>
<td>0.01</td>
<td>$130</td>
<td>1%</td>
</tr>
<tr>
<td>Kinesiology</td>
<td>0.15</td>
<td>3%</td>
<td>0.04</td>
<td>$644</td>
<td>3%</td>
</tr>
<tr>
<td>Medicine</td>
<td>2.52</td>
<td>46%</td>
<td>0.63</td>
<td>$10,791</td>
<td>43%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5.50</strong></td>
<td><strong>100%</strong></td>
<td><strong>1.38</strong></td>
<td><strong>$25,347</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Arts & Science TABBS tuition allocation: $17,254 (68%)
Medicine TABBS tuition allocation: $8,093 (32%)

Total: $25,347
2. Review of current cost structures and ability to offer this program using existing resources

Both colleges have reviewed the academic program in detail and are confident that there are no incremental significant costs to operate the program. The colleges are confident that the program can be offered using existing faculty and staff resources by leveraging the respective strengths of the CoM and A/S.

3. Future growth

The CoM and A/S examined the ability to support future growth of the program in terms of student enrollment. At question was where bottlenecks would exist and how those could be alleviated and what level of investment would be required.

a. College of Medicine

The CoM undertook an assessment of bottlenecks and the full content of that assessment is included below. In short, there are no significant bottlenecks foreseen for the upper level courses and labs. Where there is minimal concern, the additional tuition revenue received from the growth in enrollment will be sufficient to resolve those issues.

Assessment of Bottlenecks in BMSC Program
Most bottlenecks in the BMSC program occur in the classes that offer labs. When looking to expand enrollment in classes with labs, there are several factors to be considered. These are a) the overall capacity of the lab space, b) the number of days a lab section can be offered, c) the
capacity of technical staff to assist in the delivery of the labs to more students, d) the availability of equipment and, e) in some cases, the availability of the materials (i.e. cadavers) needed for the labs.

As a generalization, I believe that the most economically viable way to increase enrolment in lab classes is to add another lab section. This way, any equipment that is needed for the labs can be used for an additional day, rather than investing in more equipment that will serve more students on a given day (although this is also an option). Adding another section to the lab classes is primarily contingent on whether the space is available for an additional day and has the least impact on the other factors that influence enrolment limits in labs.

An increase in enrolment of 25% has been presented by the provost and others as a target number in various documents and discussions. As such, the lab spaces were analyzed to determine whether student enrolment could be increased by 25% in the existing facilities by offering an additional section of each of the lab classes.

<table>
<thead>
<tr>
<th>Room</th>
<th>Lab Class</th>
<th>2016/17 enrolment data</th>
<th>class limit</th>
<th>available space</th>
<th>calculated 25% increase</th>
<th>Lab space available to add extra section (y/n)</th>
<th># students per section</th>
</tr>
</thead>
<tbody>
<tr>
<td>B204 /207</td>
<td>BMSC 240</td>
<td>310</td>
<td>320</td>
<td>10</td>
<td>78</td>
<td>yes</td>
<td>84</td>
</tr>
<tr>
<td>3B58</td>
<td>ACB 310</td>
<td>95</td>
<td>110</td>
<td>15</td>
<td>24</td>
<td>yes</td>
<td>55</td>
</tr>
<tr>
<td>B204</td>
<td>ACB 331</td>
<td>36</td>
<td>32</td>
<td>-4</td>
<td>9</td>
<td>Maybe?</td>
<td></td>
</tr>
<tr>
<td>B109</td>
<td>BIOC 310</td>
<td>46</td>
<td>70</td>
<td>24</td>
<td>12</td>
<td>yes, but not needed</td>
<td>24</td>
</tr>
<tr>
<td>B109</td>
<td>BIOC 311</td>
<td>36</td>
<td>70</td>
<td>34</td>
<td>9</td>
<td>yes, but not needed</td>
<td>24</td>
</tr>
<tr>
<td>B204</td>
<td>MCIM 390</td>
<td>39</td>
<td>55</td>
<td>16</td>
<td>10</td>
<td>no, but not needed</td>
<td>24</td>
</tr>
<tr>
<td>B204</td>
<td>MCIM 391</td>
<td>25</td>
<td>55</td>
<td>30</td>
<td>6</td>
<td>no, but not needed</td>
<td>24</td>
</tr>
<tr>
<td>B104</td>
<td>PHPY 308</td>
<td>112*</td>
<td>144</td>
<td>32</td>
<td>28</td>
<td>yes, but not needed</td>
<td>24</td>
</tr>
</tbody>
</table>

*PHPY 308 enrolment data is from 2018/19 since this class did not exist in 2016

According to this analysis, the total open and unused space currently available in the lab classes is 157. The calculated increase of 25% in all lab classes totals 175. This means that with the existing lab sections, 89% of the potential target increase can be accommodated with absolutely no changes needed. If an additional section were added to the courses indicated above, our capacity would be increased by another 211 students in addition to the 157 spots that are currently available in the lab classes. This total would far exceed the 25% target increase.

Notes:
Consultation was made with the technical staff dealing with ACB 310: Gross Anatomy. It is their opinion that they would have the capacity and materials to offer another section of 55 students. It has not been assessed as to what impact this would have on the faculty/other teaching staff.

It is my estimation that all of the additional sections shown in the table above for BMSC 240, BIOC 310 and 311, MCIM 390 and 391, as well as PHPY 308 could be offered by existing lab staff.

b. College of Arts and Sciences

In the early year courses required of this program from A/S, there may be bottlenecks incurred. A/S is working with the university to address this as it relates to multiple growth initiatives across the university. The anticipated bottlenecks are Laboratory space and personnel (lab instructors, TA’s) in Biology and Chemistry introductory courses (BIOL 120, CHEM 112).

4. Final Assessment of multi-year financial situation

Both CoM and A/S are satisfied through the above described analysis that the multi-year financial projections for this program enable the colleges to operate using existing resources and also to support growth aspirations over time.
College Statement

From Gordon DesBrisay, Vice Dean Academic

I am pleased to confirm that the College of Arts and Science supports the creation of a new Bachelor of Science (Biomedical Science), Type M, template to be used for the Biochemistry, Microbiology, and Immunology; Biomedical Foundations; Biomedical Neuroscience; Cellular, Physiological, and Pharmacological Sciences; and (proposed) Interdisciplinary Biomedical Sciences majors.

The College of Arts and Science is working to provide innovative program options that meet student need and demand. The new template will allow the link between the Biomedical Science programs to be more evident to those not familiar with these programs, and will allow these programs to implement admissions requirements which differ from those in place for the Bachelor of Science, Type C, programs.

The Academic Programs Committee (BSc) approved the proposals to create the Type M template and the Interdisciplinary Biomedical Sciences major on February 27, 2020, as did the College Faculty Council through remote voting held on March 19-20, 2020.
Planning and Priorities Committee

NOTICE OF INTENT for New Program in Undergraduate Biomedical Sciences

**Motivation:** Despite a long and successful history, the undergraduate biomedical science offerings at the University of Saskatchewan have fallen short of their true potential for our students, faculty, and university. This has prompted a united effort by the Colleges of Medicine (COM) and Arts & Science (A&S) to address existing deficiencies and capitalize on strengths. From these efforts, a shared vision has emerged for a higher-order Biomedical Sciences (BMSC) Program that will: 1) enable cutting-edge, multi-disciplinary training (including experiential learning opportunities) that position our students for careers in the biomedical sciences as well as health-related professions, 2) empower branding and promotion opportunities that, coupled with the unique research opportunities available on our campus, attract top-tier students from across Canada, and 3) exemplify the institutional strategic plan to prioritize cross-college collaboration.

**Efforts to Date:** In recent years significant improvements to our undergraduate biomedical sciences programs have been achieved through strategic incremental steps. These include:

**Department Mergers:** In 2018, the five biomedical science departments merged to form two departments (Anatomy, Physiology, and Pharmacology (APP) and Biochemistry, Microbiology, and Immunology (BMI)) with a more robust structure and multi-disciplinary capacity.

**New Majors:** Three new majors (Biochemistry, Microbiology and Immunology; Cellular, Physiological, and Pharmacological Sciences, and Biomedical Neurosciences) have been approved to replace the current majors (Biochemistry; Microbiology and Immunology; Anatomy and Cell Biology; and Physiology and Pharmacology). As well, a shared three-year major (Biomedical Foundations) has been created to replace the three-year degrees of each of the former biomedical science majors in 2020.
**Revamped Curriculum:** Optimization of the content and structure of the courses as well as introduction of new courses, including Course Based Undergraduate Research Experience (CURE), to provide experiential learning opportunities.

**Next Steps:** There is further opportunity to improve by capitalizing on the potential synergies that exist across the biomedical science departments as well as between COM and A&S. The priority of the next phase is to unite the efforts of these participants by the establishment of a unified BMSC Program that will include both direct entry and upper-year transfer admissions, provide a strong sense of identity for our students, promote faculty engagement, and embody strategic priorities of the university by promoting inter-college partnerships, assisting research capacity, and enabling program growth. Specific curriculum, administration, admissions, and promotion goals of the BMSC Program are detailed [Table 1].

The updated BMSC Program will reflect efforts in the following areas:

**Partnerships:** The biomedical science departments at the U of S are housed with the COM but the associated degrees are offered through A&S. While the two colleges share a strong working relationship, it is not a true partnership. Biomedical faculty are seeking more involvement and ownership of the undergraduate program, a desire that has been welcomed by A&S. Under the new BMSC Program, the Colleges of A&S and Medicine will be equal partners. Administratively, this includes a new BMSC Academic Programming Committee equally populated by A&S and COM faculty [Figure 1]. Academically, the program draws equally on courses taught by COM and A&S faculty with future priority for new courses that are co-developed and co-taught by A&S and COM faculty. Already a new course, History of Infectious Disease and Vaccines, co-developed by faculty of the Departments of History and BMI, has gone forth for course approval.

**Admissions:** Students will be able to apply directly to the BMSC program from high school or through transfer from within the university. Efforts will be made to encourage enrollment of Indigenous students, including outreach and promotional programs.
**Curriculum:** Further improvements to the curriculum, including the creation of an Interdisciplinary BMSC major as well as the introduction of new courses in epidemiology and pathology.

**Branding & Identity:** Direct entry into the program, a distinct B.Sc. (BMSC) degree, dual signatures on the parchment by the Deans of both A&S and COM, and creation of BMSC Learning Communities will provide our learners with a sense of identity, both as students and alumni of the program.

**Promotion & Growth:** There are many features of the BMSC Program (updated curriculum, affiliation with the COM, and admissions) that will appeal to highly-qualified students. Properly promoted, and with minimal additional investment in teaching resources, there is capacity and opportunity for 20% increase in enrollment with priority on attracting new students to our campus. As the current biomedical science departments collectively graduate ~160 students/year, this would translate to an additional 32 graduates/year. This growth target is anticipated within five years of introduction of the program.

**Guiding Principles:**

**Academic Excellence:** To provide training that enables the success of our graduates.

**Partnerships:** To capitalize on inter-department and inter-college collaborations to create a degree that is greater than the sum of the parts.

**Branding & Promotion:** There are many unique features of the proposed BMSC Program (curriculum, structure, and admissions) that will attract highly-qualified students from across Canada.

**Admissions:** Direct entry application from high school to assist in defining the unique nature of the BMSC Program and instilling a sense of identity within our students. Enrollment changes with the introduction of the new program will be closely monitored. Should enrollment approach the capacity of the program, a more competitive model of
entry into the program, for both direct entry as well as transfer from within the university, will be investigated.

**Identity:** Provide students with a sense of belonging to the Biomedical Sciences and COM faculty with a sense of ownership of the program.

**Program Growth:** Opportunity and capacity for enrollment growth.

**Student Demand:** On average, about 160 students graduate from the biomedical sciences annually with about 800 students total enrolled in years 2-4 of the various biomedical sciences majors. These numbers have remained fairly steady for the last 6 years. With the launch of the new BMSC Program in 2021 and the marketability of the program being more obviously linked to the COM, will likely cause an increase in student enrollment. Other Canadian Universities who have developed biomedical science programs of similar structure and priority have been very successful. With proper promotion and branding of the BMSC Program by the university we can conceive an increase in enrollment with the current capacity of space and personnel supporting a 20% increase within five years of introduction.

**Fit with College and University Priorities:** The proposed BMSC program reflects the strategic priorities of the University and participating Colleges. Specifically, the BMSC Program is a shining example of the University priority towards intercollege collaboration. The new majors have potential to increase enrollment and additional efforts will be made to increase the number of Indigenous students in these majors. Finally, the BMSC Program enables University and College priorities for strengthening research capacity by implementing a strong biomedical science program that better stimulates graduate student and faculty research programs.

**Relationship to Other Programs at the U of S:** The recent changes to create new majors to replace existing ones, as well as the proposed transfer of these majors to a new degree template and the addition of an Interdisciplinary major, are not expected to have any significant impact on other programs on campus.

The Health Studies major offered through the College of Arts and Sciences is the closest comparable program at the U of S. Similar to the BMSC program, many students of the Health Studies program aspire to go into medical school or other health science professions. There is
also some course overlap, in particular within the first two years. The programs are, however, quite distinct in their upper year requirements where the BMSC Program places heavy emphasis on biomedical science courses within each of the majors. In contrast, the Health Studies Program offers a broader interdisciplinary scope with a reduced requirement for science courses and increased requirement for arts courses. As such, the Health Studies and BMSC offerings represent quite distinct educational experiences largely catering to unique populations of students. Notably, we have been in active discussion with the leaders of the Health Studies program and they have offered their support and enthusiasm for the development of the BMSC Program and the synergies this will offer with their own program.

**Need for Program Changes:** Many Canadian Universities, in particular those with medical schools, offer majors/degrees within the biomedical sciences. Further, many Canadian Universities have moved towards a multidisciplinary approach to biomedical science education. Several Canadian Universities have already adopted biomedical science structures which are similar to the program proposed here. These models show a shared priority for multidisciplinary training, although not to the exclusion of specialized majors in specific biomedical science disciplines, including the introduction of Interdisciplinary Biomedical Sciences or Interdisciplinary Medical Science degrees that are similar in scope and philosophy to this proposal. Within the Canadian Medical/Doctoral Universities there are examples of such programs being offered through either Arts and Science, Medical Colleges, or shared models. The BMSC program is essential for us to compete with these schools, both for retention of local students as well as to attract students on national and international scales. When we are clearly part of this group, there is the opportunity to differentiate our program and campus by virtue of infrastructure strengths, including the Canadian Light Source (CLS), the Vaccine and Infectious Disease Organization-International Vaccine Centre (VIDO-InterVac), and the new Health Sciences building.

There are no other comparable programs within Saskatchewan. The closest in-province alternative would be at the University of Regina (U of R), which offers degrees in Biology as well as Chemistry/Biochemistry. In terms of the number of available courses, faculty numbers and research activity, representation of the various biomedical sciences, and available science-based infrastructure, the programs at the University of Regina are not comparable.
The U of R has initiated a number of pre-professional programs designed for students intending to enter professional programs, like Medicine, Dentistry, and Pharmacy which are not offered at the U of R. These are pre-professional program packages of core introductory classes which are either pre-requisites for these colleges or deal with content that is emphasized on the associated aptitude exams. The courses of the U of R pre-professional programs are ubiquitous to all major Canadian universities. What is distinct is the specific packaging and marketing of these courses as pre-professional programs. As many biomedical science students at the U of S are seeking entry into professional programs, the pre-professional programs of the U of R could appeal to similar cohort of students. With similar marketing, a direct affiliation to the College of Medicine, as well as majors that enable training that is highly applicable to these professional programs (courses which are unavailable at the U of R), the BMSC Program at the U of S should be an attractive option for these students.

**Resources Required:** Discussions regarding capacity issues in CHEM 112 and BIOL 120 are ongoing and we are given to understand that the university is aware of this issue that affects multiple colleges. There is ability in the other courses of this program to accommodate 20% growth within existing sections such that a minimum of additional teaching resources is required. Additional students will result in marginal increases in costs of lab-based courses in BMSC, however, it is possible to use incremental tuition to offset those incremental costs.

By partnering with A&S we are leveraging that college’s existing infrastructure and expertise for student support and program administration (student advising, promotion, graduation procedures, coordination of curricular approvals, and catalogue maintenance). This will avoid the need to duplicate these services in the COM. The Provost, Vice-Provost, Teaching and Learning, Institutional Planning and Assessment, and the Registrar’s Office have been consulted at every step in the planning for the new BMSC program.

**Risks, Assumptions, or Constraints:** We do not believe that there are any risks associated with this new program proposal. The greater risk is failure to improve the program.

**Start Date:** May 2021
<table>
<thead>
<tr>
<th>Administration</th>
<th><strong>Old Program</strong></th>
<th><strong>New Program</strong></th>
<th><strong>2020</strong></th>
<th><strong>2021</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Specialized, isolated departments with limited interactions and high vulnerabilities.</td>
<td>Robust, multi-disciplinary departments.</td>
<td></td>
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<tr>
<td></td>
<td>A working relationship between COM and A&amp;S.</td>
<td>True partnership between A&amp;S and COM.</td>
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<tr>
<td></td>
<td>A new administrative structure with more involvement of COM to encourage interaction between A&amp;S and COM.</td>
<td>Dual signature on parchment.</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>True partnership between A&amp;S and COM.</td>
<td>New program-specific degree template.</td>
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<tr>
<td></td>
<td>A new administrative structure with more involvement of COM to encourage interaction between A&amp;S and COM.</td>
<td>New program-specific degree template.</td>
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<tr>
<td></td>
<td>Stagnant Student Enrollment</td>
<td>Projected program growth (20%)</td>
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</tr>
<tr>
<td>Curriculum</td>
<td>Traditional labs; limited experiential learning opportunities</td>
<td>CURE labs for experiential learning.</td>
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<tr>
<td></td>
<td>Outdated content.</td>
<td>Updated content and labs.</td>
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<tr>
<td></td>
<td>Course overlap.</td>
<td>Streamlined courses to eliminate redundancies.</td>
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<td></td>
<td>Multidisciplinary perspective limited to early years</td>
<td>Enhanced priority on multidisciplinary training throughout degree.</td>
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<td></td>
<td>Enhanced priority on multidisciplinary training throughout degree.</td>
<td>New majors.</td>
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<td>Enhanced priority on multidisciplinary training throughout degree.</td>
<td>New majors.</td>
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<td></td>
<td>New course offerings.</td>
<td>New course offerings.</td>
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<td>Development of cross-college courses.</td>
<td>Development of cross-college courses.</td>
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<td>Admissions</td>
<td>General entry through A&amp;S.</td>
<td>Direct admission or upper-year transfer.</td>
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<tr>
<td></td>
<td>Early entry for highly-qualified students.</td>
<td>Competitive process for selection of majors.</td>
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<td></td>
<td>Competitive process for selection of majors.</td>
<td>Competitive process for selection of majors.</td>
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<tr>
<td></td>
<td>No defined efforts to recruit or support Indigenous Students.</td>
<td>Structures and mechanisms for increased Indigenous student enrollment and support.</td>
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<tr>
<td>Promotion and Branding</td>
<td>Students experience a sense of disconnect from their departments.</td>
<td>Priority and mechanisms to provide students a sense of identity within program.</td>
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<td>Faculty experience a sense of disconnect from their program.</td>
<td>Faculty gain sense of ownership of program.</td>
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</tr>
<tr>
<td></td>
<td>Promotional advantages to explicitly linking program to COM.</td>
<td>Promotional advantages to explicitly linking program to COM.</td>
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<td>*</td>
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</tbody>
</table>
Figure 1. Proposed Administrative Structure of Biomedical Sciences Program.
TO: Dr. Darrell Mousseau, chair, Planning and Priorities Committee of Council
FROM: Dr. Gordon DesBrisay, Vice-Dean Academic, College of Arts and Science
DATE: December 11, 2019
RE: NOI for New Program in Undergraduate Biomedical Sciences

On behalf of the College of Arts and Science, I am pleased to offer our support for the proposed next phase of the new Biomedical Sciences Undergraduate Program (BMSC).

As noted in the NOI, the new BMSC program is a joint venture of the College of Medicine and the College of Arts and Science. Having developed the three new majors and gained academic approval, the NOI proposes key next-steps in the implementation process, all of them intended to achieve strategic goals shared by our colleges and the university at large -- including intercollege collaboration, in itself.

A founding principle of the implementation process is that of establishing an “enhanced partnership” between our two colleges. In practice, this means providing new opportunities for faculty and staff in the College of Medicine to engage more fully in shaping the curricular, administrative, admissions, recruiting and promotion aspects of the BMSC programs. By the same token, Arts and Science needs to concede some collegial and administrative space in which our colleagues in Medicine can participate. The steps outlined in this NOI lay a firm foundation for this enhanced partnership, as evidenced most clearly in the proposed new BMSC Academic Programs Committee to be established within the administrative structures of the College of Arts and Science, but with faculty from the College of Medicine guaranteed equal membership on a committee populated by both colleges.

The colleges are also cooperating with each other and with the central university administration in devising the best way to achieve direct entry into the BMSC program from high school as well as through upper-year transfers. The target of a 20% increase in enrolment in the program over five years is a reasonable one that takes into account our current limited ability to accommodate students in first-year lab classes. Enhanced engagement on the part of the College of Medicine promises to make the already-popular BMSC Learning Communities an even stronger draw for incoming students. As our joint promotion activities leverage the attractive force of the College of Medicine “brand”, we expect to be able to attract more highly-qualified students. Some growth in the BMSC programs can be expected to be drawn from other STEM programs on campus, but we are confident of attracting new students to the U of S from other provinces.

In sum, the College of Arts and Science continues to fully support our colleagues in the College of Medicine as we work together on this exciting joint venture.

Yours sincerely,

Gordon DesBrisay
Vice-Dean Academic, College of Arts and Science
December 11, 2019

To: Planning and Priorities Committee of Council

Re: College of Medicine Letter of Support for the Notice of Intent for the New Biomedical Sciences Undergraduate Program

This is a letter of support confirming the College of Medicine’s endorsement of the new Biomedical Sciences (BMSC) undergraduate program to be jointly offered by the Colleges of Medicine and Arts and Science through an enhanced partnership.

The College of Medicine, in cooperation with the College of Arts and Science, has been working hard to build a truly collaborative undergraduate program. We have consulted extensively with BMSC faculty and students to build on our current program. This has led us to create an innovative program with renewed priority on critical thinking, multidisciplinary training, and experiential learning. In addition, we are excited to be partnering with clinical departments to offer new pathology and epidemiology courses. We are confident that this new program will enhance the teaching and research missions of the College.

Our BMSC program has a vision that will see an increase in the numbers and quality of students coming into our program, and to increase the graduates to health professional programs and graduate studies. We want to support the culture and identity of our faculty and their affiliation with the programs and the students they teach, and ensure sustainable and viable programs. Living by the principles and priorities of the university, our college is committed to working in collaboration with the College of Arts and Science to establish a joint Biomedical Sciences undergraduate degree with four majors.

Sincerely,

[Signature]

Preston Smith, MD, MEd, CCFP, FCFP, CCPE
Dean
MEMORANDUM

TO: Peta Bohnam-Smith, Dean, College of Arts & Science
    Alexis Dahl, College of Arts & Science
    Preston Smith, Dean, College of Medicine
    Scott Napper, College of Medicine

FROM: Angela Bedard-Haughn, Planning and Priorities Committee (PPC) of Council

DATE: January 24, 2020

RE: Notice of Intent for an Undergraduate Biomedical Sciences degree

Thank you for attending the PPC meeting of January 15, 2020 to discuss the proposed new undergraduate Biomedical Science program. The committee considered two questions: 1) the program’s alignment with the university’s plans and priorities, and 2) the appropriateness of having both the College of Medicine and the College of Arts & Science’s contributions recognized on the parchment for this degree (which would be unprecedented at USask).

The committee agreed that this interdisciplinary collaboration between two colleges is a great example of how we are bringing the University Plan: 2025 to life. Making it direct entry will also help attract the best students, nationally.

The committee was concerned in particular in the resourcing of the program, and the sharing of resources between the colleges. The committee would recommend discussions with the provost about the potential impact of increased student enrolment in the program and differential implications for each of the partner colleges and departments. A multi-year budget for the program should be submitted to the Academic Programs Committee (APC) as part of the next step in the Council approval process.

For the proposal’s submission to APC, a flowchart showing the onramps and potential off-ramps for the program would be helpful. This will be important in communication of the different degree pathways to students not pursuing medical school, or to those not admitted to medical school. This is an opportunity for USask to recruit into any of the health sciences programs across campus.
With regard to the parchment, the committee agreed that dual recognition of the colleges is important for student attractiveness and to ensure that the contributions of all of the faculty are recognized. The following motion was passed:

*It is recommended to University Council that the University of Saskatchewan recognize both the College of Arts & Science and the College of Medicine on the Biomedical Sciences degree parchment.*

This motion is hereby communicated to the APC by copy of the chair on this email. The advice of the Office of the University Secretary is that such a motion should be brought forward by both APC and PPC for the consideration of Council. Moreover, the decision to recognize more than one college on a USask degree program parchment should be considered on a case-by-case basis.

Thank you for your work on this program’s development. We encourage you to consider this feedback in the next iteration of the proposal that is presented to APC.

Please do not hesitate to contact me if you have any questions.

Kind regards,

Angela Bedard-Haughn
Vice-Chair, Planning and Priorities Committee
University of Saskatchewan
tel: (306) 966-8824
Two Year BMSC Platform

Admission from High School

Transfer from Other Universities

Apply In

Transfer Out

PTSM A&S

Process to Select Major

Two Year BMSC Platform

PTSM

Year 3 BMSC

Year 4 BMSC

A&S

Employment

Professional Programs & Second Degrees

Graduate Studies
Existing Biomedical Sciences adapted into the Type M Template:

Biochemistry, Microbiology, and Immunology

The Department of Biochemistry, Microbiology and Immunology offers a program which provide education in the areas the molecular and cellular approaches to the study of the life sciences including microbial physiology and pathogenesis, protein structure and function, molecular biology, microbial genetics, virology, tumour biology and cancer, immunology and immunopathogenesis. This program includes necessary courses for students prepared to enter graduate studies in biomedical sciences and into health-related professional schools such as Medicine, Dentistry, Veterinary Medicine and Pharmacy. Graduates are also prepared for careers in broad aspects of biotechnology and they can find employment in academic/research institutions and related industries.

Double Honours programs in Biochemistry and Biology, and Biochemistry and Physics are also available. Students considering a Double Honours program must consult an academic advisor within each department.

The five B.Sc. degree programs listed below share a set of courses (the Biomedical Science Common Core) which are to be taken in years 1 & 2. These courses have been incorporated into the M1, M3, and M4 requirements.

- Biochemistry, Microbiology & Immunology
- Biomedical Foundations
- Biomedical Neuroscience
- Cellular, Physiological and Pharmacological Sciences
- Interdisciplinary Biomedical Sciences

Major Average

The major average in Biochemistry, Microbiology and Immunology programs includes the grades earned in:

- All courses listed in the Core Requirement M4
- All courses listed in the Major Requirement M5.

Residency Requirements in the Major

To receive a degree in Biochemistry, Microbiology and Immunology, students must complete at least two-thirds of the following coursework (to the nearest highest multiple of 3 credit units) from the University of Saskatchewan.

- Minimum requirements in Core Requirement M4 and the Major Requirement M5.

See Residency for additional details.
Bachelor of Science Honours (B.Sc. Honours) – Biochemistry, Microbiology and Immunology

No more than 6 credit units from one subject may be used in Requirements M1 to M3.

M1 College Requirement (15 credit units)

**English Language Writing**  
Choose **6 credit units** from the following:

- Approved list

**Indigenous Learning**  
Choose **3 credit units** from the following:

- Approved list

**Quantitative Reasoning**  
Choose **3 credit units** from the following:

- MATH 110.3 Calculus I  
- MATH 125.3 Mathematics for the Life Sciences

Choose **3 credit units** from the following:

- STAT 245.3 Introduction to Statistical Methods  
- STAT 246.3 Introduction to Biostatistics  
- PLSC 214.3 Statistical Methods

M2 Breadth Requirement (3 credit units)

Choose **3 credit units** from the following areas.

- Fine Arts  
- Humanities  
- Social Sciences  
- Courses with No Program Type

M3 Cognate Requirement (21 credit units)

- BIOL 120.3 The Nature of Life  
- CHEM 112.3 General Chemistry I Structure Bonding and Properties of Materials  
- CHEM 115.3 General Chemistry II Chemical Processes  
- PHYS 115.3 Physics and the Universe  
- PHYS 117.3 Physics for the Life Sciences or PHYS 125.3 Physics and Technology

**Required Cognate Courses**

- PHIL 140.3 Critical Thinking
Choose **3 credit units** from the following:

- HLST 110.3 Introduction to Health Studies
- PSY 120.3 Biological and Cognitive Bases of Psychology
- PSY 121.3 Social Clinical Cultural and Developmental Bases of Psychology
- SOC 111.3 Foundations in Sociology Society Structure Process
- SOC 112.3 Foundations in Sociology Social Construction of Everyday Life

**M4 Core Requirement (24 credit units)**

- BMSC 200.3 Biomolecules
- BMSC 207.3 Human Body Systems I
- BMSC 208.3 Human Body Systems II
- BMSC 210.3 Microbiology
- BMSC 220.3 Cell Biology
- BMSC 230.3 Metabolism
- BMSC 240.3 Laboratory Techniques
- CHEM 250.3 Introduction to Organic Chemistry

**M5 Major Requirement (42 credit units)**

- BMIS 340.3 Introductory Molecular Biology
- BMIS 400.0 Seminar in Biochemistry Microbiology and Immunology
- BMSC 320.3 Nucleic Acids from Central Dogma to Human Disease

Choose **3 credit units** from the following:

- BIOC 310.3 Proteins and Enzymes
- MCIM 390.3 Experimental Microbiology and Immunology

Choose **3 credit units** from the following:

- BINF 200.3 Introduction to Bioinformatics
- BINF 210.3 Introduction to Bioinformatics Applications

Choose **15 credit units** from the following, including at least 9 credit units at the 400-level:

- BIOC 435.3 Human Metabolism and Disease
- BIOC 405.3 Structure and Function of Biomolecules
- BIOC 412.3 Protein Structure Function and Engineering
- BIOC 430.3 Biochemistry of Cancer
- BIOC 436.3 Advanced Molecular Biology
- BMIS 308.3 An Introduction to Microbial Pathogens
- BMIS 380.3 Team Based Experimental Microbiology
- BMIS 489.6 Research Project in Biochemistry Microbiology and Immunology
- MCIM 321.3 Principles of Immunology
- MCIM 417.3 Molecular Virology
- MCIM 423.3 Immunopathogenesis
- MCIM 425.3 Molecular Basis of Microbial Pathogenesis
- MCIM 487.3 Microbial Genetic Systems

Choose **15 credit units** from the following:
- **ACB 325.3** Advanced Cell Biology
- **BINF 300.3** Algorithms in Bioinformatics
- **BIOL 226.3** Genes to Genomics
- **BIOL 316.3** Molecular Genetics of Eukaryotes
- **BIOL 331.3** Plant Physiology
- **BIOL 420.3** Molecular Biology of Plants
- **BIOL 436.3** Animal Parasitology
- **CHEM 456.3** Natural Products
- **FABS 325.3** Food Microbiology and Safety
- **FABS 334.3** Industrial Microbiology
- **FABS 430.3** Environmental Microbiology
- **FABS 450.3** Anaerobic and Rumen Microbiology
- **NEUR 301.3** Fundamental Neuroscience Intercellular Communication
- **PHPY 302.3** Human Physiology Transport Systems
- **PHPY 303.3** Human Physiology Reproduction Growth and Energy Homeostasis
- **Any BMSC, BMIS, BIOC or MCIM course at the 300 or 400 level**

**M6 Electives Requirement (15 credit units)**

Arts and Science courses, or those from other Colleges that have been approved for Arts and Science credit, to complete the requirements for 120 credit unit Honours program, of which at least 66 must be at the 200-level or higher.

- **HLST 210.3** is recommended.
Bachelor of Science Four-year (B.Sc. Four-year) – Biochemistry, Microbiology and Immunology

No more than 6 credit units from one subject may be used in Requirements M1 to M3.

**M1 College Requirement (15 credit units)**

**English Language Writing**
Choose **6 credit units** from the following:

- Approved list

**Indigenous Learning**
Choose **3 credit units** from the following:

- Approved list

**Quantitative Reasoning**
Choose **3 credit units** from the following:

- MATH 110.3 Calculus I
- MATH 125.3 Mathematics for the Life Sciences

Choose **3 credit units** from the following:

- STAT 245.3 Introduction to Statistical Methods
- STAT 246.3 Introduction to Biostatistics
- PLSC 214.3 Statistical Methods

**M2 Breadth Requirement (3 credit units)**

Choose **3 credit units** from the following areas.

- Fine Arts
- Humanities
- Social Sciences
- Courses with No Program Type

**M3 Cognate Requirement (21 credit units)**

- BIOL 120.3 The Nature of Life
- CHEM 112.3 General Chemistry I Structure Bonding and Properties of Materials
- CHEM 115.3 General Chemistry II Chemical Processes
- PHYS 115.3 Physics and the Universe
- PHYS 117.3 Physics for the Life Sciences or PHYS 125.3 Physics and Technology

**Required Cognate Courses**

- PHIL 140.3 Critical Thinking
Choose **3 credit units** from the following:

- **HLST 110.3** Introduction to Health Studies
- **PSY 120.3** Biological and Cognitive Bases of Psychology
- **PSY 121.3** Social Clinical Cultural and Developmental Bases of Psychology
- **SOC 111.3** Foundations in Sociology Society Structure Process
- **SOC 112.3** Foundations in Sociology Social Construction of Everyday Life

**M4 Core Requirement (24 credit units)**

- **BMSC 200.3** Biomolecules
- **BMSC 207.3** Human Body Systems I
- **BMSC 208.3** Human Body Systems II
- **BMSC 210.3** Microbiology
- **BMSC 220.3** Cell Biology
- **BMSC 230.3** Metabolism
- **BMSC 240.3** Laboratory Techniques
- **CHEM 250.3** Introduction to Organic Chemistry

**M5 Major Requirement (36 credit units)**

- **BMIS 340.3** Introductory Molecular Biology
- **BMIS 400.0** Seminar in Biochemistry Microbiology and Immunology
- **BMSC 320.3** Nucleic Acids from Central Dogma to Human Disease

Choose **3 credit units** from the following:

- **BIOC 310.3** Proteins and Enzymes
- **MCIM 390.3** Experimental Microbiology and Immunology

Choose **3 credit units** from the following:

- **BINF 200.3** Introduction to Bioinformatics
- **BINF 210.3** Introduction to Bioinformatics Applications

Choose **15 credit units** from the following, including at least 9 credit units at the 400-level:

- **BIOC 435.3** Human Metabolism and Disease
- **BIOC 405.3** Structure and Function of Biomolecules
- **BIOC 412.3** Protein Structure Function and Engineering
- **BIOC 430.3** Biochemistry of Cancer
- **BIOC 436.3** Advanced Molecular Biology
- **BMIS 308.3** An Introduction to Microbial Pathogens
- **BMIS 380.3** Team Based Experimental Microbiology
- **BMIS 489.6** Research Project in Biochemistry Microbiology and Immunology
- **MCIM 321.3** Principles of Immunology
- **MCIM 417.3** Molecular Virology
- **MCIM 423.3** Immunopathogenesis
- **MCIM 425.3** Molecular Basis of Microbial Pathogenesis
- **MCIM 487.3** Microbial Genetic Systems
Choose 9 credit units from the following:

- **ACB 325.3** Advanced Cell Biology
- **BINF 300.3** Algorithms in Bioinformatics
- **BIOL 226.3** Genes to Genomics
- **BIOL 316.3** Molecular Genetics of Eukaryotes
- **BIOL 331.3** Plant Physiology
- **BIOL 420.3** Molecular Biology of Plants
- **BIOL 436.3** Animal Parasitology
- **CHEM 456.3** Natural Products
- **FABS 325.3** Food Microbiology and Safety
- **FABS 334.3** Industrial Microbiology
- **FABS 430.3** Environmental Microbiology
- **FABS 450.3** Anaerobic and Rumen Microbiology
- **NEUR 301.3** Fundamental Neuroscience Intercellular Communication
- **PHPY 302.3** Human Physiology Transport Systems
- **PHPY 303.3** Human Physiology Reproduction Growth and Energy Homeostasis
- **Any BMSC, BMIS, BIOC or MCIM course at the 300 or 400 level**

- **Any BMSC, BMIS, BIOC or MCIM course at the 300 or 400 level**

**M6 Electives Requirement (21 credit units)**

Arts and Science courses, or those from other Colleges that have been approved for Arts and Science credit, to complete the requirements for 120 credit unit Four-year program, of which at least 66 must be at the 200-level or higher.

- **HLST 210.3** is recommended.
**Biomedical Foundations**

Through the Dean’s office at the College of Medicine, the biomedical science departments of Biochemistry, Microbiology and Immunology and Anatomy, Physiology, and Pharmacology offer a three-year major in Biomedical Foundations. This major builds on the shared two-year biomedical sciences platform shared by all the biomedical science majors to provide students with a strong foundation of multidisciplinary training while providing flexibility for initial specialization within a particular biomedical science. This program includes necessary courses for students prepared to enter into health-related professional schools not requiring a four-year degree such as Dentistry, Veterinary Medicine and Pharmacy. Graduates are also prepared for careers in broad aspects of biotechnology and they can find employment in academic/research institutions and related industries.

The five B.Sc. degree programs listed below share a set of courses (the Biomedical Science Common Core) which are to be taken in years 1 & 2. These courses have been incorporated into the M1, M3, and M4 requirements.

- Biochemistry, Microbiology & Immunology
- Biomedical Foundations
- Biomedical Neuroscience
- Cellular, Physiological and Pharmacological Sciences
- Interdisciplinary Biomedical Sciences

**Major Average**

The major average in Biomedical Foundations programs includes the grades earned in:

- All courses listed in the Core Requirement M4
- All courses listed in the Major Requirement M5.

**Residency Requirements in the Major**

To receive a degree in Biomedical Foundations, students must complete at least two-thirds of the following coursework (to the nearest highest multiple of 3 credit units) from the University of Saskatchewan.

- Minimum requirements in Core Requirement M4 and the Major Requirement M5.

See [Residency](#) for additional details.
Bachelor of Science Three-year (B.Sc. Three-year) – Biomedical Foundations

No more than 6 credit units from one subject may be used in Requirements M1 to M3.

M1 College Requirement (15 credit units)

English Language Writing
Choose 6 credit units from the following:

- Approved list

Indigenous Learning
Choose 3 credit units from the following:

- Approved list

Quantitative Reasoning
Choose 3 credit units from the following:

- MATH 110.3 Calculus I
- MATH 125.3 Mathematics for the Life Sciences
- STAT 245.3 Introduction to Statistical Methods
- STAT 246.3 Introduction to Biostatistics
- PLSC 214.3 Statistical Methods

M2 Breadth Requirement (3 credit units)

Choose 3 credit units from the following areas.

- Fine Arts
- Humanities
- Social Sciences
- Courses with No Program Type

M3 Cognate Requirement (21 credit units)

- BIOL 120.3 The Nature of Life
- CHEM 112.3 General Chemistry I Structure Bonding and Properties of Materials
- CHEM 115.3 General Chemistry II Chemical Processes
- PHYS 115.3 Physics and the Universe
- PHYS 117.3 Physics for the Life Sciences or PHYS 125.3 Physics and Technology

Required Cognate Courses

- PHIL 140.3 Critical Thinking
Choose 3 credit units from the following:

- HLST 110.3 Introduction to Health Studies
- PSY 120.3 Biological and Cognitive Bases of Psychology
- PSY 121.3 Social Clinical Cultural and Developmental Bases of Psychology
- SOC 111.3 Foundations in Sociology Society Structure Process
- SOC 112.3 Foundations in Sociology Social Construction of Everyday Life

**M4 Core Requirement (24 credit units)**

- BMSC 200.3 Biomolecules
- BMSC 207.3 Human Body Systems I
- BMSC 208.3 Human Body Systems II
- BMSC 210.3 Microbiology
- BMSC 220.3 Cell Biology
- BMSC 230.3 Metabolism
- BMSC 240.3 Laboratory Techniques
- CHEM 250.3 Introduction to Organic Chemistry

**M5 Major Requirement (18 credit units)**

Choose 3 credit units from the following:

- BIOL 226.3 Genes to Genomics
- BMSC 320.3 Nucleic Acids from Central Dogma to Human Disease

Choose 15 credit units from the following:

- ACB - 300-level, 400-level
- BIOC - 300-level, 400-level
- BMIS - 300-level, 400-level
- BMSC - 300-level
- CPPS - 300-level, 400-level
- MCIM – 300-level, 400-level
- NEUR 301.3 Fundamental Neuroscience Intercellular Communication
- NEUR 350.3 Fundamental Neuroscience
- NEUR 405.3 Current Topics in Neuroscience
- PHPY - 300-level, 400-level

**M6 Electives Requirement (12 credit units)**

Arts and Science courses, or those from other Colleges that have been approved for Arts and Science credit, to complete the requirements for 90 credit unit Three-year program, of which at least 42 must be at the 200-level or higher.
Biomedical Neuroscience

The Department of Anatomy, Physiology and Pharmacology programs provide education in the discipline of neuroscience. This program includes education in many of the major topics in neuroscience including molecular and cellular neuroscience, systems and sensory neuroscience, behavioural and cognitive neuroscience, neurophysiology and neuroanatomy. Programs in Anatomy, Physiology and Pharmacology include essential prerequisite courses for life science professional schools (e.g. Medicine, Dentistry, Pharmacy and Nutrition, Veterinary Medicine) and while this program focuses on neuroscience it prepares students for graduate studies in many areas of the life sciences. Graduates at all levels find employment in academia, industry and other life science research enterprises.

The five B.Sc. degree programs listed below share a set of courses (the Biomedical Science Common Core) which are to be taken in years 1 & 2. These courses have been incorporated into the M1, M3, and M4 requirements.

- Biochemistry, Microbiology & Immunology
- Biomedical Foundations
- Biomedical Neuroscience
- Cellular, Physiological and Pharmacological Sciences
- Interdisciplinary Biomedical Sciences

Major Average

The major average in Biomedical Neuroscience programs includes the grades earned in:

- All courses listed in the Core Requirement M4
- All courses listed in the Major Requirement M5.

Residency Requirements in the Major

To receive a degree in Biomedical Neuroscience, students must complete at least two-thirds of the following coursework (to the nearest highest multiple of 3 credit units) from the University of Saskatchewan.

- Minimum requirements in Core Requirement M4 and the Major Requirement M5.

See Residency for additional details.
Bachelor of Science Honours (B.Sc. Honours) – Biomedical Neuroscience

No more than 6 credit units from one subject may be used in Requirements M1 to M3.

M1 College Requirement (15 credit units)

English Language Writing
Choose **6 credit units** from the following:

- **Approved list**

Indigenous Learning
Choose **3 credit units** from the following:

- **Approved list**

Quantitative Reasoning
Choose **3 credit units** from the following:

- **MATH 110.3** Calculus I
- **MATH 125.3** Mathematics for the Life Sciences

Choose **3 credit units** from the following:

- **STAT 245.3** Introduction to Statistical Methods
- **STAT 246.3** Introduction to Biostatistics
- **PLSC 214.3** Statistical Methods

M2 Breadth Requirement (3 credit units)

Choose **3 credit units** from the following areas.

- Fine Arts
- Humanities
- Social Sciences
- Courses with No Program Type

M3 Cognate Requirement (21 credit units)

- **BIOL 120.3** The Nature of Life
- **CHEM 112.3** General Chemistry I Structure Bonding and Properties of Materials
- **CHEM 115.3** General Chemistry II Chemical Processes
- **PHYS 115.3** Physics and the Universe
- **PHYS 117.3** Physics for the Life Sciences or **PHYS 125.3** Physics and Technology

Required Cognate Courses

- **PHIL 140.3** Critical Thinking
Choose **3 credit units** from the following:

- **HLST 110.3** Introduction to Health Studies  
- **PSY 120.3** Biological and Cognitive Bases of Psychology  
- **PSY 121.3** Social Clinical Cultural and Developmental Bases of Psychology  
- **SOC 111.3** Foundations in Sociology Society Structure Process  
- **SOC 112.3** Foundations in Sociology Social Construction of Everyday Life

**M4 Core Requirement (24 credit units)**

- **BMSC 200.3** Biomolecules  
- **BMSC 207.3** Human Body Systems I  
- **BMSC 208.3** Human Body Systems II  
- **BMSC 210.3** Microbiology  
- **BMSC 220.3** Cell Biology  
- **BMSC 230.3** Metabolism  
- **BMSC 240.3** Laboratory Techniques  
- **CHEM 250.3** Introduction to Organic Chemistry

**M5 Major Requirement (42 credit units)**

- **ACB 325.3** Advanced Cell Biology  
- **BIOL 226.3** Genes to Genomics  
- **NEUR 301.3** Fundamental Neuroscience Intercellular Communication  
- **NEUR 334.3** Introductory Neuroanatomy  
- **NEUR 350.3** Fundamental Neuroscience  
- **NEUR 405.3** Current Topics in Neuroscience  
- **NEUR 432.6** Undergraduate Research Project in Neuroscience  
- **PHPY 304.3** Pharmacology I  
- **PHPY 305.3** Pharmacology II

Choose **3 credit units** from the following:

- **ACB 331.3** Methods in Cell and Developmental Biology  
- **PHPY 308.3** Experimental Basis of Physiology and Pharmacology

Choose **3 credit units** from the following:

- **BIOL 430.3** Neurobiology of Behavior  
- **NEUR 404.3** Neurophysiology and Neuropharmacology  
- **PSY 448.3** Advanced Seminar in Neuroscience

Choose **6 credit units** from the following:

- **PSY 242.3** Physiological Psychology  
- **PSY 246.3** Introduction to Human Neuropsychology  
- **PSY 252.3** Perceptual Processes
M6 Electives Requirement (15 credit units)

Arts and Science courses, or those from other Colleges that have been approved for Arts and Science credit, to complete the requirements for 120 credit unit Honours program, of which at least 66 must be at the 200-level or higher.

Students are advised to consider the following list of recommended electives:

- HLST 210.3
- PSY 242.3
- PSY 246.3
- PSY 252.3
- PSY 253.3
- PSY 255.3
- PSY 256.3
**Bachelor of Science Four-year (B.Sc. Four-year) – Biomedical Neuroscience**

No more than 6 credit units from one subject may be used in Requirements M1 to M3.

**M1 College Requirement (15 credit units)**

**English Language Writing**
Choose 6 credit units from the following:
- Approved list

**Indigenous Learning**
Choose 3 credit units from the following:
- Approved list

**Quantitative Reasoning**
Choose 3 credit units from the following:
- MATH 110.3 Calculus I
- MATH 125.3 Mathematics for the Life Sciences

Choose 3 credit units from the following:
- STAT 245.3 Introduction to Statistical Methods
- STAT 246.3 Introduction to Biostatistics
- PLSC 214.3 Statistical Methods

**M2 Breadth Requirement (3 credit units)**

Choose 3 credit units from the following areas.
- Fine Arts
- Humanities
- Social Sciences
- Courses with No Program Type

**M3 Cognate Requirement (21 credit units)**

- BIOL 120.3 The Nature of Life
- CHEM 112.3 General Chemistry I Structure Bonding and Properties of Materials
- CHEM 115.3 General Chemistry II Chemical Processes
- PHYS 115.3 Physics and the Universe
- PHYS 117.3 Physics for the Life Sciences or PHYS 125.3 Physics and Technology

**Required Cognate Courses**

- PHIL 140.3 Critical Thinking
Choose 3 credit units from the following:

- **HLST 110.3** Introduction to Health Studies
- **PSY 120.3** Biological and Cognitive Bases of Psychology
- **PSY 121.3** Social Clinical Cultural and Developmental Bases of Psychology
- **SOC 111.3** Foundations in Sociology Society Structure Process
- **SOC 112.3** Foundations in Sociology Social Construction of Everyday Life

**M4 Core Requirement (24 credit units)**

- **BMSC 200.3** Biomolecules
- **BMSC 207.3** Human Body Systems I
- **BMSC 208.3** Human Body Systems II
- **BMSC 210.3** Microbiology
- **BMSC 220.3** Cell Biology
- **BMSC 230.3** Metabolism
- **BMSC 240.3** Laboratory Techniques
- **CHEM 250.3** Introduction to Organic Chemistry

**M5 Major Requirement (36 credit units)**

- **ACB 325.3** Advanced Cell Biology
- **BIOL 226.3** Genes to Genomics
- **NEUR 301.3** Fundamental Neuroscience Intercellular Communication
- **NEUR 334.3** Introductory Neuroanatomy
- **NEUR 350.3** Fundamental Neuroscience
- **NEUR 405.3** Current Topics in Neuroscience
- **PHPY 304.3** Pharmacology I
- **PHPY 305.3** Pharmacology II

Choose 3 credit units from the following:

- **ACB 331.3** Methods in Cell and Developmental Biology
- **PHPY 308.3** Experimental Basis of Physiology and Pharmacology

Choose 3 credit units from the following:

- **BIOL 430.3** Neurobiology of Behavior
- **NEUR 404.3** Neurophysiology and Neuropharmacology
- **PSY 448.3** Advanced Seminar in Neuroscience

Choose 6 credit units from the following:

- **PSY 242.3** Physiological Psychology
- **PSY 246.3** Introduction to Human Neuropsychology
- **PSY 252.3** Perceptual Processes
M6 Electives Requirement (21 credit units)

Arts and Science courses, or those from other Colleges that have been approved for Arts and Science credit, to complete the requirements for 120 credit unit Four-year program, of which at least 66 must be at the 200-level or higher.

Students are advised to consider the following list of recommended electives:

- HLST 210.3
- PSY 242.3
- PSY 246.3
- PSY 252.3
- PSY 253.3
- PSY 255.3
- PSY 256.3
Cellular, Physiological, and Pharmacological Sciences

The Department of Anatomy, Physiology and Pharmacology programs provide education in disciplines of the anatomical sciences (cell biology, developmental biology, and gross anatomy), physiology and pharmacology. These life science disciplines provide a comprehensive understanding of the functions and mechanisms of actions of the cells and major systems of the human body, and of the effects and mode of action of chemicals which modify the major systems of the body. Programs in Biochemistry include essential prerequisite courses for life science professional schools (e.g. Medicine, Dentistry, Pharmacy and Nutrition, Veterinary Medicine) and graduate studies in many areas of the life sciences. Graduates at all levels find employment in academia, industry and other life science research enterprises.

The five B.Sc. degree programs listed below share a set of courses (the Biomedical Science Common Core) which are to be taken in years 1 & 2. These courses have been incorporated into the M1, M3, and M4 requirements.

- Biochemistry, Microbiology & Immunology
- Biomedical Foundations
- Biomedical Neuroscience
- Cellular, Physiological and Pharmacological Sciences
- Interdisciplinary Biomedical Sciences

Major Average

The major average in Cellular, Physiological, and Pharmacological Sciences programs includes the grades earned in:

- All courses listed in the Core Requirement M4
- All courses listed in the Major Requirement M5.

Residency Requirements in the Major

To receive a degree in Cellular, Physiological, and Pharmacological Sciences, students must complete at least two-thirds of the following coursework (to the nearest highest multiple of 3 credit units) from the University of Saskatchewan.

- Minimum requirements in Core Requirement M4 and the Major Requirement M5.

See Residency for additional details.
Bachelor of Science Honours (B.Sc. Honours) – Cellular, Physiological, and Pharmacological Sciences

No more than 6 credit units from one subject may be used in Requirements M1 to M3.

**M1 College Requirement (15 credit units)**

**English Language Writing**
Choose **6 credit units** from the following:
- Approved list

**Indigenous Learning**
Choose **3 credit units** from the following:
- Approved list

**Quantitative Reasoning**
Choose **3 credit units** from the following:
- MATH 110.3 Calculus I
- MATH 125.3 Mathematics for the Life Sciences

Choose **3 credit units** from the following:
- STAT 245.3 Introduction to Statistical Methods
- STAT 246.3 Introduction to Biostatistics
- PLSC 214.3 Statistical Methods

**M2 Breadth Requirement (3 credit units)**

Choose **3 credit units** from the following areas.
- Fine Arts
- Humanities
- Social Sciences
- Courses with No Program Type

**M3 Cognate Requirement (21 credit units)**

- BIOL 120.3 The Nature of Life
- CHEM 112.3 General Chemistry I Structure Bonding and Properties of Materials
- CHEM 115.3 General Chemistry II Chemical Processes
- PHYS 115.3 Physics and the Universe
- PHYS 117.3 Physics for the Life Sciences or PHYS 125.3 Physics and Technology

**Required Cognate Courses**

- PHIL 140.3 Critical Thinking
Choose **3 credit units** from the following:

- **HLST 110.3** Introduction to Health Studies
- **PSY 120.3** Biological and Cognitive Bases of Psychology
- **PSY 121.3** Social Clinical Cultural and Developmental Bases of Psychology
- **SOC 111.3** Foundations in Sociology Society Structure Process
- **SOC 112.3** Foundations in Sociology Social Construction of Everyday Life

**M4 Core Requirement (24 credit units)**

- **BMSC 200.3** Biomolecules
- **BMSC 207.3** Human Body Systems I
- **BMSC 208.3** Human Body Systems II
- **BMSC 210.3** Microbiology
- **BMSC 220.3** Cell Biology
- **BMSC 230.3** Metabolism
- **BMSC 240.3** Laboratory Techniques
- **CHEM 250.3** Introduction to Organic Chemistry

**M5 Major Requirement (42 credit units)**

- **ACB 310.3** Basic Human Anatomy
- **ACB 325.3** Advanced Cell Biology
- **BIOL 226.3** Genes to Genomics
- **CPPS 432.6** Undergraduate Research Project in Cellular Physiological and Pharmacological Sciences
- **PHPY 302.3** Human Physiology Transport Systems
- **PHPY 303.3** Human Physiology Reproduction Growth and Energy Homeostasis
- **PHPY 304.3** Pharmacology I
- **PHPY 305.3** Pharmacology II

Choose **3 credit units** from the following:

- **ACB 331.3** Methods in Cell and Developmental Biology
- **PHPY 308.3** Experimental Basis of Physiology and Pharmacology

Choose **6 credit units** from the following:

- **ACB 330.3** Principles of Development
- **CPPS 337.3** Experimental Design and the Health Care System
- **NEUR 301.3** Fundamental Neuroscience Intercellular Communication
- **NEUR 350.3** Fundamental Neuroscience

Choose **6 credit units** from the following:

- **ACB 400.3** Imaging and Anatomy
- **ACB 406.3** Comparative Vertebrate Histology
- **CPPS 405.3** Current topics in Cellular Physiological and Pharmacological Sciences
- **NEUR 404.3** Advances in Neurophysiology and Neuropharmacology
- **PHPY 401.3** Animal Surgery and Experimentation
- **PHPY 403.3** Physiological Genomics and Pharmacogenetics
- **PHPY 405.3** Advances in Cardiovascular Physiology and Pharmacology

**M6 Electives Requirement (15 credit units)**

Arts and Science courses, or those from other Colleges that have been approved for Arts and Science credit, to complete the requirements for 120 credit unit Four-year program, of which at least 66 must be at the 200-level or higher.

- **HLST 210.3** is recommended.
Bachelor of Science Four-year (B.Sc. Four-year) – Cellular, Physiological, and Pharmacological Sciences

No more than 6 credit units from one subject may be used in Requirements M1 to M3.

**M1 College Requirement (15 credit units)**

*English Language Writing*
Choose **6 credit units** from the following:

- Approved list

*Indigenous Learning*
Choose **3 credit units** from the following:

- Approved list

*Quantitative Reasoning*
Choose **3 credit units** from the following:

- **MATH 110.3** Calculus I
- **MATH 125.3** Mathematics for the Life Sciences

Choose **3 credit units** from the following:

- **STAT 245.3** Introduction to Statistical Methods
- **STAT 246.3** Introduction to Biostatistics
- **PLSC 214.3** Statistical Methods

**M2 Breadth Requirement (3 credit units)**

Choose **3 credit units** from the following areas.

- Fine Arts
- Humanities
- Social Sciences
- Courses with No Program Type

**M3 Cognate Requirement (21 credit units)**

- **BIOL 120.3** The Nature of Life
- **CHEM 112.3** General Chemistry I Structure Bonding and Properties of Materials
- **CHEM 115.3** General Chemistry II Chemical Processes
- **PHYS 115.3** Physics and the Universe
- **PHYS 117.3** Physics for the Life Sciences or **PHYS 125.3** Physics and Technology

**Required Cognate Courses**

- **PHIL 140.3** Critical Thinking
Choose 3 credit units from the following:

- **HLST 110.3** Introduction to Health Studies
- **PSY 120.3** Biological and Cognitive Bases of Psychology
- **PSY 121.3** Social Clinical Cultural and Developmental Bases of Psychology
- **SOC 111.3** Foundations in Sociology Society Structure Process
- **SOC 112.3** Foundations in Sociology Social Construction of Everyday Life

**M4 Core Requirement (24 credit units)**

- **BMSC 200.3** Biomolecules
- **BMSC 207.3** Human Body Systems I
- **BMSC 208.3** Human Body Systems II
- **BMSC 210.3** Microbiology
- **BMSC 220.3** Cell Biology
- **BMSC 230.3** Metabolism
- **BMSC 240.3** Laboratory Techniques
- **CHEM 250.3** Introduction to Organic Chemistry

**M5 Major Requirement (36 credit units)**

- **ACB 310.3** Basic Human Anatomy
- **ACB 325.3** Advanced Cell Biology
- **BIOL 226.3** Genes to Genomics
- **PHPY 302.3** Human Physiology Transport Systems
- **PHPY 303.3** Human Physiology Reproduction Growth and Energy Homeostasis
- **PHPY 304.3** Pharmacology I
- **PHPY 305.3** Pharmacology II

Choose 3 credit units from the following:

- **ACB 331.3** Methods in Cell and Developmental Biology
- **PHPY 308.3** Experimental Basis of Physiology and Pharmacology

Choose 6 credit units from the following:

- **ACB 330.3** Principles of Development
- **CPPS 337.3** Experimental Design and the Health Care System
- **NEUR 301.3** Fundamental Neuroscience Intercellular Communication
- **NEUR 350.3** Fundamental Neuroscience

Choose 6 credit units from the following:

- **ACB 400.3** Imaging and Anatomy
- **ACB 406.3** Comparative Vertebrate Histology
- **CPPS 405.3** Current topics in Cellular Physiological and Pharmacological Sciences
- **NEUR 404.3** Advances in Neurophysiology and Neuropharmacology
- **PHPY 401.3** Animal Surgery and Experimentation
- **PHPY 403.3** Physiological Genomics and Pharmacogenetics
- **PHPY 405.3** Advances in Cardiovascular Physiology and Pharmacology

**M6 Electives Requirement (21 credit units)**

Arts and Science courses, or those from other Colleges that have been approved for Arts and Science credit, to complete the requirements for 120 credit unit Four-year program, of which at least 66 must be at the 200-level or higher.

- **HLST 210.3** is recommended.
Consultation with the Registrar Form

This form is to be completed by the Registrar (or his/her designate) during an in-person consultation with the faculty member responsible for the proposal. Please consider the questions on this form prior to the meeting.

Section 1: New Degree / Diploma / Certificate Information or Renaming of Existing

1. Is this a new degree, diploma, or certificate?  
   Yes X No

   Is an existing degree, diploma, or certificate being renamed?  
   Yes X No

   If you've answered NO to each of the previous two questions, please continue on to the next section.

2. What is the name of the new degree, diploma, or certificate?

   - BSBM3Y (suggested Banner code) - Bachelor of Science (Biomedical Sciences) Three-Year (long description) - Bach of Sc (Biomed Sc) ThreeYr (suggested short description)
   - BSBM4Y (suggested Banner code) - Bachelor of Science (Biomedical Sciences) Four-Year (long description) - Bach of Sc (Biomed Sc) FourYr (suggested short description)
   - BSBMHON (suggested Banner code) - Bachelor of Science (Biomedical Sciences) Honours (long description) - Bach of Sc (Biomed Sc) Honours (suggested short description)

3. What is the credential of this new degree, diploma, or certificate?  
   [Example - D.M.D. = Doctor of Dental Medicine]

   B.Sc. (BMSC)

4. If you have renamed an existing degree, diploma, or certificate, what is the current name?

5. Does this new or renamed degree / diploma / certificate require completion of degree level courses or non-degree level courses, thus implying the attainment of either a degree level or non-degree level standard of achievement?

   degree level

6. If this is a new degree level certificate, can a student take it at the same time as pursuing another degree level program?  
   Yes X No

7. If YES, a student attribute will be created and used to track students who are in this certificate alongside another program. The attribute code will be:

8. Which College is responsible for the awarding of this degree, diploma, or certificate?

   Arts & Science [AR] - currently exist in student system

9. Is there more than one program to fulfill the requirements for this degree, diploma, or certificate? If yes, please list these programs.

10. Are there any new majors, minors, or concentrations associated with this new degree / diploma / certificate? Please list the name(s) and whether it is a major, minor, or concentration, along with the sponsoring department.
IDBM [suggested code] - Interdisciplinary Biomedical Sciences - Interdis Biomedical Sciences (suggested description) - NEW major

List of majors and which degree/program they're attached to:
- Biochemistry, Microbiology and Immunology [BMI] - attached to ONLY 4 year and honours degrees and attached to BIMI [Bioch Micro Immuno] department
- Biomedical Foundations [BMFD] - attached to ONLY 3 year degree and attached to MED [Medicine (Dean's Office)] department
- Biomedical Neuroscience [BMNS] - attached to ONLY 4 year and honours degrees and attached to APPY [Anat Physio Pharma] department
- Cellular, Physiological, and Pharmacological Sciences [CPPS] - attached to ONLY 4 year and honours degrees and attached to APPY [Anat Physio Pharma] department
- Interdisciplinary Biomedical Sciences [IDBM] - attached to ONLY 4 year and honours degrees and attached to MED [Medicine (Dean's Office)]

If this is a new graduate degree, is it thesis-based, course-based, or project-based?
Section 2: New / Revised Program for Existing or New Degree / Diploma / Certificate Information

1. Is this a new program?  
   Yes [X] No [ ]  
   Is an existing program being revised?  
   Yes [ ] No [X]  
   If you've answered NO to each of the previous two questions, please continue on to the next section.

2. If YES, what degree, diploma, or certificate does this new/revised program meet requirements for?  
   - BSBM3Y (suggested Banner code) - Bachelor of Science (Biomedical Sciences) Three-Year (long description) - Bach of Sc (Biomed Sc) ThreeYr (suggested short description)  
   - BSBM4Y (suggested Banner code) - Bachelor of Science (Biomedical Sciences) Four-Year (long description) - Bach of Sc (Biomed Sc) FourYr (suggested short description)  
   - BSBMHON (suggested Banner code) - Bachelor of Science (Biomedical Sciences) Honours (long description) - Bach of Sc (Biomed Sc) Honours (suggested short description)

3. What is the name of this new/revised program?  
   - BSBM3Y (suggested Banner code) - Bachelor of Science (Biomedical Sciences) Three-Year (long description) - Bach of Sc (Biomed Sc) ThreeYr (suggested short description)  
   - BSBM4Y (suggested Banner code) - Bachelor of Science (Biomedical Sciences) Four-Year (long description) - Bach of Sc (Biomed Sc) FourYr (suggested short description)  
   - BSBMHON (suggested Banner code) - Bachelor of Science (Biomedical Sciences) Honours (long description) - Bach of Sc (Biomed Sc) Honours (suggested short description)

4. What other program(s) currently exist that will also meet the requirements for this same degree(s)?  
   n/a

5. What College/Department is the academic authority for this program?  
   Arts & Science [AR] - responsible College; department responsible for each major listed in Section 1 Question 10

6. Is this a replacement for a current program?  
   Yes [ ] No [X]

7. If YES, will students in the current program complete that program or be grandfathered?  
   

8. If this is a new graduate program, is it thesis-based, course-based, or project-based?  
   

Section 3: Mobility

Mobility is the ability to move freely from one jurisdiction to another and to gain entry into an academic institution or to participate in a learning experience without undue obstacles or hindrances.

1. Does the proposed degree, program, major, minor, concentration, or course involve mobility? Yes ☒ No ☐

2. Please indicate the mobility type (refer to Nomenclature for definitions).
   - Joint Program
   - Joint Degree
   - Dual Degree
   - Professional Internship Program
   - Faculty-Led Course Abroad
   - Term Abroad Program

3. The U of S enters into partnerships or agreements with external partners for the above mobility types in order to allow students collaborative opportunities for research, studies, or activities. Has an agreement been signed? Yes ☐ No ☒

4. Please state the full name of the agreement that the U of S is entering into.

5. What is the name of the external partner?

6. What is the jurisdiction for the external partner?
Section 4: New / Revised Major, Minor, or Concentration for Existing Degree Information (Undergraduate)

1 Is this a new or revised major, minor, or concentration attached to an existing degree program?  
   Yes ☐ No ☒ Revised ☒  

   If you've answered NO, please continue on to the next section.

2 If YES, please specify whether it is a major, minor, or concentration. If it is more than one, please fill out a separate form for each.

3 What is the name of this new / revised major, minor, or concentration?

4 Which department is the authority for this major, minor, or concentration? If this is a cross-College relationship, please state the Jurisdictional College and the Adopting College.

5 Which current program(s), degree(s), and/or program type(s) is this new / revised major, minor, or concentration attached to?

Section 5: New / Revised Disciplinary Area for Existing Degree Information (Graduate)

1 Is this a new or revised disciplinary area attached to an existing graduate degree program?  
   Yes ☐ No ☒ Revised ☒  

2 If YES, what is the name of this new / revised disciplinary area?

3 Which Department / School is the authority for this new / revised disciplinary area? (NOTE - if this disciplinary area is being offered by multiple departments see question below.)

4 Which multiple Departments / Schools are the authority for this new / revised disciplinary area?

4a Of the multiple Departments / Schools who are the authority for this new / revised disciplinary area and what allocation percentage is assigned to each? (Note - must be whole numbers and must equal 100.)

4b Of the multiple Departments / Schools who is the primary department? The primary department specifies which department / school policies will be followed in academic matters (ex. late adds, re-read policies, or academic misconduct). If no department / school is considered the primary, please indicate that. (In normal circumstances, a department / school with a greater percentage of responsibility - see question above - will be designated the primary department.)

5 Which current program(s) and / or degree(s) is this new / revised disciplinary area attached to?
Section 6: New College / School / Center / Department or Renaming of Existing

1. Is this a new college, school, center, or department?  
   Yes ☒  No ☐  
2. Is an existing college, school, center, or department being renamed?  
   Yes ☐  No ☒  
3. Is an existing college, school, center, or department being deleted?  
   Yes ☐  No ☒  
   If you've answered NO to each of the previous two questions, please continue on to the next section.

2. What is the name of the new (or renamed or deleted) college, school, center, or department?  

3. If you have renamed an existing college, school, center, or department, what is the current name?  

4. What is the effective term of this new (renamed or deleted) college, school, center, or department?  

5. Will any programs be created, changed, or moved to a new authority, removed, relabelled?  

6. Will any courses be created, changed, or moved to a new authority, removed, relabelled?  

7. Are there any ceremonial consequences for Convocation (i.e. New degree hood, adjustment to parchments, etc.)?
Section 7: Course Information - as per current set-up

1. Is there a new subject area(s) of course offering proposed for this new degree? If so, what is the subject area(s) and the suggested four (4) character abbreviation(s) to be used in course listings?

2. If there is a new subject area(s) of offerings what College / Department is the academic authority for this new subject area?

3. Have the subject area identifier and course number(s) for new and revised courses been cleared by the Registrar?

4. Does the program timetable use standard class time slots, terms, and sessions? Yes [ ] No [ ]
   If NO, please describe.

5. Does this program, due to pedagogical reasons, require any special space or type or rooms? Yes [ ] No [ ]
   If YES, please describe.

NOTE: Please remember to submit a new “Course Creation Form” for every new course required for this new program / major. Attached completed “Course Creation Forms” to this document would be helpful.
### Section 8: Admissions, Recruitment, and Quota Information

1. Will students apply on-line? If not, how will they apply?  
   Yes

2. What term(s) can students be admitted to?  
   YYYY05 [May], YYYY07 [July], YYYY09 [September], and YYYY01 [January]

3. Does this impact enrollment?  
   Enrollment is anticipated to increase over time

4. How should Marketing and Student Recruitment handle initial inquiries about this proposal before official approval?  
   Inquiries should be directed to the Arts and Science Undergraduate Student Office

5. Can classes towards this program be taken at the same time as another program?  
   Yes

6. What is the application deadline?  
   Normal deadline for the College of AR

7. What are the admission qualifications? (IE. High school transcript required, grade 12 standing, minimum average, any required courses, etc.)  
   Regular admission - high school and regular admission - post-secondary

8. What is the selection criteria? (IE. If only average then 100% weighting; if other factors such as interview, essay, etc. what is the weighting of each of these in the admission decision.)  
   Academic average - 100% weighting

9. What are the admission categories and admit types? (IE. High school students and transfer students or one group? Special admission? Aboriginal equity program?)  
   Regular admission and the access program (Post-Secondary - ISAP-BMSC Pathways Program)

10. What is the application process? (IE. Online application and supplemental information (required checklist items) through the Admissions Office or sent to the College/Department?)  
    Online - no supplemental documents

11. Who makes the admission decision? (IE. Admissions Office or College/Department/Other?)  
    Admissions Office for students new to the U of S; Department will make the decision for students transferring from another Arts & Science program

12. Letter of acceptance - are there any special requirements for communication to newly admitted students?  
    No

13. Will the standard application fee apply?  
    Yes

14. Will all applicants be charged the fee or will current, active students be exempt?  
    Current, active students will be exempt

15. Are international students admissible to this program?  
    Yes
Section 9: Government Loan Information

NOTE: Federal / provincial government loan programs require students to be full-time in order to be eligible for funding. The University of Saskatchewan defines full-time as enrollment in a minimum of 9 credit units (operational) in the fall and/or winter term(s) depending on the length of the loan.

1 If this is a change to an existing program, will the program change have any impact on student loan eligibility?

2 If this is a new program, do you intend that students be eligible for student loans?
Yes

Section 10: Convocation Information (only for new degrees)

1 Are there any 'ceremonial consequences' of this proposal (ie. New degree hood, special convocation, etc.)?
Yes - new degree hood

2 If YES, has the Office of the University Secretary been notified?
Yes

3 When is the first class expected to graduate?
Fall Convocation 2021

4 What is the maximum number of students you anticipate/project will graduate per year (please consider the next 5-10 years)?
Anticipate 200

NOTE: Proposal indicates that both Colleges will sign the parchment

Section 11: Schedule of Implementation Information

1 What is the start term?
202105 [May 2021]

2 Are students required to do anything prior to the above date (in addition to applying for admission)?
Yes [ ] No [X] 
If YES, what and by what date?

[ ]
Section 12: Registration Information

1. What year in program is appropriate for this program (NA or a numeric year)?
   (General rule = NA for programs and categories of students not working toward a degree level qualification.)
   Numeric - same as other AR programs

2. Will students register themselves? Yes ☒ No
   If YES, what priority group should they be in?
   As per current AR groups

Section 13: Academic History Information

1. Will instructors submit grades through self-serve? Yes ☒ No

2. Who will approve grades (Department Head, Assistant Dean, etc.)?
   As per current set-up

Section 14: T2202 Information (tax form)

1. Should classes count towards T2202s? Yes ☒ No

Section 15: Awards Information

1. Will terms of reference for existing awards need to be amended? Yes ☒ No ☒

2. If this is a new undergraduate program, will students in this program be eligible for College-specific awards?
   Yes ☒ No ☒

Section 16: Government of Saskatchewan Graduate Retention (Tax) Program

1. Will this program qualify for the Government of Saskatchewan graduate retention (tax) program? Yes ☒ No
   To qualify the program must meet the following requirements:
   - be equivalent to at least 6 months of full-time study, and
   - result in a certificate, diploma, or undergraduate degree.
Section 17: Program Termination

1. Is this a program termination? Yes ❌ No X
   If yes, what is the name of the program?

2. What is the effective date of this termination?

3. Will there be any courses closed as a result of this termination? Yes ❌ No
   If yes, what courses?

4. Are there currently any students enrolled in the program? Yes ❌ No
   If yes, will they be able to complete the program?

5. If not, what alternate arrangements are being made for these students?

6. When do you expect the last student to complete this program?

7. Is there mobility associated with this program termination? Yes ❌ No
   If yes, please select one of the following mobility activity types.
   - Dual Degree Program
   - Joint Degree Program
   - Internship Abroad Program
   - Term Abroad Program
   - Taught Abroad Course
   - Student Exchange Program

   Partnership agreements, coordinated by the International Office, are signed for these types of mobility activities. Has the International Office been informed of this program termination? Yes ❌ No
Section 18: Proposed Tuition and Student Fees Information - as per current set-up

1. How will tuition be assessed?

   - Standard Undergraduate per credit
   - Standard Graduate per credit
   - Standard Graduate per term
   - Non standard per credit *
   - Non standard per term *
   - Other *
   - Program Based *

   * See attached documents for further details

2. If fees are per credit, do they conform to existing categories for per credit tuition? If YES, what category or rate?

3. If program based tuition, how will it be assessed? By credit unit? By term? Elsehow?

4. Does proponent’s proposal contain detailed information regarding requested tuition? If NO, please describe.

5. What is IPA’s recommendation regarding tuition assessment? When is it expected to receive approval?

6. IPA Additional comments?

7. Will students outside the program be allowed to take the classes?

8. If YES, what should they be assessed? (This is especially important for program based.)

9. Do standard student fee assessment criteria apply (full-time, part-time, on-campus versus off-campus)?

10. Do standard cancellation fee rules apply?

11. Are there any additional fees (e.g. materials, excursion)? If yes, see NOTE below.

12. Are you moving from one tuition code (TC) to another tuition code? If YES, from which tuition code to which tuition code?

13. Are international students admissible to the program? If yes, will they pay the international tuition differential?
NOTE: Please remember to submit a completed "Application for New Fee or Fee Change Form" for every new course with additional fees.
Section 19: TLSE - Information Dissemination (internal for TLSE use only)

1. Has TLSE, Marketing and Student Recruitment, been informed about this new / revised program?  
   - Yes  
   - No

2. Has TLSE, Admissions, been informed about this new / revised program?  
   - Yes  
   - No

3. Has TLSE, Student Finance and Awards, been informed about this new / revised program?  
   - Yes  
   - No

4. Has CGPS been informed about this new / revised program?  
   - Yes  
   - No

5. Has TLSE, Transfer Credit, been informed about any new / revised courses?  
   - Yes  
   - No

6. Has ICT-Data Services been informed about this new or revised degree / program / major / minor / concentration?  
   - Yes  
   - No

7. Has the Library been informed about this new / revised program?  
   - Yes  
   - No

8. Has ISA been informed of the CIP code for new degree / program / major?  
   - Yes  
   - No

9. Has Room Scheduling/Scheduling Hub/Senior Coordinator of Scheduling been informed of unique space requirements for the new courses and/or informed of program, course, college, and department changes?  
   - Yes  
   - No

10. Has the Convocation Coordinator been notified of a new degree?  
    - Yes  
    - No

11. What is the highest level of financial approval required for this submission? Check all that apply.
    a. None - as it has no financial implications  
       - 
    OR
    b. Fee Review Committee  
       - 
    c. Institutional Planning and Assessment (IPA)  
       - 
    d. Provost's Committee on Integrated Planning (PCIP)  
       - 
    e. Board of Governors  
       - 
    f. Other  
       - 

SIGNED

Date: 

Registrar (Russell Isinger): 

College / Department Representative(s): 

IPA Representative(s):