COUNCIL OF THE FACULTY OF SCIENCE

Notice of Meeting
Tuesday, 12 April 2016
3:00pm – 4:30pm
306 Lumbers

Agenda

1. Call to Order and Approval of Agenda
2. Chair’s Remarks
3. Approval of Minutes from March 8, 2016 meeting
4. Business Arising
5. Dean’s Remarks
6. Associate Deans’ and Bethune College Master’s Remarks
7. Reports from Science Representatives on Senate Committees
8. Reports from Standing Committees of Council
   8.1 Executive Committee: 2016 – 2017 Vacancies Report on Senate and FSc Committees (item for action & information)
   8.2 Science Curriculum Committee (item for action)
9. Inquiries and Communications
   9.1 Senate Synopsis: 624th Meeting of Senate: March 24, 2016
10. Other Business
   10.1 Discussion: Presidential Search – Consultations (attached)
   10.2 Presentation: Plans for the Intensification & Enhancement of Research (PIER) – Vice-President Research & Innovation Robert Haché
COUNCIL OF THE FACULTY OF SCIENCE

Tuesday, 8 March 2016
3:00pm – 4:30pm
306 Lumbers

Minutes


Guests: H. Abraham, D. Bacinello, M. Hough, H. McLellan, B. Sheeler

Regrets: A. Mun-Shimoda, A. Hilliker

1. Call to Order and Approval of Agenda
   A motion was moved, seconded and carried to adopt the Agenda as presented.

2. Chair’s Remarks
   None.

3. Approval of Minutes from February 9, 2016 meeting
   The minutes were approved as presented.

4. Business Arising
   There was no business arising.

5. Dean’s Remarks
   The Dean began his remarks by extending a warm welcome to the following newly appointed FSc Staff members:
   - Nina Bui, Marketing & Engagement Communications Coordinator, SAS
The Dean updated Council members on the following:

**CRC appointments:**
- Peter Backx – CRC in Cardiovascular Biology
- Sean Tulin – CRC in Particle Physics & Astronomy
- Jianhong Wu – CRC in Industrial & Applied Mathematics (renewal)

**YorkU Research Leaders**
- 15 faculty members and 1 postdoc from Science.
- Bridget Stutchbury - The President's Research Excellence Award

**Undergraduate Research Fair:**
- S. Diena, S. Bergman, C. Florella Perez & T. Silver – 1st prize for best group project
- M. Binczyk – 2nd prize for best poster & presentation

The Dean highlighted the following faculty who were featured in the media for their commentary on the detection of gravitational waves:
- Matthew Johnson – Toronto Sun & Toronto Star
- Sean Tulin – National Post
- Paul Delaney – CTV News, CJAD 800AM & Sirius XM

Dean Jayawardhana informed members of Council of the following upcoming events:
- March 9: Science Forum, 10:30am – 12:00pm, LUM 306
- March 22: Red & White Day #YUTweetup with the Dean and President Shoukri
- April 2: York Region Science & Technology Fair

The Dean provided an update to Council members on the External Research Funding. He pointed out that there has been a significant increase in the amount and diversity of sources for research funding, resulting in some $14.5 in external support for research in 2015. He highlighted the following examples:
- $ 1.34mio+ - Genome Canada, Ontario Research Fund and Ontario Ministry of Agriculture and Food and Rural Affairs (OMAFRA); Amro Zayed (Biology) and Jianhong Wu (Math & Statistics)
- $ 1.49M – CIHR operating grants; Emanuel Rosonina (Biology), Chun Peng (Biology) & Thilo Womelsdorf (Biology).
- $ 1 mio CFI-IF & ORF funding; Scott Menary (Physics & Astronomy)
- $ 546K – CFI-JELF & ORF funding
- $ 990K – NSERC with Sanofi, ABSciex and Fluidigm
- $ 289K _ NSERC Research Tools & Instruments; Sergey Krylov (Chemistry), Jean-Paul Paluzzi and colleagues (Biology), Emmanuel Rosonina (Biology)
- $ 380K – NSERC Discovery Grant & Accelerator Supplement; K. Andrew White (Biology)
- $ 1.45 mio – Ontario Research Fund
- $ 330K – Krembil Foundation; Derek Wilson (Chemistry)
- $ 192K – NSERC Engage with TMX Group; Huaxiang Huang (Math & Statistics)
- $ 80K – Ontario Ministry of the Environment; Huaiping Zhu (Math & Statistics)

Dean Jayawardhana also discussed as an example of a productive partnership, the faculty collaboration with pharmaceutical industry leader Sanofi Pasteur and Mitacs:
- “Transmission dynamics & cost effectiveness for Sanofi’s pertussis booster vaccine” - $110,000 Project (PI: Jianhong Wu)
- “Influenza vaccine with high-dose antigen; effects on geriatric population” - $107,000 Project (PI: Seyed Moghadas)
- “Biomolecular structure analysis for vaccine & antibody development” - $240,000 Project (Investigators: Derek Wilson Sergey Krylov, Yi Sheng)

NSERC CRC (Investigators: Derek Wilson, Sergey Krylov, Chun Peng; project value ~ $1.8M):
- Collaborative Research & Development Grant in “Technology-enhanced Biopharmaceuticals Development & Manufacturing”
- Three Industry Partners: Sanofi Pasteur, Fluidigm, Sciex

Other projects with Sanofi:
- Smaller-scale Mitacs internships
- Equipment donations (~$12,000 value)
- CREATE interns; Undergraduate co-op students
- Past sponsorships of events and scholarships

6. Associate Deans’ and Bethune Master’s Remarks

AD – S. Morin updated Council that students and supervisors will be notified of the NSERC USRA awards and DURA results. The Faculty received a total of 19 NSERC USRA awards. Students will be notified shortly and will then have a week to accept the award.

Additionally, AD – Morin informed Council that her office has received application for the YUFA Minor Research Grant and Junior Faculty Fund and the Committee of Research and Awards will be meeting shortly to adjudicate the applications.

AD – Morin informed Councils that calls will go out shortly for the following:

- NSERC Synergy Awards for Innovation.
- The Killam Research Fellowship.
- NSERC Steacie Memorial Fellowships.

AD – EJ Janse van Rensburg reminded Chairs of the Call for the AEF non-computing equipment requests for 2016 – 17 which is due by March 18, 2016.

Additionally, AD – Janse van Rensburg informed Council that a call will be sent shortly for 2017 – 18 sabbaticals. Faculty members who are eligible for sabbatical are required to get the approval of the Department Chairs.

Bethune College Master – J. Amanatides suggested to Council to increase the number of representatives of Science Student Caucus from the current 12 students.

7. Reports from Science Representatives on Senate Committees

There were none.

8. Reports from Committees

8.1 Executive Committee:

i) 2016 – 2017 Vacancies Report on Senate and FSc Committees (item for action)
Council moved, seconded and carried all proposed changes to the vacancies report on FSc Committees.

ii) 2016 – 2017 Vacancies Report on Senate and FSc Committees (item for information)
Council noted the vacancies and the Chair encouraged members to self-nominate for the various vacancies via the Department / School Chair.

8.2 Science Curriculum Committee (item for consent; except for items nos. 8.3.1, 8.4.8 and 8.4.9 which are items for action)
Consent items were noted by Council. Action items were moved, seconded and unanimously approved by Council.

9. **Inquiries and Communications**

Faculty Council noted the Senate Synopsis: 623rd Meeting of Senate held on February 25, 2016.

10. **Other Business**

Meeting adjourned.

Chair of Council, V. Tsoukanova

Recording Secretary of Council, J. Sequeira
# 2016 - 17 Report of Vacancies on Senate and FSc Committees

**Outstanding vacancies are highlighted in red**

* Sabbatical

**Nominations for ratification at 12 April 2016 Council Meeting**

<table>
<thead>
<tr>
<th>Committee</th>
<th>Rules of Faculty Council - membership</th>
<th>Meeting time / Membership</th>
<th>Term From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senate</td>
<td>According to the York University Secretariat based on the Senate Rules and Procedures governing the size and composition of Senate, the Faculty of Science shall have 9 members, including a minimum of two Chairs. According to The Rules of Council (Science), Faculty representation shall include the Director of Natural Science, three Department Chairs, and terms shall be for three years.</td>
<td>As per Senate website</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dean</td>
<td>R. Jayawardhana</td>
<td></td>
<td>designated</td>
<td></td>
</tr>
<tr>
<td>Associate Dean - Faculty</td>
<td>EJ Janse van Rensburg</td>
<td></td>
<td>2015 2018</td>
<td></td>
</tr>
<tr>
<td>Member at large</td>
<td>V. Saridakis, Biology</td>
<td></td>
<td>2016 2019</td>
<td></td>
</tr>
<tr>
<td>Member at large</td>
<td>G. Audette, Chemistry</td>
<td></td>
<td>2016 2019</td>
<td></td>
</tr>
<tr>
<td>Member at large</td>
<td>T. Salisbury</td>
<td></td>
<td>2015 2018</td>
<td></td>
</tr>
<tr>
<td>Member at large</td>
<td>J. Lazenby, STS</td>
<td></td>
<td>2016 2019</td>
<td></td>
</tr>
<tr>
<td>Department Chair</td>
<td>D. Hastie (Chemistry)</td>
<td></td>
<td>2015 2018</td>
<td></td>
</tr>
<tr>
<td>Department Chair</td>
<td>P. Szeptycki (Math &amp; Statistics)</td>
<td></td>
<td>2016 2019</td>
<td></td>
</tr>
<tr>
<td>Department Chair</td>
<td>M. McCall (Physics &amp; Astronomy)</td>
<td></td>
<td>2015 2018</td>
<td></td>
</tr>
<tr>
<td>Director of NATS</td>
<td>J. Clark</td>
<td></td>
<td>designated</td>
<td></td>
</tr>
</tbody>
</table>

**FSc Reps on Senate Committees**

<table>
<thead>
<tr>
<th>Committee</th>
<th>Rules of Faculty Council - membership</th>
<th>Meeting time / Membership</th>
<th>Term From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senate Executive</td>
<td>1 member from FSc</td>
<td>P. Delaney, NATS</td>
<td>2013 2016</td>
<td></td>
</tr>
<tr>
<td>Academic Policy, Planning and Research Committee (APPRC)</td>
<td>1 member from FSc</td>
<td>L. Donaldson, Biology</td>
<td>2014 2017</td>
<td></td>
</tr>
<tr>
<td>Sub-Committee on Honorary Degrees &amp; Ceremonials</td>
<td>1 member from FSc</td>
<td>Cody Storry, Physics &amp; Astronomy</td>
<td>2016 2017</td>
<td></td>
</tr>
</tbody>
</table>
## Committee Rules of Faculty Council - membership

### Executive Committee

The **Executive Committee** shall be chaired by the Chair of Council and include the Vice-Chair of Council, the Secretary of Council, and one member elected from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy, and Science and Technology Studies/Natural Science, the Dean of the Faculty of Science (*ex officio*), one student member of Council, and one of the staff members elected to Council.

<table>
<thead>
<tr>
<th>Chair</th>
<th>N. Madras</th>
<th>2016 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vice-Chair</td>
<td>Vacant</td>
<td>2016 2017</td>
</tr>
<tr>
<td>Dean</td>
<td>Ex officio</td>
<td></td>
</tr>
<tr>
<td>Asst. Dean - SEM &amp; SEP</td>
<td>Designated</td>
<td></td>
</tr>
<tr>
<td><strong>Staff Rep</strong></td>
<td>Elected</td>
<td></td>
</tr>
<tr>
<td><strong>Undergraduate Student Rep</strong></td>
<td>Elected</td>
<td></td>
</tr>
<tr>
<td>Biology</td>
<td>V. Saridakis</td>
<td>2015 2018</td>
</tr>
<tr>
<td>Chemistry</td>
<td>R. McLaren</td>
<td>2015 2018</td>
</tr>
<tr>
<td>Math &amp; Stats</td>
<td>P. Gibson</td>
<td>2016 2019</td>
</tr>
<tr>
<td>STS</td>
<td>E. Hamm</td>
<td>2013 2016</td>
</tr>
</tbody>
</table>

**The Executive Committee will normally meet the first Tuesday of each month (September to May) from 1:30 pm - 3:00 pm in LUM 305B**

### APPC

The **Academic Policy and Planning Committee** shall include the Dean or designate (*ex officio*), the Master of Norman Bethune College and one member elected from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy, and Science and Technology Studies/Natural Science, one student member of Council, and one of the staff members elected to Council.

<table>
<thead>
<tr>
<th>AD - Faculty</th>
<th>Designated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master - Bethune</td>
<td>Designated</td>
</tr>
<tr>
<td><strong>Undergraduate Student Rep</strong></td>
<td>Elected</td>
</tr>
<tr>
<td><strong>Staff Rep</strong></td>
<td>Elected</td>
</tr>
<tr>
<td>Biology</td>
<td>S. Benchimol</td>
</tr>
<tr>
<td>Chemistry</td>
<td>M. Yousaf</td>
</tr>
<tr>
<td>Math &amp; Stats</td>
<td>P. Szeptycki</td>
</tr>
<tr>
<td>Physics &amp; Astronomy</td>
<td>E. Hessels</td>
</tr>
<tr>
<td>STS</td>
<td>V. Pavri</td>
</tr>
</tbody>
</table>

**APPC will normally meet the last Thursday of each month (September to April) from 9:00 am - 10:30 am**
### Curriculum Committee

<table>
<thead>
<tr>
<th>Membership</th>
<th>Term From</th>
<th>Term To</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Curriculum Committee shall include the Dean and an Associate Dean (ex officio), the Chair or nominee from each teaching Division or Department, three members elected by Council and two student members of Council.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Member at Large</strong></td>
<td>J. Clark, NATS</td>
<td>2016</td>
</tr>
<tr>
<td><strong>Member at Large</strong></td>
<td>N. Nivilac, Biology</td>
<td>2016</td>
</tr>
<tr>
<td><strong>Dean</strong></td>
<td>Ex officio</td>
<td></td>
</tr>
<tr>
<td><strong>Associate Dean - Students</strong></td>
<td>designated</td>
<td></td>
</tr>
<tr>
<td><strong>Undergraduate Student Rep (two vacancies)</strong></td>
<td>elected</td>
<td>2016</td>
</tr>
<tr>
<td><strong>Biology</strong></td>
<td>P. Lakin-Thomas</td>
<td>2016</td>
</tr>
<tr>
<td><strong>Chemistry</strong></td>
<td>P. Potvin</td>
<td>2016</td>
</tr>
<tr>
<td><strong>Math &amp; Stats</strong></td>
<td>Y. Fu (Fall); M. Chen (Winter)</td>
<td>2016</td>
</tr>
<tr>
<td><strong>Physics &amp; Astronomy</strong></td>
<td>C. Storry</td>
<td>2013</td>
</tr>
<tr>
<td><strong>STS</strong></td>
<td>J. Lazenby</td>
<td>2015</td>
</tr>
<tr>
<td><strong>Geography</strong></td>
<td>R. Bello</td>
<td>2013</td>
</tr>
</tbody>
</table>

The Curriculum Committee will normally meet every last Tuesday of each month (September to April) from 1:30 pm - 3:00 pm.

### CEAS

<table>
<thead>
<tr>
<th>Membership</th>
<th>Term From</th>
<th>Term To</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Committee on Examinations and Academic Standards shall consist of an Associate Dean (ex officio), five members elected by Council from each of Biology, Chemistry, Mathematics &amp; Statistics, Physics &amp; Astronomy and Science and Technology Studies/Natural Science, and one student member of Council. In addition to the above membership of the committee, Council shall elect an alternate member from each of the Departments specified above. The alternate member shall be the person polling the next highest number of votes to those elected to the committee from each Department. The alternate for the student member will be selected by the Science Student Caucus from one of its Members at Large. An alternate can only vote in the event that first elected members are not in attendance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Associate Dean - Students</strong></td>
<td>Designated</td>
<td></td>
</tr>
<tr>
<td><strong>Undergraduate Student Rep</strong></td>
<td>Elected</td>
<td>2013</td>
</tr>
<tr>
<td><strong>Chemistry</strong></td>
<td>G. Audette / J. Rudolph</td>
<td>2015</td>
</tr>
<tr>
<td><strong>Math &amp; Stats</strong></td>
<td>A. Wu / J. Grigull</td>
<td>2015</td>
</tr>
<tr>
<td><strong>Physics &amp; Astronomy</strong></td>
<td>B. Quine / N. Bartel</td>
<td>2014</td>
</tr>
<tr>
<td><strong>STS (MH Armour on Sabbatical Jan - Dec 2017)</strong></td>
<td>MH Armour* / J. Lazenby</td>
<td>2013/15</td>
</tr>
</tbody>
</table>

CEAS will normally meet every alternate Wed / Thurs from 1:00 - 3:00 pm year round.
2016 - 17 Report of Vacancies on Senate and FSc Committees

| Committee          | Rules of Faculty Council - membership                                                                 | Meeting time / Membership                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Term From  | Term To |  |
|--------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------         |            |        |  |
| Petitions          | The Petitions Committee shall consist of an Associate Dean (ex officio), six members of Council, and two student members of Council. A quorum shall consist of either (a) three faculty members and one student member or (b) four faculty members.                                                                 | The Petitions Committee has two panels. Each panel meets once a month either on Tuesday from 2:30 pm - 4:00 pm or Thursday from 11:00 am - 1:00 pm                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| Associate Dean     |                                                                                                        |                                                                                                                                                                                                                                                                ----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------- |            |        |  |
| Undergraduate Student Rep (2 vacancies) | N. Nivilac 2016 2019                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| Member at Large    |                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| Biology            | M. Scheider 2014 2017                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| Chemistry          | R. Fournier 2016 2019                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| Physics & Astronomy | S. Tulin 2015 2018                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| Math & Stats       | A. Wong 2015 2018                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| STS                | D. Lungu 2016 2019                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| SRC T & P Committee| The Committee on Tenure and Promotions shall consist of one currently tenured member from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy and Science and Technology Studies/Natural Science elected by Council, and one student member of Council. No member of the Committee shall be a member of another Tenure and Promotions Committee at any time during their tenure on this committee. In addition to the above membership of the committee, Council shall elect an alternate member from each of the Units mandated above. The alternate member shall be the person polling the next highest number of votes to those elected to the committee from each Department. The alternate for the student member shall be selected by the Science Student Caucus from one of its Members-at-Large on an annual basis. An alternate can only vote in the event that existing members are not in attendance. | SRC T & P Committee will normally meet the last Friday of each month (September to March) from 9:00 am - 11:00 am in LUM 305B |            |        |  |
| Associate Dean     | Ex Officio                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| Undergraduate Student Rep | K. Schneider / ALT - G. Zoidl 2014 2017                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| Biology            |                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| Chemistry          |                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| Physics & Astronomy |                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| Math & Stats       |                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |
| STS                | D. Lungu / ALT - VACANT                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |  |

2016 - 17 Report of Vacancies on Senate and FSc Committees

<table>
<thead>
<tr>
<th>Committee</th>
<th>Rules of Faculty Council - membership</th>
<th>Meeting time / Membership</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoTL</td>
<td>Currently, the Committee on Teaching and Learning shall consist of a minimum of two Faculty members from each department, the Associate Dean – Students, one Librarian, one staff member, one undergraduate student, and two graduate students, in addition to other members invited as provided for by the Rules. Graduate students and staff nominees will indicate their interest in serving on the committee in writing to the committee, who will then approve by majority vote.</td>
<td>CoTL normally meets every third Thursday of each month (September to May) from 1:00 pm - 2:30 pm</td>
<td>From To</td>
</tr>
</tbody>
</table>

- **Associate Dean - Students**: Ex Officio
- **Graduate Student Rep (two vacancies)**: Elected 2016 2017
- **Undergraduate Student Rep**: Elected 2016 2017
- **Steacie Librarian**: designated
- **IT Rep (D. Keramidas)**: designated
- **Teaching Commons Rep**: Y. Su
- **Staff Representattive**: Elected 2016 2017
- **Biology**: T. Kelly 2014 2017
- **Biology**: D. Bazely 2014 2017
- **Biology**: C. Bucking 2014 2017
- **Chemistry**: D. Jackson 2013 2016
- **Chemistry**: J. Chen 2015 2018
- **Physics & Astronomy**: S. Bhadra 2015 2018
- **Physics & Astronomy**: A. Kumarakrishnan 2015 2018
- **Math & Stats**: X. Gao* & W. Liu 2014/15 2017 / 18
- **STS**: D. Lungu 2014 2017
- **STS**: V. Pavri 2015 2018
## 2016 - 17 Report of Vacancies on Senate and FSc Committees

<table>
<thead>
<tr>
<th>Committee</th>
<th>Rules of Faculty Council - membership</th>
<th>Meeting time / Membership</th>
<th>Term From</th>
<th>Term To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research &amp; Awards</td>
<td>The Committee on Research and Awards shall consist of one member elected by Council from each of Biology, Chemistry, Mathematics and Statistics, Science and Technology Studies/Natural Science, and Physics and Astronomy, one student member of Council and an Associate Dean <em>(ex officio)</em> who will serve as the Chair.</td>
<td>The Research &amp; Awards Committee will meet when grants and awards need to be adjudicated.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Ex Officio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate Student Rep</td>
<td><strong>Elected</strong></td>
<td></td>
<td><strong>2016</strong></td>
<td><strong>2017</strong></td>
</tr>
<tr>
<td>Biology</td>
<td>B. Stutchbury</td>
<td></td>
<td><strong>2014</strong></td>
<td><strong>2017</strong></td>
</tr>
<tr>
<td>Chemistry</td>
<td>P. Johnson</td>
<td></td>
<td><strong>2016</strong></td>
<td><strong>2019</strong></td>
</tr>
<tr>
<td>Physics &amp; Astronomy</td>
<td>C. Bergevin</td>
<td></td>
<td><strong>2015</strong></td>
<td><strong>2018</strong></td>
</tr>
<tr>
<td>Math &amp; Stats</td>
<td>I. Farah</td>
<td></td>
<td><strong>2016</strong></td>
<td><strong>2019</strong></td>
</tr>
<tr>
<td>STS</td>
<td>R. Metcalfe</td>
<td></td>
<td><strong>2016</strong></td>
<td><strong>2019</strong></td>
</tr>
<tr>
<td>Appeals</td>
<td>The Appeals Committee for the purpose of hearing student appeals shall consist of four elected faculty members from Science units, an Associate Dean <em>(ex officio)</em> and two student members of Council. A quorum shall consist of either (a) two faculty members and one student member or (b) three faculty members.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>ex officio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate Student Rep</td>
<td><strong>Elected</strong></td>
<td></td>
<td><strong>2016</strong></td>
<td><strong>2017</strong></td>
</tr>
<tr>
<td>Member at Large</td>
<td>J.P. Paluzzi <em>(Biology)</em></td>
<td></td>
<td><strong>2016</strong></td>
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<td>D. Bazely</td>
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<td>Physics &amp; Astronomy</td>
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<td></td>
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<tr>
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<td></td>
<td><strong>2015</strong></td>
<td><strong>2018</strong></td>
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<td>STS</td>
<td>R. Metcalfe</td>
<td></td>
<td><strong>2015</strong></td>
<td><strong>2018</strong></td>
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</table>
8.2.1 Change in Course Credit Exclusion: SC/CHEM 1000 3.0 “Chemical Structure”
8.2.2 Change in Course Credit Exclusion: SC/CHEM 1001 3.0 “Chemical Dynamics”
8.2.3 Proposal to Close the Joint York/Seneca BSc (tech) Program in Applied Biotechnology
8.2.4 Proposal for Articulation Agreement between Seneca’s Biotechnology Advanced Program and York’s BSc Biology program – for information
8.2.5 New course: SC/ITSC 1101 3.0 “Integrated Science I (Biology)”
8.2.6 New course: SC/ITSC 1102 3.0 “Integrated Science II (Biology)”
8.2.7 New course: SC/ITSC 1201 3.0 “Integrated Science I (Chemistry)”
8.2.8 New course: SC/ITSC 1202 3.0 “Integrated Science II (Chemistry)”
8.2.9 New course: SC/ITSC 1301 3.0 “Integrated Science I (Physics)”
8.2.10 New course: SC/ITSC 1302 3.0 “Integrated Science II (Physics)”
8.2.11 New course: SC/ITSC 1401 3.0 “Integrated Science I (Mathematics)”
8.2.12 New course: SC/ITSC 1402 3.0 “Integrated Science II (Mathematics)”
8.2.13 Proposal for Creation of a Course Rubric for First Year Integrated Science
Changes to Existing Course

Faculty:

Department: Chemistry

Date of Submission: March 21, 2016

Course Number: 1000

Effective Session: F16

Course Title: Chemical Structure

Type of Change:

- [ ] in pre-requisite(s)/co-requisite(s)
- [ ] in course number/level
- [x] in degree credit exclusion(s)
- [ ] regularize course (from Special Topics)
- [ ] in course format/mode of delivery *
- [ ] retire/expire course
- [ ] other (please specify):

Change From: Course credit exclusions: SC/CHEM 1000 6.00, SC/CHEM 1010 6.00.

To: Course credit exclusion: SC/INSC 1201 3.00.

Rationale: This change is to allow INSC 1201 students to take courses pre-requiring CHEM 1000. At the same time, we can safely drop mention of the very old 6-credit courses.
Changes to Existing Course

Faculty:
Department: Chemistry
Course Number: 1001
Course Title: Chemical Dynamics

Date of Submission: March 21, 2016
Effective Session: F16

Type of Change:
[ ] in pre-requisite(s)/co-requisite(s)
[ ] in course number/level
[ ] in credit value
[ ] in title (max. 40 characters for short title)
[ ] in Calendar description (max. 40 words or 200 characters)
[ ] in cross-listing
[ ] in degree credit exclusion(s)
[ ] regularize course (from Special Topics)
[ ] in course format/mode of delivery *
[ ] retire/expire course
[ ] other (please specify):

Change From:
Course credit exclusions: SC/CHEM 1000 6.00, SC/CHEM 1010 6.00.

To:
Course credit exclusion: SC/INSC 1202 3.00.

Rationale:
This change is to allow INSC 1202 students to take courses pre-requiring CHEM 1001. At the same time, we can safely drop mention of the very old 6-credit courses.
Faculty of Science
Department of Biology

Proposal to Close the Joint York/Seneca BSc(tech) Program in Applied Biotechnology

Proposal

We are proposing to close the Joint York/Seneca BSc(tech) Program in Applied Biotechnology (APBI Program), with the intent to replace it with an articulation agreement between the Seneca Biotechnology Advanced Program and the York BSc Biology program (Keele campus).

Effective Date: September 2016

Rationale

The program was designed as a pathway between college and university at a time when such pathways were rare. Students complete 5 of 6 semesters of the Biotechnology Advanced Program at Seneca, then transfer to York in January and complete 3 semesters to obtain a BSc (tech) in Applied Biotechnology. While students are generally successful at York (Appendix A), there is increasing interest in completing the BSc Biology degree rather than the APBI degree, and students are regularly moving out of the APBI program and into the BSc Biology program.

Rationale for closure:
• Improvements in pathways between colleges and universities render this program largely obsolete.
• Enrolments have remained fairly low and appear to be on the decline (see Appendix A).
• We are told by Seneca colleagues anecdotally that the BSc Biology is the program of choice and a more valuable degree for their students. Some students are opting to complete their Seneca program and then transfer directly to the BSc Biology.
• Transfer requests from APBI to BSc Biology are now very common, indicating students are increasingly using the program as a pathway to the BSc program.
• The change is likely to recruit higher quality students who are currently opting for BSc pathways from Seneca to other Universities such as Guelph and Lakehead.
• Replacing APBI with a direct articulated pathway to the BSc program will eliminate unnecessary administration and improve the student experience.

Alignment between the program changes with Faculty and/or University academic plans and implications for the quality and diversity of academic programming

Currently we have at least three categories of Seneca students from the Advanced Biotechnology Program in our department: APBI students, students who transferred from APBI to BSc Biology, and students who have transferred directly from Seneca to the BSc Program. These distinctions have resulted in ongoing confusion and inconsistencies in the transfer credit
and course waivers among these groups, which has negatively impacted the student experience and generated additional administrative and advising workload.

This closure, replaced with a more effective transfer tool, will improve student mobility between college and university, strengthen the York-Seneca partnership, improve the student experience, and decrease administrative complexity.

**Consultation and Impact**

This proposal was developed in consultation with Seneca and the Office of the Vice Provost Academic. We have been working with Dr. Michael Gadsden (Seneca faculty member) and previously with Karine LaCoste (York Seneca Partnership Manager). Seneca is supportive of the proposal (see Appendix B).

No new resources are required. There will be no impact on other York/Seneca units or faculty members.

**Summary of how students currently enrolled in the program will be accommodated.**

Students currently enrolled in the APBI program will be permitted to complete their program, and will be given the option of transferring into the BSc program. Students will be expected to have completed their program by Fall 2019.
### Appendix A. APBI Program Data 2009-2014

#### Integrated Academic Program Information data Sheet

<table>
<thead>
<tr>
<th>Faculty Level</th>
<th>Undergraduate</th>
<th>Program ID</th>
<th>Program:</th>
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</thead>
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<tr>
<td>SC</td>
<td>Undergraduate</td>
<td>SC-UG-APBI</td>
<td>SC-UG-APBI</td>
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<table>
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<tr>
<th>A. Admissions (Academic Year)</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014 *</th>
<th>Trend</th>
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<tr>
<td>1.0 Applications</td>
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<td>7</td>
<td>9</td>
<td>11</td>
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<td>1.3 Applications 105-Domestic</td>
<td>11</td>
<td>7</td>
<td>8</td>
<td>11</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
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<td>5</td>
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<td>3</td>
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<td>3.4 Accepts 105-International</td>
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<td>4.0 Registrations</td>
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*Note: For 2014 the admission information is incomplete as it only includes summer 2015 information up to March 17, 2015. Complete 2014 information that includes all of the Summer 2015 activity will be available in September 2015 once the summer cycle is complete.*

<table>
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<tr>
<th></th>
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<th>2011</th>
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<th>2013</th>
<th>2014 *</th>
<th>Trend</th>
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<td>1</td>
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<td>2.2 FFTEs taken from diff resp prog, same Faculty</td>
<td>6</td>
<td>9</td>
<td>11</td>
<td>8</td>
<td>8</td>
<td>9</td>
<td>6</td>
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<td>2.3 FFTEs taken from diff Faculty</td>
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<td>1</td>
<td>2</td>
<td>1</td>
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<table>
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<tr>
<th>F. Degrees Awarded (Calendar Year)</th>
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<th>2009</th>
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<td></td>
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</table>

Data from Undergraduate Office as of March 2014:
Of the 57 students who have come over through this articulation since 2004:
3 have not completed a degree
30 have completed the APBI degree
7 have switched to and completed an honours BSc Biology (at least 2 are now graduate students in the dept.)
12 are in APBI in progress
5 are in Honours BSc Biology in progress.
Appendix B Letter of Support

Seneca

Re Closure of the Joint York-Seneca BSc (tech) Program in Applied Biotechnology and New Articulation Agreement between Seneca College BTA Programme and York University (Biology)

The Seneca College School of Biological Sciences within the Faculty of Applied Sciences and Engineering Technology are excited to enter into another, improved articulation agreement with York University and the Biology Department.

The new agreement involves closing the joint York-Seneca BSc (tech) Program in Applied Biotechnology (APBI) and creating a new Articulation Agreement between Seneca College BTA Programme and York University (Biology). This agreement has been constructed with the students’ best interest in mind and structured to optimize the student experience and learning opportunities at both schools. It will result in greater efficiency and clarity in administration and increased flexibility for students to facilitate clear pathways to more program options, including the Honours B.Sc. degree.

With respect to the Seneca portion of the agreement, the students would complete their diploma requirements (for the BTA programme) and would be better prepared for success in the B.Sc. programme at York. Also, many students who have taken part in the current BTR agreement have come back to Seneca, after obtaining their B.Sc. at York, to finish the courses required to earn their BTR Diploma. By completing the BTA Diploma requirements as set out in the new agreement, the students would no longer need to return.

Another benefit proposed in the new agreement would be the potential for students to take one or two York courses before finishing their Seneca diploma. This not only would help to fast track degree completion but would also give the students experience with University level expectations.

York students would also benefit in that they would easily stream into the BTA programme in order to augment their lab experience and/or provide an avenue into our Co-op programme.

In summary, we believe the new agreement to be an improved connection between our schools that will ultimately lead to an enhanced pedagogical experience.

Sincerely

Mike Gadsden B.Ed, Ph.D.
Professor - School of Biological Sciences and Applied Chemistry

Pacla Battiston B.Sc., M.Ed.,
Chair - School of Biological Sciences and Applied Chemistry

Ranjan Bhattacharyya B.Sc, MBA
Dean – Faculty of Applied Science and Engineering Technology
Proposal for Articulation Agreement between Seneca’s Biotechnology Advanced Program and York’s BSc Biology program.

Proposal: To create a clear pathway for students to transition seamlessly from Seneca College’s Biotechnology Advanced Program and York University’s Honours BSc Biology Program.

Rationale: Students currently enter the Biology programs at York from Seneca College either via the joint BSc (tech) program in Applied Biotechnology or as regular transfer credits students. There has been ongoing inconsistencies and confusion regarding transfer credit, and many cases where students have completed the same courses at Seneca but receive different transfer credit depending on the pathway they take into the BSc Biology. We wish to provide more clarity and transparency to students and administrators to improve the student experience and ideally to improve the number and quality of transfers between the two institutions.

Articulation
Students who have completed Seneca’s Biotechnology Advanced Program and have an overall average of B+ or higher, will be considered for admission to the BSc Biology. Students who receive admission will receive enhanced block credit of 45 credits towards their BSc. Degree at York, which will include up to 21 BIOL major credits as well as some credits towards their General Education and Science Breadth requirements. Detailed course CCEs for the current curriculum are found in Appendix A of this document, but will be updated regularly in consultation with Seneca College, with the details then sent to Seneca Advising and York’s Transfer Credit office.
Current Seneca Program:

### 2014/2015 Academic Year

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Course Name</th>
<th>Hrs/Wk</th>
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<tbody>
<tr>
<td>BIO173</td>
<td>Biology</td>
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</tr>
<tr>
<td>CHM173</td>
<td>Chemistry</td>
<td>6</td>
</tr>
<tr>
<td>EAC150</td>
<td>College English</td>
<td>3</td>
</tr>
<tr>
<td>MTH173</td>
<td>Mathematics</td>
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<tr>
<td>SSA001</td>
<td>Science Survival</td>
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"Semester 2" subjects

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<tr>
<td>ACA273</td>
<td>Advanced Computer Applications</td>
</tr>
<tr>
<td>BIO273</td>
<td>Biology</td>
</tr>
<tr>
<td>CHM273</td>
<td>Chemistry</td>
</tr>
<tr>
<td>MTH273</td>
<td>Mathematics</td>
</tr>
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<td>XXXXXX</td>
<td>General Education Option</td>
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"Semester 3" subjects

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<td>BIT373</td>
<td>Biotechniques</td>
</tr>
<tr>
<td>CHO373</td>
<td>Chemistry - Organic</td>
</tr>
<tr>
<td>MBG353</td>
<td>Microbiology</td>
</tr>
<tr>
<td>SES391</td>
<td>Effective Technical Writing</td>
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<tr>
<td>BIC373</td>
<td>Biochemistry</td>
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"Semester 4" subjects

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<tbody>
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<td>BIT473</td>
<td>Biotechniques</td>
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<tr>
<td>AIN473</td>
<td>Analytical Instrumentation</td>
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<tr>
<td>PHY453</td>
<td>Physics</td>
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## Year 3

<table>
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<td>STA453</td>
<td>Statistics</td>
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<td>XXXXXXX</td>
<td>General Education Option</td>
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<td>CPP100</td>
<td>Co-op Professional Theory (co-op option only)</td>
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<tr>
<td>CWT100</td>
<td>Co-op Work Term (co-op option only)</td>
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"Year 3" subjects

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<th>Hrs/Wk</th>
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<tr>
<td>BNF573 Bioinformatics</td>
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<td>FMB573 Food Microbiology</td>
<td>5</td>
</tr>
<tr>
<td>BPH633 Biopharmaceuticals</td>
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<td>IMU673 Immunology</td>
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<tr>
<td>MOB673 Molecular Genetics</td>
<td>6</td>
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<tr>
<td>TIC673 Tissue Culture</td>
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<td>VIR673 Virology</td>
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<tr>
<td>XXXXXXX General Education Option</td>
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and two of the following courses:

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<th>Course Name</th>
<th>Hrs/Wk</th>
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<tr>
<td>ANH573</td>
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<tr>
<td>BIT573</td>
<td>Advanced Techniques in Biotechnology</td>
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<tr>
<td>CPY573</td>
<td>Cell Physiology</td>
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<td>OCC433</td>
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<td>PHA333</td>
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</tr>
<tr>
<td>PHM633</td>
<td>Pharmaceutical Microbiology</td>
<td>5</td>
</tr>
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</table>
Transfer Credit at York

In order to receive specific course exclusions, students must achieve a C+ or higher on the Seneca course. In cases where several courses from Seneca are required for a course exclusion, the average of the course grades will be used for determining transfer credit.

45 Credits total:
42 Sc credits
3 Non Sc credit (to count towards the non-science requirement*)

Basic Exclusions:

<table>
<thead>
<tr>
<th>Seneca Courses</th>
<th>York Equivalence</th>
<th>Total Credits</th>
<th>Year Level/ cr. type</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAC 150/Gen Ed</td>
<td>Non-Sc*</td>
<td>3 non-Sc</td>
<td>1000 /non Sc</td>
</tr>
<tr>
<td>CHM 173+273</td>
<td>CHEM 1000 3.0</td>
<td>3 CHEM</td>
<td>1000 /Sc</td>
</tr>
<tr>
<td>ACA 273</td>
<td>EECS 1520 3.0</td>
<td>3 EECS</td>
<td>1000 /Sc</td>
</tr>
<tr>
<td>CHO 373</td>
<td>CHEM 2020 3.0</td>
<td>3 CHEM</td>
<td>2000 /Sc</td>
</tr>
<tr>
<td>BIO 173+273</td>
<td>BIOL 1000 3.0</td>
<td>3 BIOL</td>
<td>1000 /Sc</td>
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</tbody>
</table>

* May vary with the courses completed at Seneca – to be confirmed

**students completing the optional CPY 573 will receive BIOL 2021 and 2 unspecified BIOL credits rather than 5 unspecified credits.
**Advising**

York and Seneca agree to support this articulation by providing timely information to interested students. Seneca will advise/encourage students who indicate an interest in the articulation to complete BIOL 1001 3.0 (and ideally BIOL 2040) while they are at Seneca (for example during the summer between years and/or the summer prior to entering York full time in the fall).

**Period of Agreement and Course Equivalency Review**

The agreement is effective for September 1, 2016. Course equivalencies will be reviewed at least every 5 years in order to adjust for curricular changes at both institutions. York’s transfer credit office and Science Academic Services and Seneca’s Students Advising Office will be notified of equivalency changes.
Sample Program Honours Major BSc Biology - Seneca
(Refer to Handbook or Calendar for detailed degree requirements;)

Seneca Transfer Credit: 45 Total
BIOL 1000/2020/2021/2070/3120/2XXX/3140 (1000/2000 level) 17
CHEM 1000/2020 6
CSE 1520 (?) 3
BIOL 3140 (3000 level) 4
Sc 1000/2000 level 9
Non Sci Gen Ed 3

Complete BIOL 1001 prior to Fall entry

Year 1

<table>
<thead>
<tr>
<th>FALL</th>
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<tr>
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<td>BIOL 2030 4.0</td>
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<td>Free Elective 3.0</td>
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<td>Non Sc Gen Ed 3.0</td>
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| Total Credits Completed: 28 (13 BIOL, 21 Sc)

Year 2

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<td>BIOL 3100 2.0</td>
<td>BIOL 4XXX 3.0</td>
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<td>Elective 3XXX 3.0</td>
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<td>Non Sc Gen Ed 3.0</td>
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<tr>
<td>Elective 3XXX 3.0</td>
<td>CHEM 2021 3.0</td>
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| Total Credits Completed:30 (16 BIOL, 19 Sc)

Year 3

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<td>3</td>
</tr>
<tr>
<td>Free Elective 3.0</td>
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</table>
| Total Credits Completed: 17 (8 BIOL, 8 Sc)

Sc=science; Free elective= any course, any level;
Non-Sc Gen Ed – see handbook for details. Must be in two different subject areas

Total BIOL 21 + 37 = 58 (includes core and 3000/4000 requirements of major)
Total Science 42 + 45 = 87 (meets breadth, Gen Ed and science requirements)
Total 3000/4000 42
Total Overall Credits 120
COMMITTEE ON ACADEMIC STANDARDS, CURRICULUM AND PEDAGOGY
TEMPLATE

NEW COURSE PROPOSAL FORM

Faculty:
Indicate all relevant Faculty(ies)

Faculty of Science

Department:
Indicate department and course prefix (e.g. Languages, GER)

Biology

Date of Submission:

Course Number:
Special Topics courses Include variance (e.g. HUMA 3000C 6.0, Variance is “C”)

ITSC 1101 3.00

Var:

Academic Credit Weight:
Indicate both the fee, and MTCU weight if different from academic weight (e.g. AC=6, FEE=8, MET=6

Course Title:
The official name of the course as it will appear in the Undergraduate Calendar and on the Repository

Integrated Science I (Biology)

Short Title:
Appears on any documents where space is limited - e.g. transcripts and lecture schedules - maximum 40 characters

Integrated Science I (Biology)

With every new course proposal it is the Department’s responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.
This course primarily examines foundational topics in biology through the lens of contemporary issues in science, integrating disciplinary knowledge, skills and values from biology, chemistry, physics, and mathematics and statistics. Registration in this course requires simultaneous registration in ITSC 1201 3.00, ITSC 1301 3.00, and INSC 1401 3.00. This course is Drop by Permission only. Course Credit Exclusion: SC/BIOL 1000 3.00
This course is part of the biology component of the first year integrated science program. It covers the same topics and achieves equivalent learning outcomes as the regular first year first term biology course. Broad topics covered are selected from: 1) Light and Life; 2) The Cell; 3) Evolution; 4) Energy and Enzymes; 5) Membranes and Transport; 6) Cellular Respiration; 7) Photosynthesis; 8) DNA Structure and Replication; 9) Biotechnology; 10) Cell Division; 11) Gene Expression; 12) Genetics; and, 13) Communication.

Integrated course learning outcomes are: 1) Integrate and apply knowledge, skills and values in biology, chemistry, physics and mathematics in order to consider and discuss broad scientific and societal problems and issues; 2) Critically and creatively solve disciplinary and interdisciplinary problems using an investigative case-based learning approach that models the process of scientific inquiry; 3) Use quantitative and qualitative reasoning to describe systems; 4) Communicate effectively with professional and lay audiences and with faculty, staff and students through written and verbal communication; and, 5) Collaborate with faculty, staff, students and community members in a productive and professional manner.

Biology-specific learning outcomes are: 1) Use biological terminology with correct scientific meaning and appropriate context; 2) Explain how light impacts life in different ways; 3) Describe the cell theory in biology, and relate this theory to other biological concepts; 4) Describe the importance of membranes, and different mechanisms of membrane transport; 5) Relate biological structure and function at the level of the cell, organ and organism; 6) Identify key similarities and differences between prokaryotic and eukaryotic cells; 7) Compare and contrast major biochemicals and biochemical pathways (including cellular respiration, photosynthesis and cell signaling); 8) Compare and contrast different mechanisms regulating gene expression; 9) Describe processes of mitosis and how the cell cycle works in eukaryotic cells; 10) Describe how chromosome movement during meiosis reflects Mendel’s principles of independent assortment and segregation. Solve Mendelian genetics problems involving one or two genes.; 11) Describe the relationship between genes, alleles, proteins and phenotype; 12) Describe the mechanisms that lead to genetic diversity, identify patterns of inheritance relating to sex linkage, gene linkage, codominance and incomplete dominance; 13) Describe basic techniques used in recombinant DNA technology and their significance; and 14) Explain selection and its role in evolution.
Course Design:

Indicate how the course design supports students in achieving the learning objectives. For example, in the absence of scheduled contact hours what role does student-to-student and/or student-to-instructor communication play, and how is it encouraged?

Detail any aspects of the content, delivery, or learning goals that involve "face-to-face" communication, non-campus attendance or experiential education components.

Alternatively, explain how the course design encourages student engagement and supports student learning in the absence of substantial on-campus attendance.

This course will be delivered in a blended format. Students will interact with faculty from biology, chemistry, physics, mathematics and/or natural science for nine contact hours (scheduled as three 3-hour blocks) each week. Students will engage in an additional three hours of online learning using curated videos, simulations, and exercises. Students will also participate in biology, chemistry and physics laboratories in specific Integrated Science laboratory sections.

During the asynchronous online component, students will be introduced to basic concepts by watching videos (e.g. Khan Academy videos), working through online simulations, and completing online assessments. Basic concepts introduced through the online component will be reinforced, expanded upon, and applied in the synchronous face-to-face component. Online learning analytics will be used to support just-in-time teaching in the face-to-face component.

During the face-to-face component, students will work individually and in small and large groups to advance through integrative case studies. Faculty instructors will facilitate student learning through direct instruction, as needed, and by guiding student inquiry. Active learning techniques will be extensively used to promote student learning and engagement. At various times throughout the semester, guest speakers (faculty, industry partners) will deliver presentations related to what the students are learning about in order to make connections to ongoing research and other real-world applications, and give students the opportunity to build their academic networks.

Two Bethune College Peer Mentors will be specifically assigned to the Integrated Science cohort to provide students with the resources needed to develop their academic skills for success in university.
1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).

2. Number of department members currently competent to teach the course.

3. Instructor(s) likely to teach the course in the coming year.

4. An indication of the number of contact hours (defined in terms of hours, weeks, etc.) involved, in order to indicate whether an effective length of term is being maintained OR in the absence of scheduled contact hours a detailed breakdown of the estimated time students are likely to spend engaged in learning activities required by the course.

1. Every year, one section

2. Any Biology faculty member should be competent to teach this course

3. Dr. Nicole Nivillac

4. Together with ITSC1201 3.0, ITSC1301 3.0 and ITSC1401 3.0 students will engage in 9 contact hours and 3 online hours each week. Students will also complete 48 laboratory hours (biology - 15, chemistry - 18, and physics - 15) over the term.
Evaluation:

A detailed percentage breakdown of the basis of evaluation in the proposed course must be provided.

If the course is to be integrated, the additional requirements for graduate students are to be listed.

If the course is amenable to technologically mediated forms of delivery please identify how the integrity of learning evaluation will be maintained. (e.g. will "on-site" examinations be required, etc.)

Online Quizzes – 15%
This consists of pre-class preparatory work and post class homework for each of six modules.

Participation – 20%
This consists of in-class readiness assessment (did they do the preparatory work) for each of six modules, generally a quiz

Case Studies Learning Activities – 20%
This consists of application exercises and mini-projects for each of six modules demonstrating disciplinary and integrative learning

Lab – 20%

Final Exam – 25%

Bibliography:

A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES

The Library has requested that the reading list contain complete bibliographical information, such as full name of author, title, year of publication, etc., and that you distinguish between required and suggested readings. A statement is required from the bibliographer responsible for the discipline to indicate whether resources are adequate to support the course.

Also please list any online resources.

If the course is to be integrated (graduate/undergraduate), a list of the additional readings to be required of graduate students must be included. If no additional readings are to be required, a rationale should be supplied.

LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.


Selected online resources from Khan Academy and PhET Simulations

- www.khanacademy.org
- http://phet.colorado.edu

(Specific URL links available upon request)
Other Resources:
A statement regarding the adequacy of physical resources (equipment, space, etc.) must be appended. If other resources will be required to mount this course, please explain.

COURSES WILL NOT BE APPROVED UNLESS IT IS CLEAR THAT ADEQUATE RESOURCES ARE AVAILABLE TO SUPPORT IT.

An active learning classroom (eg. BERG 317) is required.

Course Rationale:
The following points should be addressed in the rationale:

- How the course contributes to the learning objectives of the program / degree.
- The relationship of the proposed course to other existing offerings, particularly in terms of overlap in objectives and/or content. If inter-Faculty overlap exists, some indication of consultation with the Faculty affected should be given.
- The expected enrolment in the course.

By taking an integrated approach, this course will enable students to see and explore the connections between biology, chemistry, physics and mathematics in the context of societal issues and problems. The ability to approach large societal issues and problems (eg. sustainability) from an interdisciplinary perspective is an essential skill for science students to develop as part of their scientific literacy skill set.

This course has the same learning objectives as SC/BIOL 1000. Student transcripts will specify that equivalent first year first term biology topics have been covered.

A committee of ten faculty members from the Departments of Biology, Chemistry, Physics, Mathematics & Statistics, and Science and Technology Studies, the Associate Dean, Students, and an Educational Development Specialist has been established to advise on the design and implementation of this course.

Expected enrolment: 48 students
Faculty and Department Approval for Cross-listings:

If the course is to be cross-listed with another department, this section needs to be signed by all parties. In some cases there may be more than two signatures required (i.e. Mathematics, Women’s Studies). In the majority of the cases either the Undergraduate Director or Chair of a unit approves the agreement to cross-list. All relevant signatures must be obtained prior to submission to the Faculty curriculum committee.

<table>
<thead>
<tr>
<th>Dept: __________________________</th>
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Accessible format can be provided upon request.
COMMITTEE ON ACADEMIC STANDARDS, CURRICULUM AND PEDAGOGY
TEMPLATE

NEW COURSE PROPOSAL FORM

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<tr>
<th>Faculty:</th>
<th>Faculty of Science</th>
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<table>
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<th>Short Title:</th>
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<tbody>
<tr>
<td>Integrated Science II (Biology)</td>
<td>Integrated Science II (Biology)</td>
</tr>
</tbody>
</table>

With every new course proposal it is the Department’s responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.
This course primarily examines foundational topics in biology through the lens of contemporary issues in science, integrating disciplinary knowledge, skills and values from biology, chemistry, physics, and mathematics and statistics. Registration in this course requires simultaneous registration in ITSC 1202 3.00, ITSC 1302 3.00, and ITSC 1402 3.00. This course is Drop by Permission only. Course Credit Exclusion: SC/BIOL 1001 3.00
This course is part of the biology component of the first year integrated science program. It covers the same topics and achieves equivalent learning outcomes as the regular first year second term biology course. Broad topics covered are: 1) Nature of Science; 2) Introduction to Evolution; 3) Phylogenetics; 4) History of Evolutionary Thought; 5) Microevolutionary Processes and Hardy-Weinburg Equilibrium; 6) Speciation; 7) Macroevolution; 8) Human Evolution; 9) Introduction to Ecology; 10) Population Ecology; 11) Community Ecology; and, 12) Ecosystem Ecology/Biodiversity

### Integrated course learning outcomes are:
1. Integrate and apply knowledge, skills and values in biology, chemistry, physics and mathematics in order to consider and discuss broad scientific and societal problems and issues;
2. Critically and creatively solve disciplinary and interdisciplinary problems using an investigative case-based learning approach that models the process of scientific inquiry;
3. Use quantitative and qualitative reasoning to describe systems;
4. Communicate effectively with professional and lay audiences and with faculty, staff and students through written and verbal communication; and, 5. Collaborate with faculty, staff, students and community members in a productive and professional manner.

### Biology-specific learning outcomes are:
Relate concepts from BIOL 1000 to those in BIOL 1001; Use the process of scientific inquiry to make effective decisions/arguments about real-world biological issues, including assessment of information in the media using scientific reasoning; Describe the nature of science, how scientific knowledge is iterative and cumulative, the process by which scientific knowledge comes to be accepted as valid, including the roles of prediction, evidence, consensus, and authority and what is, and is not, appropriate subject matter to scientific study; Explain and illustrate the predictive power of scientific theories and how acceptance or rejection of hypotheses takes place; Use proper biological terminology with correct scientific meaning and appropriate context; Explain, in basic terms, how evolution (via mechanisms not limited to natural selection) shapes life on Earth, the necessity of genetic variation (e.g., through mutation), and how many behavioural traits are adaptive; Describe how populations can change over time and space through intraspecific interactions and environmental constraints; Describe the history of evolutionary thought, and the evidence for evolution and the common ancestry of life; Explain how phylogenetics are used to generate hypotheses about the history of life on Earth; Describe the mechanisms by which speciation can occur, difficulties in assigning a universal definition of the term ‘species’, and why the term can vary between groups of organisms; Describe the different factors that can influence population growth, explaining differences in their effects; Describe how interspecific interactions can shape populations and the communities these populations comprise; Relate conservation plans with evolutionary processes and population dynamics; Describe how energy and matter...
flow and/or are recycled in ecosystems, and how ecosystems may change over time due to natural or human-induced processes.
Course Design:

Indicate how the course design supports students in achieving the learning objectives. For example, in the absence of scheduled contact hours what role does student-to-student and/or student-to-instructor communication play, and how is it encouraged?

Detail any aspects of the content, delivery, or learning goals that involve "face-to-face" communication, non-campus attendance or experiential education components.

Alternatively, explain how the course design encourages student engagement and supports student learning in the absence of substantial on-campus attendance.

This course will be delivered in a blended format. Students will interact with faculty from biology, chemistry, physics, mathematics and/or natural science for nine contact hours (scheduled as three 3-hour blocks) each week. Students will engage in an additional three hours of online learning using curated videos, simulations, and exercises. Students will also participate in biology, chemistry and physics laboratories in specific Integrated Science laboratory sections.

During the asynchronous online component, students will be introduced to basic concepts by watching videos (eg. Khan Academy videos), working through online simulations, and completing online assessments. Basic concepts introduced through the online component will be reinforced, expanded upon, and applied in the synchronous face-to-face component. Online learning analytics will be used to support just-in-time teaching in the face-to-face component.

During the face-to-face component, students will work individually and in small and large groups to advance through integrative case studies. Faculty instructors will facilitate student learning through direct instruction, as needed, and by guiding student inquiry. Active learning techniques will be extensively used to promote student learning and engagement. At various times throughout the semester, guest speakers (faculty, industry partners) will deliver presentations related to what the students are learning about in order to make connections to ongoing research and other real-world applications, and give students the opportunity to build their academic networks.

Two Bethune College Peer Mentors will be specifically assigned to the Integrated Science cohort to provide students with the resources needed to develop their academic skills for success in university.
Instruction:

1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).

2. Number of department members currently competent to teach the course.

3. Instructor(s) likely to teach the course in the coming year.

4. An indication of the number of contact hours (defined in terms of hours, weeks, etc.) involved, in order to indicate whether an effective length of term is being maintained OR in the absence of scheduled contact hours a detailed breakdown of the estimated time students are likely to spend engaged in learning activities required by the course.

1. Every year, one section

2. Any Biology faculty member should be competent to teach this course

3. Dr. Tamara Kelly

4. Together with ITSC1202 3.0, ITSC1302 3.0 and ITSC1402 3.0 students will engage in 9 contact hours and 3 online hours each week. Students will also complete 48 laboratory hours (biology - 15, chemistry – 18, and physics - 15) over the term.
Evaluation:

A detailed percentage breakdown of the basis of evaluation in the proposed course must be provided.

If the course is to be integrated, the additional requirements for graduate students are to be listed.

If the course is amenable to technologically mediated forms of delivery please identify how the integrity of learning evaluation will be maintained. (e.g. will "on-site" examinations be required, etc.)

Online Quizzes – 15%
This consists of pre-class preparatory work and post class homework for each of six modules.

Participation – 20%
This consists of in-class readiness assessment (did they do the preparatory work) for each of six modules, generally a quiz

Case Studies Learning Activities – 20%
This consists of application exercises and mini-projects for each of six modules demonstrating disciplinary and integrative learning

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Final Exam – 25%

Bibliography:

A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES

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Also please list any online resources.

If the course is to be integrated (graduate/undergraduate), a list of the additional readings to be required of graduate students must be included. If no additional readings are to be required, a rationale should be supplied.

LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.


Selected online resources from Khan Academy and PhET Simulations
- [www.khanacademy.org](http://www.khanacademy.org)
- [http://phet.colorado.edu](http://phet.colorado.edu)

(Specific URL links available upon request)
An active learning classroom (eg. BERG 317) is required.

By taking an integrated approach, this course will enable students to see and explore the connections between biology, chemistry, physics and mathematics in the context of societal issues and problems. The ability to approach large societal issues and problems (eg. sustainability) from an interdisciplinary perspective is an essential skill for science students to develop as part of their scientific literacy skill set.

This course has the same learning objectives as SC/BIOL 1001. Student transcripts will specify that equivalent first year second term biology topics have been covered.

A committee of ten faculty members from the Departments of Biology, Chemistry, Physics, Mathematics & Statistics, and Science and Technology Studies, the Associate Dean, Students, and an Educational Development Specialist has been established to advise on the design and implementation of this course.

Expected enrolment: 48 students
Faculty and Department Approval for Cross-listings:

If the course is to be cross-listed with another department, this section needs to be signed by all parties. In some cases there may be more than two signatures required (i.e. Mathematics, Women’s Studies). In the majority of the cases either the Undergraduate Director or Chair of a unit approves the agreement to cross-list. All relevant signatures must be obtained prior to submission to the Faculty curriculum committee.

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**NEW COURSE PROPOSAL FORM**

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</tr>
</tbody>
</table>

With every new course proposal it is the Department’s responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.
Brief Course Description:

Maximum 2000 characters
(approximately 300 words including spaces and punctuation).

The course description should be carefully written to convey what the course is about. It should be followed by a statement of prerequisites and co-requisites, if applicable. This description appears in the calendar.

For editorial consistency, and in consideration of the various uses of the Calendars, verbs should be in the present tense (i.e., “This course analyzes the nature and extent of...,” rather than “This course will analyze...”)

Generic Course Description:

This is the description of the “Parent / Generic course” for Special Topics courses under which variances of the “Generic” course can be offered in different years (Max. 40 words). Generic course descriptions are published in the calendar.

List all degree credit exclusions, prerequisites, integrated courses, and notes below the course description.

This course primarily examines foundational topics in chemistry through the lens of contemporary issues in science, integrating disciplinary knowledge, skills and values from biology, chemistry, physics, and mathematics and statistics. Registration in this course requires simultaneous registration in ITSC 1101 3.00, ITSC 1301 3.00, and ITSC 1401 3.00. This course is Drop by Permission only. Course Credit Exclusion: SC/CHEM 1000 3.00 Chemical Structure
This course is part of the chemistry component of the first year integrated science program. It covers the same topics and achieves equivalent learning outcomes as the regular first year first term chemistry course. Broad topics covered are: 1) Gases; 2) Thermochemistry; 3) Atomic Theory & Periodic Table; 4) Chemical Bonding; and, 5) Solids and Liquids.

Integrated course learning outcomes are: 1) Integrate and apply knowledge, skills and values in biology, chemistry, physics and mathematics in order to consider and discuss broad scientific and societal problems and issues; 2) Critically and creatively solve disciplinary and interdisciplinary problems using an investigative case-based learning approach that models the process of scientific inquiry; 3) Use quantitative and qualitative reasoning to describe systems; 4) Communicate effectively with professional and lay audiences and with faculty, staff and students through written and verbal communication; and, 5) Collaborate with faculty, staff, students and community members in a productive and professional manner.

Chemistry-specific learning outcomes are: 1) Explain and predict gas behavior and properties using the kinetic-molecular theory of gases, the simple gas laws, ideal gas equation and general gas equation; 2) Describe the transfer of energy as heat and work in chemical reactions; 3) Use the periodic table to explain different electron configurations and predict atomic properties; 4) Relate chemical bonds to molecular shapes and properties; 5) Describe different states of matter in terms of intermolecular forces.
Course Design:

Indicate how the course design supports students in achieving the learning objectives. For example, in the absence of scheduled contact hours what role does student-to-student and/or student-to-instructor communication play, and how is it encouraged?

Detail any aspects of the content, delivery, or learning goals that involve "face-to-face" communication, non-campus attendance or experiential education components.

Alternatively, explain how the course design encourages student engagement and supports student learning in the absence of substantial on-campus attendance.

This course will be delivered in a blended format. Students will interact with faculty from biology, chemistry, physics, mathematics and/or natural science for nine contact hours (scheduled as three 3-hour blocks) each week. Students will engage in an additional three hours of online learning using curated videos, simulations, and exercises. Students will also participate in biology, chemistry and physics laboratories in specific Integrated Science laboratory sections.

During the asynchronous online component, students will be introduced to basic concepts by watching videos (eg. Khan Academy videos), working through online simulations, and completing online assessments. Basic concepts introduced through the online component will be reinforced, expanded upon, and applied in the synchronous face-to-face component. Online learning analytics will be used to support just-in-time teaching in the face-to-face component.

During the face-to-face component, students will work individually and in small and large groups to advance through integrative case studies. Faculty instructors will facilitate student learning through direct instruction, as needed, and by guiding student inquiry. Active learning techniques will be extensively used to promote student learning and engagement. At various times throughout the semester, guest speakers (faculty, industry partners) will deliver presentations related to what the students are learning about in order to make connections to ongoing research and other real-world applications, and give students the opportunity to build their academic networks.

Two Bethune College Peer Mentors will be specifically assigned to the Integrated Science cohort to provide students with the resources needed to develop their academic skills for success in university.
Instruction:

1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).

2. Number of department members currently competent to teach the course.

3. Instructor(s) likely to teach the course in the coming year.

4. An indication of the number of contact hours (defined in terms of hours, weeks, etc.) involved, in order to indicate whether an effective length of term is being maintained OR in the absence of scheduled contact hours a detailed breakdown of the estimated time students are likely to spend engaged in learning activities required by the course.

1. Every year, one section

2. Any Chemistry faculty member should be competent to teach this course

3. Dr. Bill Pietro

4. Together with ITSC1101 3.0, ITSC1301 3.0 and ITSC1401 3.0 students will engage in 9 contact hours and 3 online hours each week. Students will also complete 48 laboratory hours (biology - 15, chemistry - 18 and physics - 15) over the term.
Evaluation:

A detailed percentage breakdown of the basis of evaluation in the proposed course must be provided. 

If the course is to be integrated, the additional requirements for graduate students are to be listed. 

If the course is amenable to technologically mediated forms of delivery please identify how the integrity of learning evaluation will be maintained. (e.g. will "on-site" examinations be required, etc.)

Bibliography:

A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES

The Library has requested that the reading list contain complete bibliographical information, such as full name of author, title, year of publication, etc., and that you distinguish between required and suggested readings. A statement is required from the bibliographer responsible for the discipline to indicate whether resources are adequate to support the course.

Also please list any online resources.

If the course is to be integrated (graduate/undergraduate), a list of the additional readings to be required of graduate students must be included. If no additional readings are to be required, a rationale should be supplied.

LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.

Online Quizzes – 15%
This consists of pre-class preparatory work and post class homework for each of six modules.

Participation – 20%
This consists of in-class readiness assessment (did they do the preparatory work) for each of six modules, generally a quiz.

Case Studies Learning Activities – 20%
This consists of application exercises and mini-projects for each of six modules demonstrating disciplinary and integrative learning.

Lab – 20%

Final Exam – 25%


Selected online resources from Khan Academy and PhET Simulations
- [www.khanacademy.org](http://www.khanacademy.org)
- [http://phet.colorado.edu](http://phet.colorado.edu)

(Specific URL links available upon request)
Other Resources:
A statement regarding the adequacy of physical resources (equipment, space, etc.) must be appended. If other resources will be required to mount this course, please explain.

COURSES WILL NOT BE APPROVED UNLESS IT IS CLEAR THAT ADEQUATE RESOURCES ARE AVAILABLE TO SUPPORT IT.

An active learning classroom (eg. BERG 317) is required.

Course Rationale:
The following points should be addressed in the rationale:

How the course contributes to the learning objectives of the program / degree.

The relationship of the proposed course to other existing offerings, particularly in terms of overlap in objectives and/or content. If inter-Faculty overlap exists, some indication of consultation with the Faculty affected should be given.

The expected enrolment in the course.

By taking an integrated approach, this course will enable students to see and explore the connections between biology, chemistry, physics and mathematics in the context of societal issues and problems. The ability to approach large societal issues and problems (eg. sustainability) from an interdisciplinary perspective is an essential skill for science students to develop as part of their scientific literacy skill set.

This course has the same learning objectives as SC/CHEM 1000. Student transcripts will specify that equivalent first year first term chemistry topics have been covered.

A committee of ten faculty members from the Departments of Biology, Chemistry, Physics, Mathematics & Statistics, and Science and Technology Studies, the Associate Dean, Students, and an Educational Development Specialist has been established to advise on the design and implementation of this course.

Expected enrolment: 48 students
Faculty and Department Approval for Cross-listings:

If the course is to be cross-listed with another department, this section needs to be signed by all parties. In some cases there may be more than two signatures required (i.e. Mathematics, Women’s Studies). In the majority of the cases either the Undergraduate Director or Chair of a unit approves the agreement to cross-list. All relevant signatures must be obtained prior to submission to the Faculty curriculum committee.

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Accessible format can be provided upon request.
Faculty:  
Indicate all relevant Faculty(ies)  

Faculty of Science  

Department:  
Indicate department and course prefix (e.g. Languages, GER)  

Chemistry  

Date of Submission:  

Course Number:  
Special Topics courses  
Include variance (e.g. HUMA 3000C 6.0, Variance is “C”)  

ITSC 1202 3.00  
Var:  

Academic Credit Weight:  
Indicate both the fee, and MTCU weight if different from academic weight (e.g. AC=6, FEE=8, MET=6)  

Course Title:  
The official name of the course as it will appear in the Undergraduate Calendar and on the Repository  

Integrated Science II (Chemistry)  

Short Title:  
Appears on any documents where space is limited - e.g. transcripts and lecture schedules - maximum 40 characters  

Integrated Science II (Chemistry)  

With every new course proposal it is the Department’s responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.
This course primarily examines foundational topics in chemistry through the lens of contemporary issues in science, integrating disciplinary knowledge, skills and values from biology, chemistry, physics, and mathematics and statistics. Registration in this course requires simultaneous registration in ITSC 1102 3.00, ITSC 1302 3.00, and ITSC 1402 3.00. This course is Drop by Permission only. Course Credit Exclusion: SC/CHEM 1001 3.00 Chemical Dynamics
This course is part of the chemistry component of the first year integrated science program. It covers the same topics and achieves equivalent learning outcomes as the regular first year first term chemistry course. Broad topics covered are: 1) Chemical Kinetics; 2) Chemical Equilibrium; 3) The Driving Force of Chemical Change; and, 4) Electrochemistry.

Integrated course learning outcomes are: 1) Integrate and apply knowledge, skills and values in biology, chemistry, physics and mathematics in order to consider and discuss broad scientific and societal problems and issues; 2) Critically and creatively solve disciplinary and interdisciplinary problems using an investigative case-based learning approach that models the process of scientific inquiry; 3) Use quantitative and qualitative reasoning to describe systems; 4) Communicate effectively with professional and lay audiences and with faculty, staff and students through written and verbal communication; and, 5) Collaborate with faculty, staff, students and community members in a productive and professional manner

Chemistry-specific learning outcomes are: 1) Describe chemical reactions in terms of reaction mechanisms and reaction rates; 2) Apply the principles of chemical equilibrium to acids and bases and complex ions; 3) Predict spontaneous change using the principles of entropy and Gibb’s free energy; and 4) Describe the conversion of chemical energy into electrical energy and vice versa.
This course will be delivered in a blended format. Students will interact with faculty from biology, chemistry, physics, mathematics and/or natural science for nine contact hours (scheduled as three 3-hour blocks) each week. Students will engage in an additional three hours of online learning using curated videos, simulations, and exercises. Students will also participate in biology, chemistry and physics laboratories in specific Integrated Science laboratory sections.

During the asynchronous online component, students will be introduced to basic concepts by watching videos (eg. Khan Academy videos), working through online simulations, and completing online assessments. Basic concepts introduced through the online component will be reinforced, expanded upon, and applied in the synchronous face-to-face component. Online learning analytics will be used to support just-in-time teaching in the face-to-face component.

During the face-to-face component, students will work individually and in small and large groups to advance through integrative case studies. Faculty instructors will facilitate student learning through direct instruction, as needed, and by guiding student inquiry. Active learning techniques will be extensively used to promote student learning and engagement. At various times throughout the semester, guest speakers (faculty, industry partners) will deliver presentations related to what the students are learning about in order to make connections to ongoing research and other real-world applications, and give students the opportunity to build their academic networks.

Two Bethune College Peer Mentors will be specifically assigned to the Integrated Science cohort to provide students with the resources needed to develop their academic skills for success in university.
Instruction:

1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).

2. Number of department members currently competent to teach the course.

3. Instructor(s) likely to teach the course in the coming year.

4. An indication of the number of contact hours (defined in terms of hours, weeks, etc.) involved, in order to indicate whether an effective length of term is being maintained OR in the absence of scheduled contact hours a detailed breakdown of the estimated time students are likely to spend engaged in learning activities required by the course.

1. Every year, one section

2. Any Chemistry faculty member should be competent to teach this course

3. Dr. Bill Pietro

4. Together with ITSC1102 3.0, ITSC1302 3.0, and ITSC1402 3.0 students will engage in 9 contact hours and 3 online hours each week. Students will also complete 48 laboratory hours (biology – 15, chemistry – 18, and physics - 15) over the term.
### Evaluation:

A detailed percentage breakdown of the basis of evaluation in the proposed course must be provided.

If the course is to be integrated, the additional requirements for graduate students are to be listed.

If the course is amenable to technologically mediated forms of delivery please identify how the integrity of learning evaluation will be maintained. (e.g. will "on-site" examinations be required, etc.)

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<th>Component</th>
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<tr>
<td>Online Quizzes</td>
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<tr>
<td>Participation</td>
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<td>20%</td>
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<td>Lab</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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**Online Quizzes – 15%**
This consists of pre-class preparatory work and post class homework for each of six modules.

**Participation – 20%**
This consists of in-class readiness assessment (did they do the preparatory work) for each of six modules, generally a quiz

**Case Studies Learning Activities – 20%**
This consists of application exercises and mini-projects for each of six modules demonstrating disciplinary and integrative learning

**Lab – 20%**

**Final Exam – 25%**

### Bibliography:

**A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES**

The Library has requested that the reading list contain complete bibliographical information, such as full name of author, title, year of publication, etc., and that you distinguish between required and suggested readings. A statement is required from the bibliographer responsible for the discipline to indicate whether resources are adequate to support the course.

Also please list any online resources.

If the course is to be integrated (graduate/undergraduate), a list of the additional readings to be required of graduate students must be included. If no additional readings are to be required, a rationale should be supplied.

**LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.**


Selected online resources from Khan Academy and PhET Simulations
- [www.khanacademy.org](http://www.khanacademy.org)
- [http://phet.colorado.edu](http://phet.colorado.edu)

(Specific URL links available upon request)
Other Resources:
A statement regarding the adequacy of physical resources (equipment, space, etc.) must be appended. If other resources will be required to mount this course, please explain.

COURSES WILL NOT BE APPROVED UNLESS IT IS CLEAR THAT ADEQUATE RESOURCES ARE AVAILABLE TO SUPPORT IT.

An active learning classroom (eg. BERG 317) is required.

Course Rationale:
The following points should be addressed in the rationale:

How the course contributes to the learning objectives of the program / degree.

The relationship of the proposed course to other existing offerings, particularly in terms of overlap in objectives and/or content. If inter-Faculty overlap exists, some indication of consultation with the Faculty affected should be given.

The expected enrolment in the course.

By taking an integrated approach, this course will enable students to see and explore the connections between biology, chemistry, physics and mathematics in the context of societal issues and problems. The ability to approach large societal issues and problems (eg. sustainability) from an interdisciplinary perspective is an essential skill for science students to develop as part of their scientific literacy skill set.

This course has the same learning objectives as SC/CHEM 1001. Student transcripts will specify that equivalent first year second term chemistry topics have been covered.

A committee of ten faculty members from the Departments of Biology, Chemistry, Physics, Mathematics & Statistics, and Science and Technology Studies, the Associate Dean, Students, and an Educational Development Specialist has been established to advise on the design and implementation of this course.

Expected enrolment: 48 students
Faculty and Department Approval for Cross-listings:

If the course is to be cross-listed with another department, this section needs to be signed by all parties. In some cases there may be more than two signatures required (i.e. Mathematics, Women's Studies). In the majority of the cases either the Undergraduate Director or Chair of a unit approves the agreement to cross-list. All relevant signatures must be obtained prior to submission to the Faculty curriculum committee.

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Accessible format can be provided upon request.
**NEW COURSE PROPOSAL FORM**

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<th>Faculty:</th>
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<tr>
<td>Academic Credit Weight:</td>
<td>Var:</td>
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<tr>
<td>Course Title:</td>
<td>Integrated Science I (Physics)</td>
</tr>
<tr>
<td>Short Title:</td>
<td>Integrated Science I (Physics)</td>
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With every new course proposal it is the Department’s responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.
This course primarily examines foundational topics in physics through the lens of contemporary issues in science, integrating disciplinary knowledge, skills and values from biology, chemistry, physics, and mathematics and statistics. Registration in this course requires simultaneous registration in ITSC 1001 0.00, ITSC 1101 3.00, ITSC 1201 3.00, and ITSC 1401 3.00. This course is Drop by Permission only.

Course Credit Exclusion: SC/PHYS 1010 6.00, SC/PHYS 1410 6.00, SC/PHYS1420 6.00, SC/PHYS 1800 3.0, SC/PHYS 1801 3.0.
This course is part of the physics component of the first year integrated science program. Together with ITSC 1302 3.00, it covers the same topics and achieves equivalent learning outcomes as the regular first year physics course PHYS 1010 6.0. Broad topics covered are: 1) Motion in one, two and three dimensions; 2) Newton’s Laws; 3) Energy; 4) Linear Momentum, Collisions, and Systems of Particles; 5) Rotational Dynamics; 6) Gravitation.

Integrated course learning outcomes are: 1) Integrate and apply knowledge, skills and values in biology, chemistry, physics and mathematics in order to consider and discuss broad scientific and societal problems and issues; 2) Critically and creatively solve disciplinary and interdisciplinary problems using an investigative case-based learning approach that models the process of scientific inquiry; 3) Use quantitative and qualitative reasoning to describe systems; 4) Communicate effectively with professional and lay audiences and with faculty, staff and students through written and verbal communication; and, 5) Collaborate with faculty, staff, students and community members in a productive and professional manner.

Physics-specific learning outcomes are:
1) Explain Newton’s laws of motion and the relationship between force, mass and motion;
2) Solve rotational dynamics problems using the work-mechanical energy approach, force-torque approach, and conservation of angular momentum;
3) Relate the principle of conservation of mechanical energy to the work done by a constant force, variable force and a spring;
4) Apply the laws of conservation of momentum and energy to collisions;
5) Solve problems using Newton’s law of universal gravitation.
Course Design:

Indicate how the course design supports students in achieving the learning objectives. For example, in the absence of scheduled contact hours what role does student-to-student and/or student-to-instructor communication play, and how is it encouraged?

Detail any aspects of the content, delivery, or learning goals that involve "face-to-face" communication, non-campus attendance or experiential education components.

Alternatively, explain how the course design encourages student engagement and supports student learning in the absence of substantial on-campus attendance.

This course will be delivered in a blended format. Students will interact with faculty from biology, chemistry, physics, mathematics and/or natural science for nine contact hours (scheduled as three 3-hour blocks) each week. Students will engage in an additional three hours of online learning using curated videos, simulations, and exercises. Students will also participate in biology, chemistry and physics laboratories in specific Integrated Science laboratory sections.

During the asynchronous online component, students will be introduced to basic concepts by watching videos (e.g., Khan Academy videos), working through online simulations, and completing online assessments. Basic concepts introduced through the online component will be reinforced, expanded upon, and applied in the synchronous face-to-face component. Online learning analytics will be used to support just-in-time teaching in the face-to-face component.

During the face-to-face component, students will work individually and in small and large groups to advance through integrative case studies. Faculty instructors will facilitate student learning through direct instruction, as needed, and by guiding student inquiry. Active learning techniques will be extensively used to promote student learning and engagement. At various times throughout the semester, guest speakers (faculty, industry partners) will deliver presentations related to what the students are learning about in order to make connections to ongoing research and other real-world applications, and give students the opportunity to build their academic networks.

Two Bethune College Peer Mentors will be specifically assigned to the Integrated Science cohort to provide students with the resources needed to develop their academic skills for success in university.
Instruction:

1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).

2. Number of department members currently competent to teach the course.

3. Instructor(s) likely to teach the course in the coming year.

4. An indication of the number of contact hours (defined in terms of hours, weeks, etc.) involved, in order to indicate whether an effective length of term is being maintained OR in the absence of scheduled contact hours a detailed breakdown of the estimated time students are likely to spend engaged in learning activities required by the course.

1. Every year, one section

2. Any Physics faculty member should be competent to teach this course

3. Dr. Chris Bergevin

4. Together with ITSC1101 3.00, ITSC1201 3.00, and ITSC1401 3.00 students will engage in 9 contact hours and 3 online hours each week. Students will also complete 45 laboratory hours (15 laboratory hours in each of biology, chemistry and physics) over the term.
Evaluation:

A detailed percentage breakdown of the basis of evaluation in the proposed course must be provided.

If the course is to be integrated, the additional requirements for graduate students are to be listed.

If the course is amenable to technologically mediated forms of delivery please identify how the integrity of learning evaluation will be maintained. (e.g. will "on-site" examinations be required, etc.)

Online Quizzes – 18%
Participation – 21%
Case Studies Learning Activities – 21%
Laboratory Activities – 10%*
Final Exam – 30%

*B laboratory reports in first-year physics are fully completed and submitted in the lab. Along with short pre-lab exercises, this component counts for 10% of the course mark in all regular first-year Physics courses.

Bibliography:

A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES

The Library has requested that the reading list contain complete bibliographical information, such as full name of author, title, year of publication, etc., and that you distinguish between required and suggested readings. A statement is required from the bibliographer responsible for the discipline to indicate whether resources are adequate to support the course.

Also please list any online resources.

If the course is to be integrated (graduate/undergraduate), a list of the additional readings to be required of graduate students must be included. If no additional readings are to be required, a rationale should be supplied.

LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.


Selected online resources from Khan Academy and PhET Simulations

• www.khanacademy.org
• http://phet.colorado.edu

(Specific URL links available upon request)
Other Resources:
A statement regarding the adequacy of physical resources (equipment, space, etc.) must be appended. If other resources will be required to mount this course, please explain.

COURSES WILL NOT BE APPROVED UNLESS IT IS CLEAR THAT ADEQUATE RESOURCES ARE AVAILABLE TO SUPPORT IT.

Course Rationale:
The following points should be addressed in the rationale:

How the course contributes to the learning objectives of the program / degree.

The relationship of the proposed course to other existing offerings, particularly in terms of overlap in objectives and/or content. If inter-Faculty overlap exists, some indication of consultation with the Faculty affected should be given.

The expected enrolment in the course.

An active learning classroom (e.g., BERG 317) is required.

By taking an integrated approach, this course will enable students to see and explore the connections between biology, chemistry, physics and mathematics in the context of societal issues and problems. The ability to approach large societal issues and problems (e.g., sustainability) from an interdisciplinary perspective is an essential skill for science students to develop as part of their scientific literacy skill set.

Taken together with SC/ITSC 1300, this course has the same learning objectives as SC/PHYS 1010. Student transcripts will specify that equivalent first year physics topics have been covered.

A committee of ten faculty members from the Departments of Biology, Chemistry, Physics, Mathematics & Statistics, and Science and Technology Studies, the Associate Dean, Students, and an Educational Development Specialist has been established to advise on the design and implementation of this course.

Expected enrolment: 48 students
Faculty and Department Approval for Cross-listings:

If the course is to be cross-listed with another department, this section needs to be signed by all parties. In some cases there may be more than two signatures required (i.e. Mathematics, Women’s Studies). In the majority of the cases either the Undergraduate Director or Chair of a unit approves the agreement to cross-list. All relevant signatures must be obtained prior to submission to the Faculty curriculum committee.

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Indicate all relevant Faculty(ies)

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**Department:**
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**Course Number:**
Special Topics courses Include variance (e.g. HUMA 3000C 6.0, Variance is “C”)

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**Course Title:**
The official name of the course as it will appear in the Undergraduate Calendar and on the Repository

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**Short Title:**
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**Academic Credit Weight:**
Indicate both the fee, and MTCU weight if different from academic weight (e.g. AC=6, FEE=8, MET=6)

With every new course proposal it is the Department’s responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.
This course primarily examines foundational topics in physics through the lens of contemporary issues in science, integrating disciplinary knowledge, skills and values from biology, chemistry, physics, and mathematics and statistics. Registration in this course requires simultaneous registration in ITSC 1002 0.00, ITSC 1102 3.00, ITSC 1202 3.00, and ITSC 1402 3.00. This course is Drop by Permission only. Course Credit Exclusion: SC/PHYS 1010 6.00, SC/PHYS 1410 6.00, SC/PHYS 1420 6.00, SC/PHYS 1800 3.0, SC/PHYS 1801 3.0.
This course is part of the physics component of the first year integrated science program. Together with ITSC 1301 3.00, it covers the same topics and achieves equivalent learning outcomes as the regular first year physics course PHYS 1010 6.0. Broad topics covered are: 1) Oscillations; 2) Waves; 3) Electricity and Circuits; 4) Magnetic Fields; 5) Electromagnetic Induction; 6) Electromagnetic Waves.

Integrated course learning outcomes are: 1) Integrate and apply knowledge, skills and values in biology, chemistry, physics and mathematics in order to consider and discuss broad scientific and societal problems and issues; 2) Critically and creatively solve disciplinary and interdisciplinary problems using an investigative case-based learning approach that models the process of scientific inquiry; 3) Use quantitative and qualitative reasoning to describe systems; 4) Communicate effectively with professional and lay audiences and with faculty, staff and students through written and verbal communication; and, 5) Collaborate with faculty, staff, students and community members in a productive and professional manner.

Physics-specific learning outcomes are:
1) Understand the basics of electrostatics and magnetostatics.
2) Familiarize yourself with electromagnetic induction and solve relevant problems.
3) Understand oscillatory motion, waves on a string, and acoustic waves.
4) Describe the basics of electromagnetic radiation and relate them to relevant applications.
5) Apply the laws of electromagnetism to specific problems.
Course Design:
Indicate how the course design supports students in achieving the learning objectives. For example, in the absence of scheduled contact hours, what role does student-to-student and/or student-to-instructor communication play, and how is it encouraged?

Detail any aspects of the content, delivery, or learning goals that involve "face-to-face" communication, non-campus attendance or experiential education components.

Alternatively, explain how the course design encourages student engagement and supports student learning in the absence of substantial on-campus attendance.

This course will be delivered in a blended format. Students will interact with faculty from biology, chemistry, physics, mathematics and/or natural science for nine contact hours (scheduled as three 3-hour blocks) each week. Students will engage in an additional three hours of online learning using curated videos, simulations, and exercises. Students will also participate in biology, chemistry and physics laboratories in specific Integrated Science laboratory sections.

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Two Bethune College Peer Mentors will be specifically assigned to the Integrated Science cohort to provide students with the resources needed to develop their academic skills for success in university.
Instruction:

1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).

2. Number of department members currently competent to teach the course.

3. Instructor(s) likely to teach the course in the coming year.

4. An indication of the number of contact hours (defined in terms of hours, weeks, etc.) involved, in order to indicate whether an effective length of term is being maintained OR in the absence of scheduled contact hours a detailed breakdown of the estimated time students are likely to spend engaged in learning activities required by the course.

1. Every year, one section

2. Any Physics faculty member should be competent to teach this course

3. Dr. Scott Menary

4. Together with ITSC1102 3.00, ITSC1202 3.00, and ITSC1402 3.00 students will engage in 9 contact hours and 3 online hours each week. Students will also complete 45 laboratory hours (15 laboratory hours in each of biology, chemistry and physics) over the term.
Evaluation:

A detailed percentage breakdown of the basis of evaluation in the proposed course must be provided.

If the course is to be integrated, the additional requirements for graduate students are to be listed.

If the course is amenable to technologically mediated forms of delivery please identify how the integrity of learning evaluation will be maintained. (e.g. will "on-site" examinations be required, etc.)

Online Quizzes – 18%
Participation – 21%
Case Studies Learning Activities – 21%
Laboratory Activities – 10%*
Final Exam – 30%

*Laboratory reports in first-year physics are fully completed and submitted in the lab. Along with short pre-lab exercises, this component counts for 10% of the course mark in all regular first-year Physics courses.

Bibliography:

A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES

The Library has requested that the reading list contain complete bibliographical information, such as full name of author, title, year of publication, etc., and that you distinguish between required and suggested readings. A statement is required from the bibliographer responsible for the discipline to indicate whether resources are adequate to support the course.

Also please list any online resources.

If the course is to be integrated (graduate/undergraduate), a list of the additional readings to be required of graduate students must be included. If no additional readings are to be required, a rationale should be supplied.

LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.


Selected online resources from Khan Academy and PhET Simulations
  • www.khanacademy.org
  • http://phet.colorado.edu

(Specific URL links available upon request)
Other Resources:
A statement regarding the adequacy of physical resources (equipment, space, etc.) must be appended. If other resources will be required to mount this course, please explain.

COURSES WILL NOT BE APPROVED UNLESS IT IS CLEAR THAT ADEQUATE RESOURCES ARE AVAILABLE TO SUPPORT IT.

An active learning classroom (e.g., BERG 317) is required.

Course Rationale:
The following points should be addressed in the rationale:

How the course contributes to the learning objectives of the program / degree.

The relationship of the proposed course to other existing offerings, particularly in terms of overlap in objectives and/or content. If inter-Faculty overlap exists, some indication of consultation with the Faculty affected should be given.

The expected enrolment in the course.

By taking an integrated approach, this course will enable students to see and explore the connections between biology, chemistry, physics and mathematics in the context of societal issues and problems. The ability to approach large societal issues and problems (e.g., sustainability) from an interdisciplinary perspective is an essential skill for science students to develop as part of their scientific literacy skill set.

Taken together with SC/ITSC 1301, this course has the same learning objectives as SC/PHYS 1010. Student transcripts will specify that equivalent first year physics topics have been covered.

A committee of ten faculty members from the Departments of Biology, Chemistry, Physics, Mathematics & Statistics, and Science and Technology Studies, the Associate Dean, Students, and an Educational Development Specialist has been established to advise on the design and implementation of this course.

Expected enrolment: 48 students
Faculty and Department Approval for Cross-listings:

If the course is to be cross-listed with another department, this section needs to be signed by all parties. In some cases there may be more than two signatures required (i.e. Mathematics, Women's Studies). In the majority of the cases either the Undergraduate Director or Chair of a unit approves the agreement to cross-list. All relevant signatures must be obtained prior to submission to the Faculty curriculum committee.

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### NEW COURSE PROPOSAL FORM

**Faculty:**
Indicate all relevant Faculty(ies)

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<th>Faculty of Science</th>
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**Department:**
Indicate department and course prefix (e.g. Languages, GER)

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<th>Department:</th>
<th>Mathematics and Statistics</th>
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**Course Number:**
Special Topics courses Include variance (e.g. HUMA 3000C 6.0, Variance is “C”)

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<th>Course Number:</th>
<th>ITSC 1401 3.00</th>
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**Var:**

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**Academic Credit Weight:**
Indicate both the fee, and MTCU weight if different from academic weight (e.g. AC=6, FEE=8, MET=6)

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**Course Title:**
The official name of the course as it will appear in the Undergraduate Calendar and on the Repository

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<th>Course Title:</th>
<th>Integrated Science I (Mathematics)</th>
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**Short Title:**
Appears on any documents where space is limited - e.g. transcripts and lecture schedules - maximum 40 characters

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*With every new course proposal it is the Department’s responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.*
This course primarily examines foundational topics in calculus through the lens of contemporary issues in science, integrating disciplinary knowledge, skills and values from biology, chemistry, physics, and mathematics and statistics. Registration in this course requires simultaneous registration in ITSC 1101 3.00, ITSC 1201 3.00, and ITSC 1301 3.00. This course is Drop by Permission only. Course Credit Exclusion: SC/MATH 1013 3.00, SC/MATH1300 3.0, SC/MATH1505 6.0.
This course is part of the mathematics component of the first year integrated science program. It covers the same topics and achieves equivalent learning outcomes as the regular first year first term calculus course. Broad topics covered are: 1) Functions and Models; 2) Limits and Derivatives; 3) Differentiation; and, 4) Integration.

Integrated course learning outcomes are: 1) Integrate and apply knowledge, skills and values in biology, chemistry, physics and mathematics in order to consider and discuss broad scientific and societal problems and issues; 2) Critically and creatively solve disciplinary and interdisciplinary problems using an investigative case-based learning approach that models the process of scientific inquiry; 3) Use quantitative and qualitative reasoning to describe systems; 4) Communicate effectively with professional and lay audiences and with faculty, staff and students through written and verbal communication; and, 5) Collaborate with faculty, staff, students and community members in a productive and professional manner

Mathematics-specific learning outcomes are: 1) Appropriately develop and interpret limits, and use them to analyze continuous and differentiable functions; 2) Compute first and higher order derivatives and sketch graphs of functions; 3) Identify and employ the appropriate tools and techniques in differential calculus to solve problems on related rates and optimization; 4) Define the definite integral in terms of Riemann sums and interpret it as an area; 5) Explain the Fundamental Theorem of Calculus, and use it to compute definite integrals; 6) Distinguish between the indefinite and definite integral; and 7) Evaluate definite and indefinite integrals using the appropriate techniques at hand
Course Design:
Indicate how the course design supports students in achieving the learning objectives. For example, in the absence of scheduled contact hours what role does student-to-student and/or student-to-instructor communication play, and how is it encouraged?

Detail any aspects of the content, delivery, or learning goals that involve "face-to-face" communication, non-campus attendance or experiential education components.

Alternatively, explain how the course design encourages student engagement and supports student learning in the absence of substantial on-campus attendance.

This course will be delivered in a blended format. Students will interact with faculty from biology, chemistry, physics, mathematics and/or natural science for nine contact hours (scheduled as three 3-hour blocks) each week. Students will engage in an additional three hours of online learning using curated videos, simulations, and exercises. Students will also participate in biology, chemistry and physics laboratories in specific Integrated Science laboratory sections.

During the asynchronous online component, students will be introduced to basic concepts by watching videos (eg. Khan Academy videos), working through online simulations, and completing online assessments. Basic concepts introduced through the online component will be reinforced, expanded upon, and applied in the synchronous face-to-face component. Online learning analytics will be used to support just-in-time teaching in the face-to-face component.

During the face-to-face component, students will work individually and in small and large groups to advance through integrative case studies. Faculty instructors will facilitate student learning through direct instruction, as needed, and by guiding student inquiry. Active learning techniques will be extensively used to promote student learning and engagement. At various times throughout the semester, guest speakers (faculty, industry partners) will deliver presentations related to what the students are learning about in order to make connections to ongoing research and other real-world applications, and give students the opportunity to build their academic networks.

Two Bethune College Peer Mentors will be specifically assigned to the Integrated Science cohort to provide students with the resources needed to develop their academic skills for success in university.
Instruction:

1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).

2. Number of department members currently competent to teach the course.

3. Instructor(s) likely to teach the course in the coming year.

4. An indication of the number of contact hours (defined in terms of hours, weeks, etc.) involved, in order to indicate whether an effective length of term is being maintained OR in the absence of scheduled contact hours a detailed breakdown of the estimated time students are likely to spend engaged in learning activities required by the course.

   1. Every year, one section

   2. Any Mathematics and Statistics faculty member should be competent to teach this course

   3. Dr. Neal Madras

   4. Together with ITSC1101 3.0, ITSC1201 3.0, and ITSC1301 3.0 students will engage in 9 contact hours and 3 online hours each week. Students will also complete 48 laboratory hours (biology - 15, chemistry – 18, and physics - 15) over the term.
Evaluation:

A detailed percentage breakdown of the basis of evaluation in the proposed course must be provided.

If the course is to be integrated, the additional requirements for graduate students are to be listed.

If the course is amenable to technologically mediated forms of delivery please identify how the integrity of learning evaluation will be maintained. (e.g. will "on-site" examinations be required, etc.)

Online Quizzes – 15%
This consists of pre-class preparatory work and post class homework for each of six modules.

Participation – 25%
This consists of in-class readiness assessment (did they do the preparatory work) for each of six modules, generally a quiz

Case Studies Learning Activities – 25%
This consists of application exercises and mini-projects for each of six modules demonstrating disciplinary and integrative learning

Final Exam – 35%

Bibliography:
A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES

The Library has requested that the reading list contain complete bibliographical information, such as full name of author, title, year of publication, etc., and that you distinguish between required and suggested readings. A statement is required from the bibliographer responsible for the discipline to indicate whether resources are adequate to support the course.

Also please list any online resources.

If the course is to be integrated (graduate/undergraduate), a list of the additional readings to be required of graduate students must be included. If no additional readings are to be required, a rationale should be supplied.

LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.

| Selected online resources from Khan Academy and PhET Simulations |
| • [www.khanacademy.org](http://www.khanacademy.org) |
| • [http://phet.colorado.edu](http://phet.colorado.edu) |

(Specific URL links available upon request)
Other Resources:
A statement regarding the adequacy of physical resources (equipment, space, etc.) must be appended. If other resources will be required to mount this course, please explain.

COURSES WILL NOT BE APPROVED UNLESS IT IS CLEAR THAT ADEQUATE RESOURCES ARE AVAILABLE TO SUPPORT IT.

An active learning classroom (eg. BERG 317) is required.

Course Rationale:
The following points should be addressed in the rationale:

By taking an integrated approach, this course will enable students to see and explore the connections between biology, chemistry, physics and mathematics in the context of societal issues and problems. The ability to approach large societal issues and problems (eg. sustainability) from an interdisciplinary perspective is an essential skill for science students to develop as part of their scientific literacy skill set.

This course has the same learning objectives as SC/MATH 1013. Student transcripts will specify that equivalent first year first term calculus topics have been covered.

A committee of ten faculty members from the Departments of Biology, Chemistry, Physics, Mathematics & Statistics, and Science and Technology Studies, the Associate Dean, Students, and an Educational Development Specialist has been established to advise on the design and implementation of this course.

Expected enrolment: 48 students
Faculty and Department Approval for Cross-listings:

If the course is to be cross-listed with another department, this section needs to be signed by all parties. In some cases there may be more than two signatures required (i.e. Mathematics, Women's Studies). In the majority of the cases either the Undergraduate Director or Chair of a unit approves the agreement to cross-list. All relevant signatures must be obtained prior to submission to the Faculty curriculum committee.

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Accessible format can be provided upon request.
NEW COURSE PROPOSAL FORM

Faculty:  
Indicate all relevant Faculty(ies)  
Faculty of Science

Department:  
Indicate department and course prefix (e.g. Languages, GER)  
Mathematics and Statistics

Date of Submission:

Course Number:  
Special Topics courses Include variance (e.g. HUMA 3000C 6.0, Variance is “C”)  
ITSC 1402 3.00

Var:  

Academic Credit Weight:  
Indicate both the fee, and MTCU weight if different from academic weight (e.g. AC=6, FEE=8, MET=6

Course Title:  
The official name of the course as it will appear in the Undergraduate Calendar and on the Repository  
Integrated Science II (Mathematics)

Short Title:  
Appears on any documents where space is limited - e.g. transcripts and lecture schedules - maximum 40 characters  
Integrated Science II (Mathematics)

With every new course proposal it is the Department’s responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.
This course primarily examines foundational topics in calculus through the lens of contemporary issues in science, integrating disciplinary knowledge, skills and values from biology, chemistry, physics, and mathematics and statistics. Registration in this course requires simultaneous registration in ITSC 1102 3.00, ITSC 1202 3.00, and ITSC 1302 3.00. This course is Drop by Permission only. Course Credit Exclusion: SC/MATH 1014 3.00, SC/MATH1310 3.00, SC/MATH1505 6.0
This course is part of the mathematics component of the first year integrated science program. It covers the same topics and achieves equivalent learning outcomes as the regular first year second term calculus course. Broad topics covered are: 1) Integration; 2) Differential Equations; 3) Parametric Equations and Polar Coordinates; and, 4) Infinite Sequences and Series

Integrated course learning outcomes are: 1) Integrate and apply knowledge, skills and values in biology, chemistry, physics and mathematics in order to consider and discuss broad scientific and societal problems and issues; 2) Critically and creatively solve disciplinary and interdisciplinary problems using an investigative case-based learning approach that models the process of scientific inquiry; 3) Use quantitative and qualitative reasoning to describe systems; 4) Communicate effectively with professional and lay audiences and with faculty, staff and students through written and verbal communication; and, 5) Collaborate with faculty, staff, students and community members in a productive and professional manner

Mathematics-specific learning outcomes are: 1) Evaluate definite and indefinite integrals using the appropriate techniques at hand; 2) Identify the appropriate integration techniques needed to solve a problem; 3) Evaluate improper integrals using the appropriate techniques at hand; 4) Develop the appropriate integrals in rectangular and polar coordinates for areas of planar regions, volumes and surface areas of solids; 5) Compute areas of specific planar regions, surface areas and volumes of solids arising in sciences and engineering; 6) Solve initial value problems for first-order differential equations and integral equations that can be reduced to first-order differential equations; 7) Test for convergence and divergence of sequences and infinite series; and 8) Represent functions in terms of power series and Taylor series
This course will be delivered in a blended format. Students will interact with faculty from biology, chemistry, physics, mathematics and/or natural science for nine contact hours (scheduled as three 3-hour blocks) each week. Students will engage in an additional three hours of online learning using curated videos, simulations, and exercises. Students will also participate in biology, chemistry and physics laboratories in specific Integrated Science laboratory sections.

During the asynchronous online component, students will be introduced to basic concepts by watching videos (e.g., Khan Academy videos), working through online simulations, and completing online assessments. Basic concepts introduced through the online component will be reinforced, expanded upon, and applied in the synchronous face-to-face component. Online learning analytics will be used to support just-in-time teaching in the face-to-face component.

During the face-to-face component, students will work individually and in small and large groups to advance through integrative case studies. Faculty instructors will facilitate student learning through direct instruction, as needed, and by guiding student inquiry. Active learning techniques will be extensively used to promote student learning and engagement. At various times throughout the semester, guest speakers (faculty, industry partners) will deliver presentations related to what the students are learning about in order to make connections to ongoing research and other real-world applications, and give students the opportunity to build their academic networks.

Two Bethune College Peer Mentors will be specifically assigned to the Integrated Science cohort to provide students with the resources needed to develop their academic skills for success in university.

Course Design:
Indicate how the course design supports students in achieving the learning objectives. For example, in the absence of scheduled contact hours what role does student-to-student and/or student-to-instructor communication play, and how is it encouraged?

Detail any aspects of the content, delivery, or learning goals that involve "face-to-face" communication, non-campus attendance or experiential education components.

Alternatively, explain how the course design encourages student engagement and supports student learning in the absence of substantial on-campus attendance.
Instruction:

1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).

2. Number of department members currently competent to teach the course.

3. Instructor(s) likely to teach the course in the coming year.

4. An indication of the number of contact hours (defined in terms of hours, weeks, etc.) involved, in order to indicate whether an effective length of term is being maintained OR in the absence of scheduled contact hours a detailed breakdown of the estimated time students are likely to spend engaged in learning activities required by the course.

1. Every year, one section

2. Any Mathematics and Statistics faculty member should be competent to teach this course

3. Dr. Neal Madras

4. Together with ITSC1102 3.00, ITSC1202 3.00, and ITSC1302 3.00 students will engage in 9 contact hours and 3 online hours each week. Students will also complete 48 laboratory hours (biology - 15, chemistry – 18, and physics - 15) over the term.
Evaluation:

A detailed percentage breakdown of the basis of evaluation in the proposed course must be provided.

If the course is to be integrated, the additional requirements for graduate students are to be listed.

If the course is amenable to technologically mediated forms of delivery please identify how the integrity of learning evaluation will be maintained. (e.g. will "on-site" examinations be required, etc.)

Online Quizzes – 15%
This consists of pre-class preparatory work and post class homework for each of six modules.

Participation – 25%
This consists of in-class readiness assessment (did they do the preparatory work) for each of six modules, generally a quiz

Case Studies Learning Activities – 25%
This consists of application exercises and mini-projects for each of six modules demonstrating disciplinary and integrative learning

Final Exam – 35%

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LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.


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(Specific URL links available upon request)
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COURSES WILL NOT BE APPROVED UNLESS IT IS CLEAR THAT ADEQUATE RESOURCES ARE AVAILABLE TO SUPPORT IT.

Course Rationale:
The following points should be addressed in the rationale:

How the course contributes to the learning objectives of the program / degree.

The relationship of the proposed course to other existing offerings, particularly in terms of overlap in objectives and/or content. If inter-Faculty overlap exists, some indication of consultation with the Faculty affected should be given.

The expected enrolment in the course.

By taking an integrated approach, this course will enable students to see and explore the connections between biology, chemistry, physics and mathematics in the context of societal issues and problems. The ability to approach large societal issues and problems (eg. sustainability) from an interdisciplinary perspective is an essential skill for science students to develop as part of their scientific literacy skill set.

This course has the same learning objectives as SC/MATH 1014. Student transcripts will specify that equivalent first year second term calculus topics have been covered.

A committee of ten faculty members from the Departments of Biology, Chemistry, Physics, Mathematics & Statistics, and Science and Technology Studies, the Associate Dean, Students, and an Educational Development Specialist has been established to advise on the design and implementation of this course.

Expected enrolment: 48 students

An active learning classroom (eg. BERG 317) is required.
Faculty and Department Approval for Cross-listings:

If the course is to be cross-listed with another department, this section needs to be signed by all parties. In some cases there may be more than two signatures required (i.e. Mathematics, Women's Studies). In the majority of the cases either the Undergraduate Director or Chair of a unit approves the agreement to cross-list. All relevant signatures must be obtained prior to submission to the Faculty curriculum committee.

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Proposal for Creation of a Course Rubric for First Year Integrated Science
(Faculty of Science, March 2016)

1. It is proposed that the rubric ITSC be established for courses that are part of first year integrated science (FYIS).

1.1. The integrated science first year experience is a unique approach to first year pedagogy in science and participation should be clear on the student transcript.
1.2. The integrated science courses emphasise the interdisciplinary nature of science. In first year that manifests itself as an approach to teaching via problems and case studies that clearly require use of knowledge from multiple disciplines.
1.3. Integrated science courses also emphasise collaborative learning through problem solving and group work in the classroom.
1.4. A clear label should be used for such courses.
1.5. It is proposed that this rubric not “belong” to an academic unit but rather be a Faculty-wide rubric used exclusively for courses that adopt the integrated science approach in the sense of 1.2 and 1.3

2. Currently we are proposing 8 new integrated courses reflecting the disciplinary components of mathematics, physics, chemistry and biology in the fall and winter terms of the first year integrated science. It is possible that additional courses representing disciplinary components of integrated science for second year will be established in the future; and for third year.

3. We would like ITSC courses to appear on the student’s transcript thereby clearly show their participation in integrated science.

3.1. The integrated science approach brings added value in terms of understanding the process of science, and the contribution of disciplines to tackling real-world issues
3.2. The approach also brings added value in terms of collaborative and group work skills
3.3. This added value should be signalled on the student’s transcript
The 624th Meeting of Senate held on Thursday, March 31, 2016

Remarks
The Chair of Senate, Professor George Comninel, wished students and faculty members well as the Winter Term was ending and welcomed the Chair of the Board of Governors, Rick Waugh, who spoke of the importance of the search for the next President and Senate’s vital contributions to the process.

The President, Dr Mamdouh Shoukri, reported on postsecondary education elements of the March 23 federal budget. Members have been named to the President’s Advisory Committee on Inclusion which will take a lead in further redeeming the University’s commitment to diverse and inclusive campuses. The University’s formal partial designation as a provider of French language services is a positive recognition of the role played by the University and Glendon. The University is assisting Professor Felipe Montoya and his family in their efforts to obtain permanent residency, and President Shoukri urged Senators to lend their support.

The President’s monthly “Kudos Report” can be accessed from the agenda package.

Senate Advisory Statement to the Presidential Search Committee
Senators offered their thoughts on the contents of an advisory statement to the Presidential Search Committee which will be brought to Senate for approval in April after input from Faculty Councils and Senate committees.

Approvals
Senate approved the establishment of a Department of Computational Arts in the School of the Arts, Media, Performance and Design. Academic units are formally approved by the Board of Governors with the concurrence of Senate.

Senate approved recommendations made by the Academic Standards, Curriculum and Pedagogy Committee to establish

- the Degree of Master of Management, Schulich School of Business / Faculty of Graduate Studies
- a Master of Management Program, Schulich School of Business / Faculty of Graduate Studies
- a Dual Credential Program: Master of Public and International Affairs at York University and the Maîtrise en Affaires publiques at Laval University, Glendon / Faculty of Graduate Studies
- a Minor Degree Option in Human Resource Management, School of Human Resource Management, Faculty of Liberal Arts & Professional Studies
- a 90-Credit Degree Option within the BA Program in Digital Media, School of the Arts, Media, Performance and Design / Lassonde School of Engineering
- a Game Arts Stream within the BA Program in Digital Media, School of the Arts, Media, Performance and Design / Lassonde School of Engineering
Committee Information Reports
Senate Executive advised that it had issued the annual call for expressions of interest in Senate committee membership and other positions elected by Senate. It also confirmed that a motion first considered under other business at the February meeting had been withdrawn.

APPRC urged Senators to participate in the next stage of consultations on the Plan for the Intensification and Enhancement of Research (PIER). The draft report can be accessed from this link


ASCP advised Senate on implementation plans for the three “academic forgiveness” policies approved in February 2016 and reported that it had approved minor modifications for the following:

School of the Arts, Media, Performance and Design
- BA programs in Human Rights and Equity Studies (change to requirements)

Lassonde / Graduate Studies
- Graduate Program in Electrical Engineering and Computer Science (revised rubric)

APPRC and ASCP jointly conveyed a report from the Joint Sub-Committee on Quality Assurance and the Annual Report on Non-Degree Studies prepared by the Vice-Provost Academic, Alice Pitt.

Please refer to the full Senate agenda posted online for details about these items.

Senate’s next meeting will be held at 3:00 p.m. on Thursday, April 28, 2016.
From Senate Executive to Senate Committees and Faculty Councils
Advisory Statement to the Presidential Search Committee
March 16, 2016

The Principles Governing a Presidential Search (approved by Senate, March 2005; and by the Board of Governors, May 2005) spell out an explicit role for the Executive Committee of Senate with regard to the development of advice to the Search Committee:

“The process should include broad and extensive consultations with the York community about the University’s strategic needs in the following five to ten year period and about the attributes which the new president should possess to meet those needs. Senate’s advice to the search committee shall be based on focused discussion by Senators in committee of the whole and in key Senate committees. Senate Executive shall be responsible for preparing an advisory statement on the criteria which will be submitted to Senate for approval prior to transmittal to the search committee.”

As in the past, the Executive Committee seeks input from Senate committees and Faculty Councils in the development of the advisory statement.

The Search Committee has formulated a series of questions as the basis for consultations. Senate committees and Faculty Councils are asked to provide input to Senate Executive by responding to the following questions. In doing so, please pay particular attention to the University Academic Plan 2015-2020 and its objectives.

What makes York University different from other universities / what strengths should York continue to build upon?

What challenges and opportunities do you see for York University over the next few years?

What should be the goals and priorities for the next President and Vice-Chancellor? (Alternatively, you may wish to just finish the sentence: “I hope that the next President does …”.)

What experience and/or leadership attributes should York University be seeking in its next President and Vice-Chancellor – and are there any characteristics of York itself that the next President should exemplify?

What else should the Search Committee be considering?

Senate Executive meetings on April 19 to finalize a draft advisory statement for approval by Senate. The Committee asks that responses are forwarded by April 11.

Members of Senate committees and Faculty Councils may also wish to participate in consultations scheduled for the Keele and Glendon campuses. A list of meeting dates, times and locations can be accessed from this link:


Individuals may also submit confidential responses to the questions or other comments to the Search Committee at its e-mail address of yorkupresident@caldwellpartners.com