

Computational Sciences

College of Natural Sciences
Faculty of Science

This section presents the requirements for:

- **Computational Biochemistry - B.Sc. Honours**
- **Computational Biology with Specialization in Molecular Bioinformatics - B.Sc. Honours Biodiversity - B.Sc. Honours**
- **Computational Chemistry - B.Sc. Honours**
- **Computational Chemistry - B.Sc. General**
- **Computational Geophysics - B.Sc. Honours**

These programs are offered by the Institute of Biochemistry and the Departments of Biology, Chemistry and Earth Sciences.

Graduation Requirements

In addition to the requirements listed below, students must satisfy the University regulations common to all undergraduate students (see the *Academic Regulations of the University* in this Calendar),

Students should consult with the relevant Department(s) when planning their program and selecting courses.

Course Categories for Computational Sciences

The program descriptions below make use of the following categories defined in the *Academic Regulations for the Bachelor of Science Degree* section of this Calendar.

- **Science Faculty Electives**
- **Approved Arts or Social Science**
- **Free Elective**

Program Requirements

Computational Biochemistry B.Sc. Honours (20.0 credits)

A. Credits Included in the Major (14.0 credits):

1. 1.5 credits in BIOL 1003, BIOL 2104, BIOL 3104;
2. 1.0 credit in Biology at the 1000-level or higher;
3. 3.0 credits in CHEM 1000 [1.0], CHEM 2203, CHEM 2101, CHEM 2303, CHEM 3503;
4. 0.5 credit in CHEM 2204 or CHEM 2206;
5. 2.5 credits in Biochemistry: BIOC 2200, BIOC 3005, BIOC 3100 [1.0], BIOC 4006;
6. 0.5 credit in Biochemistry at the 4000-level or CHEM 4406;
7. 0.5 credit in Biochemistry at the 4000-level;
8. 1.5 credits in COMP 1005, COMP 1006, COMP 2002;
9. 0.5 credits in Computer Science at the 2000-level or above;
10. 2.5 credits in CMPS 2800, CMPS 3604, CMPS 3800, CMPS 4909 [1.0];

B. Credits Not Included in the Major (6.0 credits):

11. 1.0 credit in PHYS 1007 and PHYS 1008; or PHYS 1003 and PHYS 1004;

12. 1.5 credits in MATH 1007, MATH 1107, and STAT 2507;

13. 2.0 credits in Approved Arts or Social Sciences;

14. 1.5 credits in free electives.

Computational Biology with Specialization in Molecular Bioinformatics B.Sc. Honours (20.0 credits)

A. Credits Included in the Major CGPA (12.0 credits):

1. 4.0 credits in BIOL 1003, BIOL 1004, BIOL 2001, BIOL 2002, BIOL 2104, BIOL 2200 BIOL 2600, BIOL 4901;
2. 0.5 credit in BIOL 3205 or BIOL 3305;
3. 2.5 credits in CMPS 2800, CMPS 3604, CPMS 3800, CMPS 4909[1.0];
4. 4.0 credits in CHEM 2203, CHEM 2204, BIOL 3104, BIOC 3100 [1.0], BIOC 4002, BIOC 4006, BIOL 4106;
5. 1.0 credit in Biology or Biochemistry at the 3000-level or above;

B. Credits Not Included in the Major CGPA (8.0 credits):

6. 1.0 credit in CHEM 1000 [1.0];
7. 1.0 credit in PHYS 1007 and PHYS 1008, or PHYS 1003 and PHYS 1004;
8. 1.5 credits in MATH 1007, MATH 1107 and STAT 2507;
9. 1.5 credits in COMP 1005, COMP 1006, COMP 2002;
10. 0.5 credit in Computer Science at the 2000-level or above;
11. 0.5 credits in NSCI 1000 or Approved Arts or Social Sciences;
12. 1.5 credits in Approved Arts or Social Sciences;
13. 0.5 credit in free elective.

Computational Biology with Specialization in Biodiversity B.Sc. Honours (20.0 credits)

A. Credits Included in the Major CGPA (11.0 credits):

1. 4.0 credits in BIOL 1003, BIOL 1004, BIOL 2001, BIOL 2002, BIOL 2104, BIOL 2200 BIOL 2600, BIOL 4901;
2. 0.5 credit in BIOL 3205 or BIOL 3305;
3. 1.5 credits in CMPS 2800, CMPS 4909 [1.0];
4. 0.5 credit in CMPS 3604 or CMPS 3800;
5. 2.0 credits in BIOL 3601, BIOL 3602, BIOL 3604, BIOL 4103;
6. 0.5 credit in BIOL 4104 or BIOL 4609;
7. 2.0 credits in Biology at the 3000-level or above;

B. Credits Not Included in the Major CGPA (9.0 credits):

8. 1.0 credit in CHEM 1000 [1.0];
9. 1.0 credit in Physics: PHYS 1007 and PHYS 1008, or PHYS 1003 and PHYS 1004;
10. 1.5 credits in MATH 1007, MATH 1107 and STAT 2507;
11. 1.5 credits in COMP 1005, COMP 1006, COMP 2002;
12. 0.5 credit in Computer Science at the 2000-level or above;

13. 0.5 credits in NSCI 1000 or Approved Arts or Social Sciences;
14. 1.5 credits in Approved Arts or Social Sciences;
15. 1.5 credit in free elective.

Computational Chemistry B.Sc. Honours (20.0 credits)

A. Credits Included in the Major CGPA (13.0 credits):

1. 6.5 credits in CHEM 1000 [1.0], CHEM 2101, CHEM 2102, CHEM 2203, CHEM 2206, CHEM 3101, CHEM 3102, CHEM 3106, CHEM 3201, CHEM 3503, CHEM 3504, CHEM 4406;
2. 0.5 credit in Chemistry or Biochemistry at the 3000- or 4000-level;
3. 0.5 credit in Chemistry or Biochemistry at the 4000-level;
4. 3.5 credits in COMP 1002, COMP 1005, COMP 1006; COMP 2002, COMP 2003, COMP 2004, COMP 3004;
5. 0.5 credit from: COMP 3005, COMP 3806;
6. 0.5 credit in Computer Science at the 3000- or 4000-level;
7. 1.0 credit in CMPS 4909 [1.0];

B. Credits Not Included in the Major CGPA (7.0 credits):

8. 1.5 credits in MATH 1007, MATH 1107, MATH 2007;
9. 0.5 credit in BIOL 1003;
10. 1.0 credit in BIOC 3100 [1.0];
11. 0.5 credit in PHYS 1003 or PHYS 1007;
12. 0.5 credit in NSCI 1000 or Approved Arts or Social Sciences;
13. 1.5 credit in Approved Arts or Social Sciences;
14. 0.5 credit in Science Faculty Electives;
15. 1.0 credit in free electives.

Computational Chemistry B.Sc. General (15.0 credits)

A. Credits Included in the Major CGPA (9.5 credits):

1. 5.0 credits in CHEM 1000 [1.0], CHEM 2101, CHEM 2203, CHEM 2206, CHEM 3101, CHEM 3102, CHEM 3106, CHEM 3201, CHEM 3503;
2. 1.0 credit in BIOC 3100 [1.0];
3. 3.5 credits in COMP 1002, COMP 1005, COMP 1006, COMP 2002, COMP 2003, COMP 2004, COMP 3004;

B. Credits Not Included in the Major CGPA (5.5 credits):

4. 1.5 credits in MATH 1007, MATH 1107, MATH 2007;
5. 0.5 credits in BIOL 1003;
6. 0.5 credits in PHYS 1003 or PHYS 1007;
7. 0.5 credits in NSCI 1000 or Approved Arts or Social Sciences;
8. 1.5 credit in Approved Arts or Social Sciences;
9. 1.0 credit in free electives.

Computational Geophysics B.Sc. Honours (20.0 credits)

A. Credits Included in the Major CGPA (9.5 credits):

1. 1.5 credits in COMP 1005, COMP 1006, and COMP 2002;
2. 0.5 credit in Computer Science at the 2000-level or above;
3. 2.0 credits in CMPS 2800, CMPS 3800, and CMPS 4909 [1.0];
4. 0.5 credit in Computational Science (CMPS) at the 3000-level or above;
5. 1.0 credit from GEOL 1006, GEOL 1007 and GEOL 1008;
6. 4.0 credits in GEOL 2801, GEOL 2205, GEOL 2208, GEOL 3201, GEOL 3805, GEOL 3806, GEOL 4801, GEOL 4804;

B. Credits Not Included in the Major CGPA (10.5 credits):

7. 2.5 credits in MATH 1007, MATH 1107, MATH 2007, MATH 2008, STAT 2507;
8. 2.5 credits in PHYS 1001, PHYS 1002, PHYS 2202, PHYS 3807, PHYS 4203;
9. 0.5 credit in ELEC 3105;
10. 1.0 credit in CHEM 1000 [1.0];
11. 2.0 credits from GEOL 2203, GEOL 2301, GEOL 2802, GEOL 3203, GEOL 3204, GEOL 3205, GEOL 4203, GEOL 4707, GEOL 4805, PHYS 2604, PHYS 3604;
12. 0.5 credits in NSCI 1000 or Approved Arts and Social Sciences;
13. 1.5 credits in Approved Arts and Social Sciences.

Note: the courses in Requirement 10 above should be selected in consultation with the program adviser.