

## BSc Honours Molecular Biology and Biotechnology

**Minimum Requirements for Graduation: GPA Cumulative Average 60% and Major Average 70%**

### RECOMMENDED COURSE SEQUENCE

#### Fall Semester:

#### Winter Semester:

##### Year 1: Ten Courses Including:

- ☐ **BIOL 1101** – Cell Biology
- ☐ **CHEM 1100** – General Chemistry I
- ☐ **COMP 1047** – Comp. Concepts End-Users or **COMP-2067** Programming for Beginners
- ☐ **MATH 1720** or **MATH 1760** – Differential Calculus
- ☐ **PHYS 1300** – Intro Physics Life Sciences I or **PHYS 1400** – Intro Physics I

- ☐ **BIOL 1111** – Biological Diversity
- ☐ **CHEM 1110** – General Chemistry II
- ☐ **PHYS 1310** – Intro Physics Life Sciences II or **PHYS 1410** – Intro Physics II
- ☐ **STAT 2910** – Statistics for the Sciences
- ☐ \_\_\_\_\_ Any Area of Study Course

##### Year 2: Ten Courses Including:

- ☐ **BIOM 2071** – Intro Microbiology & Techniques
- ☐ **BIOL 2101** – Ecology
- ☐ **BIOL 2111** – Genetics
- ☐ **CHEM 2300** – Intro Organic Chemistry I
- ☐ \_\_\_\_\_ Any Area of Study Course

- ☐ **BIOC 2010** – Organic Chem. of Biomolecules
- ☐ **BIOM 2131** – Introductory Molecular Biology
- ☐ \_\_\_\_\_ Mol Bio&Biotech\* or Biochem/Chem/Bio Option\*\*
- ☐ \_\_\_\_\_ Mol Bio&Biotech\* or Biochem/Chem/Bio Option\*\*
- ☐ \_\_\_\_\_ Any Area of Study Course

##### Year 3: Ten Courses Including:

- ☐ **BIOC 3100** – Metabolism I
- ☐ **BIOM 3500** – Molecular Cell Biology
- ☐ **BIOM 3581** – Biotech Lab (Semester 1)
- ☐ \_\_\_\_\_ Mol Bio&Biotech\* or Biochem/Chem/Bio Option\*\*
- ☐ \_\_\_\_\_ Any Area of Study Course

- ☐ **BIOC 3110** – Metabolism II
- ☐ **BIOC 3130** – Protein and Nucleic Acid Chemistry
- ☐ **BIOL 3142** – Evolution
- ☐ **BIOM 3530** – Advanced Cell Biology
- ☐ **BIOM 3581** – Biotech Lab (Semester 2)

##### Year 4: Ten Courses Including:

- ☐ **BIOL 4570** – Plant Molecular Biology & Physiology
- ☐ **BIOL 4904**<sup>†</sup> (Semester 1) – Undergrad Research Biology
- ☐ \_\_\_\_\_ Mol Bio&Biotech\* or Biochem/Chem/Bio Option\*\*
- ☐ \_\_\_\_\_ Mol Bio&Biotech\* or Biochem/Chem/Bio Option\*\*
- ☐ \_\_\_\_\_ Mol Bio&Biotech\* or Biochem/Chem/Bio Option\*\*

- ☐ **BIOC 4010** – Bioinformatics/Genomics/Proteomics
- ☐ **BIOM 4560** – Molecular Biotechnology
- ☐ **BIOL 4904**<sup>†</sup> (Semester 2) – Undergrad Research Biology
- ☐ \_\_\_\_\_ Mol Bio&Biotech\* or Biochem/Chem/Bio Option\*\*
- ☐ \_\_\_\_\_ Mol Bio&Biotech\* or Biochem/Chem/Bio Option\*\*

\*Must choose 5 courses from the following **Mol Bio & Biotech Options:**

- |                                           |                                           |                                           |                                           |
|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| <input type="checkbox"/> <b>BIOL 3022</b> | <input type="checkbox"/> <b>BIOM 3070</b> | <input type="checkbox"/> <b>BIOM 3550</b> | <input type="checkbox"/> <b>BIOM 4540</b> |
| <input type="checkbox"/> <b>BIOL 3571</b> | <input type="checkbox"/> <b>BIOM 3071</b> | <input type="checkbox"/> <b>BIOM 4530</b> | <input type="checkbox"/> <b>BIOM 4590</b> |

\*\*Must Choose 3 courses from the following **Biochem/Chem/Bio Options:**

- |                                           |                                           |                                           |                                           |
|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| <input type="checkbox"/> <b>BIOC 4030</b> | <input type="checkbox"/> <b>BIOL 2480</b> | <input type="checkbox"/> <b>BIOL 4481</b> | <input type="checkbox"/> <b>CHEM 2500</b> |
| <input type="checkbox"/> <b>BIOC 4050</b> | <input type="checkbox"/> <b>BIOL 4232</b> | <input type="checkbox"/> <b>BIOM 4440</b> | <input type="checkbox"/> <b>CHEM 3210</b> |
| <input type="checkbox"/> <b>BIOL 4008</b> | <input type="checkbox"/> <b>BIOL 4450</b> | <input type="checkbox"/> <b>CHEM 2200</b> |                                           |

<sup>†</sup>Requires pre-requisites, a 70% major GPA, and 60% cumulative GPA

Students considering application to some Pharmacy schools are advised to take CHEM-2400.

Students planning to write the MCAT or DAT may wish to take PSYC-1150 and PSYC-1160 (Social Science) and GART-1500 or ENGL-1001 (Art/Language)

**CORE COURSES SUMMARY****CORE COURSES (A) – BIOLOGY & BIOMEDICAL: Total 11 Courses**Complete **ALL** of the following:

- |                                                                        |                                                                                  |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <input type="checkbox"/> <b>BIOL 1101</b> – Cell Biology               | <input type="checkbox"/> <b>BIOM 2131</b> – Intro Molecular Biology              |
| <input type="checkbox"/> <b>BIOL 1111</b> – Biological Diversity       | <input type="checkbox"/> <b>BIOL 3142</b> – Evolution                            |
| <input type="checkbox"/> <b>BIOL 2071</b> – Intro Microbiology & Tech. | <input type="checkbox"/> <b>BIOM 3500</b> – Molecular Cell Biology               |
| <input type="checkbox"/> <b>BIOL 2101</b> – Ecology                    | <input type="checkbox"/> <b>BIOM 3530</b> – Advanced Cell Biology                |
| <input type="checkbox"/> <b>BIOL 2111</b> – Genetics                   | <input type="checkbox"/> <b>BIOM 4560</b> – Molecular Biotechnology              |
|                                                                        | <input type="checkbox"/> <b>BIOL 4570</b> – Plant Molecular Biology & Physiology |

**CORE COURSES (B) – BIOLOGY & BIOMEDICAL: Total 4 Courses**Complete **ALL** of the following pair:

- ☐
- BIOL 4904 (2 semesters)**
- Undergrad Research Biology
- 
- ☐
- BIOM 3581A & 3581B**
- Biotechnology

**CORE COURSES – CHEMISTRY: Total 8 Courses**Complete **8** of the following:

- |                                                                                |                                                                                |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| <input type="checkbox"/> <b>BIOC 2010</b> – Organic Chem. of Biomolecules      | <input type="checkbox"/> <b>BIOC 4010</b> – Bioinformatics/Genomics/Proteomics |
| <input type="checkbox"/> <b>BIOC 3100</b> – Metabolism I                       | <input type="checkbox"/> <b>CHEM 1100</b> – General Chemistry I                |
| <input type="checkbox"/> <b>BIOC 3110</b> – Metabolism II                      | <input type="checkbox"/> <b>CHEM 1110</b> – General Chemistry II               |
| <input type="checkbox"/> <b>BIOC 3130</b> – Protein and Nucleic Acid Chemistry | <input type="checkbox"/> <b>CHEM 2300</b> – Intro Organic Chemistry I          |

**PHYSICS PAIR: Total 2 Courses**Complete **1 PAIR** of the following:

- ☐
- PHYS 1300 & 1310**
- Intro Physics Life Sciences I & II
- 
- ☐
- PHYS 1400 & 1410**
- Intro Physics I & II

**COMPUTER SCIENCE COURSE: Total 1 Courses**Complete **1** of the following:

- ☐
- COMP 1047**
- Comp. Concepts End-Users
- 
- ☐
- COMP-2067**
- Programming for Beginners

**MATH COURSES: Total 2 Courses**

- ☐
- MATH 1720**
- or
- MATH 1760**
- Differential Calculus
- 
- ☐
- STAT 2910**
- Statistics for the Sciences

**MOLECULAR BIO & BIOTECHNOLOGY COURSES: – Total 5 courses**Complete **5** of the following

- |                                                                                                                                                |                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <input type="checkbox"/> <b>BIOL 3022</b> – Res. Principles/Study Design Biology                                                               | <input type="checkbox"/> <b>BIOM 3550</b> – Embryology                       |
| <input type="checkbox"/> <b>BIOL 3571</b> – Animal Cells and Tissues                                                                           | <input type="checkbox"/> <b>BIOM 4530</b> – Biology of Cell Transformation   |
| <input type="checkbox"/> <b>BIOM 3070</b> – Medical Microbiology <b>OR</b> <b>BIOM 3071</b> – Medical Micro. And Techniques (cannot take both) | <input type="checkbox"/> <b>BIOM 4540</b> – Regenerative Biology and Disease |
|                                                                                                                                                | <input type="checkbox"/> <b>BIOM 4590</b> – Epigenetics                      |

**ADDITIONAL CHEM, BIOCHEM, BIO COURSES: – Total 3 courses**Complete **3** of the following:

- |                                                                          |                                                                             |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <input type="checkbox"/> <b>BIOC 4030</b> – Enzymology and Biotechnology | <input type="checkbox"/> <b>BIOL 4450</b> – Behavioural Neurobiology        |
| <input type="checkbox"/> <b>BIOC 4050</b> – Drug Design                  | <input type="checkbox"/> <b>BIOL 4481</b> – Excitable Cells                 |
| <input type="checkbox"/> <b>BIOL 4008</b> – Special Topics               | <input type="checkbox"/> <b>BIOM 4440</b> – Neurophysiology                 |
| <input type="checkbox"/> <b>BIOL 2480</b> – Principles of Neuroscience   | <input type="checkbox"/> <b>CHEM 2200</b> – Analytical Chemistry            |
| <input type="checkbox"/> <b>BIOL 4232</b> – Pollution Ecology            | <input type="checkbox"/> <b>CHEM 2500</b> – Intro. Inorganic Chemistry      |
|                                                                          | <input type="checkbox"/> <b>CHEM 3210</b> – Princ. of Instrumental Analysis |

**ADDITIONAL COURSES – Total 4 courses****Any Area of Study** – Choose **4** Courses (Recommend a minimum of one Arts/Language and one Social Science)