



## Program Planning Guide

Current and past Program Planning Guides are available on the UofL website at [www.uleth.ca/ross/ppgs/ppg.html](http://www.uleth.ca/ross/ppgs/ppg.html)

Calendar Year: 2011/2012

Faculty: Arts & Science

### About the Multidisciplinary Major in Neuroscience

The Faculty of Arts and Science offers instruction leading to a Bachelor of Science with a multidisciplinary major in Neuroscience. The program provides background for a diverse range of post-graduate activities and is a popular area of study for students who wish to gain entry into graduate programs in Medicine, Dentistry, and other professional programs related to medical science. Core courses are offered by the Departments of Neuroscience and Psychology but the major also draws on both science and arts courses from across the Faculty.

### Co-operative Education

A Co-op option, requiring three work terms, is available. Students interested in the Co-operative Education/Internship program should contact the Coordinator of Co-operative Education in the Career Resources Centre (AH154 | phone: 403-382-7154) for further information.

### High School Courses

Several university-level science courses have high school-level courses as recommended background or prerequisites. Students are advised to complete recommended background courses before registering in the university-level course; students must have successfully completed prerequisites before they may register in the university-level course. Students pursuing a Neuroscience major should note the following recommended/required high school courses.

<i>UofL Science course</i>		<i>High School course</i>
Biology	1010 1020 2000	Biology 30 and Chemistry 30** <i>Recommended: Biology 30</i> Mathematics 30-1 or Pure Mathematics 30* (and Biology 1010 and Biology 1020)
Chemistry	1000 1110	Chemistry 30** and Mathematics 30-1 or Pure Mathematics 30* <i>Recommended: Mathematics 31 and Physics 30</i> <i>Recommended: Chemistry 30** and Mathematics 30-1 or Pure Mathematics 30*</i>
Mathematics	1410 1560	Mathematics 30-1 or Pure Mathematics 30* Mathematics 30-1 or Pure Mathematics 30* <i>Recommended: Mathematics 31 and a blended grade of at least 75% in Mathematics 30-1 or Pure Mathematics 30*</i>
Physics	1000 1050	Physics 30, and Mathematics 30-1 or Pure Mathematics 30* Mathematics 30-1 or Pure Mathematics 30* <i>Recommended: One course in the physical sciences at the 20 level or above</i>
Statistics	1770	Mathematics 30-1, Mathematics 30-2, or Pure Mathematics 30*

\* Instead of Mathematics 30-1, Mathematics 30-2, or Pure Mathematics 30, students may use UofL's Mathematics 0500, or both Applied Mathematics 30 and a minimum grade of 75% in Athabasca University's Mathematics 101.

\*\* Instead of Chemistry 30, students may use UofL's Chemistry 0500.

### Program Requirements

The B.Sc. degree with a multidisciplinary major in Neuroscience requires 40 semester courses, including 22 courses in the major.

### Transfer Credit

Remember that you may use both University of Lethbridge credit and credit transferred from another college or university to meet degree and major requirements. Transfer credit may be either specified or unspecified. Specified credit is indicated on your transcript by the subject name and the specific number of the course, e.g., Biology 1010, Chemistry 2500. Unspecified credit (1XXX, 2XXX, etc.) is indicated by the subject name and level of the course in parentheses, e.g., Biology (1000 level), Chemistry (2000 level), etc.

**Unspecified Course Credit**      Unspecified course credit means that the University of Lethbridge does not offer the same course you transferred in, but we recognize it and treat it as a regular course. An unspecified course would count as one of your maximum of 20 from one department, but it could not meet a specific course requirement. For example, if Biology 2000 is required in your program, you could not use Biology (2000 level) to fulfill that requirement. Students with unspecified transfer credit need to consult an Academic Advisor to establish how the transfer credit fits in the degree program. This should be done as soon as possible after transfer credit is awarded.

**Program Worksheet**

**Name :** \_\_\_\_\_ **ID :** \_\_\_\_\_

**Required courses:**

- \_\_\_\_\_ 1. Biology 1010 - Cellular Basis of Life
- \_\_\_\_\_ 2. Biology 1020 - Diversity of Life
- \_\_\_\_\_ 3. Biology 2000 - Principles of Genetics
- \_\_\_\_\_ 4-6. THREE of:
  - \_\_\_\_\_ Biochemistry 2000 - Introductory Biochemistry
  - \_\_\_\_\_ Biology 3000 - Gene Expression and Regulation
  - \_\_\_\_\_ Biology 3105 - Signal Transduction
  - \_\_\_\_\_ Biology 3310 - Developmental Biology
  - \_\_\_\_\_ Biology 3400 - Principles of Microbiology
  - \_\_\_\_\_ Neuroscience 3625 - Cellular and Molecular Neurobiology
- \_\_\_\_\_ 7. ONE of:
  - \_\_\_\_\_ Philosophy 2220 - Philosophy of Mind
  - \_\_\_\_\_ Philosophy 2233 - Philosophy and the World View of Science: Earth and Life Sciences
  - \_\_\_\_\_ \*Philosophy 3270 - Theory of Knowledge
  - \_\_\_\_\_ \*Philosophy 3402 - Biomedical Ethics
- \_\_\_\_\_ 8. ONE of:
  - \_\_\_\_\_ Physics 1000 - Introduction to Physics I
  - \_\_\_\_\_ Physics 1050 - Introduction to Biophysics
- \_\_\_\_\_ 9. Neuroscience 2600 - Brain and Behaviour
- \_\_\_\_\_ 10. Neuroscience 3600 - Fundamental Neurobiology
- \_\_\_\_\_ 11. Psychology 2320 - Cognition and Perception: Thinking and Seeing
- \_\_\_\_\_ 12. Psychology 2700 - Behaviour and Evolution
- \_\_\_\_\_ 13. ONE of:
  - \_\_\_\_\_ Neuroscience 4630 - Neuroscience (Series)
  - \_\_\_\_\_ Neuroscience 4980 - Applied Studies
  - \_\_\_\_\_ Neuroscience 4990 - Independent Study
  - \_\_\_\_\_ \*\*Neuroscience 4995 - Undergraduate Thesis
- \_\_\_\_\_ 14-15. Any two courses in Neuroscience or Psychology at the 3000 or 4000 level with a Science designation (see the 2011/2012 Calendar, Part 7, Section 20 - Divisional Course Designation, p. 110 and List III: Science Courses, p. 87).
  - 1. \_\_\_\_\_
  - 2. \_\_\_\_\_
- \_\_\_\_\_ 16. ONE of the following:
  - \_\_\_\_\_ One course (3.0 credit hours) in English (at the 1000 level or higher)
  - \_\_\_\_\_ Writing 1000 - Introduction to Academic Writing

- \_\_\_\_\_ 17. ONE of the following:  
 \_\_\_\_\_ Psychology 2030 - Methods and Statistics  
 \_\_\_\_\_ Statistics 1770 - Introduction to Probability and Statistics

- \_\_\_\_\_ 18-22. ONE of the following groups (a or b):

\_\_\_\_\_ a.

Biochemistry 2000 - Introductory Biochemistry  
 Chemistry 1110 - Chemistry for Life Sciences I  
 Chemistry 2120 - Chemistry for Life Sciences II  
 Two additional courses in Biology, Chemistry, Neuroscience, or Psychology at the 3000 or 4000 level with a Science designation (see the 2011/2012 Calendar, Section 20. Divisional Course Designation, p. 110 and List III: Science Courses, p. 87)

**Note:** *Students who choose this grouping may not choose Biochemistry 2000 as part of the "Three of" list above.*

OR

\_\_\_\_\_ b.

Chemistry 1000 - General Chemistry I  
 Chemistry 2000 - General Chemistry II  
 Chemistry 2500 - Organic Chemistry I  
 Chemistry 2600 - Organic Chemistry II  
 ONE of:  
     Mathematics 1410 - Elementary Linear Algebra  
     Mathematics 1560 - Calculus I

*\*Prerequisite required: One of Philosophy 1000 or a 2000-level course (3.0 credit hours) in Philosophy.*

*\*\*If Neuroscience 4995 (6.0 credit hours) is chosen, the requirement for two additional courses at the 3000 or 4000 level in Neuroscience or Psychology with a Science designation is reduced to one additional such course.*

**Recommended courses include:**

- Biology 3005 - Genome Maintenance
- Biology 3115 - Principles of Cell Growth
- \*Biology 3210 - Experimental Methods in Molecular and Cellular Biology
- Biology 3420 - Animal Physiology
- \*\*Biology 4110 - Advances in Genetics, Molecular and Cellular Biology
- Computer Science 1000 - Introduction to Computer Science
- Drama 2350 - Speech Communication
- Logic 1000 - Critical Thinking
- \*\*\*Logic 2003 - Symbolic Logic I
- Management 3020 - Marketing
- Neuroscience 3705 - Evolution of Brain and Behaviour
- Psychology 3360 - Sensation and Perception

*\*Has prerequisite: Chemistry 2000.*

*\*\*Has prerequisite: One of Biology 3000 or Biology 3005; One of Biology 3105 or Biology 3115.*

*\*\*\*Logic 2003 is recommended background for Philosophy 3270.*

It is strongly recommended that students who are planning to pursue graduate studies in the neurosciences consider the undergraduate thesis option and include the following courses in their program:

- Neuroscience 3605 - Research Methods in Neuroscience
- Psychology 3400 - Advanced Research Design and Data Analysis

## Sample Sequencing Plan

Shown below is a sample sequence of courses for your degree. If you follow this plan, you should be able to graduate in four years, provided you complete five courses per semester. This is just one example of how you could complete your major and degree requirements; you may find that a different sequence works as well as this one.

<p><b>Year 1, Fall</b>                      Biology 1010                      Chemistry 1000 or                      Chemistry 1110                      Mathematics 1410 or                      Mathematics 1560 or Elective<sup>1</sup>                      GLER course                      GLER course</p>	<p><b>Year 1, Spring</b>                      Biology 1020                      Chemistry 2000 or                      Chemistry 2120                      Neuroscience 2600                      One of: English 1900 or                      Writing 1000                      GLER course</p>
<p><b>Year 2, Fall</b>                      Biochemistry 2000 or                      Chemistry 2500                      Biology 2000                      Physics 1000 or Physics 1050                      Psychology 2320                      GLER course (<i>List 1: Philosophy 1000 recommended</i>)</p>	<p><b>Year 2, Spring</b>                      Chemistry 2600 or One Biology,                      Chemistry, Neuroscience, or                      Psychology 3000/4000 level                      (Science)                      Psychology 2030 or                      Statistics 1770                      Psychology 2700                      GLER course                      GLER course</p>
<p><b>Year 3, Fall</b>                      Neuroscience 3600                      One "Three of:" List requirement<sup>2</sup>                      Science elective                      Elective                      Elective</p>	<p><b>Year 3, Spring</b>                      One of: Philosophy 2220, 2233,                      3270, or 3402<sup>3</sup>                      One Biology, Chemistry,                      Neuroscience, or Psychology                      3000/4000 level (Science) or                      Science elective 3000/4000                      level<sup>4</sup>                      One "Three of:" List requirement<sup>2</sup>                      Science elective                      Science elective</p>
<p><b>Year 4, Fall</b>                      One "Three of:" List requirement<sup>2</sup>                      Neuroscience/Psychology 3000/                      4000 level (Science)                      Science elective 3000/4000 level                      Science elective                      Elective</p>	<p><b>Year 4, Spring</b>                      Neuroscience/Psychology 3000/                      4000 level (Science)                      One of: Neuroscience 4630, 4980,                      4990, or 4995<sup>5</sup>                      Elective 3000/4000 level                      Elective                      Elective</p>

<sup>1</sup> Students choosing group a in requirements 18-22 (p. 3) are not specifically required to take Mathematics 1410 or Mathematics 1560. You may choose an Elective here instead. Students choosing group b should complete Mathematics 1410 or Mathematics 1560 in Year One, Fall.

<sup>2</sup> Students require Three of: Biochemistry 2000; Biology 3000, 3105, 3310, 3400; Neuroscience 3625. Semester of offering for these courses may vary. Please check with the Departments of Biological Sciences, Chemistry and Biochemistry, or Neuroscience, respectively.

<sup>3</sup> Semester of offering may vary.

<sup>4</sup> Students choosing group a in requirements 18-22 (p. 3) should substitute a 3000/4000-level Science elective.

<sup>5</sup> As Neuroscience 4995 is a 6.0 credit course, students should register for it in the Fall.

### Terms Used

**GLER course:** A course that could count toward the General Liberal Education Requirement. You may use courses in your major towards this 12-course requirement. See the 2011/2012 University of Lethbridge Calendar, Part 4 - Academic Regulations (p. 85) for complete information.

The Faculty of Arts and Science offers Liberal Education 1000 and 2000, specifically designed to introduce first-year students to the wide scope of human knowledge and teach essential university success skills, critical thinking, and integrative thinking (see the 2011/2012 University of Lethbridge Calendar, Part 14 - Courses, p. 306). LBED 1000 and 2000 may be used toward satisfying the GLER.

**Elective:** A course that you may choose freely from all those available and applicable to your program. Use courses inside or outside your major, bearing in mind any restrictions that may apply (e.g., a maximum of 20 courses from any one department).

