

University of  
Lethbridge



## Program Planning Guide

**Departments:** Geography, and Mathematics and Computer Science

**Calendar Year:** 2018/2019

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

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

# Bachelor of Science Computer Science and Geographical Information Science

**Major in Computer Science and GIS:**

[www.uleth.ca/artsci/gis](http://www.uleth.ca/artsci/gis)

**Academic Calendar:**

[www.uleth.ca/ross/academic-calendar](http://www.uleth.ca/ross/academic-calendar)

**High School Admission Requirements:**

[www.uleth.ca/ross/admissions/undergrad/high-school](http://www.uleth.ca/ross/admissions/undergrad/high-school)

**Current and Past Program Planning Guides:**

[www.uleth.ca/ross/ppgs](http://www.uleth.ca/ross/ppgs)

**Faculty of Arts and Science Advising:**

[www.uleth.ca/artsci/advising](http://www.uleth.ca/artsci/advising)  
[artsci.advising@uleth.ca](mailto:artsci.advising@uleth.ca)  
403-329-5106  
SU060

**Co-operative Education:**

[www.uleth.ca/artsci/coop](http://www.uleth.ca/artsci/coop)

This is a planning guide and not a graduation check or guarantee of course offerings. You should have a program check done in your final year of studies. Students are responsible for the accuracy of their own programs. The guide should be used in conjunction with the University of Lethbridge Calendar, which is the final authority on all questions regarding program requirements and academic regulations. Contact an Academic Advisor in the Faculty of Arts and Science for advising information.

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

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

**B.Sc. Computer Science and GIS**

Completion of at least 40 courses (120.0 credit hours) with a grade point average of at least 2.00.

**Major Requirements (22 courses)**

- \_\_\_\_\_ 1. Computer Science 1620 - Fundamentals of Programming I
- \_\_\_\_\_ 2. Computer Science 1820 - Discrete Structures
- \_\_\_\_\_ 3. Computer Science 2620 - Fundamentals of Programming II
- \_\_\_\_\_ 4. Computer Science 2720 - Practical Software Development
- \_\_\_\_\_ 5. Computer Science 3620 - Data Structures and Algorithms
- \_\_\_\_\_ 6. Computer Science 3660 - Introduction to Database Systems
- \_\_\_\_\_ 7. Computer Science 3710 - Computer Graphics
- \_\_\_\_\_ 8. Computer Science 4660 - Database Management Systems
- \_\_\_\_\_ 9. Geography 1000 - Introduction to Physical Geography
- \_\_\_\_\_ 10. Geography 1200 - Introduction to Human Geography
- \_\_\_\_\_ 11. Geography 2700 - Geographical Data and Analysis
- \_\_\_\_\_ 12. Geography 2735 - Introduction to Geographical Information Science
- \_\_\_\_\_ 13. Geography 3720 - Remote Sensing
- \_\_\_\_\_ 14. Geography 3740 - Geographical Information Systems
- \_\_\_\_\_ 15. Geography 4725 - Advanced Remote Sensing
- \_\_\_\_\_ 16. Geography 4740 - Advanced Geographical Information Systems
- \_\_\_\_\_ 17. **One of:**
  - \_\_\_\_\_ Geography 4400 - Advanced Hydrology
  - \_\_\_\_\_ Geography 4415 - Integrated Watershed Management
  - \_\_\_\_\_ Geography 4700 - Advanced Computer Mapping
  - \_\_\_\_\_ Geography 4710 - Remote Sensing Field Techniques
  - \_\_\_\_\_ Geography 4750 - Glacial Processes, Measurements, and Models
  - \_\_\_\_\_ Geography 4751 - Project in Spatial Modelling
  - \_\_\_\_\_ Geography 4753 - Seminar in Remote Sensing

One course (3.0 credit hours) in Computer Science at the 4000 level, excluding Computer Science 4850 (Topics), Computer Science 4980 (Applied Studies), and Computer Science 4990 (Independent Study)

22. \_\_\_\_\_

**Other Courses (minimum 18 courses)**

- |          |           |
|----------|-----------|
| 1. _____ | 10. _____ |
| 2. _____ | 11. _____ |
| 3. _____ | 12. _____ |
| 4. _____ | 13. _____ |
| 5. _____ | 14. _____ |
| 6. _____ | 15. _____ |
| 7. _____ | 16. _____ |
| 8. _____ | 17. _____ |
| 9. _____ | 18. _____ |

- \_\_\_\_\_ 18-21. **Four of:**
  - \_\_\_\_\_ Any of the courses listed above but not already selected as required courses
  - \_\_\_\_\_ Computer Science 2610 - Introduction to Digital Systems
  - \_\_\_\_\_ Computer Science 3720 - Introduction to Software Engineering
  - \_\_\_\_\_ <sup>1</sup>Computer Science 3740 - Programming Languages
  - \_\_\_\_\_ Computer Science 3750 - Artificial Intelligence
  - \_\_\_\_\_ Computer Science 3770 - Human-Computer Interaction
  - \_\_\_\_\_ Computer Science 3780 - Data Communications and Networking
  - \_\_\_\_\_ Geography 2030 - Geomorphology
  - \_\_\_\_\_ Geography 2300 - Weather and Climate
  - \_\_\_\_\_ Geography 3400 - Hydrology
  - \_\_\_\_\_ Geography 3700 - Cartography
  - \_\_\_\_\_ Geography 3710 - Field Techniques in the Earth Sciences
  - \_\_\_\_\_ Geography 3750 - GIS Applications in Human Geography
  - \_\_\_\_\_ Geography 4730 - Spatial Statistics
  - \_\_\_\_\_ <sup>2</sup>Statistics 2780 - Statistical Inference

**Notes**

<sup>1</sup>Prerequisite required: Mathematics 2000.

<sup>2</sup>Prerequisite required: Statistics 1770.

See also:

- Bachelor of Science - Computer Science
- Bachelor of Science - Geography

**Completion of the Liberal Education List Requirement (Lib Ed Requirement).**

Only four courses (12.0 credit hours) in total may be counted from any one discipline toward the Lib Ed Requirement. Disciplines are identified by separate course subject codes.

Only four courses (12.0 credit hours) in total from the Faculties of Education (EDUC), Health Sciences (ABHL, ADCS, HLSC, NURS, PUBH, and TREC), and Management (MGT) may be counted towards the Lib Ed Requirement.

See the 2018/2019 Calendar, p. 95, for more information.

**LIST I: Fine Arts and Humanities Courses**

- |          |          |
|----------|----------|
| 1. _____ | 3. _____ |
| 2. _____ | 4. _____ |

**LIST II: Social Science Courses**

- |          |          |
|----------|----------|
| 1. _____ | 3. _____ |
| 2. _____ | 4. _____ |

**LIST III: Science Courses**

- |          |          |
|----------|----------|
| 1. _____ | 3. _____ |
| 2. _____ | 4. _____ |

Not more than 12 courses (36.0 credit hours) may be completed at the 1000 level (or lower) [0500 - 1999] for credit towards the degree, excluding Activity courses (labelled PHAC and MUSE) and courses numbered in the range of 0520 to 0530.

- |          |                  |
|----------|------------------|
| 1. _____ | 7. _____         |
| 2. _____ | 8. _____         |
| 3. _____ | 9. _____         |
| 4. _____ | 10. _____        |
| 5. _____ | 11. _____        |
| 6. _____ | 12. _____ (max.) |

Completion of at least 15 courses (45.0 credit hours) from disciplines offered by the Faculty of Arts and Science or the Faculty of Fine Arts at the 3000/4000 level, excluding Activity courses (labelled PHAC and MUSE). Out-of-faculty courses (i.e. labelled ABHL, ADCS, CDEV, CRED, EDUC, HLSC, MGT, NURS, PUBH, and TREC) will not meet this requirement.

- |          |                  |
|----------|------------------|
| 1. _____ | 9. _____         |
| 2. _____ | 10. _____        |
| 3. _____ | 11. _____        |
| 4. _____ | 12. _____        |
| 5. _____ | 13. _____        |
| 6. _____ | 14. _____        |
| 7. _____ | 15. _____ (min.) |
| 8. _____ |                  |

\_\_\_\_ Not more than five Independent Study courses (15.0 credit hours) may be completed for credit towards the degree.

\_\_\_\_ Not more than five Disciplinary Credit Applied Studies courses (15.0 credit hours) may be completed for credit towards the degree. Students may, in addition, complete Applied Studies 2000, 2001, 2010, and 2011.

\_\_\_\_ Not more than 24 courses (72.0 credit hours) may be completed from any one discipline for credit towards the degree.

*Note: Disciplines are identified by a specific course label (e.g. KNES, ASTR, and HIST are separate disciplines).*

\_\_\_\_ Not more than six credit hours in Activity courses (i.e. courses labelled PHAC and MUSE) may be completed for credit towards the degree, except for Kinesiology majors (not more than 15.0 credit hours) and Music majors (not more than 12.0 credit hours).

\_\_\_\_ Not more than four courses (12.0 credit hours) from disciplines offered outside the Faculty of Arts and Science or the Faculty of Fine Arts may be completed for credit towards the degree (i.e. labelled ABHL, ADCS, CDEV, CRED, EDUC, HLSC, MGT, NURS, PUBH, and TREC). Courses cross-listed between the Faculty of Arts and Science and another Faculty do not count towards this limit.

\_\_\_\_ **Residence requirement:**

Degree: a minimum of 20 courses (60.0 credit hours) must be completed at the University of Lethbridge, including at least 10 Arts and Science courses (30.0 credit hours) at the 3000/4000 level.

Major: at least half of the courses required in the major must be completed at the University of Lethbridge.

**Minor (Optional):** \_\_\_\_\_  
 See the 2018/2019 Calendar, p. 291, for eligible minors.

- |          |          |
|----------|----------|
| 1. _____ | 4. _____ |
| 2. _____ | 5. _____ |
| 3. _____ | 6. _____ |

## 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 term. 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><br/> <b>Computer Science 1620</b><br/> <b>Computer Science 1820</b><br/> <b>Geography 1000</b><br/>                     Lib Ed Requirement course<br/>                     Lib Ed Requirement course</p>  | <p><b>Year 1, Spring</b><br/> <b>Computer Science 2620</b><br/>                     Geography 1200<br/> <b>Geography 2735</b><br/>                     Lib Ed Requirement course<br/>                     Lib Ed Requirement course</p>   |
| <p><b>Year 2, Fall</b><br/>                     Computer Science 2720<br/>                     Computer Science 3620<br/>                     Geography 2700<br/>                     Lib Ed Requirement course<br/>                     Lib Ed Requirement course</p>                       | <p><b>Year 2, Spring</b><br/>                     Computer Science 3710<sup>1</sup><br/> <b>Geography 3740</b><br/>                     Lib Ed Requirement course<br/>                     Elective<br/>                     Elective</p>   |
| <p><b>Year 3, Fall</b><br/>                     Geography 3720<br/>                     Computer Science or Geography list course<br/>                     Computer Science or Geography list course 3000/4000 level<br/>                     Elective<br/>                     Elective</p> | <p><b>Year 3, Spring</b><br/>                     Computer Science 3660<br/>                     Computer Science or Geography list course<br/>                     Computer Science or Geography list course 3000/4000 level<br/>                     Elective 3000/4000 level<br/>                     Elective</p> |
| <p><b>Year 4, Fall</b><br/>                     Computer Science 4660<br/>                     Geography 4740<br/>                     Geography 4000-level list course<br/>                     Elective 3000/4000 level<br/>                     Elective</p>                              | <p><b>Year 4, Spring</b><br/>                     Geography 4725<br/>                     Computer Science 4000 level<br/>                     Elective 3000/4000 level<br/>                     Elective<br/>                     Elective</p>   |

<sup>1</sup> Term of offering may vary.

**Note:** Courses in **bold** in Years 1 and 2 of the sample sequence are prerequisite(s) for required courses and should be completed early in your program. Students are advised to review the prerequisites for electives courses within the major and plan accordingly.

## Terms Used

**Lib Ed Requirement course:** A course that could count toward the Liberal Education List Requirement. You may use courses in your major towards this 12-course requirement. See the 2018/2019 University of Lethbridge Calendar, School of Liberal Education 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 2018/2019 University of Lethbridge Calendar, Course Catalogue). LBED 1000 and 2000 may be used toward satisfying the Lib Ed Requirement.

**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 24 courses from any one discipline).

