Program Planning Guide

Department: Physics and Astronomy

Calendar Year: 2019/2020

Name: ____________________________

ID: ____________________________

Major in Physics:
www.uleth.ca/artsci/physics-astronomy

Academic Calendar:
www.uleth.ca/ross/academic-calendar

High School Admission Requirements:
www.uleth.ca/ross/admissions/undergrad/high-school

Current and Past Program Planning Guides:
www.uleth.ca/ross/ppgs

Faculty of Arts and Science Advising:
www.uleth.ca/artsci/advising
artsci.advising@uleth.ca
403-329-5106
M2102

Co-operative Education:
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.
Bachelor of Science - Physics

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

Major Requirements (26 courses)

1. Chemistry 1000 - General Chemistry I
2. Computer Science 1620 - Fundamentals of Programming I
3. Mathematics 1410 - Elementary Linear Algebra
4. Mathematics 2565 - Accelerated Calculus II
5. Mathematics 2570 - Calculus III
6. Mathematics 2580 - Calculus IV
7. Physics 2000 - Introduction to Physics II
8. Physics 2120 - Introduction to Physics III
9. Physics 2130 - Waves, Optics and Sound
10. Physics 2150 - Quantum Mechanics I
11. Physics 2800 - Methods in Mathematical Physics
12. Physics 2925 - Introduction to Experimental Physics
13. Physics 3150 - Quantum Mechanics II
14. Physics 3175 - Electricity and Magnetism
15. Physics 3200 - Mechanics
16. Physics 3400 - Thermal and Statistical Physics
17. Physics 3750 - Contemporary Physics
18. Physics 3800 - Methods of Theoretical Physics
19. Physics 3925 - Experimental Physics
20. Physics 4175 - The Electromagnetic Interaction
21. One of:
   - Mathematics 1560 - Calculus I
   - Mathematics 1565 - Accelerated Calculus I (recommended)
22. One of:
   - Biology 1010 - Cellular Basis of Life
   - Biology 1020 - Diversity of Life
23. One of:
   - Physics 1000 - Introduction to Physics I
   - Physics 1050 - Introduction to Biophysics
   - Engineering 2060 - Engineering Mechanics
24. One of:
   - Physics 4150 - Quantum Mechanics III
   - Physics 4200 - Advanced Mechanics

Other Courses (minimum 14 courses)

1. __________________  8. __________________
2. __________________  9. __________________
3. __________________ 10. __________________
4. __________________ 11. __________________
5. __________________ 12. __________________
6. __________________ 13. __________________
7. __________________ 14. __________________

Notes

1Engineering 2000 and Mathematics 1565 are prerequisites for Engineering 2060.
2Offerings in Physics 3850 (Topics) and Physics 4850 (Topics) and either Physics 4150 or Physics 4200 (if not used above) may be used to satisfy this requirement.

Since a number of courses are offered only on alternate years, students are advised to plan carefully to include the desired courses. In all cases, students (especially those planning for advanced studies in Physics) are encouraged to seek advice on their programs from any member of the Department of Physics and Astronomy.

It is recommended that students majoring in Physics include in their program courses in Biology, Chemistry, Computer Science, and Mathematics.

It is strongly recommended that a student attain a grade of 'C' or higher in any course used to satisfy prerequisites for courses in Physics and Mathematics.

See also:

• Bachelor of Science - Remote Sensing
• Bachelor of Science/Bachelor of Education - Physics/Science Education
• Bachelor of Science/Bachelor of Management - Physics
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 Faculty of Education (EDUC), Faculty of Health Sciences (ABHL, ADCS, HLSC, NURS, PUBH, and TREC), and the Dhillon School of Business (MGT) may be counted towards the Lib Ed Requirement. See the 2019/2020 Calendar, p. 83, for more information.

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

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**LIST II: Social Science Courses**

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**LIST III: Science Courses**

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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.

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<th>9.</th>
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<th>11.</th>
<th>12. (max.)</th>
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Not more than six courses (18.0 credit hours) from disciplines outside the Faculty of Arts and Science, Faculty of Fine Arts, or School of Liberal Education 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.

**Minor (Optional):**

See the 2019/2020 Calendar, p. 277, for more information.

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**Concentration: Theoretical Physics (Optional)**

See the 2019/2020 Calendar, p. 122, for more information.

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**Residence requirement:**

Degree: a minimum of 20 courses (60.0 credit hours) must be completed at the University of Lethbridge, including at least 10 courses (30.0 credit hours) from disciplines offered by the Faculty of Arts and Science, Faculty of Fine Arts, or School of Liberal Education at the 3000/4000 level.

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

**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 six courses (18.0 credit hours) from disciplines outside the Faculty of Arts and Science, Faculty of Fine Arts, or School of Liberal Education 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.**

**Not more than six credit hours in Activity courses (i.e. courses labelled PHAC and MUSE) may be completed for credit towards the degree.**

**Residence requirement:**

Degree: a minimum of 20 courses (60.0 credit hours) must be completed at the University of Lethbridge, including at least 10 courses (30.0 credit hours) from disciplines offered by the Faculty of Arts and Science, Faculty of Fine Arts, or School of Liberal Education 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 2019/2020 Calendar, p. 277, for more information.

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**Concentration: Theoretical Physics (Optional)**

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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.

<table>
<thead>
<tr>
<th>Year 1, Fall</th>
<th>Year 1, Spring</th>
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<tbody>
<tr>
<td>Mathematics 1410</td>
<td>Mathematics 2565</td>
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<tr>
<td>Mathematics 1565 or</td>
<td>Physics 2000</td>
</tr>
<tr>
<td>Mathematics 1560</td>
<td>Physics 2130</td>
</tr>
<tr>
<td>Physics 1000 or Physics 1050</td>
<td>Computer Science 1620</td>
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<tr>
<td>Lib Ed Requirement course</td>
<td>Lib Ed Requirement course</td>
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<table>
<thead>
<tr>
<th>Year 2, Fall</th>
<th>Year 2, Spring</th>
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<tbody>
<tr>
<td>Chemistry 1000</td>
<td>Biology 1010 or Biology 1020</td>
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<tr>
<td>Mathematics 2570</td>
<td>Mathematics 2580</td>
</tr>
<tr>
<td>Physics 2120</td>
<td>Physics 2150</td>
</tr>
<tr>
<td>Physics 2800</td>
<td>Physics 2925</td>
</tr>
<tr>
<td>Lib Ed Requirement course</td>
<td>Lib Ed Requirement course</td>
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<table>
<thead>
<tr>
<th>Year 3, Fall</th>
<th>Year 3, Spring</th>
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<tbody>
<tr>
<td>Physics 3150</td>
<td>Physics 3400</td>
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<tr>
<td>Physics 3175</td>
<td>Physics 3750</td>
</tr>
<tr>
<td>Physics 3200</td>
<td>Physics 3800</td>
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<tr>
<td>Physics 3925</td>
<td>Lib Ed Requirement course</td>
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<td>Lib Ed Requirement course</td>
<td>Lib Ed Requirement course</td>
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<tr>
<th>Year 4, Fall</th>
<th>Year 4, Spring</th>
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<tbody>
<tr>
<td>Physics 3000/4000 level</td>
<td>Physics 4150 or Physics 4200</td>
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<tr>
<td>Physics 3000/4000 level</td>
<td>Physics 4175</td>
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<tr>
<td>Elective 3000/4000 level</td>
<td>Elective 3000/4000 level</td>
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<tr>
<td>Elective 3000/4000 level</td>
<td>Elective</td>
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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.

Students are strongly advised to consult with the Department of Physics and Astronomy regarding the sequencing of courses.

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 2019/2020 University of Lethbridge Calendar, School of Liberal Education for complete information.

The School of Liberal Education 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 2019/2020 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).