NATURAL SCIENCES — M.S.

Program director
Leonard R. Brand

The Natural Sciences Program leads to the Master of Science degree. Course work is selected from the allied fields of biology, paleontology, geology, earth systems science, and geographic information systems. Areas of curriculum strength include ecology, genetics, systematics, sedimentary geology, paleontology, environmental geology, environmental science, and GIS.

Objectives
Students completing the Master of Science degree in natural sciences will be:

1. fluent in the fundamental concepts of biology, geology, GIS, and environmental science.
2. qualified to seek endorsement for subject-teaching in secondary education and will be competent in either biological science or geoscience.
3. effective in written and oral communication.
4. familiar with the scientific method, hypothesis testing, and deductive reasoning.
5. familiar with key issues related to the integration of faith and science.
6. qualified to seek employment in K-12 teaching or civil or public service, or will be satisfied that the degree meets other personal or professional development objectives.

Program features
The Natural Sciences Program emphasizes ecology-oriented areas of biology and field-oriented geology—particularly sedimentology, stratigraphy, and paleontology. Fieldwork is emphasized because it provides a first-hand experience with biological and geological phenomena that cannot be satisfactorily grasped or understood solely from classroom or laboratory study. Throughout the natural sciences curriculum, students are encouraged to develop an open-minded and investigative approach in the application of the scientific method to the resolution of biological and geologic problems. Multiple working hypotheses are encouraged. The goal is to prepare students for effective careers in teaching or government.

Learning outcomes
1. Demonstrate breadth of knowledge in the natural sciences.
2. Demonstrate written and oral communication skills and integrate technology in communication.
3. Demonstrate ability to analyze and synthesize previous knowledge.
4. Demonstrate a professional aptitude and attitude.
5. Demonstrate critical evaluation skills in relating faith and science with public interest issues.

Rosario Beach summer courses
In cooperation with the Walla Walla University Marine Station at Anacortes, Washington, facilities are available for marine courses and research by graduate students of the Department of Earth and Biological Sciences.

Admissions
In addition to Loma Linda University admission requirements, the applicant must also complete the following requirements:

- a bachelor's degree in biology, geology, chemistry, physics, or other degree with typical biology and geology prerequisites.
- undergraduate G.P.A. of at least 3.0 is expected.
- achieve an acceptable score on the general Graduate Record Examination (GRE). The subject GRE is not required.
- completion of prerequisite courses:
  - college mathematics—two quarter (calculus recommended)
  - biology—one year
  - general physics with laboratory—one year
  - general chemistry with laboratory—one year
  - general ecology—one course

Some of the courses listed above may be taken during residence at Loma Linda University, with approval of the admissions committee.

Application
Applications are accepted at any time. Review of applications begins in February for the Autumn Quarter admission. It is highly recommended that the applicant complete the application process by January 31 of the calendar year being considered for admissions, for priority consideration. Research assistantships are competitively awarded. Applicants may contact the department at <ebs@llu.edu>.

Program requirements
A minimum of 50 quarter units, including 34 at or above the 500 level, constitutes the curriculum for the Master of Science degree program in natural sciences. The following courses are required. Undergraduate courses must be at the 400 level.

Core

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>BIOL 558</td>
<td>Philosophy of Science</td>
<td>4</td>
</tr>
<tr>
<td>or GEOL 558</td>
<td>Philosophy of Science</td>
<td></td>
</tr>
<tr>
<td>GEOL 518</td>
<td>Earth Structure, Process, and History</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 607</td>
<td>Seminar in Biology</td>
<td>3</td>
</tr>
<tr>
<td>or GEOL 607</td>
<td>Seminar in Geology</td>
<td></td>
</tr>
<tr>
<td>BIOL 616</td>
<td>Research and Experimental Design</td>
<td>2</td>
</tr>
<tr>
<td>or GEOL 616</td>
<td>Research and Experimental Design</td>
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Select one course of the following:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>BIOL 505</td>
<td>Marine Biology</td>
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<tr>
<td>BIOL 515</td>
<td>Biogeography</td>
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<tr>
<td>BIOL 517</td>
<td>Ecological Physiology</td>
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<tr>
<td>BIOL 539</td>
<td>Behavioral Ecology</td>
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<tr>
<td>BIOL 546</td>
<td>Techniques in Vertebrate Ecology</td>
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<tr>
<td>BIOL 549</td>
<td>Biodiversity and Conservation</td>
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<th>Title</th>
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<tbody>
<tr>
<td>GEOL 512</td>
<td>Invertebrate Paleontology</td>
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<tr>
<td>GEOL 513</td>
<td>Vertebrate Paleontology</td>
</tr>
<tr>
<td>GEOL 514</td>
<td>Paleobotany</td>
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<tr>
<td>GEOL 545</td>
<td>Taphonomy</td>
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Religion
Noncourse requirements

Seminar attendance requirements
All graduate students in residence must register for and attend Seminars (BIOL 607 Seminar in Biology or GEOL 607 Seminar in Geology) each quarter at Loma Linda University.

Advancement to candidacy
Students may apply for advancement to candidacy by completing Form A, which requires:
1. Completing an approved written project proposal.
2. Passing the written comprehensive examination.
3. Being recommended by the program faculty (should be completed by the end of the third quarter of study).

Final examinations
Students are expected to pass a written comprehensive examination during their penultimate quarter in residence.

Project
As part of the core curriculum, the student will complete a project, in consultation with the advisor, involving 4 units of registration in research or special projects.

Grade requirement for graduation
A grade of B (3.0) or better is required in all courses that count toward the degree.

Normal time to complete the program
2 years based on full-time enrollment; part time permitted