

Mathematical Biology Minor: Description and Guidelines

The Mathematical Biology Minor (Proposed Catalog Copy)

PROPOSED Catalog Copy:

Affiliation: Interdisciplinary Studies
Degrees Offered: None
Minor Offered: Mathematical Biology

The *interdisciplinary* Mathematical Biology Minor requires the successful completion of 15 credits, with at least 9 credits at or above the 300-level, and the approval of the student's portfolio by the minor's oversight committee. These credits must include *Introduction to Mathematical Biology* (BIOL 345/MATH 345). Additionally, all mathematical biology minors must complete an interdisciplinary research experience in mathematical biology. The research experience can be completed at Truman or from an off-campus REU (or the equivalent).

Only courses that count toward a major or minor in mathematics, biology, statistics or computer science can count toward the Mathematical Biology Minor. Further, courses taken must enable a student seeking the minor to assemble a portfolio that demonstrates proficiency in the following areas:

- **Data Acquisition:** Acquiring data on biological phenomena in a lab, in the field, or both.
- **Modeling:** Developing and applying mathematical models in a biological context.
- **Computation:** Developing or applying computational tools in a biological context.
- **Statistical Analysis:** Applying statistical testing of biological hypotheses.
- **Research:** Investigating an open-ended question by conducting research at the intersection of the life and mathematical sciences.

Evidence for each of the proficiencies should be roughly equivalent to what might be done for a substantial end-of-term project in a three-credit course. The evidence provided by students seeking the minor will be compiled into a portfolio that will be evaluated by the minor's oversight committee.

Students interested in earning the minor in Mathematical Biology should develop a learning plan proposal (forms available at <http://mathbio.truman.edu/mathminor.asp>) in consultation with a member of the Mathematical Biology Minor Oversight Committee. Students are strongly encouraged to complete the learning plan proposal at least three semesters before graduation. The learning plan identifies the specific courses and experiences in which students will develop the five proficiencies listed above, and in which they will generate the products that will form the portfolio.

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The Learning Plan (Web Content)

Proposed Coursework. — The Mathematical Biology Minor requires the successful completion of 15 credits of coursework, with at least 9 credits at or above the 300-level. Coursework must include *Introduction to Mathematical Biology* (BIOL 345/MATH 345). Additionally, all mathematical biology minors must complete an interdisciplinary research experience in mathematical biology.

Learning Plan Statement. — The learning plan statement should be a brief essay (500-700 words) that describes an applicant's reasons for earning the Minor in Mathematical Biology. The applicant should describe how the proposed coursework and research experiences would form a strong foundation for interdisciplinary work at the interface of mathematics and the life sciences. The essay should convey aspects of the learning plan that are not apparent in the proposed coursework section. For example, the applicant might develop a theme that unifies the courses and experiences into a program that will be a foundation for post-graduate professional development. The learning plan statement will be used in conjunction with the proposed coursework to evaluate the learning plan proposal.

Submitting the Learning Plan. — Before submitting your learning plan to the Mathematical Biology Minor Oversight Committee (MBMOC), please discuss your proposal with a member of the committee. The MBMOC member should sign the front page of this form to indicate that the two of you have discussed your plan and believe it to be ready to submit to the MBMOC for review.

Please submit **four (4) copies** of this learning plan proposal, each with an accompanying **Learning Plan Statement**, to the chair of the MBMOC; see the MathBio website for contact information.

The Portfolio (Web Content)

Once the MBMOC has approved the Learning Plan Proposal (now the Learning Plan), the next step to successfully earning the minor is to compile a portfolio of materials by which the student can clearly demonstrate proficiency in the areas of Data Acquisition, Modeling, Computation, Statistics, and Research. The portfolio shall contain two components: a reflective statement and a final product from work completed toward gaining the focal proficiency.

Reflective Statements. — To adequately demonstrate proficiency, the portfolio must include a clearly articulated (and well-edited) reflective statement. The reflective statement should demonstrate *reflection* on student learning while *explicitly* forming a link between the coursework, proficiency guidelines and the supporting materials are being submitted as a portfolio. For example, a student might describe how involvement in a course or research experience (i) changed her thinking about some aspect of Mathematical Biology, OR (ii) how she gained information to which she was previously naive and how that has altered/reinforced her thinking, OR (iii) how participation in a particular course or experience allowed her to make connections that previously eluded her, OR (iv) something that is not included in the list above, OR (v) some combination of the above ideas. Avoid simply describing course content or research procedures.

Final Product. — To adequately demonstrate a particular proficiency, the applicant must submit a well-written and edited final product that clearly demonstrates accomplishment of work that contributes to building proficiency in three (or more) of the focal areas of the minor. The final product may be documents submitted for a class project, a draft or reprint of a research paper, a poster given at a research conference, or the transcript of a research presentation (accompanied by the slides presented as visual aides during the presentation).