MATH 205: Foundations MathLab

Syllabus

Title: Foundations MathLab

Instructor: Daniel Dugger

Contact Info: 215 Fenton Hall, 346-8402, ddugger@uoregon.edu (also sometimes available in 205 Fenton Hall inside the main math office)

General information: 2 credits; class meets each Monday and Wednesday from 2–2:50pm in Knight Library B41. CRN 13679.

Website: http://pages.uoregon.edu/ddugger/ma205.html

Prerequisites: None.

Course description: This is an exploratory course in mathematics, centered around computer technology. The course focuses on techniques of mathematical exploration and discovery, the language of mathematics, and foundational issues, built around computer exploration. Students will learn basic programming skills and gain practice developing algorithms. Along the way we will touch on a variety of topics from geometry, number theory, and algebra.

Learning Outcomes: The goal of the MathLabs is to help students make the transition from the kind of “procedure-driven” mathematics that they see in K-12 education (and that to some extent continues in lower-division college courses) to the more creative engagement with mathematics that is required for upper-division math courses.

- Students will develop the basic skills of developing mathematical algorithms and implementing them in Python or Sage.
- Students will continue the development of the mathematical skills of trying examples, looking for patterns, and making/testing/modifying conjectures.
- Students will continue the development of the mathematical skills of explaining their reasoning to others, and in forming judgments regarding whether an explanation is adequate or not.
- Students will continue the development of the skill of critically reading an account of mathematics.

Class discussions and in-class worksheets, weekly homework, lab “write-ups”, and a final portfolio will provide students with opportunities to demonstrate the level of their abilities relative to the above learning outcomes.
Organization of the course: Each week there are two class sessions, which will be a combination of discussion and group exercises. Often there will be assigned readings.

Attendance: Attendance is very important in this course. I will take attendance during each class, and this will contribute to your final point count in the course.

Assessment: Points for this course are awarded according to the following scheme:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
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<tbody>
<tr>
<td>Attendance</td>
<td>30</td>
</tr>
<tr>
<td>Weekly writing</td>
<td>20</td>
</tr>
<tr>
<td>Write-up Drafts</td>
<td>16</td>
</tr>
<tr>
<td>Final Portfolio</td>
<td>24</td>
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Attendance is 30 points (1.5 points per class session)
Weekly writing is 20 points (two points per week)
Write-up Drafts is 16 points (eight points each)
Final Portfolio is 24 points

This course is offered as P/N only, with 75 points out of 90 being a passing grade. Work must be handed in on time, and must be in a reasonable state of completion. Mistakes can always be corrected later in the course. In this course, the only time you will be penalized for “being wrong” is on the final portfolio.

Due dates:

- Weekly writing/homework is due every Monday, at the beginning of class.
- Drafts for the write-ups are due October 17 and November 7.
- The final Portfolio, containing all the weekly homeworks and the three write-ups, is due December 5 by 4pm (Wednesday of finals week).

NOTE: Late work is not accepted except in extreme circumstances as determined by the instructor.

Workload: A student should expect to spend 60 hours on this course during the term, with the work divided up roughly as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Hours per week</th>
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<tbody>
<tr>
<td>Class sessions</td>
<td>2 hours</td>
</tr>
<tr>
<td>Reading</td>
<td>1 hour</td>
</tr>
<tr>
<td>Homework</td>
<td>3 hours</td>
</tr>
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The “Homework” portion of the workload includes three things: weekly writings and homework, thinking about the in-class exercises, and three “write-ups”. For the latter, you will choose three of the topics we worked on during the quarter and you will explore it a bit further on your own, giving a detailed write-up of what you learned. These write-up should explain the basic problem and any code you developed, things you tried, any conjectures that arose, and explanations for the conjectures that you know how to resolve. In most cases this will be under five typewritten pages per write-up.
Throughout the course you will maintain a portfolio of your work. The portfolio will contain the things you handed in each week, together with the three write-ups. After getting feedback on your work, you might choose to revise some of it before submitting your final portfolio at the end of the course. This will give you the opportunity to correct mistakes and learn from them, before getting your final grade.

**Learning Environment:** The University of Oregon strives for inclusive learning environments. Please notify me if the instruction or design of this course results in disability-related barriers to your participation. You are also encouraged to contact the Accessible Education Center in 360 Oregon Hall at 541-346-1155 or uoaec@uoregon.edu.

**Academic Conduct:** The code of student conduct and community standards is at dos.uoregon.edu/conduct. In this course, it is appropriate to help each other on homework as long as the work you are submitting is your own and you understand it.