M 408D: Sequences, Series, and Multivariable Calculus

Course Format: Online, Self-Paced

Course Author: Amanda Hager, Ph.D.

Course Instructor: Jillian Fisher, M.S. Contact using the Inbox tool in Canvas.

Course Credits: 4

Prerequisites: Mathematics 408C, 408L, or 408S with a grade of at least C-; or consent of the University Extension advisor. Students must have the approval of the University Extension advisor to enroll in this course.

How This Course Works
This course is online and is self-paced. Students have five months from their date of enrollment to complete the course. All coursework and proctored exams are submitted or taken online.

While this course is self-paced in terms of when you complete the work and submit assignments, periodic assessments are critical to ensuring that students receive adequate support and are able to achieve the intended learning outcomes. Thus, this course is organized into modules that must be completed in order. Students will only be able to move forward once they have received a grade on all assessments within a given module.

Review the course outline and assignment descriptions carefully. Computer-graded assignments are scored immediately. You can expect to receive feedback on instructor-graded assignments or exams within three business days following submission. This does not include weekends or holidays. Requests for expedited grading are not accommodated, so please plan accordingly. During certain times (end of semester, spring break, etc.), instructors may experience higher-than-usual demands on their time and may need additional time for evaluation. Students should reach out to University Extension at uex@austin.utexas.edu with any concerns regarding grading turnaround.

University Extension strongly advises students to be aware of when they may need a course grade to be recorded on their transcript. It can take up to two weeks after the final exam is complete for a grade to be officially recorded with the Office of the Registrar.
Course Overview
M408D is the second course in UT’s standard first-year calculus sequence. It is directed at students in the natural and social sciences and at engineering students. The emphasis in this course is on problem solving, not on the presentation of theoretical considerations. While the course necessarily includes some discussion of theoretical notions, its primary objective is not the production of theorem-provers. M408D contains a treatment of infinite series, and an introduction to vectors and vector calculus in 2-space and 3-space, including parametric equations, partial derivatives, gradients and multiple integrals.

Required Materials
You must also purchase a non-refundable Quest subscription for this course.

Course Organization
There are five modules containing 12 lessons, each covering 2–3 sections of book content in this course. There is also a midterm exam and a final exam. In each lesson you will find these sections: objectives and reading assignment, Quest learning modules, computer-graded Quest assignments, homework hint videos, and instructor-graded book homework assignments.
You must receive a grade on all assignments in a module before the next module will open.

Computer-Graded Assignments
In each lesson you'll be asked to complete several Quest assignments. For each book section, there is a Quest learning module, which is essentially a YouTube lecture with examples, and a Quest homework assignment where you can practice lots of problems. All Quest items, whether they are learning modules or homework assignments, will be lumped into one group in Canvas and will be worth 10% of your course grade. Computer-graded assignments may only be taken once.

Instructor-Graded Assignments
There is one written homework assignment in each lesson. You can write or type up these assignments in any way you wish, and your instructor will grade your homework and offer feedback through Canvas.

Exams
This course requires you to complete a midterm exam and a final exam. The midterm exam covers material from the first six lessons and is worth 35% of your course grade. The final exam is comprehensive, covering all 12 lessons, and is worth 40% of your course grade.
You must pass the final exam to pass the course.
## Course Outline

<table>
<thead>
<tr>
<th>Module</th>
<th>Topics</th>
<th>Assessments</th>
</tr>
</thead>
</table>
| 1      | Lesson 1: The Substitution Rule; Integration by Parts; Trigonometric Integrals; Trigonometric Substitution | • Computer-Graded Assignment 1  
• Computer-Graded Assignment 2  
• Computer-Graded Assignment 3  
• Computer-Graded Assignment 4  
• Computer-Graded Assignment 5  
• Computer-Graded Assignment 6  
• Computer-Graded Assignment 7  
• Computer-Graded Assignment 8  
• Instructor-Graded Assignment 9 |
| 2      | Lesson 2: Integration of Rational Functions by Partial Fractions; Strategy for Integration; Improper Integrals | • Computer-Graded Assignment 10  
• Computer-Graded Assignment 11  
• Computer-Graded Assignment 12  
• Computer-Graded Assignment 13  
• Computer-Graded Assignment 14  
• Computer-Graded Assignment 15  
• Instructor-Graded Assignment 16 |
| 3      | Lesson 3: Modeling with Differential Equations; Direction Fields and Euler’s Method; Separable Equations | • Computer-Graded Assignment 17  
• Computer-Graded Assignment 18  
• Computer-Graded Assignment 19  
• Computer-Graded Assignment 20  
• Instructor-Graded Assignment 21 |
|        | Lesson 4: Models for Population Growth; Linear Equations | • Computer-Graded Assignment 22  
• Computer-Graded Assignment 23  
• Computer-Graded Assignment 24  
• Instructor-Graded Assignment 25 |
|        | Lesson 5: Curves Defined by Parametric Equations; Calculus with Parametric Curves; Polar Coordinates; Areas and Lengths in Polar Coordinates | • Computer-Graded Assignment 26  
• Computer-Graded Assignment 27  
• Computer-Graded Assignment 28  
• Computer-Graded Assignment 29  
• Computer-Graded Assignment 30  
• Computer-Graded Assignment 31  
• Computer-Graded Assignment 32  
• Instructor-Graded Assignment 33 |
|        | Lesson 6: Conic Sections; Conic Sections in Polar Coordinates | • Computer-Graded Assignment 34  
• Computer-Graded Assignment 35  
• Computer-Graded Assignment 36  
• Computer-Graded Assignment 37  
• Instructor-Graded Assignment 38 |
|        | MIDTERM EXAM | |

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<thead>
<tr>
<th>Module</th>
<th>Topics</th>
<th>Assessments</th>
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</thead>
<tbody>
<tr>
<td>Lesson 7: Sequences; Series; The Integral Test and Estimates of Sums; The Comparison Tests; Alternating Series</td>
<td><img src="#" alt="Computer-Graded Assignment 39" /></td>
<td><img src="#" alt="Computer-Graded Assignment 40" /> <img src="#" alt="Computer-Graded Assignment 41" /> <img src="#" alt="Computer-Graded Assignment 42" /> <img src="#" alt="Computer-Graded Assignment 43" /> <img src="#" alt="Computer-Graded Assignment 44" /> <img src="#" alt="Computer-Graded Assignment 45" /> <img src="#" alt="Computer-Graded Assignment 46" /> <img src="#" alt="Computer-Graded Assignment 47" /> <img src="#" alt="Computer-Graded Assignment 48" /> <img src="#" alt="Instructor-Graded Assignment 49" /></td>
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<td>Lesson 8: Absolute Convergence and the Ratio and Root Tests; Strategy for Testing Series; Power Series</td>
<td><img src="#" alt="Computer-Graded Assignment 50" /> <img src="#" alt="Computer-Graded Assignment 51" /> <img src="#" alt="Computer-Graded Assignment 52" /> <img src="#" alt="Computer-Graded Assignment 53" /> <img src="#" alt="Computer-Graded Assignment 54" /> <img src="#" alt="Computer-Graded Assignment 55" /> <img src="#" alt="Instructor-Graded Assignment 56" /></td>
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<td>Lesson 9: Representations of Functions as Power Series; Taylor and Maclaurin Series; Applications of Taylor Polynomials</td>
<td><img src="#" alt="Computer-Graded Assignment 57" /> <img src="#" alt="Computer-Graded Assignment 58" /> <img src="#" alt="Computer-Graded Assignment 59" /> <img src="#" alt="Computer-Graded Assignment 60" /> <img src="#" alt="Computer-Graded Assignment 61" /> <img src="#" alt="Computer-Graded Assignment 62" /> <img src="#" alt="Instructor-Graded Assignment 63" /></td>
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<td>Lesson 10: Functions of Several Variables; Continuity; Partial Derivatives; The Chain Rule</td>
<td><img src="#" alt="Computer-Graded Assignment 63" /> <img src="#" alt="Computer-Graded Assignment 64" /> <img src="#" alt="Computer-Graded Assignment 65" /> <img src="#" alt="Computer-Graded Assignment 66" /> <img src="#" alt="Computer-Graded Assignment 67" /> <img src="#" alt="Instructor-Graded Assignment 68" /></td>
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<td>Lesson 11: Double Integrals over Rectangles; Iterated Integrals; Double Integrals over General Regions</td>
<td><img src="#" alt="Computer-Graded Assignment 69" /> <img src="#" alt="Computer-Graded Assignment 70" /> <img src="#" alt="Computer-Graded Assignment 71" /> <img src="#" alt="Computer-Graded Assignment 72" /> <img src="#" alt="Instructor-Graded Assignment 73" /></td>
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<td>Lesson 12: Double Integrals in Polar Coordinates; Applications of Double Integrals; Change of Variables in Multiple Integrals</td>
<td><img src="#" alt="Computer-Graded Assignment 74" /> <img src="#" alt="Computer-Graded Assignment 75" /> <img src="#" alt="Computer-Graded Assignment 76" /> <img src="#" alt="Computer-Graded Assignment 77" /> <img src="#" alt="Computer-Graded Assignment 78" /> <img src="#" alt="Instructor-Graded Assignment 79" /></td>
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**FINAL EXAM**
Grade Calculation
Your final grade for the course will be calculated as follows:
12 Instructor-Graded Assignments 15%
68 Computer-Graded Assignments 10%
Midterm Exam 35%
Final Exam 40%

You must pass the final exam to pass the course. You must also earn an overall passing grade:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>100-93%</td>
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<tr>
<td>A-</td>
<td>92-90%</td>
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<tr>
<td>B</td>
<td>89-87%</td>
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<tr>
<td>B-</td>
<td>82-80%</td>
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<tr>
<td>C</td>
<td>79-77%</td>
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<tr>
<td>C-</td>
<td>72-70%</td>
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<tr>
<td>D</td>
<td>69-67%</td>
</tr>
<tr>
<td>D-</td>
<td>66-63%</td>
</tr>
<tr>
<td>F</td>
<td>59-0%</td>
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Getting Help
- Technical Support: uextechsupport@austin.utexas.edu
- For content questions or questions about assignment and grades, use the Inbox tool within Canvas to contact the course instructor.
- For other questions (registration, transcripts, etc.), contact University Extension.

University Extension Policies
Full University Extension policies for self-paced courses may be found on the University Extension website.

Scholastic Dishonesty
Students in this course are expected to work independently, without direct supervision, and to conduct themselves responsibly in accordance with that freedom. To obtain the greatest benefit from their course work, and for the sake of everyone enrolled in our courses, students must demonstrate the willingness to exercise self-discipline, personal responsibility, and scholastic integrity.

We expect the course work and exams that you submit for course credit to be yours and yours alone. Plagiarism and other forms of scholastic dishonesty are serious academic violations that will not be tolerated. The penalties for scholastic dishonesty include the possibility of failure in the course. Scholastic dishonesty in examinations will automatically result in a grade of F on the exam and an F in the course.

University Extension Contact Information
uex@austin.utexas.edu
512-471-2900