CALCULUS 3 MTWF 1-1:50PM FALL 2016 SH405

Instructor:	Jonathan White
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Office:	Stuart 316
Office Hours:	MTWF 9:20-9:50am, 3:00-3:30pm, and by appointment
Office Phone:	399-8280
Home Phone:	362-3350 (between 7am and 10pm)
Text:	*Calculus, Early Transcendentals*, 3rd Edition, by Rogawski & Adams
Problem Sets, Quizzes & WW:	There will be several problem sets and quizzes during the semester, as well as online WeBWorK assignments. Together these will be worth 200 points
Math Culture Points:	Math Culture Points will constitute 50 points. These will be earned through participation in various activities outside of class, as detailed on the third page of this syllabus.
Exams:	There will be three in-class exams administered during class time. The dates of these are indicated in the schedule on the back side of this sheet. These exams will be worth 100 points each. The final exam will be held during finals week at the date and time indicated on the back side of this sheet. The final will be worth 200 points.
Grading:	Grading will approximately follow a $[92.0\%, \infty) \to$ A, $[90\%, 92\%) \to$ A–, $[87\%, 90\%) \to$ B+, $[82\%, 87\%) \to$ B, $[80\%, 82\%) \to$ B–, $[77\%, 80\%) \to$ C+, $[72\%, 77\%) \to$ C, $[70\%, 72\%) \to$ C–, $[67\%, 70\%) \to$ D+, $[62\%, 67\%) \to$ D, $[60\%, 62\%) \to$ D–, $(-\infty, 60\%) \to$ F scale. Current grade information will be available online through Moodle at all times.
Makeups:	For the sake of fairness to those who follow the schedule, makeups for exams will be allowed only under extenuating circumstances, with documentation and advance notice when humanly possible. Late problem sets and quizzes will generally not be accepted, and if accepted due to extenuating circumstances will generally be subject to a penalty of 20% of the possible points for each day past due. Late WeBWorK will not be accepted.

Any student entering this class should already be aware that calculus is the mathematics of changing quantities. The major development in Calculus 3 is that we widen our scope to functions of more than one variable. This simultaneously adds tremendously to the breadth of phenomena that can be addressed, and also introduces complications that have no analog in the essentially two-dimensional world of Calculus 1 and 2.

Calculus 3 is the culmination of the calculus sequence, and this presents challenges in at least three respects. First, ability to visualize and use spatial intuition is taken to a new level. Second, computations are in some cases correspondingly bigger and longer. Third, abstract theoretical considerations become a more central element, increasingly overshadowing mere computations as the most important material. In response to all three of these considerations the judicious use of technology can be a valuable aid. Sophisticated calculators such as the TI-89 and computer software packages such as *Mathematica*, when used well, can lead to easier and deeper understanding of the course material. However the use of this technology itself involves a significant learning experience, and often significant frustrations. We will attempt to use *Mathematica* in this course when the benefits are the greatest, and assist you in its use enough to keep the frustrations to a minimum.

To enter this class, each student must pass a computer-administered antiderivatives "gateway" exam. You may attempt this exam as often as desired, provided that you demonstrate understanding of previous mistakes before a retake. Success by 5pm Wednesday, 8/31 will count as 20 points toward a student's WeBWorK score; success within a week of that earns 15 out of 20 points, and so on, meaning negative scores if the gateway is not completed by 5pm on 9/28.

If at some point the challenges or frustrations of this class get too bad, I strongly encourage you to see me for extra explanation – don't wait until you're overwhelmed. I'm here to help.

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Tentative Schedule

		Wednesday 8/24 §12.1-2 Vectors	Friday 8/26 §11.3 Dot Products
Monday 8/29 §12.4 Cross Products	Tuesday 8/30 §12.5 Planes	Wednesday 8/31 §12.6 Quadric Surfaces	Friday 9/2 §13.1 $\mathbf{r}:\mathbb{R}\to\mathbb{R}^3$ & §13.2 $\mathbf{r}'$
Monday 9/5 No Class – Labor Day	Tuesday 9/6 §13.3-4 Arc Length & Curvature	Wednesday 9/7 §14.1-2 $f:\mathbb{R}^2\to\mathbb{R}$, Limits & Cont.	Friday 9/9 §14.3 Partial Derivatives
Monday 9/12 §14.4 Tangent Planes	Tuesday 9/13 §14.5 Dir. Der. & Gradients	Wednesday 9/14 §14.6 Chain Rule	Friday 9/16 §14.7 Optimization
Monday 9/19 §14.7 Optimization	Tuesday 9/20 §12.9 Constrained Opt.	Wednesday 9/21 Review for Exam	Friday 9/23 **Exam 1**
Monday 9/26 §15.1 Double Integrals	Tuesday 9/27 §15.1 Double Integrals	Wednesday 9/28 §15.2 Double Integrals	Friday 9/30 §15.2 Double Integrals
Monday 10/3 §15.4 Double Int. in Polar	Tuesday 10/4 §15.3 Triple Integrals	Wednesday 10/5 §15.3 Triple Integrals	Friday 10/7 §12.7 Cylindrical & Spherical
Monday 10/10 §15.4 Triple Int. in Cylindrical	Tuesday 10/11 §15.4 Triple Int. in Spherical	Wednesday 10/12 §15.5 Applications: CoM	Friday 10/14 No Class – Fall Break
Monday 10/17 §15.5 Applications: Probability	Tuesday 10/18 §15.6 The Jacobian	Wednesday 10/19 Review for Exam	Friday 10/21 **Exam 2**
Monday 10/24 §16.1 Vector Fields	Tuesday 10/25 §16.1 Divergence	Wednesday 10/26 §16.1 Curl	Friday 10/28 §16.2 Line Integrals
Monday 10/31 §16.2 Line Integrals	Tuesday 11/1 §16.3 The FTfLI	Wednesday 11/2 §16.3 The FTfLI	Friday 11/4 §17.1 Green's Theorem
Monday 11/7 §17.1 Green's Theorem	Tuesday 11/8 §16.4 Parametrized Surfaces	Wednesday 11/9 §16.4 Surface Integrals	Friday 11/11 §16.5 Surface Integrals
Monday 11/14 §16.5 Surface Integrals	Tuesday 11/15 §17.2 Stokes Theorem	Wednesday 11/16 §17.2 Stokes Theorem	Friday 11/18 §17.3 Divergence Theorem
Monday 11/21 No Class – Thanksgiving	Tuesday 11/22 No Class – Thanksgiving	Wednesday 11/23 No Class – Thanksgiving	Friday 11/25 No Class – Thanksgiving
Monday 11/28 §17.3 Divergence Theorem	Tuesday 12/29 FTC	Wednesday 11/30 Review for Exam	Friday 12/2 **Exam 3**
Monday 12/5 The Complex Plane	Tuesday 12/6 Complex Arithmetic	Wednesday 12/7 Quadratic Approximations	Friday 12/9 Review for Final
Final Exam – 11am Wednesday, 12/14			

Any students with disabilities which might affect their performance in this class should contact me as soon as possible to arrange accommodations.

The faculty has adopted a policy on academic integrity. It is your responsibility to understand and follow it. Details of this, as well as other legal considerations under FERPA, can be found in the current *Catalog*.

Diversity, in all its forms, is valuable.

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Math Culture Points

A portion of the grade for this course will take the form of Math Culture Points. These will be earned through activities outside of class including, but not necessarily limited to, those listed below:

Activity	Points	Maximum
Colloquium Attendance	5	–
Colloquium Presentation	5-15	2
Conference Attendance Iowa Section of the MAA (October 7-8) Midwest Sports Analytics Meeting (November 19)	5-15	2
Mathematics Competition Participation Iowa Mathematical Modeling Competition (?) Putnam Competition (December 3)	15	2
Math Culture Reading Specific readings will be posted, typically around 6 each semester Any article from *Math Horizons* With approval, any relevant article from *Math Magazine*, *CMJ*, etc.	5	 – 3 3
Math Club Activities (when appropriate) Movies, Math Club portion of the Playground of Science, Speakers, Workshops, etc.	5	--
Other Appropriate Coe or Outreach Activities Chess Club Meeting Job Shadowing in any relevant field Other Volunteer Outreach (Garfield, McKinnley, etc. – talk to Jon for information!)	 5 10 5	 2 1 4

You should plan to spread your participation throughout the semester. In each case above, credit assumes both full participation and posting a brief summary/response on Moodle **in a timely manner**. These reflections should generally be between 100 and 300 words, and include both a brief summary and your personal thoughts on the event, and **must be submitted within one week of the event**, or within the specified time window for other activities. Up to three units of credit may be submitted after normal deadlines in the "Math Culture – Late" category on Moodle, but otherwise exceptions will not be made without serious extenuating circumstances.

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Learning Outcomes

By the end of this class each student should be able to demonstrate:

- understanding of limits and continuity of multivariable functions.
- understanding of derivatives of multivariable functions.
- understanding of multiple integrals.
- understanding of vector calculus, including generalizations of the Fundamental Theorem of Calculus.
- understanding of selected applications of the above concepts.

The Provost has mandated that the material below this line appear on all syllabi:

For those of you who do not want to use the template, the following policy statements need to be on your syllabi:

? Academic Integrity

o At Coe College, we expect academic integrity of all members of our community. Academic integrity assumes honesty about the nature of one's work in all situations. Such honesty is at the heart of the educational enterprise and is a pre-condition for intellectual growth. Academic dishonesty is the willful attempt to misrepresent one's work, cheat, plagiarize, or impede other students' academic progress. Academic dishonesty interferes with the mission of the College and will be treated with the utmost seriousness as a violation of community standards.

o Please refer to the Coe College Academic Catalog for complete information regarding Academic Integrity: http://www.coe.edu/academics/dean/academicintegrity

? FERPA

o Students should be aware of their rights regarding the privacy of their educational records. Detailed information about your rights can be found under the FERPA (Family Educational Rights and Privacy Act of 1974) section in the Academic Catalog and online here: http://www.coe.edu/academics/registrar/ferpa.

o In line with FERPA restrictions, students should be aware that your instructor cannot publicly post grades by student name, institutional student identification number, or social security number without first having obtained students' written permission.

? The Definition of a Course Credit & Expected Workload:

o One course credit at Coe College constitutes 150 hours' worth of student work over the course of the term. This figure includes both the time spent in class and the time spent out of class completing course work. In other words, students are expected to devote a considerable amount of time outside of class to this course. For courses that meet in a standard M-W-F or T-Th slot, students should be expected to work seven hours a week outside of the three hours in class.

? Students with Disabilities:

o Coe College will make reasonable accommodations for persons with documented disabilities. If you have a disability which may have some impact on your work in this course, please contact the Learning Commons' Academic Coach and ADA Coordinator (Kim Pierson, x8844).

o Please note that all arrangements for accommodations must be handled through the Learning Commons. Faculty must give the opportunity of an accommodation to every student in the course or only to those students for which it is determined as a need by the Academic Coach and ADA Coordinator (Kim Pierson, x8844).

? Reporting of Sexual Misconduct

As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. I also have a mandatory reporting responsibility related to my role as a faculty member. It is my goal that you feel able to share information related to your life experiences in classroom discussions, in your written work, and in any one-on-one meetings. I will seek to keep information you share with me private to the greatest extent possible. However, I am required to share information regarding sexual misconduct or students who may be in danger to themselves or to others. Students may speak to someone confidentially by contacting Student Development at 319-399-8843 or Safety and Security at 319-399-8888.