CALCULUS 3   MTWF 1:00-1:50PM   FALL 2009   STUART 308

Instructor:	Jonathan White
E-Mail:	JWhite@Coe.Edu
Web Page:	public.coe.edu/~jwhite
Office:	Stuart 316
Office Hours:	MTW 3:00-3:50pm and by appointment
Office Phone:	399-8280
Home Phone:	841-5111 (between 7am and 10pm)
Text:	*Calculus, Early Transcendentals, 6th Edition*, James Stewart
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 elsewhere.
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 90% A, 80% B, 70% C, 60% D 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, sometimes 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 Friday, August 28th will count as 5 points toward a student's WeBWorK score, but after 5pm Friday, September 4th course grades will be lowered by 5% for each week or portion of a week without passing this exam.

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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

Monday, August 24th §12.1-2 $\mathbb{R}^3$ and Vectors	Tuesday, August 25th §12.3 Dot Products	Wednesday, August 26th §12.4 Cross Products	Friday, August 28th §12.5 Lines & Planes
Monday, August 31st §12.6 Quadric Surfaces	Tuesday, September 1st §12.6 Quadric Surfaces	Wednesday, September 2nd §14.1 f:$\mathbb{R}^n$→$\mathbb{R}$	Friday, September 4th §14.2 Limits & Continuity
Monday, September 7th No Class – Labor Day	Tuesday, September 8th §14.2 Limits & Continuity	Wednesday, September 9th §14.3 Partial Derivatives	Friday, September 11th §14.4 Tangent Planes
Monday, September 14th §14.5 Chain Rule	Tuesday, September 15th §14.6 Directional Derivatives	Wednesday, September 16th §14.7 Optimization	Friday, September 18th §14.7 Optimization
Monday, September 21st §14.8 Constrained Opt.	Tuesday, September 22rd §14.8 Constrained Opt.	Wednesday, September 23rd Review for Exam	Friday, September 25th **Exam 1**
Monday, September 28th §15.1 Double Integrals	Tuesday, September 29th §15.1 Double Integrals	Wednesday, September 30th §15.2 Iterated Integrals	Friday, October 2nd §15.3 General Double Integrals
Monday, October 5th §15.4 Double Int. in Polar	Tuesday, October 6th §15.5 Applications	Wednesday, October 7th §15.5 Applications	Friday, October 9th §15.6 Triple Integrals
Monday, October 12th No Class – Fall Break	Tuesday, October 13th No Class – Fall Break	Wednesday, October 14th §15.6 Triple Integrals	Friday, October 16th §15.7 Int. in Cylindrical
Monday, October 19th §15.8 Int. in Spherical	Tuesday, October 20th §15.9 The Jacobian	Wednesday, October 21st Review for Exam	Friday, October 23rd **Exam 2**
Monday, October 26th §13.1 Vector Functions	Tuesday, October 27th §13.2 & §13.4 $\mathbf{r}'(t)$	Wednesday, October 28th §13.2 & §13.4 $\mathbf{r}'(t)$	Friday, October 30th §13.3 Arc Length & Curvature
Monday, November 2nd §16.1 Vector Fields	Tuesday, November 3rd §16.2 Line Integrals	Wednesday, November 4th §16.2 Line Integrals	Friday, November 6th §16.3 Fun. Theorem of Line Int.
Monday, November 9th §16.4 Green's Theorem	Tuesday, November 10th §16.5 Curl & Divergence	Wednesday, November 11th §16.6 Parametric Surfaces	Friday, November 13th §16.7 Surface Integrals
Monday, November 16th §16.8 Stokes' Theorem	Tuesday, November 17th §16.8 Stokes' Theorem	Wednesday, November 18th §16.9 Divergence Theorem	Friday, November 20th §16.10 Summary
Monday, November 23rd Review for Exam	Tuesday, November 24th **Exam 3**	Wednesday, November 25th No Class – Thanksgiving Break	Friday, November 27th No Class – Thanksgiving Break
Monday, November 30th Quadratic Approximation	Tuesday, December 1st Euler's Formula	Wednesday, December 2nd Complex Arithmetic	Friday, December 4th Complex Arithmetic
Monday, December 7th Review	Tuesday, December 8th Review		
Final Exam – 11am on Monday, December 14th			

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.

Diversity, in all its forms, is valuable.

Math Culture Points

A significant 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	Max #
Colloquium Attendance	5	–
Colloquium Presentation	5-15	2
Meeting Attendance Iowa Section of the Mathematical Association of America (October 9th -10th)	15	2

Mathematics Competition Participation
    Iowa Mathematical Modeling Competition (October?)
    Putnam Competition (December 5th)
	10	2

Math Culture Reading
    Some weeks specific readings will be posted on the course web page
    With approval, any column on MAA.org
    With approval, an article from *Math Horizons*, *CMJ*, etc.
	5	–
		5
		5

Math Club Activities (when appropriate) Movies, Speakers, Game Nights, mathematical portion of Playground of Science, etc.	5-10	5
Volunteer Math Outreach Working with students at Polk Elementary, etc.	5	3
Other Appropriate Coe Activities (with approval) Psychology Experiment Participation	5	–

Generally Math Culture Points can be earned for at most two activities in any given week, so 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. 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.