MATH 250 MATH ANALYSIS III FALL 2003

Lecture MWF 12:00pm - 12:50pm EN2152

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Textbook. D. Varberg, E.J. Purcell, and S.E. Rigdon*Calculus*, 8th Edition, Prentice Hall, Upper Saddle River, New Jersey 07458, 2000.

Course content. Cartesian coordinates; vectors; the cross product; lines and curves in tree-space; velocity, acceleration, and curvature; surfaces; cylindrical and spherical coordinates; functions of two and more variables; partial derivatives; limits and continuity, differentiability; directional derivatives; the chain rule; tangent planes; max an min; Lagrange's method; double integral, iterated integrals; double integral in polar coordinates; triple integrals; vector fields, line integrals, independence of path, Green's theorem in the plane. 3 credits. 3 classes per week, 3 midterms, 1 final exam.

First two classes. According to the university policy, a student missing first two class meetings "looses the right to remain in the class roll and must formally withdraw from the class". Please, check the policies and regulations in the University Catalog for details and, please, be present.

Deadline to enroll. Subject to availability you can add to this course within first three weeks. Starting from week four new enrollment will be allowed only in exceptional circumstances.

Deadline to drop. Last day to drop with no questions asked is October 17, 2003. After this date dropping the class will be permitted only in exceptional circumstances.

Final. This course has a common final which this semester falls on Wednesday, December 10, 2003, 12:45pm–14:45pm. Rooms will be announced later.

Homework and quiz arrangements. Homework problems are listed for each section in the Lecture Schedule attached to the syllabus. The homework will be randomly collected and some subset from the problems will be graded. Generally, you will NOT be knowing when you will be handing in the assignment so, please, have them ready for each class. The purpose of homework is to strengthen your skills and to give you better understanding of the material through practice. (REMEMBER! Doing homework is crucial for you performance: normally a B requires working out at least 85% of problems.)

Absence from exams. Missing a midterm is permitted only for the most compelling reason. Except in extraordinary situations, permissions should be obtained in advance from the professor to miss an exam; otherwise you will be awarded a 0. If you are excused from taking a midterm, you course grade will be determined by giving extra weight to the final exam. Except in extremely exceptional situations, a student who misses the final exam fails the course.

Incompletes. These are given only in exceptional circumstances. The student must have satisfactorily completed all but a small portion of the work in the course, have a compelling reason for the incomplete, and must have a prior arrangements with the professor for how the incomplete will be removed, well before the end of the term.

Grading policy.

Your course grade is based on (assuming that all grades are made out of 100):

1) Each from three midterms will give you 15% of your Semester Grade;

2) An accumulated grade for completing the homework is 15% of Semester grade;

3) Your performance on the final exam: The grade for the final is 40% of the Semester Grade.

Again, the final exam makes 40%, each midterm makes 15%, and homework makes 15% of the Semester Grade.

Bonus Rule: If the Semester Grade turns out to be less then the grade for the final, then *the grade for the final will be the grade for the course.* In other words, you will always have the highest from two grades.

Note: An S is equivalent to C or better.

Week 1, August 25 — August 29, 2003

M	14.1: Cartesian coordinates in three-space. Distance. Equation of a sphere. Graphs of an equation in 3-D.
	HW **14.1**: 1,5(a,c),7,8(b,c),11(a,b),13,14,15,17,19,23,25,27,30; LE **14.1**: 2,5(b),6,8(a),11(c),16,18, 24,26,28,31.
W	14.2: Vectors in three-space. Direction angles and cosines.
	HW **14.2**:1,3,5,7,9,11,12,13,16,17,19,23,25(a),29,31,32; LE **14.2**: 2,4,6,8,10,14,15,21,25(b),26,30,34.
F	14.2: Equation of the plane.
	LE **Cont 14.2**: 14,15,21,25(b),26,30,34.

Week 2, September 1 — September 5, 2003

M	Labour Day: No classes
W	14.3: The cross product. Algebraic properties.
	HW **14.3**: 1(a,c),2,3,5,7,9,11,13,15,17,21,22 (?? 16); LE **14.3**: 1(b,d),4,6,8,12,14,18.
F	14.4: Lines and curves in three-space.
	HW **14.4**: 1,3,4,5,7,9,11,13,15,16,19,21,23,26; LE **14.4**: 2,6,8,10,12,14,17,18,22,24.

Week 3, September 8 — September 12, 2003

M	14.5: Velocity, acceleration and curvature.
	HW **14.5**: 1,5,9,13,15,17,21,25,27,29,35,41,47,49; LE **14.5**: 2,6,14,16,18,22,26,28,36,46.
W	14.6: Surfaces in three-space.
	HW **14.6**: 1,5,9,11,13,16,19; LE **14.6**: 2,4,10,12,20.
F	Midterm ♯1.

Week 4, September 15 — September 19, 2003

M	14.7: Cylindrical and spherical coordinates.
	HW **14.7**: 3,5,7,9,11,13,15,17,19,21,23,27,29; LE **14.7**: 2,8,10,12,16,18,24,28.
W	15.1: Function of two or more variables. Graph of function.
	HW **15.1**: 1(e,f),3(b,c),5,7,11,15,17,19; LE **14.6**: 2(e,f)6,8,12,16,18,22.
F	15.2 Partial derivatives. Higher partial derivatives.
	HW **15.2**: 1,5,7,9,11,13,15,17,19,25,27,33,37,38; LE **15.2**: 2,4,8,12,18,28,34

Week 5, September 22 — September 26, 2003

M	15.3: Limits and continuity. Continuity on a set.
	HW **15.3**: 1,3,5,7,9,11,13,15,17,19,21,23,27(a,d); LE **15.3**: 2,4,8,10,12
W	15.3: cont. Equality of second partial derivatives.
	LE **15.3 cont.**: 16,20,22,26,27(f).
F	15.4. Differentiability, gradient. Continuity versus differentiability.
	HW **15.4**: 1,3,5,7,9,11,13,15,17,19 (??18); LE **15.4**: 2,4,6,12,14,16,18

Week 6, September 29 — October 3, 2003

M	15.5: Directional derivatives and gradients.
	HW **15.5**: 1,3,5,7,9,11,13,17,23,25,28; LE **15.5**: 2,4,8,10,12,14,18,21,24.
W	15.6: The chain rule. Implicit functions.
	HW **15.6**:1,3,5,7,9,11,13,15,21,23,25; LE **14.2**: 4,6,8,10,14.
F	15.6 cont.: The chain rule. Implicit functions.
	LE **15.6 cont.**: 16,22,26.

Week 7, October 6 — October 10, 2003

M	15.7: Tangent planes. Differentials and approximations.
	HW **15.7**:1,3,5,7,9,11,13,17; LE **15.7**: 2,6,10.
W	15.7 cont.: Tangent planes. Differentials and approximations. Review.
	LE **15.7 cont.**: 14,16.
F	Midterm ♯2.

Week 8, October 13 — October 17, 2003

M	15.8: Maxima and minima. Critical point theorem. Second partial derivatives test.
	HW **15.8**: 1,3,5,7,9,11,13,15,21,27; LE **15.8**: 2,4,8.
W	15.8 cont.: Maxima and minima. Second partial derivatives test.
	LE **15.8 cont.**: 10,12,22,24.
F	15.9: Lagrange's method.
	HW **15.9**: 1,3,5,7,8,19; LE **15.9**: 2,4,6.

Week 9, October 20 — October 24, 2003

M	15.9 cont.: Lagrange's method.
	LE **15.9 cont.**: 10,16,17.
W	16.1: Double integrals over rectangles. Graph of function.
	HW **16.1**: 1,3,5,7,9,15,17; LE **16.1**: 2,6,10,16,18.
F	16.2: Iterated integrals.
	HW **16.2**: 1,3,5,7,9,11,13,15,29,31,32; LE **16.2**: 2,4,6,10.

Week 10, October 27 — October 31, 2003

M	16.2 cont.: Iterated integrals.
	LE **16.2 cont.**:14,16,30.
W	16.3: Double integrals over non-rectangular regions. X-simple and Y-simple sets.
	HW **16.3**: 1,3,5,7,9,11,13,15,17,19,23,25,27,31,33,35; LE **16.3**: 2,6,8,12,14.
F	16.3 cont.: Double integrals over non-rectangular regions. X-simple and Y-simple sets.
	LE **16.3 cont.**: 16,20,22,32,34.

Week 11, November 3 — November 7, 2003	
M	16.4: Double integrals in polar coordinates. Probability integrals.
	HW **16.4**: 1,3,5,7,9,11,13,15,17,21; LE **16.4**: 2,4,6,8.
W	16.4 cont.: Double integrals in polar coordinates. Probability integrals..
	LE **16.4 cont.**: 12,16,18.
F	16.5: Applications of double integrals. Center of mass, moment of inertia, radius of gyration.
	HW **16.5**: 1,3,5,7,9,11,13; LE **16.5**: 2,6,8,10,12,14.

Week 12, November 10 — November 14, 2003	
M	16.6: Surface area.
	HW **16.6**: 1,3,5,7,9,11; LE **16.6**: 2,4,6,8.
W	16.7: Triple integrals. Mass and center of mass.
	HW **16.7**: 1,3,5,7,9,11,13,19,21,23,25,27,29; HW **16.7**: 2,4,12,20,22,24,28.
F	Midterm ♯ 3

Week 13, November 17 — November 21, 2003	
M	16.8: Triple integrals in spherical and cylindrical coordinates. Change variables in multiple integrals.
	HW **16.8**: 1,3,5,7,9,17(a,b),19,23,24; LE **16.8**: 2,4,10,12.
W	16.8 cont.: Triple integrals in spherical and cylindrical coordinates. Change variables in multiple integrals.
	LE **16.8 cont.**: 14,16,22.
F	17.1: Vector fields. Gradient of a scalar field. Divergence and curl of a vector field.
	HW **17.1**: 1,3,5,7,11,13,15,17,18,19,20(a,b); LE **17.1**: 2,4,8,14,16,20(c).

Week 14, November 24 — November 28, 2003	
M	17.2: Line integrals. Work.
	HW **17.2**: 1,3,5,7,9,11,13,19,21,23; LE **17.2**: 2,4,6,12,14,20,22,30.
W	17.3: Independence of path. Fundamental theorem of line integrals. Recovering a function form its gradient. Conservation of energy.
	HW **17.3**: 1,3,5,7,9,11,13,15,17; LE **17.3**: 2,4,6,8,12,14.
F	Thanksgiving Recess.

Week 15, December 1 — December 5, 2003	
M	17.4 Green's theorem in the plane. Vector forms of Green's theorem.
	HW **17.4**: 1,3,5,7,9,11,14,15,17,20; LE **17.4**: 2,6,8,10,16,19.
W	Review
F	Review

Final: December 10, 2003, 12:45pm–14:45pm.