

Tentative Schedule and Homework Assignments for MATH 1550

Fall 2011

The schedule below is *tentative* and will be updated as the course progresses. Homework is due on **Fridays** at the end of class.

Date	Sections	Topics	Homework due
Mon., Aug. 29	1.1-1.3	Review of basic vector algebra; basis vectors	
Wed., Aug. 31	1.3-1.5	Change of basis; vector products	
Fri., Sept. 2	1.5, 1.6	Vector products (cont'd); reciprocal bases	
Mon., Sept. 5		Labor Day (no class)	
Wed., Sept. 7	1.6	Reciprocal bases (cont'd), Einstein summation convention, covariant and contravariant components	
Fri., Sept. 9	1.6, 1.7	Covariant and contravariant components (cont'd)	Problem 3, p. 40 Work out cases 2,3,4 in Problem 9, p. 44 pp. 54-55, #2,6,9,10,11 p. 57, #22 (a,c) Solution
Mon., Sept. 12	1.7, 2.1-2.3	Vector functions; introduction to tensors; zeroth and first order tensors	
Wed., Sept. 14	2.3, 2.4	First and second order tensors	
Fri., Sept. 16	2.4-2.6	Second order tensors (cont'd)	Click here for homework #2 Solution
Mon., Sept. 19	2.6, 2.7	Second order tensors (cont'd), higher order tensors Read these notes on transformation of tensors under rotations and invariance of tensor equations	
Wed., Sept. 21	2.8	Curvilinear coordinates	
Fri., Sept. 23	2.8, 2.9	Curvilinear coordinates (cont'd), tensors in generalized coordinate systems	Click here for homework #3 Solution
Mon., Sept. 26	notes , 2.9	Tensors in generalized coordinate systems (cont'd)	
Wed., Sept. 28	notes , 2.9	Tensors in generalized coordinate systems (cont'd)	
Fri., Sept. 30		Review Old Exam 1 (ignore problems 4 & 5, which are on the material from 2.9, not covered in this year's Exam 1) Solution Additional practice problems for Exam 1 Solution	Click here for homework #4 Solution
Mon., Oct. 3		Exam 1 (1.1-2.8) Solution	
Wed., Oct. 5	notes , 3.1	Tensors in generalized coordinate systems (cont'd); tensor addition and multiplication by a scalar	
Fri., Oct. 7	3.2-3.4.1	Inner and outer products of tensors; symmetry properties of tensors	Click here for homework #5 Solution
Mon., Oct. 10		No class (Fall Break)	

Tues., Oct. 11	3.4.1, 3.7, notes	Meet at noon (follow Monday schedule) Symmetry properties (cont'd); pseudotensors	
Wed., Oct. 12	3.7, 3.4.2, notes	Pseudotensors (cont'd)	
Fri., Oct. 14	3.5	Reduction of symmetric tensors to principal axes	Click here for homework #6 (you may want to read these notes first) Solution
Mon., Oct. 17	3.6	Invariants of a tensor; surface integrals	
Wed, Oct. 19	4.2, 4.4	Surface integrals (cont'd), flux and divergence	
Fri., Oct. 21	4.2, 4.4	Divergence (cont'd), Gauss theorem	Click here for homework #7 Solution
Mon., Oct. 24	4.1, 4.4	Line integrals, circulation and curl	
Wed, Oct. 26	4.2, 4.4	Curl (cont'd), Stokes theorem <i>This week's office hours are rescheduled to Friday, Oct. 28</i>	
Fri., Oct. 28	4.2, 4.3	Green's theorem, directional derivative <i>Office hours 2-3 pm and 4-6 pm</i>	
Mon., Oct. 31	4.3	Properties and coordinate-free definition of gradient	Click here for homework #8 (note Monday deadline due to rescheduled office hours) Solution
Wed., Nov. 2	4.5, 4.6	Properties of differential operators; second-order tensor fields	
Fri., Nov. 4		Review Practice problems for Exam 2 (includes problem from old exams) Solution	Click here for homework #9 Solution
Mon., Nov. 7		Exam 2 (2.9-4.4) Solution	
Wed., Nov. 9	5.1	Covariant differentiation of vectors, Christoffel symbols	
Fri., Nov. 11	5.1	Covariant differentiation of vectors, Christoffel symbols (cont'd)	No homework due this week
Mon., Nov. 14	5.1	Calculation of Christoffel symbols, covariant differentiation of tensors	
Wed., Nov. 16	5.1	Rules of covariant differentiation, Ricci's theorem; differential operators in generalized coordinates	
Fri., Nov. 18	5.1, 4.6.1	Differential operators in in generalized coordinates; the case of orthogonal curvilinear coordinates	Click here for homework #10 Solution
Mon., Nov. 21	5.1, 5.2	The case of orthogonal curvilinear coordinates (cont'd); integral theorems	
Nov. 23-27		No classes (Thanksgiving Break)	
Mon., Nov. 28	5.2, 5.4	Integral theorems (cont'd); potential and irrotational fields	
Wed., Nov. 30	5.4	Potential and irrotational fields (cont'd)	
Fri., Dec. 2	5.4, 5.5, 5.8	Potential and irrotational fields (cont'd); solenoidal fields; application to electromagnetism	Click here for homework #11 Solution
Mon., Dec. 5	5.7	The fundamental theorem of vector analysis Review Practice problems for Exam 3 solution Old Exam 3 solution	

Wed., Dec. 7		Review	
Fri., Dec 9		Exam 3 (4.5-5.2, 5.4, 5.5)	