MATH-348 **Advanced Engineering Mathematics**

Course Syllabus

`http://ticc.mines.edu/` **Fall 2009**

Text	E. Kreyszig, Advanced Engineering Mathematics, 9^{th} edition, Wiley, New York, 2006
Course Description	Introduction to partial differential equations, with applications to physical phenomena. Fourier series, Linear Algebra with emphasis on sets of simultaneous equations. Prerequisite: MATH225 or equivalent.
Sections	C : 11:00am-11:50am Location: Green Center 210 South D : 1:00pm-1:50pm Location: Green Center 265 E : 2:00pm-2:50pm Location: Coolbaugh Hall 131
Instructor Info	Instructor: Scott Strong Phone: 303.384.2446 Office: Chauvenet Hall 266 Email: math348.fall2009@gmail.com Office Hours: MWF, Monday 12:00pm-12:50pm, 3:00pm-5:00pm
Grading	Exams (2 @ 25% each): 50% Final Exam: 30% Discretionary: 20% Total: 100% 90 - 100% A 80 - 89% B 70 - 79% C 60 - 69% D Below 60% F
Important Dates	First Day of Class August 25 Last Day to Drop Without a W September 9 Fall Break October 19-20 Last Day to Withdraw November 3 Thanksgiving Break November 25-27 Last Day of Class December 9
Academic Honor Code	I pledge to uphold the high standards of academic ethics and integrity expressed by the Colorado School of Mines Student Honor Code by which I am bound. In particular, 'I will not misrepresent the work of others as my own, nor will I give or receive unauthorized assistance in the performance of academic coursework.' I understand that my instructor will report any infraction of academic integrity to the Department Head and that any such matter will be investigated and prosecuted fully.
Flu Policy	All students are advised to be familiar with CSMs policy regarding the make-up of work missed due to excused absences. This policy may be found in the Bulletin. If a student is ill and exhibits flu-like symptoms, they should not attend class, labs, or exams. For this particular flu season, the Centers for Disease Control are discouraging those who are ill and without serious complications from visiting a health clinic or physician thus it will be difficult for students to obtain written documentation of their illness for the Associate Dean of Students and for faculty. In order for an absence based on illness to be excused, the student must normally communicate directly with the Associate Dean of Students or his/her instructors. To make this notification process easier, particularly in the case of students suffering flu-like symptoms, we have created a web-based certification system, and strongly encourage students to use this system to automatically notify all of their instructors regarding their illness. The link to this web-based form is: `http://inside.mines.edu/Flu`

MATH348 - Fall2009 - Tentative Schedule

Section	Pages	Key Concepts
7.1, 7.2	272-286	Algebra, Associativity, Commutativity, Distribution, Inner-Product, Outer-Product, Matrix Product, Symmetric, Skew-Symmetric
7.3,7.5	287-295, 302-305	Linear System, Existence and Uniqueness, Gauss Elimination, Row Echelon Form, Fundamental Theorem for Linear Systems, Homogeneous and Nonhomogeneous systems.
7.7-7.8	308-314	Determinant, Cramer's Theorem, Matrix Inverse, Orthogonal Matrix
7.4, 7.9	296-301, 323-329	Linear Dependence, Basis, Dimension, Rank, Span, Row Space, Column Space, Null Space, Vector Space, Inner Product Space
8.1	334-339	Eigenvalue, Spectra, Eigenvector, Eigenfunction
8.3	345-348	Symmetric, Skew-Symmetric, Orthogonal, Transformations, Spectra
8.4	349-355	Eigenbasis, Diagonalization, Quadratic Form, Definiteness
Review of Functions	N/A	Function, Even, Odd, Periodic Function, Trigonometric Function, Factorial Function, Gamma Function, Bessel Function of the First Kind
11.1, 11.3	478-486, 490-495	Fourier Series, Fourier Coefficents, Fourier Series of Functions with Symmetry
11.2	487-489	Domain Scaling Properties
11.4	496-498	Euler's Formula, Complex Fourier Series
11.6	502-505	Trigonometric Approximation
11.7-11.8	506-517	Fourier Integral, Fourier Sine/Cosine Transform
11.9	518-528	Fourier Transform, time/space domain, frequency domain, spectral representation, convolution, Green's function, Frequency Response
Review of DE, 12.1	535-537	Differential Equation, Vocabulary, Linear ODE's, Boundary Value Problems, Simple Harmonic Oscillators, Bessel's Equation
Flows and Conservations Laws	N/A	Divergence Theorem, Conservation Equation, Constitutive Equation, Fourier's Law of Heat Conduction
12.5	552-561	Boundary Conditions, Separation of Variables, Periodic Extension
Inhomogeneity	N/A	Extension of Fourier Methods
12.2-12.4	538-551	Ideal Wave Equation, Vibrations, D'Alebert's Solution
12.6	562-568	Cauchy-Problem, Heat Kernel
12.9	579-586	Multivariate Chain Rule, Laplacian in Polar Coordinates, Fourier-Bessel Series
12.10	587-593	Cylindrical and Spherical Geometries
12.11	594-596	Laplace Transforms and PDE's
Acoustics	N/A	Linear Approximations and Small Amplitude Vibrations

A listing of recommended problems from the text will be given in the header box of each 'lecture slide' posted on the ticc website.