MATH-348 **Advanced Engineering Mathematics**

Course Syllabus

`http://ticc.mines.edu/`

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	A : 11:00am-12:20pm Location: Green Center 249
Instructor Info	Instructor: Scott Strong Phone: 303.384.2446 Office: Chauvenet Hall 266 Email: math348@gmail.com Office Hours: MTWR 12:30pm-1:30pm
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 June 28 Independence Day (No Classes) July 5 Last Day to Drop Without a W July 6 Last Day to Withdraw August 6 Last Day of Class August 19
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.

MATH348 - Summer2010 - Tentative Schedule[1]

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, Gaussian Function
11.1, 11.3	478-486, 490-495	Fourier Series, Fourier Coefficients, 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, Parseval's Identity, Harmonic Series
11.7-11.8	506-517	Fourier Integral, Fourier Sine/Cosine Transform
11.9	518-528	Fourier Transform, time/space domain, frequency/momentum domain, Uncertainty Relations, Sampling Theorem, Convolution, Green's function, Frequency Response, Parseval's Identityf
Review of DE, 12.1	535-537	Linear 2^{nd}-order ODE's, Simple Harmonic Oscillators, Boundary Value Problems, 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

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