

FACULTY OF ENGINEERING

ERG Coded Courses

Course Description

(Unless otherwise specified, all are 3-unit term courses of three hours of lecture and one hour of tutorial per week.)

ERG 1800

Modern Information Technology

2 U; 2 Lect. 1 Tut

This course introduces the latest information technology to students of all disciplines. The objective is to enable the students to comprehend the extensive and rapidly changing information technology knowledge at an executive level. Topics will include, but not limited to, microprocessors, software, computer graphics, multimedia, Internet, electronic commerce, electronic publishing, etc. (Not for Engineering Faculty students.)

ERG 1810

Engineering Laboratory I

1 U; 4 Lab.

ERG 2011

Advanced Engineering Mathematics (Syllabus A)

1st term

Vector calculus: vector space; grad, div and curl; curvilinear coordinates; line and surface integrals; Green's theorem, divergence theorem, and Stoke's theorem. First order differential equations: linear, separable, exact and homogeneous equations; existence and uniqueness of solutions. Second order differential equations: linear independence; reduction of order; homogeneous equations; nonhomogeneous problem; series solutions. Partial differential equations: wave equation. Properties of Laplace transform and convolution integral. Fourier series, even and odd functions, Fourier transform and its properties. (For Computer Engineering and Electronic Engineering Majors only.)

ERG 2012

Advanced Engineering Mathematics (Syllabus B)

Complex variables: complex number, analytic functions, complex functions, power series and convergence tests. Linear algebra: matrices, systems of linear equations and solutions, determinants and rank, eigenvalues and eigenvectors. Numerical integration and differentiation, numerical methods in linear algebra. Basic concept in probability and statistics. (For Computer Engineering and Electronic Engineering Majors only.)

ERG 2013

Advanced Engineering Mathematics (Syllabus C)

Vector calculus: grad, double integrals, Jacobian. First order differential equations: partial differentiation, separable, exact and linear equations, integrating factors, existence and uniqueness of solutions. Second order differential equations: homogeneous and nonhomogeneous linear equations with constant coefficients, solution by undetermined coefficients, modelling of mechanical and electrical systems. Series: power series, Taylor series, convergence tests. Linear algebra: linear system of equations, rank, Cramer's rule, eigenvalues, eigenvectors, orthogonal matrices, diagonalization, vector space, inner product space, linear transformation. Numerical examples. (For Information Engineering Majors only and not for students who have taken ERG 2011 or 2012.)

ERG 2014

Advanced Engineering Mathematics (Syllabus D)

Calculus of several variables: partial derivatives; differential and the Jacobian matrix; chain rule; grad, div, curl; path integrals; double integrals; triple and surface integrals; Green's theorem, Gauss's theorem, Stoke's theorem. Complex analysis: complex analytic functions; complex integration. Ordinary differential equations: separable equations; linear first-order equations with constant coefficients; systems of linear differential equations, nonhomogeneous equations. Fourier series: sinusoidal form and complex form. Partial differential equations: Laplace's equation; diffusion equation; wave equation. (For Automation and Computer-Aided Engineering, and Innovation and Design Engineering Majors only.)

ERG 2015

Advanced Engineering Mathematics (Syllabus E)

Linear algebra: vector spaces; linear transformations and their matrix representations; eigenvalues and eigenvectors; symmetric and orthogonal matrices; systems of linear equations and their solutions. Probability theory: probability concepts; random variables and distributions; mean and variance; joint distributions; covariance and correlation. Introduction to discrete mathematics: logic; graphs; recurrence relations; analysis of algorithms. (For Automation and Computer-Aided Engineering, and Innovation and Design Engineering Majors only. Not for students who have taken ERG 2017.)

ERG 2016

Advanced Engineering Mathematics (Syllabus F)

Linear Algebra: matrices, vector space, system of linear equations, determinant, eigenvalues and eigenvectors, linear transformation, inner product space. Linear programming: simplex method, duality. First order differential equations: separable, exact and linear equations, integrating factors, existence and uniqueness of solutions. Homogeneous linear systems of differential equations with constant coefficients. (For Internet Engineering Majors only.)

*ERG 2017

Advanced Engineering Mathematics (Syllabus G)

ERG 2020

Digital Logic and Systems

Digital concepts; number systems; operations and codes; logic gates; Boolean algebra and logic simplification; combinational logic; functions of combinational logic; flip-flops and related devices; counters; finite state machines; programmable logic devices - programming and sequential logic applications; memory and storage; integrated circuit technologies. (Not for students who have taken ELE 2120.)

ERG 2030

Signals and Systems

Classification of signals. Linear time-invariant systems. Convolution. Sampling. Fourier series, discrete Fourier series and DFT. Continuous-time and discrete-time Fourier transforms. Laplace transform and its applications. State space representation. Stability and linear feedback. Introduction to z-transform.

ERG 2040

Probability Models and Applications

Fundamental probability concepts. Functions of random variables. Conditional probability. Bayes' Theorem. Characteristic functions. Limit theorems. Markov chain. Applications.

* Course offered in 2001-02.

ERG 2310

Principles of Communication Systems

Review of linear system theory and probability. Analog modulations. Sampling and quantization. Baseband modulations. Passband modulations. Multiplexing methods. Noise and performance analysis. Introduction to error control coding. Case studies of communication systems.

ERG 2810

Engineering Laboratory II

1 U; 4 Lab.

ERG 3810

Product Development Project

1 U; 4 Lab.

ERG 3820

Software Engineering Practice

2 U; 2 Lect. 1 Lab.

Introduction to software engineering principle. Software lifecycles: system modelling; requirement analysis and specifications; preliminary and detailed designs; implementation and testing; operation and maintenance. Software and system interface: design criteria; system integration; verification and validation; reliability and performance. Software tools and practice: application of CASE tools; documentation; communication skills; software project management. Prerequisite: CSC 1110 or 1500 or ERG 1210. (Not for Computer Science and Computer Engineering Majors and students who have taken CSC 3100 or IEG 3080.)

ERG 4910, 4920

Thesis I, II

4 each

(Graduation Project as prescribed by ERG 4920 will carry a separate weight of 6.79% in honours classification in Electronic Engineering and 10% in honours classification in Information Engineering.)