

Module Code	MA1023	Title	Methods of Mathematics			
Credits	03	Hours/ Week	Lectures	03	Prerequisites	MA1013
			Lab/Tutorial	01		
<u>Learning Outcomes</u>						
<p>At the end of this module the student should be able to</p> <ul style="list-style-type: none"> • Solve a non-linear equation in a single variable, to a desired accuracy. • Integrate a function of a single variable numerically, to a desired accuracy. • Solve first order non-linear ordinary differential equations. • Solve initial value problems involving second order linear ordinary differential equations. • Application of multivariate calculus to solve simple engineering problems. • Apply statistical skills in engineering problems. • Use probability distributions for decision making in engineering. 						
<u>Outline Syllabus</u>						
<u>Numerical Methods</u>						
<ul style="list-style-type: none"> • Algorithms and errors; • Numerical solution of non-linear equations. Bisection and false position methods, simple iterations. Newton-Raphson method; • Estimation of errors and acceleration of convergence. Approximations of functions. • Numerical integration; Trapezoidal rule, Simpson's rule. 						
<u>Ordinary Differential Equations & Multivariate Calculus</u>						
<ul style="list-style-type: none"> • Reimann integration; • First order ordinary differential equations: Variable separable, homogeneous and exact eqations. • Second order differential equations: Reducible forms. • Functions of several variables: partial differentiation, chain rule, directional derivatives. • Maxima and minima, Lagrange multipliers; • Taylor series expansion of multivariate functions. 						
<u>Basic Probability and Statistics</u>						
<ul style="list-style-type: none"> • Conditional probability, Bayes' theorem. • Discrete and continuous random variables. Probability and cumulative distribution functions, joint distribution functions. • Uniform, Binomial, Poisson and Normal distributions and their applications. • Basic statistical indicators in data analysis, correlation coefficients; • Introduction of Minitab - statistical software. 						

Note: For all MPR,ER,TT students excluding CS students.