

University of Moratuwa, Faculty of Engineering, Department of Mathematics-20150831
 BSc Engineering Honors Degree
 Batch 14(683)-Semester 2-2014/08/31:2015/12/18-16 weeks
 Reading Week-2015/10/30:2015/11/08
 ME(101)+ER(50)-(151)Mon-every other week-08.15:10.15-ASSH
 BM(16)+EE(101)+EN(102)-(219)Mon-every other week-13.15:15.15-ASSH
 CE(128)+CH(85)+MT(50)+TT(50)-(313)Wed-every other week-13.15:15.15-NA1

Lecturer: Dr. Udaya Chinthaka Jayatilake

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Web: <http://www.math.mrt.ac.lk/content/drudayajayatilake-teaching>

Module Code	MA1023 Part 2	Title	Methods of Mathematics <u>Ordinary Differential Equations & Multivariate Calculus</u>			
			Lectures Lab/Tutorial	01 1/3	Prerequisites	MA1013
Credits	01	Hours/Week				
<u>Learning Outcomes</u>						
At the end of this module the student should be able to						
<ul style="list-style-type: none"> Solve initial value problems involving second order linear ordinary differential equations. Application of multivariate calculus to solve simple engineering problems. 						
<u>Outline Syllabus</u>						
<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>Detailed Syllabus</u>						
<ul style="list-style-type: none"> Reimann Integration: partitions, definition, integrability, properties, fundamental theorem of calculus, integration by parts, differentiation under the integral sign, improper integrals, comparison theorems, non inetegrable functions. Differential Equations: variable separable, homogeneous, linear and exact equations, second order linear ordinary differential equations, variation of parameters, Wronskian, power series methods, concepts of existence and uniqueness. Functions of Several Variables: partial differentiation, chain rule, directional derivatives, inverse function theorem, implicit function theorem, maxima and minima, Lagrange multipliers, Taylor series expansion of multivariate functions, Frechet derivative. 						
<u>Method of Assessment (for the whole course MA1023)</u>						
End of semester examination: 2 hour closed book paper: 70%						
Mid semester examination: 1 hour open book paper: 20%						
Tutorial class activities: 10%						
<u>References</u>						
<ul style="list-style-type: none"> <i>Principles of Mathematical Analysis</i>, Walter Rudin <i>Mathematical Analysis</i>, Tom M. Apostol <i>Calculus</i>-Volume1 and 2, Tom M. Apostol <i>Real Analysis</i>, N. P. Bali <i>Advanced Calculus</i>, David V. Widder 						