

University of Moratuwa, Faculty of Engineering, Department of Mathematics-20150429

BSc Engineering Honors Degree

Semester 3(13 batch): 2015/04/27-2015/08/21-15 weeks, Reading Week-2015/07/11-2015/07/26

CS(100)-We 13.15: 15.15-Aud 1 L block

**Lecturer: Dr. Udaya Chinthaka Jayatilake**

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Module Code	MA2073	Title	Calculus for System Modeling			
Credits	02	Hours/ Week	Lectures	02	Pre-requisites	MA1013
			Lab/Tutorials	-		
<b><u>Learning Outcomes</u></b> At the end of this module the student should be able to <ul style="list-style-type: none"><li>• Perform vector differentiation and integration and evaluate vector and scalar quantities in various engineering applications.</li><li>• Perform contour integration techniques.</li><li>• Apply conformal mapping in physical system modeling.</li><li>• Use probability distributions for various decision making in engineering.</li></ul>						
<b><u>Outline Syllabus</u></b> <b>Vector Calculus</b> <ul style="list-style-type: none"><li>• Multivariable functions, partial differentiation, chain rule, directional derivatives, Maxima and minima, Lagrange multipliers.</li><li>• Taylor series expansion of multivariate functions.</li><li>• Double Integral, triple integral, vector functions.</li><li>• Introduction to vector calculus. Vector differentiation and differential operators, space curves and line integral, surface integrals.</li></ul> <b>Complex Variables</b> <ul style="list-style-type: none"><li>• Taylor and Laurent's series, contour integration.</li><li>• Introduction to conformal mapping.</li></ul> <b>Basic Probability and Statistics</b> <ul style="list-style-type: none"><li>• Properties of random variables.</li><li>• Statistical distributions.</li><li>• Applications involving Binomial, Poisson, Normal and Exponential distributions.</li></ul>						
<b><u>Method of Assessment</u></b> End of semester examination: 2 hour closes book paper: 70% Mid semester examination: 1 hour open book paper: 10% In-class assessments: 10% Take-home assessment: 10%						
<b><u>Requirements</u></b> 80% attendance is compulsory						
<b><u>References</u></b> <ul style="list-style-type: none"><li>• Advanced Calculus, David V. Widder</li><li>• Calculus: Volume I &amp; II, Tom M. Apostol</li><li>• Mathematical Analysis, Tom M. Apostol</li><li>• Complex Variables: Introduction and Applications- Cambridge Texts in Applied Mathematics, Mark J. Ablowitz and Athanassios S. Fokas .</li><li>• Probability, Random Variables and Stochastic Processes, Athanasios Papoulis and S.Unnikrishna Pillai.</li><li>• Advanced Engineering Mathematics, Michael D. Greenberg</li><li>• <a href="http://www.wolframalpha.com/">http://www.wolframalpha.com/</a></li><li>• <a href="http://mathworld.wolfram.com/">http://mathworld.wolfram.com/</a></li></ul>						