University of Moratuwa, Faculty of Engineering, Department of Mathematics-20140527
BSc Engineering Honors Degree
Semester 5: 2014/05/26-2014/09/12-16 weeks, Reading Week-2014/07/19-2014/07/27
EN(100) /ME(80)-(180)-Tue 10.15: 12.15-215
CH(80)/ EE(100)/ER(50)/MT(50)-(280)-Tue 13.15: 15.15-NA2, Total-460

Lecturer: Dr. Udaya Chinthaka Jayatilake
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Module Code	**MA3023**	**Title**	**Numerical Methods**			
Credits	**02**	**Hours/ Week**	**Lectures**	**02**	**Pre-requisites**	MA1023
			Lab/Tutorials	**-**		

Learning Outcomes

At the end of this module the student should be able to

- solve a system of linear equations by various numerical methods.
- solve a system of non-linear equations by various numerical methods.
- find maxima and minima of functions of several variables by numerical methods.
- solve an initial value problem involving an ordinary differential equation by various numerical methods.
- solve an initial-boundary-value problem involving a partial differential equation by various numerical methods.

Outline Syllabus

- Gaussian elimination, Jacobi's and Gauss-Siedel methods.
- Curve fitting.
- Numerical solution of a system of non-linear equations;
- Numerical optimization;
- Numerical solution of an ordinary differential equation: Taylor series method, Euler's method and Runge-Kutta methods;
- Numerical solution of partial differential equation: Initial boundary value problems involving Heat equation, Wave equation and Laplace's equation.

Method of Assessment

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%

Note

80% attendance is compulsory.
Please bring your calculators and laptops with Matlab and Mathematica installed.
We will solve one problem in detail at each lecture.

References

Classical and Modern Numerical Analysis: Theory, Methods and Practice, Azmy S. Ackleh, Edward J. Allen, R. Baker Kearfott and Padmanabhan Seshaiyer, 1st edition, Chapman & Hall/CRC Numerical Analysis and Scientific Computing Series.