Course Specifications

General Information

Course name	Numerical Analysis (2)
Course number	MATH3313
Faculty	
Department	
Course type	Major Needs
Course level	3
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - Numerical techniques for solving Differential Equations
2 - Computer algoriths for the Numerical Methods
3 - Convergence and Stability of the Numerical Methods

Intended Learning Outcomes

Knowledge and Understanding
* The students are supposed to be able to analysis and solve DEs Numerically

Course Contents

1 - Numerical Solution of Ordinary Differential Equations
2 - Taylors series method, Euler and modified Euler Method
3 - Rung-Kuta Method, Milnes Method, Adams-Mouhon Method
4 - Convergence and Error Analysis
5 - Numerical Solution of Boundary Value Problems
6 - Raleigh-Ritz, Collocation, Calerkin Method
7 - Main Concepts of the Finite Element Methods for Solving PDEs

Teaching and Learning Methods

1 - Lectures, discusions, Computer Labs, Projects

Teaching and Learning Methods for the Disabled Students

1 - NA

Students Assessment

Assessment Method	TIME	MARKS
Midterm Exam	After 6 weeks	20%
Quizez	every two weeks	20%
Project and Assignments	one or two projects	10%
Final	end of semester	50%

Books and References

Course note	1- Applied Numerical Analysis, Gerald, Sixth Edition, "Text"
	2- Numerical Analysis, Richard Burden - Reference
	3- Numerical Analysis, Lee, Johnson - Reference

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
Computer Error and Convergence	First week				
Numerical Methods for Solving Ordinary Differential Equations	Second and Third Week				
Numerical Solution of Boundary Value Problems	Fourth and Fifth Week				
Programming and Discussion,	Sixth week				
Convergence and Stability of the N. Methods for Ordinary Differential	7				
Convergence and Stability of the N. Methods for Ordinary Differential Equations	8				
Midterm	9				
Numerical Solution of Elliptic Partial Differential Equations	9				
Numerical Solution of Elliptic Partial Differential Equations	10				
Numerical Solution of Parabolic Partial Differential Equations	11				
Numerical Solution of Hyperbolic Partial Differential Equations	12				
Convergence and Stability of the N. Methods for Partial Differential Equations	13				
Convergence and Stability of the N. Methods for Partial Differential Equations	14				
Convergence and Stability of the N. Methods for Partial Differential Equations	15				
Numerical Solution of BVPs Problems Using matlab	16				