Course Specifications

Course Title:	**Numerical Analysis-2**
Course Code:	**475Math-3**
Program:	**Mathematics**
Department:	**Mathematics**
College:	**College of Science and Arts**
Institution:	**Najran University**

Table of Contents

A. Course Identification

1. Credit hours: 3	
2. Course type	
a. University ☐ College ☐ Department ☑ Others ☐	
b. Required ☑ Elective ☐	
3. Level/year at which this course is offered: 8/4	
4. Pre-requisites for this course (if any)**:474Math-3**	
5. Co-requisites for this course (if any)**:**	

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	٣٠	%٦٦
2	Blended		
3	E-learning		
4	Correspondence		
5	Other	١٥	%٣٤

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	30
2	Laboratory/Studio	15
3	Tutorial	
4	Others (specify)	
	Total	45
Other Learning Hours*		
1	Study	20
2	Assignments	5
3	Library	15
4	Projects/Research Essays/Theses	5
5	Others (o.h)	15
	Total	105

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course will cover the foundations of numerical analysis . The main focus of this course is find numerical solution of (ordinary differential equations, system of nonlinear equation, system of ordinary differential equations and Partial differential equations)

2. Course Main Objective

The main objectives of the course is to familiarize the students with the essential concepts to Numerical analysis and how to get the numerical solution of the equations

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	Define the elementary concepts of numerical analysis	
1.2	Specify the methods used in numerical solutions to solve(ordinary differential equations ,nonlinear system equation, system of differential equation and partial differential equation, …)	
1.3		
1...		
2	**Skills :**	
2.1	**Use appropriate theories, principles and concepts relevant to the numerical methods that are applicable to real problems.**	
2.2	**Solve various problems in numerical analysis**	
2.3	**Compare between numerical methods to find the numerical solutions**	
2...		
3	**Competence:**	
3.1	**Use language program for solving numerical problem.**	
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Numerical Solution of system of nonlear equations Fixed Points ; Newton's Method; Quasi-Newton Methods	12
2	Numerical solution of ordinary differential equations Euler's Method; Euler's Predictor corrector Method; Higher-Order Taylor Methods; Runge-Kutta Methods	١٢
٣	Numerical Solution of system of ordinary differential equations Euler's Method; Runge-Kutta Methods	١٢
4	Numerical solution of partial differential equations	٩
5		
5		
...		
	Total	٤٥

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1	Define the basic concepts of numerical analyses	**Lectures discussions**	- **Oral exam (observation card)**
1.2	**Know how to solve the equations by using numerical method**	**Lectures discussions**	- **Oral exam** - **(observation card)**
1.3	**Know how to use the computer program to solve the equation**	**Lectures discussions**	- **Oral exam (observation card)**
…			
2.0	**Skills**		
2.1	**Use the numerical method for solving the nonlinear equation**	**Lectures discussions**	- **Practical test** - **Theatrical test** **Assignments**
2.2	**Evaluate the error for the different method**		-
2.3	**Using computer program to solve the equation**	**Lectures discussions**	- **Practical test** - **Theatrical test** **Assignments**
…			
3.0	**Competence**		
3.1	Show the errors in different method		
3.2			
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Assignments**	**open**	**5**
2	**Quizzes**	**open**	**5**
3	**Practical tests**	**7 & 13**	**٤٠**
4	**Final exam**	**16**	**50**
5			
6			
7			
8			

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :
Available at office hours per week

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	**R. Burden, and J. D. Faires, Numerical Analysis, PWS-Kent Publishers, (1993).** التحليل العددي ريتشارد بيردن ودوغلاس فايرس ترجمة محمد صبحي ١٤٣٤
Essential References Materials	V. A. Patel, Numerical Analysis, Harcourt Brace, College Publishers, (1994). [2]- W. Cheney and D. Kincaid, Numerical Mathematics and Computing, Brooks/Cole Publishing Company, (2003). [3]- John H. Mathews & Kurtis D. Fink, Numerical Methods Using Matlab, Fourth Edition (& Higher). UpperSaddleRiver: Pearson Prentice Hall, 2004.
Electronic Materials	. • **http://www.uaemath.com/ar/aforum.** • **http://www.mathramz.com/xyz/index.php** **http://www.yzeeed.com.**
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom .lab include 20 computes
Technology Resources (AV, data show, Smart Board, software, etc.)	Data Show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Questioner (Indirect)
achievement of course learning outcomes	Lecturer	Software (Direct)
Quality of learning resources	all	Questioner (Indirect)

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	