اعتماد
NCAAA

T4

2020

Course Specifications

Course Title:	**Mathematical Packages**
Course Code:	**Math 3510**
Program:	**Bachelor of Science in Mathematics**
Department:	**Mathematics Department**
College:	**College of Science and Humanities Studies in Alkharj**
Institution:	**Prince Sattam Bin Abdualziz University**

Table of Contents

A. Course Identification

1. Credit hours: 05 (Five)	

2. Course type

a.   University ☐   College ☐   Department **X**   Others ☐

b.   Required **X**   Elective ☐

3. Level/year at which this course is offered: Level 9

4. Pre-requisites for this course (if any)**: MATH 2301, MATH 3330**

5. Co-requisites for this course (if any)**: None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	Weekly 5 hours	100%
2	**Blended**	None	0%
3	**E-learning**	None	0%
4	**Distance learning**	None	0%
5	**Other**	None	0%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	42
2	**Laboratory/Studio**	28
3	**Tutorial**	--
4	**Others** (specify)	60
	Total	130

B. Course Objectives and Learning Outcomes

1. Course Description

Introduction: Problem Formulation – Algorithm Development. FORTRAN 95: Program Creation – Compilation and Linking Variables and Parameters – Flow Control – Subroutines and Functions – Use of Libraries. C++ for Scientific Uses – Mathematica® : Vectors and Matrices – Numerical Calculations – Symbolic Calculations – Graphics. MATLAB®"Matrix Laboratory": MATLAB® Vectors and Matrices – Numerical Calculation. Applications: Polynomials – Interpolation – Integration – Differentiation – ODE – Graphics – 2- D and 3- D. Graphics: Review of Common Graphics Program – Graphics with Spreadsheets

2. Course Main Objective

The objective of the course is to provide an hands on experience to the students in some mathematical packages such as MATLAB, Mathematica etc.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Understand the concept of development of algorithms	K1
1.2	Gain thorough understanding about the Syntax and construct of MATLAB, FORTRAN etc.	K3
1.3	Gain knowledge about application softwares	K4
2	**Skills :**	
2.1	Able to develop applications using MATLAB.	S1
2.2	Use software to sketch graph and make reports	S3
3	**Values:**	
3.1	Make Inference and reports	**V2**

C. Course Content

No	List of Topics	Contact Hours
1	Problem Formulation and Algorithm Development	4
2	Fortran 95 – Program Creation – Compilation and Linking	4
3	Flow control, subroutines and functions	4
4	Libraries	4
5	Mathematica -Vectors and Matrices	4
6	Numerical Calculations – Symbolic Calculations	4
7	Graphics	3
8	MATLAB "MATRIX LABORATORY" – Introduction	3
9	Vectors and Matrices	3
10	Numerical Calculations	3
11	Applications: Polynomials – Interpolation – Differentiation – Integration	6
12	ODE-Graphics	3
13	Graphics and Spreadsheets	3
	Total	48

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 and Understanding**		
1.1	Understand the concept of development of algorithms	1. Class Room lectures	1. Two Internal Exams
1.2	Gain thorough understanding about the Syntax and construct of MATLAB, FORTRAN etc.	2.Interactive sessions	2. Atleast two Quiz
		3.Exclusive Office Hours for clearing doubts in small groups	3. End Semester Exam
2.0	**Skills**		
2.1	Able to develop applications using MATLAB.	1. Class Room lectures	

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.2	Use software to sketch graph and make reports	2.Interactive sessions	1. Exams
2.1	Able to develop applications using MATLAB.	3.Exclusive Office Hours for clearing doubts in small groups	2. Practical sessions
3.0	**Values**		
3.1	Make Inference and reports	Group Discussion during lectures and Interactive Session Exercises during Lecture and Tutorials	Homework to be given so that the students discuss among themselves or refer materials from textbook to find solution Internal Exams Final Exam

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid Term Exam I	6	20%
2	Quiz	4 & 10	5%
3	Mid Term Exam II	13	20%
4	Continuous Assessment – Homework, Assignment, Attendance etc.	--	5%
5	End Semester Exam	15	50%

*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 :
1. Exclusive Office Hours – 5 Hours per week.
2. Academic Advising for Students – 1 Hour per week.

F. Learning Resources and Facilities
1.Learning Resources

Required Textbooks	• A Guide to MATLAB® for Beginners and Experienced Users, Brian R. Hunt Ronald L. Lipsman. • MATLAB® An Introduction with Applications, Amos Gilat.
Essential References Materials	NIL
Electronic Materials	Web Sites, Facebook, Twitter, etc.
Other Learning Materials	Lecture Notes Prepared by the Department of Mathematics

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms with Smart boards with seating facilities for at least 30 students
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart board, Internet Connection for Blackboard MATLAB, Mathematica installed in at least 30 terminals in the Computer Lab
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Computer lab with 30 terminals

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching	Students, Graduates	Course Evaluation and Program Evaluation Survey (Indirect)
	Program Leaders	Peer Review (Direct)
Achievement of CLOs	Faculty and Quality Personnel	Direct (Tests and Quiz) and Review of Course Report
Quality of Learning Resources	Students	Course Evaluation (Indirect)
	Graduates	Program Evaluation(Indirect)
Facilities	Students / Graduates	Course and Program Evaluation (Indirect)
	Faculty	Faculty Survey (Indirect), Course Reports (Direct)

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	