Course Specification

(Postgraduate Programs)

Course Title:	**Differential Equations**
Course Code:	**Math 620**
Program:	**Master of Science in Mathematics**
Department:	**Mathematics**
College:	**College of Science and Humanities**
Institution:	**Prince Sattam Bin Adbdulaziz University**
Version:	**V3**
Last Revision Date:	**Dec 2024**

Table of Contents

A. General information about the course:

1. Course Identification:

1. Credit hours: 3(3,0,0)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (First)					
4. Course general Description:					
Existence and uniqueness of solutions of linear systems. Stability theory. Poincare's theory for two dimensional systems. Sturm-Liouville boundary problems.					
5. Pre-requirements for this course (if any)**:**					
NIL					
6. Co-requirements for this course (if any)**:**					
NIL					
7. Course Main Objective(s):					
To make the students aware of Stability Theory, Poincare's Theory etc and solve differential equations including Sturm-Liouville Boundary Problems using various techniques					

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3 Hours per week	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning	In case of any exigency	
4	Distance learning		

3. Contact Hours: (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures (16 X 3)**	48
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)……**	
	Total	48

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods:

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	**Able to recall and reproduce the concepts of of Stability Theory, Poincare's Theory**	**K1**	**Class room lectures Tutorial session Interactive session Group and Individual discussion**	**Atleast Two Quiz Mid Semester Exam End Semester Exam**
1.2	**Able to identify different types boundary value problems and describe appropriate technique to solve the same.**	**K3**		
2.0	**Skills**			
2.1	**Able to analyze the existence of solution to a given differential eqution**	**S1**	**Class room lectures Tutorial session Interactive session Group and Individual discussion**	**Atleast Two Quiz Mid Semester Exam End Semester Exam**
2.2	**Solve Sturm-Liouville Boundary Problems using various techniques**	**S1**		
3.0	**Values, autonomy, and responsibility**			
…				

C. Course Content:

No	List of Topics	Contact Hours
1.	Existence and uniqueness of solutions of linear systems	12
2.	Stability theory	12
3.	Poincare's theory for two dimensional systems	12
4.	Sturm-Liouville boundary problems	12
	Total	48

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quiz	3 and 9	5%
2.	First Mid term Exam	7	20%
3.	Second Mid Term Exam	12	20%
4.	Homework, Assignment etc	Continuous	5%
5.	Final Exam	17	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities:

1. References and Learning Resources:

Essential References	Edwards C., and Penney D., " Differential Equations with Boundary Value Problems", 5th ed. Upper Saddle River, NJ: Prentice Hall, (2003), ISBN: 013145773X.
Supportive References	
Electronic Materials	- William Boyce, and Richard C. DiPrima, " Differential Equations and Boundary Value Problems", 7th ed, John Wiley and Sons
Other Learning Materials	**Lecture notes prepared by the Department**

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	**Class room to accommodate 20 students**
Technology equipment (Projector, smart board, software)	**Smart Board, Projector, Licensed version of Blackboard to handle lecture remotely in case of exigencies.**
Other equipment (Depending on the nature of the specialty)	**NIL**

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Graduates	Course Evaluation and Program Evaluation Survey (Indirect)
Effectiveness of students' assessment	Program Leaders	Peer review (Direct)
Effectiveness of students' assessment	Students	Indirect
Quality of learning resources	Students, Graduates	Indirect (Program Evaluation and Alumni Survey)
Other	Faculty	Indirect (Survey)

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	**DEPARTMENT COUNCIL MEETING 4**
REFERENCE NO.	**4**
DATE	**OCT 2024**