



Course Specification

— (Postgraduate)

Course Title: Theory of Differential Equations

Course Code: 202504-3

Program: Master of Pure Mathematics

Department: Mathematics and Statistics

College: Science

Institution: Taif university

Version: 1

Last Revision Date: 20/10/2023



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A. General information about the course:

1. Course Identification:

1. Credit hours: (3)

2. Course type

A. University College Department Track

B. Required Elective

3. Level/year at which this course is offered: Level 1/First Year

4. Course general Description:

In this course, we will study Dynamical Systems – Existence and uniqueness of solutions of linear systems – eigenvalues and eigenvectors – Rayleigh-Ritz method - perturbation method.

5. Pre-requirements for this course (if any):

None

6. Pre-requirements for this course (if any):

None

7. Course Main Objective(s):

The student will be taught as follows:

1. Studying Dynamical Systems
2. Studying Existence and uniqueness of solutions of linear systems
3. Studying eigenvalues and eigenvectors.
4. Studying Rayleigh.
5. Studying Ritz method
6. Studying perturbation method.

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		
4	Distance learning		





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

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	NA
3.	Field	NA
4.	Tutorial	NA
5.	Others (specify).....	NA
	Total	45

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Recognize Existence and uniqueness of solutions of linear systems.	K1	Lectures, discussion, group	Exams, Quizzes, Assignments
1.2	Describe perturbation method.	K3	Lectures, discussion, group	Exams, Quizzes, Assignments
2.0	Skills			
2.1	Apply perturbation method - Existence and uniqueness of solutions of linear systems.	S1	Lectures, discussion, group	Exams, Quizzes, Assignments, report
2.2	Demonstrate Ritz method. eigenvalues and eigenvectors.	S5	Lectures, discussion, group	Exams, Quizzes, Assignments, report
3.0	Values, autonomy, and responsibility			
3.1	Participate effectively within groups and independently.	V1	Lectures, discussion, group	Exams, Quizzes, Assignments, report
3.2	Give responsibility for learning importance and continuing personal and professional development.	V2	Lectures, discussion, group	Exams, Quizzes, Assignments, report



C. Course Content:

No	List of Topics	Contact Hours
1.	Dynamical Systems.	9
2.	Existence and uniqueness of solutions of linear systems	9
3.	Eigenvalues and eigenvectors.	9
4.	Rayleigh.	6
5.	Ritz method.	6
6.	Perturbation method.	6
Total		45

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes and HomeWorks	Continues	10 %
2.	Midterm exam	8 th -9 th	20 %
3.	Final exam	16 th	70%

*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	Partial Differential Equations: Second Edition ISBN-13: 978-0821849743 ISBN-10: 0821849743
Supportive References	Introduction to Partial Differential Equations. ISBN-13: 978-0691043616 ISBN-10: 0691043612
Electronic Materials	https://www.amazon.com/Partial-Differential-Equations-Graduate-Mathematics/dp/0821849743
Other Learning Materials	None

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms



Items	Resources
Technology equipment (Projector, smart board, software)	Data show, Blackboard, Maple and MATLAB software
Other equipment (Depending on the nature of the specialty)	Wi-Fi internet connections

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect
Effectiveness of students assessment	Students	Indirect
Quality of learning resources	Students	Indirect
The extent to which CLOs have been achieved	Peer reviewer	Direct
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	Department of Mathematics and Statistics
REFERENCE NO.	
DATE	20/10/2023

