



T-104
2022

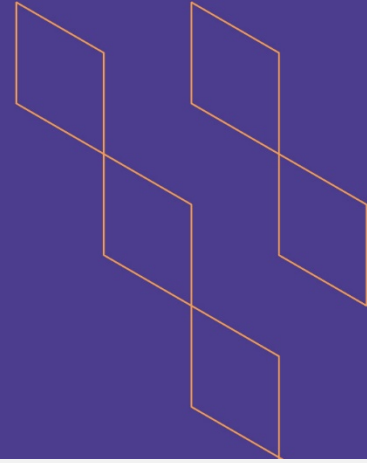
Course Specification





T-104
2022

Course Specification



Course Title	Mathematical Methods
Course Code:	344Math-3
Program:	B. Sc. Mathematics
Department:	Mathematics
College:	Arts and Sciences
Institution:	Najran University
Version:	V2022
Last Revision Date:	10-9-2023



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A. General information about the course:

Course Identification

1. Credit hours: 3

2. Course type

a. University College Department Track Others

b. Required Elective

3. Level/year at which this course is offered: 6 / 3 12

4. Course general Description

This course is designed to cover three main topics: special functions, Fourier series and integrals, and a brief sketch of the Sturm–Liouville problem and its solutions.

5. Pre-requirements for this course (if any): 240Math-3

6. Co- requirements for this course (if any): None

7. Course Main Objective(s)

Display Sturm–Liouville theory as a way to study the special functions, and give an introduction to Fourier series and integrals.

1. Teaching mode (mark all that apply)

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

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	---
3.	Field	---
4.	Tutorial	---
5.	Others (specify)	---
	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	Describe the basic concepts of mathematical methods	K1	Discussion and exercises during lecture time	Quiz Written Exam
2.0	Skills			
2.1	Construct some formulas of special functions	S2	Discussion and exercises during lecture time	Quiz Written Exam Homework
2.2	Solve various problems related to mathematical methods	S3	Discussion and exercises during lecture time	Quiz Written Exam Homework
2.3	Prove elementary theorems related to mathematical methods	S2	Discussion and exercises during lecture time	Quiz Written Exam Homework
2.4	Present the main concepts of mathematical methods to others, both in oral and written form	S4	Homework and discussions in the classes	Oral Exam Rubrics
3.0	Values, autonomy, and responsibility			

C. Course Content

No	List of Topics	Contact Hours
1.	Inner product space, convergence in L_2 , complete orthogonal set in L_2	9
2.	The Sturm–Liouville theory	6
3	Fourier series in L_2 , pointwise convergence	9
4	Orthogonal polynomials (Legendre, Hermite and Laguerre)	6
5	Bessel functions (the first and second kinds)	9
6	Fourier transform and its applications	6
Total		45



D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Exam	6	30
2.	Assignments & Quizzes	During classes	20
3.	Final Exam	12-13	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	M.A.Al-Gwaiz, Sturm-Liouville Theory and its Applications, Springer-Verlag London, 2008.
Supportive References	None
Electronic Materials	Lectures on the Department of Mathematics YouTube Channel.
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	<ul style="list-style-type: none"> Classroom with suitable seats
Technology equipment (projector, smart board, software)	<ul style="list-style-type: none"> Data show Smart Board Wi Fi
Other equipment (depending on the nature of the specialty)	<ul style="list-style-type: none"> None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Questionnaire (Indirect)
Effectiveness of students assessment	Peer Reviewer	Rubrics (Indirect)
Quality of learning resources	Peer Reviewer	Rubrics (Indirect)
The extent to which CLOs have been achieved	-----	-----



Assessment Areas/Issues	Assessor	Assessment Methods
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

