



Course Specification

— (Postgraduate)

Course Title: Functional analysis 2

Course Code: 202651-3

Program: Master of pure Mathematics

Department: Mathematics and Statistics Department

College: Faculty of Sciences

Institution: Taif University

Version: 1

Last Revision Date: 20/05/2023



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A. General information about the course:

1. Course Identification:

1. Credit hours: (3) h			
2. Course type			
A.	<input type="checkbox"/> University	<input type="checkbox"/> College	<input checked="" type="checkbox"/> Department
			<input type="checkbox"/> Track
	<input type="checkbox"/> Others		
B.	<input type="checkbox"/> Required		<input checked="" type="checkbox"/> Elective
3. Level/year at which this course is offered: Level 3 / 3th year			
4. Course general Description:			
<p>This course covers some topics in functional analysis such as: Open mapping theorem – Topological vector spaces – closed and complete sets – convex spaces – Hahan-Banach theorem – Linear operators – Banach-Algebra – B*-Algebra – Spectral theorem – Gelfand-Theorem – Spectral Theory of Operators.</p>			
5. Pre-requirements for this course (if any):			
None			
6. Pre-requirements for this course (if any):			
None			
7. Course Main Objective(s):			
<p>The student will be taught as follows:</p> <ol style="list-style-type: none"> 1. Study Open mapping theorem. 2. Study Topological vector spaces . 3. Study closed and complete sets. 4. Study convex spaces. 5. Study Linear operators – Banach-Algebra. 6. Study Banach-Algebra – B*-Algebra 7. Study spectral theorem – Gelfand-theorem – spectral theory of operators 			

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 		



No	Mode of Instruction	Contact Hours	Percentage
	• 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	Define fundamentals concepts of Topological vector spaces.	K1	Lectures, discussion group	Exams, Quizzes, Assignments
1.2	Describe spectral theorem – Gelfand-theorem – spectral theory of operators.	K3	Lectures, discussion group	Exams, Quizzes, Assignments
2.0	Skills			
2.1	Apply linear operators and Banach-Algebra – B*-Algebra.	S1	Lectures, discussion group	Exams, Quizzes, Assignments, report
2.2	Use properties of open mapping theorem.	S5	Lectures, discussion group	Exams, Quizzes, Assignments, report
3.0	Values, autonomy, and responsibility			
3.1	Work effectively within groups and independently.	V1	Collaborative Learning Self-learning	Scientific activity





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.2	Articulate responsibility for learning importance and continuing personal and professional development.	V2	Lectures	Assignments
...				

C. Course Content:

No	List of Topics	Contact Hours
1.	Linear operators	6
2.	Topological spaces.	9
3.	Banach-Algebra – B*-Algebra.	9
4.	open mapping theorem.	9
5.	Hahn-Banach Theorem.	3
6.	Banach-Algebra – B*-Algebra. - Gelfand-theorem – spectral theory of operators	9
Total		45

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes and homeworks	Continuous Evaluation	10 %
2.	Midterm Exam	10-11	20 %
3.	Final Exam	15-16	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
Erwin Kreyzig, Introductory Functional Analysis with Applications, Willy, 1978





Supportive References	Erwin Kreyzig, Introductory Functional Analysis with Applications, Willy , 1978
Electronic Materials	Lectures available in Blackboard
Other Learning Materials	

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (projector, smart board, software)	Data show, Blackboard
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Program Leader	Direct& Indirect
Effectiveness of students' assessment	Faculty, Program Leader	Direct
Quality of learning resources	Students, Faculty	Indirect
The extent to which CLOs have been achieved	Faculty	Direct& Indirect
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	Department Council
REFERENCE NO.	
DATE	October 2023

قسم الرياضيات والإحصاء
Mathematics and Statistics
Department

