



مركز الاعتماد  
و ضمان الجودة  
ACCREDITATION & QUALITY ASSURANCE CENTER



**The University of Jordan**

**Accreditation & Quality Assurance Center**

## **Course Syllabus**

### **Course Name**

0301914 Geometry of Banach spaces

<b>1</b>	Course title	Geometry of Banach spaces
<b>2</b>	Course number	0301914
<b>3</b>	Credit hours (theory, practical)	3
	Contact hours (theory, practical)	3
<b>4</b>	Prerequisites/corequisites	0301911
<b>5</b>	Program title	Ph.D. In Mathematics
<b>6</b>	Program code	
<b>7</b>	Awarding institution	The University of Jordan
<b>8</b>	Faculty	Science
<b>9</b>	Department	Mathematics
<b>10</b>	Level of course	Compulsory specialization requirement
<b>11</b>	Year of study and semester (s)	2 <sup>nd</sup> year, 2 <sup>nd</sup> semester
<b>12</b>	Final Qualification	Ph.D. In Mathematics
<b>13</b>	Other department (s) involved in teaching the course	--
<b>14</b>	Language of Instruction	English
<b>15</b>	Date of production/revision	20/10/2020

**16. Course Coordinator:**

A. Tallafha

**17. Other instructors:****Prof. R khalil.****Prof. F. Kittaneh**

**18. Course Description:**

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| 1. Reflexive Banach spaces. Separable Banach spaces. Uniformly convex spaces. Strict convexity and smoothness. Gateaux-differentiability of the norm. Extreme. Exposed and smooth points. Best approximation in Banach spaces. |
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**19. Course aims and outcomes:**

**A- Aims:** to understand the topics in the course and to know the most important application of these topics.

**B- Intended Learning Outcomes (ILOs):** Upon successful completion of this course students will be able to ...

- B1. To know the properties of reflexive Banach spaces.  
 B2. To be able to decide with a Banach space is separable or not.  
 B3. To recognize the difference between convex spaces and uniformly convex spaces.  
 B4. To be Know the properties of strict convex spaces  
 B5. To understand the definition and properties of Gateaux-differentiability of the norm.  
 B6. To be able distinguish between Exposed and smooth points.  
 B7. To Know the definitions and most important results of Best approximation in Banach spaces.

**20. Topic Outline and Schedule:**

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
1. Reflexive Banach spaces	1		B1	Homework's and Exams	Rudin, W., Helemberg, G. and John Conway
2. Separable Banach spaces	2, 3		B2	Homework's and Exams	Rudin, W., Helemberg, G. and John Conway
3. Uniformly convex spaces	4		B3	Homework's and Exams	Rudin, W., Helemberg, G. and John Conway

4. Strict convexity and smoothness	5,6		B4	Homework's and Exams	Rudin, W., Heleberg, G. and John Conway
5. Gateaux-differentiability of the norm	6,8		B5	Homework's and Exams	Rudin, W., Heleberg, G. and John Conway
6. Extreme	9		B5	Homework's and Exams	Rudin, W., Heleberg, G. and John Conway
7. Exposed and smooth points	10,11		B6	Homework's and Exams	Rudin, W., Heleberg, G. and John Conway
8. Best approximation in Banach spaces	12-15		B7	Homework's and Exams	Rudin, W., Heleberg, G. and John Conway

### 21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

In order to succeed in this course, each student needs to be an active participant in learning – both in class and out of class.

- Class time will be spent on lecture as well as discussion of homework problems and some group work.
- To actively participate in class, you need to prepare by reading the textbook and doing all assigned homework before class (homework will be assigned each class period, to be discussed the following period).
- You should be prepared to discuss your homework (including presenting your solutions to the class) at each class meeting - your class participation grade will be determined by your participation in this.

You are encouraged to work together with other students and to ask questions and seek help from the professor, both in and out of class.

### 22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

ILO/s	Learning Methods	Evaluation Methods	Related ILO/s to the program
	Lectures	Exam	
		Presentation	
		Homework	

### 23. Course Policies:

1. The student is not allowed to take the course and it's pre-requisite in the same time.
2. Attendance is absolutely essential to succeed in this course. You are expected to attend every class; please notify your instructor if you know you are going to be absent. All exams must be taken at the scheduled time. Exceptions will be made only in extreme circumstances, by prior arrangement with the instructor.

3. If a student is absent for more than 10% of lectures without an excuse of sickness or due to other insurmountable difficulty, then he/she shall be barred from the final examination also he/she will get a failing grade in this course.
4. Medical certificates shall be given to the University Physician to be authorized by him. They should be presented to the Dean of the Faculty within two weeks of the student's ceasing to attend classes.
5. Test papers shall be returned to students after correction. His/her mark is considered final after a lapse of one week following their return.
6. Solutions for the exams questions and marks will be announced at the webpage of the instructor: <http://eacademic.ju.edu.jo/eabuosba/default.aspx>
7. Cheating is prohibited. The University of Jordan regulations on cheating will be applied to any student who cheats in exams or on homework's.

**24. Required equipment:**

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**25. References:**

Rudin, W. Functional analysis Helemberg, G. Spectral theory in Hilbert spaces John Conway. A course in functional analysis
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**26. Additional information:**

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Name of Course Coordinator: Professor Khalil, R. Signature: -----A.Tallafha----- Date: 20/10/2020

Head of curriculum committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of curriculum committee/Faculty: ----- Signature: -----

Dean: ----- -Signature: -----

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Assistant Dean for Quality Assurance  
Course File