مركز الاعتماد وضمان الجودة
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Course Syllabus

1	**Course title**	Mathematical Physics
2	**Course number**	0332282
3	**Credit hours**	3
	Contact hours (theory, practical)	3 hours weekly
4	**Prerequisites/corequisites**	Phys2, Mathematical Physics 1
5	**Program title**	Physics
6	**Program code**	
7	**Awarding institution**	The University of Jordan
8	**School**	Science
9	**Department**	Physics
10	**Course level**	Second year
11	**Year of study and semester (s)**	2nd sem, 2022/2023
12	**Other department (s) involved in teaching the course**	
13	**Main teaching language**	English
14	**Delivery method**	☐xFace to face learning☐Blended ☐Fully online
15	**Online platforms(s)**	☐xMoodle ☐xMicrosoft Teams ☐Skype☐Zoom ☐Others……
16	**Issuing/Revision Date**	

17 Course Coordinator:

Name: Noureddine Chair Contact hours:

Office number 13 Contact hour 1 houre Monday,Tuesday
Phone number: 22023

Email: : n.chair@ju.edu.jo

18 Other instructors:

Name: Office number: Phone number: Email: Contact hours: Name: Office number: Phone number: Email: Contact hours:

19 Course Description:

As stated in the approved study plan. This is an advanced Mathematical physics course aiming at expanding student's knowledge in the subject Mathematics. This course offers the methods of Mathematics used in Physics.

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20 Course aims and outcomes:

A- ims:

After taking this course, students should be able to:

4 1 . Compute the Fourier series and the Fourier integral transforms and understand their basic properties, including their connection with the Dirac delta function.

2. Understand the fractional function in integral, the Gamma function and the Beta function and their connections with distributions in statistics.

3. Solve general linear second order differential equations by using power series to obtain Legendre, Bessel, Hermite, and Laguerre functions.

4. Separate the variables in simple partial differential equations.

5. Use Bessel and Laguerre series to solve simple problems in cylindrical and spherical geometry.

6. Identify singularities of complex functions, compute residues and use them to calculate integrals.

B- Students Learning Outcomes (SLOs):

For purposes of mapping the course SLOs to the physics program SLOs, at the successful completion of the physics program, graduates are expected to be able to:

1. An ability to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.
2. An ability to formulate or design a system, process, procedure or program to meet desired needs.
3. An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.
4. An ability to communicate effectively with a range of audiences.
5. An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.
6. An ability to function effectively in teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.

Program SLOs / Course SLOs	SLO (1)	SLO (2)	SLO (3)	SLO (4)	SLO (5)	SLO (6)
Compute the Fourier series and the Fourier integral transforms and understand their basic properties, including their connection with the Dirac delta function.	✓	✓				
Understand the fractional function in integral, the Gamma function and the Beta function and their connections with distributions in statistics.	✓	✓				

	Solve general linear second order differential equations by using power series to obtain Legendre, Bessel, Hermite, and Laguerre functions.	✓	✓				

Separate the variables in simple partial differential equations.	✓	✓					
Use Bessel and Laguerre series to solve simple problems in cylindrical and spherical geometry.	✓	✓					
Identify singularities of complex functions, compute residues and use them to calculate integrals.	✓	✓					

21. Topic Outline and Schedule:

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous/ Asynchronous Lecturing	Evaluation Methods	Resources

1	1.1	The Fourier series and the Fourier integral transforms						
	1.2							

	1.3							
2	2.1							
	2.2							
	2.3							
Week	**Lecture**	**Topic**	**Student Learning Outcome**	**Learning Methods(Face to Face/Blended/ Fully Online)**	**Platform**	**Synchronous/ Asynchronous Lecturing**	**Evaluation Methods**	**Resources**
3	3.1							
	3.2							
	3.3							

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4	4.1	The Gamma function and the Beta function and their connections with distributions in statistics						
	4.2							
	4.3							
5	5.1							
	5.2							
	5.3							

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6	6.1	The Gamma function and the Beta function and their connections with distributions in statistics						
	6.2							
	6.3							
7	7.1							
	7.2							
	7.3							

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8	8.1	Series solutions of differential equations; Legendre, Bessel, Hermite,and Laguerre functions						
	8.2							
	8.3							
9	9.1							
	9.2							
	9.3							
10	10.1	Separatione of variables in simple partial differential equations						
	10.2							
	10.3							

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
11	11.1							
	11.2							
	11.3							
12	12.1							
	12.2							
	12.3							
13	13.1	Analytic functions, Contour Integrals,						
		and the Residue theorem						
	13.2							
	13.3							
14	14.1							
	14.2							
	14.3							
15	15.1							
	15.2							
	15.3							

22 Evaluation Methods:

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

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform

23 Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform…etc):

24 Course Policies:

A- Attendance policies:

B- Absences from exams and submitting assignments on time:
C- Health and safety procedures:
D- Honesty policy regarding cheating, plagiarism, misbehavior:
E- Grading policy:
F- Available university services that support achievement in the course:

25 References:

A- Required book(s), assigned reading and audio-visuals: Mathematical Methods in the Physical Sciences By Mary L. Boas B- Recommended books, materials,and media:

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26 Additional information:

Name of Course Coordinator: **Nour Chair** ----------Signature: *Nour Chair* ---------- Date: ----------
Head of Curriculum Committee/Department: ---------- Signature: ----------
Head of Department: ---------- Signature: ----------
Head of Curriculum Committee/Faculty: ---------- Signature: ----------
Dean: ---------- Signature: ----------