

## Course Description Form

1. Course Name:	
Mathematical physics	
2. Course Code:	
MS205	
3. Semester / Year:	
Second 2024- 2025	
4. Description Preparation Date:	
30 / 3/2024	
5. Available Attendance Forms:	
Theory	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60hrs	4 units
7. Course administrator's name (mention all, if more than one name)	
Name: Sabah Salman Hamdi Email: : Sabah.S.Hamdi@tu.edu.iq	
8. Course Objectives	
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. Introduce students to the mathematical tools and techniques that are used to model physical phenomena.</li> <li>2. Develop students' understanding of the mathematical concepts and principles that underpin classical mechanics, quantum mechanics, electromagnetic theory, and thermodynamics.</li> <li>3. Help students develop the ability to perform mathematical calculations and solve problems common to mathematical physics.</li> <li>4. Encourage students to think critically and analytically about the relationship between mathematical models and physical reality.</li> <li>5. Provide students with the opportunity to apply mathematical principles and techniques to real-world physical problems.</li> <li>6. Enhance students' communication and presentation skills through the use of technical language and scientific notation.</li> <li>7. Facilitate the development of research skills, including the ability to identify and evaluate sources of</li> </ol>

	<p>information, and to conduct independent research in the field of mathematical physics.</p> <p>8 .Foster an appreciation for the beauty and elegance of mathematical models and their applications in physics.</p> <p>9 .Promote an understanding of the interdisciplinary nature of physics and the importance of collaboration across different fields of study.</p>
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**9. Teaching and Learning Strategies**

<b>Strategy</b>	<p>1.Practice regular problem-solving: Mathematical physics is a subject that requires practice. Therefore, it is essential to solve a large amount of mathematical problems regularly.</p> <p>2. Master the fundamentals: Mathematical physics involves several mathematical concepts and formulas. It is ideal to have a strong understanding of the basics of mathematics to effectively master the material.</p> <p>3. Understand the physical concepts: Mathematical physics is an integrated study of mathematical and physical theories. Understanding the underlying principles of physics is essential for mastering the subject</p> <p>4. Read the textbook and lecture notes: Textbooks and lecture notes offer a more structured approach to understanding the subject. It helps to read the assigned readings before attending lectures and completing the assigned practice problems.</p> <p>5. Collaborate with peers: Studying in groups gives opportunities to work through difficult problems, compare notes, and share insights. Active group participation can improve problem-solving techniques and encourage discussion of concepts.</p> <p>6. Err on the side of overlearning: To gain mastery of the subject, one must be persistent and committed to the learning process. Incorporate both intentional and unintentional types of learning.</p> <p>7. Seek guidance from instructors: Instructors are available to help learners with any difficulties they may encounter in attempting to understand .</p>
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**10. Course Structure**

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	method
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			Evaluation		
1	4	Definition & examples	The theory of matrices and determinants	course	Examinations: daily & monthly
2	4	Definition & examples	Matrix multiplication, types of Matrices and some special matrices	course	Examinations: daily & monthly
3	4	Definition & examples	Complex number, Conjugates of a complex number and Properties of complex numbers	course	Examinations: daily & monthly
4	4	Definition & examples	Absolute values of complex numbers, Geometric representation of a complex number	course	Examinations: daily & monthly
5	4	Definition & examples	Polar coordinates of a complex number, De Moivre's theorem	course	Examinations: daily & monthly
6	4	Definition & examples	Euler's formula, various examples of Euler's and De Moivre's formula	course	Examinations: daily & monthly
7	4	Definition & examples	Finding the roots of complex numbers with examples	course	Examinations: daily & monthly
8	4	Definition & examples	Periodic function (definition with examples)	course	Examinations: daily & monthly
9	4	Definition & examples	Series, Fourier series	course	Examinations: daily & monthly
10	4	Definition & examples	Examples of Fourier series	course	Examinations: daily & monthly
11	4	Definition & examples	Taylor Series, example of Taylor series	course	Examinations: daily & monthly
12	4	Definition & examples	Special functions, beta function.	course	Examinations: daily & monthly
13	4	Definition & examples	Special functions, beta function	course	Examinations: daily & monthly
14	4	Definition & examples	Special functions, gamma function	course	Examinations: daily & monthly
15	4	Definition & examples	Special functions, gamma function	course	Examinations: daily & monthly