Extended Syllabus

Course Title	Mathematical Physics I	Semester	Spring, 2022
Credit	3	Course Number	PHY2005
Class Time	Mon. Wed. 10:30~11:45	Enrollment Eligibility	Sophomore

Instructor's Photo	Name: Wontae Kim	Homepage:
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	Office: Office Hours:	

Ⅰ. Course Overview

1. Description

The purpose of this subject is to understand basic mathematical tolls for a wide variety of physical applications.

2. Prerequisites

3. Course Format (%)

Lecture	Discussion	Experiment/Practicum	Field study	Presentations	Other
100%	%	%	%	%	%

4. Evaluation (%)

mid-term Exam	Final exam	Quizzes	Presentations	Projects	Assignments	Participation	Other
40%	40%	%	%	%	%	20%	%

Ⅱ. Course Objectives

Knowledge:

Skill:

Attitude:

Ⅲ. Course Format

(* In detail)

Ⅳ. Course Requirements and Grading Criteria

Ⅴ. Course Policies

Ⅵ. Materials and References

Main: Mathematical Methods in the Physical Sciences (3rd edition) Mary L Boas. Sub: Mathematical Methods for Physicists (7th edition) Arfken and Weber

Ⅶ. Course Schedule

(* Subject to change)

Week 1 (03/02)	**Learning Objectives**	Understanding basic concepts of series
	Topics	Infinite series, power series
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 1
	Assignments	
Week 2 (03/09)	**Learning Objectives**	Understanding complex numbers
	Topics	Complex numbers and algebra
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 2
	Assignments	
Week 3 (03/16)	**Learning Objectives**	Understanding complex numbers
	Topics	Euler's formula, exponential and trigonometric functions
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 2
	Assignments	
Week 4 (03/23)	**Learning Objectives**	Understanding of linear algebra
	Topics	Matrices, linear combinations
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 3
	Assignments	

Week 5 (03/30)	**Learning Objectives**	Understanding of linear algebra
	Topics	Eigenvalues and eigenvectors
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 3
	Assignments	
Week 6 (04/06)	**Learning Objectives**	Understanding of partial differentiation
	Topics	Differentials and chain rule
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 4
	Assignments	
Week 7 (04/13)	**Learning Objectives**	Understanding of partial differentiation
	Topics	Partial differentiation
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 4
	Assignments	
Week 8 (04/20)	**Learning Objectives**	Midterm exam
	Topics	
	Class Work (Methods)	
	Materials (Required Readings)	
	Assignments	

Week 9 (04/27)	**Learning Objectives**	Understanding multiple integrals
	Topics	Multiple integrals
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 5
	Assignments	
Week 10 (05/04)	**Learning Objectives**	Understanding multiple integrals
	Topics	Jacobians, surface integrals
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 5
	Assignments	
Week 11 (05/11)	**Learning Objectives**	Understanding of vector analysis
	Topics	Fields, gradient, Green's theorem in the plane
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 6
	Assignments	
Week 12 (05/18)	**Learning Objectives**	Understanding of vector analysis
	Topics	The divergence theorem, the curl and Stokes's theorem
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 6
	Assignments	

Week 13 (05/25)	**Learning Objectives**	Understanding Fourier series and transforms
	Topics	Simple harmonic motion, applications of Fourier series
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 7
	Assignments	
Week 14 (06/01)	**Learning Objectives**	Understanding Fourier series and transforms
	Topics	Dirichlet conditions, even and odd functions
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 7
	Assignments	
Week 15 (06/08)	**Learning Objectives**	Understanding ordinary differential equations
	Topics	The Laplace transform, the Dirac delta function
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Chapter 8
	Assignments	
Week 16 (06/15)	**Learning Objectives**	Final exam
	Topics	
	Class Work (Methods)	
	Materials (Required Readings)	
	Assignments	

Ⅷ. Special Accommodations

IX. Aid for the Challenged Students