ÇANKAYA UNIVERSITY
Faculty of Arts and Sciences
Course Definition Form

This form should be used for either an elective or a compulsory course being proposed and for a curriculum development process for an undergraduate curriculum at Çankaya University, Faculty of Arts and Sciences. Please fill in the form completely and submit the print-out carrying the approval of the Department Chairto the Dean's Office and mail its electronic copy to serpilkilic@cankaya.edu.tr. Upon receipt of *both copies*, the print-out will be forwarded to the Faculty Academic Board for approval. Incomplete forms will be returned to the Department. The approved form is finally sent to the President's office for approval by the Senate.

Part I. Basic Course Information

Department Name	MATHEMATICS					**Dept. Numeric Code**	27
Course Code	MATH481	**Number of Weekly Lecture Hours**	2	**Number of Weekly Lab/Tutorial Hours**	2	**Number of Credit Hours**	**3**
Course Web Site	http://math481.cankaya.edu.tr					**ECTS Credit**	05

Course Name *This information will appear in the printed catalogs and on the web online catalog.*	
English Name	Mathematical Methods in Physics
Turkish Name	Fizikte Matematiksel Metodlar

Course Description
Provide a brief overview of what is covered during the semester. This information will appear in the printed catalogs and on the web online catalog. Maximum 60 words.

Newton's Laws of Motion. Work, energy and momentum. Falling bodies and projectiles. Harmonic oscillators, motion of a simple pendulum, motion under the action of central forces. Systems of varying mass, rocket motion. Dynamics of rigid bodies. Lagrange's Equations, Hamiltonian Theory. Coulomb's law Divergence of electric field Gauss' law. Laplace's equation for electrostatic potential, Wave equation Plane electromagnetic waves.

Prerequisites (if any) *Give course codes and check all that are applicable.*	1st	2nd	3rd	4th
	☐ Consent of the Instructor	☐ Senior Standing	☐ Give others, if any.	
Co-requisites (if any)	1st	2nd	3rd	4th
Course Type *Check all that are applicable*	☒ Must course for dept. ☐ Must course for other dept.(s) ☐ Elective course for dept. ☐ Elective course for other dept.(s)			

Course Classification *Give the appropriate percentage for each category.*					
Category	Mathematics & Natural Sciences	Engineering & Architectural Sciences			
Percentage	80	20			

Part II. Detailed Course Information

Course Objectives
Maximum 100 words.

The purposes of the course are to give a rigorous mathematical foundation for Classical mechanics and Classical Electromagnetic Theory using vector algebra, calculus ordinary differential equations and partial differential equations.

Learning Outcomes
Explain the learning outcomes of the course. Maximum 10 items.

Students will be able to:

1. Use vectors to express the motion of a particle
2. Write and solve equations of motion
3. Analyze harmonic motion and vibrations using ordinary differential equations
4. Use Lagrangian and Hamiltonian formalisms to express mechanical problems
5. Solve partial differential equations for basic electromagnetic problems.

Textbook(s)
List the textbook(s), if any, and other related main course material.

Author(s)	Title	Publisher	Publication Year	ISBN
Giovanni Gallavotti	The Elements of Mechanics	Springer	1983	978-3540117537
David J. Griffiths	Introduction to Electrodynamics	Cambridge University Press	2017	978-1108420419

Reference Books
List, ifany,otherreference books to be used as supplementary material.

Author(s)	Title	Publisher	Publication Year	ISBN
Michael Spivak	Physics for Mathematicians, Mechanics I	Publish or Perish	2010	978-0914098324
Murray R. Spiegel	Theory and Problems of Theoretical Mechanics	Mc Graw Hill	1967	

Teaching Policy
Explain how you will organize the course (lectures, laboratories, tutorials, studio work, seminars, etc.)

4 hours of lecturing including problem solving and applications per week. Attendance to the lectures is compulsory.

Laboratory/Studio Work
Give the number of laboratory/studio hours required per week, if any, to do supervised laboratory/studio work and list the names of the laboratories/studios in which these sessions will be conducted.

Computer Usage
Briefly describe the computer usage and the hardware/software requirements for the course.

Course Outline
List the weekly topics to be covered.

Week	Topic(s)
1	Force, mass, acceleration, Newton's Laws
2	Frames of Reference. Momentum, Kinetic Energy, Work
3	Projectile Motion
4	Angular momentum and torque
5	Simple Harmonic Oscillator
6	Vibrating Systems
7	Continuous systems of particles
8	Lagrange's Equations
9	Lagrange's Equations
10	Hamiltonian Theory
11	Hamiltonian Theory
12	Coulomb's law, Flux, Gauss' Law
13	Electric Potential, Laplace's Equation
14	Electromagnetic Waves in Vacuum

Grading Policy
List the assessment tools and their percentages that may give an idea about their relative importance to the end-of-semester grade.

Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage
Homework	2	20	Case Study			Attendance		
Quiz(es)			Lab Work			Field Study		
Midterm Exam	2	**40**	Classroom Participation			Project		
Term Paper			Oral Presentation			Final Exam	1	40

ECTS Workload
List all the activities considered under the ECTS.

Activity	Quantity	Duration (hours)	Total Workload (hours)
Attending Lectures (*weekly basis*)	14	2	28
Attending Labs/Recitations (*weekly basis*)	14	2	28
Compilation and finalization of course/lecture notes (*weekly basis*)	14	1	14
Collection and selection of relevant material (*once*)	-	-	-
Self study of relevant material (*weekly basis*)	14	2	28
Take-home assignments	2	3	6
Preparation for quizzes	-	-	-
Preparation for mid-term exams (*including the duration of the exams*)	2	6	12
Preparation of term paper/case-study report (*including oral presentation*)	-	-	-
Preparation of term project/field study report (*including oral presentation*)	-	-	-
Preparation for final exam (*including the duration of the exam*)	1	9	9
TOTAL WORKLOAD / 25			125/25
ECTS Credit			5

Total Workloads are calculated automatically by formulas. To update all the formulas in the document firstpressCTRL+Aandthenpress F9.

Program Qualifications vs. Learning Outcomes *Consider the program qualifications given below as determined in terms of learning outcomes and acquisition of capabilities for all the courses in the curriculum. Look at the learning outcomes of this course given above. Relate these two using the Likert Scale by marking with X in one of the five choices at the right.*

No	Program Qualifications	Contribution				
		0	1	2	3	4
1	Adequate knowledge in mathematics; ability to use applied and theoretical information in these areas to solve pure and applied mathematics problems.					X
2	Ability to use modern computational tools to analyze an abstract or real life problem				X	
3	Adequate knowledge in theoretical and historical background in mathematics				X	
4	Ability to work individually and in teams efficiently, ability to collaborate effectively in teams to analyze complex systems from intra-disciplinary and multi-disciplinary areas				X	
5	Ability to communicate effectively in English about technical subjects, both orally and in writing				X	
6	Ability to use, develop and implement new experiments and algorithms to solve scientific, engineering and financial problems				X	
7	Ability to analyze a mathematical problem using both analytical and numerical methods; use and compare theoretical and simulational methods to gain deeper insight				X	
8	Ability to report the findings, conclusions and interpretations related to a project in the area of pure and applied mathematics, ability to write technical reports, to prepare and conduct effective presentations				X	
9	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to keep continuous self improvement				X	
10	Awareness of professional and ethical responsibility issues and their legal consequences					X

Scale for contribution to a qualification: **0**-none, **1**-little, **2**-moderate, **3**-considerable, **4**-highest