Course Information								
Course Code	**T**	**P**	**L**	**C**	**ECTS**	**Type** C/E	**Language** TR/ENG etc.	**Year/Semester**
FİZ3015	**3**	**0**	**0**	**3**	**5**	**E**	**TR**	**3/FALL**
Course Name (Turkish**)**	**Rölativistik Mekanik**							
Course Name (English**)**	**Relativistic Mechanics**							

Unit/Program	Physics Department/Undergraduate Program
Course Prerequisite	No
Course Objectives	Comprehension of the equations of motion of particles moving at speeds close to the speed of light
Course Outline	Vectors, Newton's Laws, Observation Systems, Momentum-Angular Momentum, Speed of Light-Special Relativity, Relativistic Momentum and Energy, Relativistic Dynamics Problems
Textbook/ Material / Resources	1. Physical Serway (III. Cilt) 2. College Physics
Internship Status	No

Course Precedents

University Name	**Program Name**	**Course Name**	**T-P-L-C; ECTS**	**Type**

The instructor who proposed the course (Title, Name and Surname)	*Signature*
Instructors who can teach the course (Title, Name and Surname)	*Signature*

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)

Face-to-face courses will be taught under the supervision of the relevant faculty member.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)

Stakeholder Name	**Opinion** (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	**Theory**	**Application/Laboratory**
1	VECTORS: Vector Operations, Scalar Product, Vector Product, Vector Derivatives and Applications in Physics	
2	NEWTON'S LAW: Charged Particle Motion, Electric and Magnetic Fields, Lorenz Force, Momentum	
3	NEWTON'S LAW: Charged Particle Motion, Electric and Magnetic Fields, Lorenz Force, Momentum	
4	OBSERVATION SYSTEMS, GALILEAN TRANSFORMATIONS: Inertial and Accelerated Observation Systems, Forces in Inertial Observation System, Absolute and Relative Velocity, Galilean Transformations	
5	OBSERVATION SYSTEMS, GALILEAN TRANSFORMATIONS: Inertial and Accelerated Observation Systems, Forces in Inertial Observation System, Absolute and Relative Velocity, Galilean Transformations	
6	OBSERVATION SYSTEMS, GALILEAN TRANSFORMATIONS: Inertial and Accelerated Observation Systems, Forces in Inertial Observation System, Absolute and Relative Velocity, Galilean Transformations	
7	Hadron Interaction, Lepton-Proton Scattering Experiments	
8	MOMENTUM-ANGULAR MOMENTUM: Conservation of Momentum, Laboratory and Center of Mass Systems, Reduced Mass	
9	Midterm Exam	
10	SPEED OF LIGHT, SPECIAL RELATIVITY: Lorentz Transformations, Length Contraction, Time Dilation	
11	SPEED OF LIGHT, SPECIAL RELATIVITY: Lorentz Transformations, Length Contraction, Time Dilation	
12	RELATIVISTIC MOMENTUM AND ENERGY: Conservation of Momentum and Relativistic Momentum, Momentum and Energy Conversion, Equivalent of Mass and Energy, Zero Mass Particles	
13	PROBLEMS OF RELATIVISTIC DYNAMICS: Longitudinal of a Charged Particle Acceleration in Electric Field, Acceleration in Transverse Electric Field, Particle Charged in Magnetic Field, Center of Mass System and Threshold Energy	
14	RELATIVISTIC DYNAMIC PROBLEMS: Acceleration of Charged Particle in Longitudinal Electric Field, Acceleration in Transverse Electric Field, Particle Charged in Magnetic Field, Center of Mass System and Threshold Energy, Applications	
15	Final Exam	
16		

Assessment			
	Activity	**Custom**	**Contribution to Success Grade (%)**
Evaluation Criteria	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
		Sum:	100
Remarks			

Content Design and Subject Weight	Mathematics and Basic Sciences	100

(%)		
	Engineering Sciences	
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	**Number**	**Duration (Hours)**	**Total workload (Hours)**
Fieldwork			
Midterm Exam Application	1	2	2
Self-Study (including pre-class and exam preparation)	14	2	28
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)	14	3	42
Homework			
Final Exam Practice	1	2	2
Laboratory			
Article Review			
Writing an Article			
Reading			
Case Study			
Performance			
Problem Solution			
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work	12	3	36
Argument	14	1	14
Application/Practice			
Other			
TOTAL WORKLOAD:			**126**
ECTS CREDİTS OF THE COURSE: *(The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)*			**5**

Program Outcomes (PO) / **Learning Outcomes (LO)** *(Course Outcomes)*		1	2	3	4	5	6	7	8	9	10	11
1	Learns the equations of motion of objects moving at speeds close to the speed of light	**5**	**5**	**5**	**4**	**3**	**3**	**4**	**5**	**5**	**3**	**3**
2	Understand the difference between an inertial observation frame and an accelerated observation frame	**5**	**5**	**5**	**4**	**3**	**3**	**4**	**5**	**5**	**3**	**3**
3	Learn how to switch between Galilean transformations and reference systems	**5**	**5**	**5**	**4**	**3**	**3**	**4**	**5**	**5**	**3**	**3**

Organizer: Prof. Dr. Cengiz TATAR
Preparation Date: 20.05.2024