Fizik Bölümü / PHYSICS /

Course Code	Course Name	Teorical	Practice	Laboratory	Credits	ECTS
FZK-3001	Classical Mechanic	3.00	2.00	0.00	4.00	6.00

Course Detail

Course Language	:	Turkish
Qualification Degree	:	Bachelor
Course Type	:	Compulsory
Preconditions	:	Not
Objectives of the Course	:	The aim this course is to discuss kinematics in general coordinates, lagrangian mechanics, Hamiltonian mechanics, two-body problem, central force problem; dynamics of a system of particles, motion in a noninertial reference frame, rigid body motion, small oscillations, nonlinear oscillations and chaos.
Course Contents	:	Topics to be covered in this course include are kinematics in generalized coordinates, principle of least action, Lagrangian mechanics, the Hamiltonian mechanics, Euler-Lagrangian equations of motion, Hamiltonian equations of motion, two-body centrifugal force problem, dynamics of multiparticles systems, motion in accelerated reference systems, rigid-body problem, small oscillations, elementary particles and its wave feature, nonlinear oscillations and chaos, Hamiltonian-Jacobi equations.
Recommended or Required Reading	:	1. Ercan, Y., 2014. İleri Dinamik. Açık Kaynak. ISBN: 978-605-030-981-2. http://library.iyte.edu.tr/dosya/kitap/dinamikyucelercan.pdf 2. Rızaoğlu E., ve Sünel, N., 2011. Klasik Mekanik: Özel Görecelik Kuramı ve Nonlineer Dinamiğe Giriş ile Genişletilmiş 3. Baskı. Okutman Yayıncılık. Ankara. ISBN: 978-605-5884-28-4 3. Yahşi, U., 2012. Problemlerle Klasik Mekanik. Literatür Yayıncılık, İstanbul. ISBN:978-975-04-0618-8 4. Thornton, S. T., ve Marion, J. B., Ed.: Özdemir, M., ve Ufuktepe, Y., Çev.: Önengüt, D., ve ark., 2011. Parçacıklar ve Sistemler için Klasik Mekanik. Akademi Yayıncılık. Ankara.ISBN: 978-075-6885-24-6. 5. Landau, L. D., and Lifshitz, E. M., 1976. Mechanics. Vol. 1., Elsevier. 6. Taylor, J. R., 2005. Classical Mechanics. University Science Books. 7. Goldstein, H., Poole, C. P., and Safko, J. L., 2001. Classical Mechanics. Addison Wesley.
Planned Learning Activities and Teaching Methods	:	Oral lectures with interactive discussions, researches and homeworks.
Recommended Optional Programme Components	:	Doing case studies and research with course subjects.
Course Instructors	:	Prof. Dr. İsmail Tarhan
Instructor's Assistants	:	Prof. Dr İsmail TARHAN
Presentation Of Course	:	face to face

Course Outcomes

Upon the completion of this course a student :

1 Interpret fundamental mechanical concepts.

2 Analyze with mechanic similarity approach.

3 Evoluate the obtained solutions.

4 Apply fundamental mechanical concepts to various problems and events.

Preconditions

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Weekly Contents

	Teorical	Practice	Laboratory	Preparation Info	Teaching Methods
1.Week	*Fundamental Concepts and Kinematics in generalized coordinates.	*Problem Solutions.			
2.Week	*The Least Impact Principle.	*Problem Solutions.			
3.Week	*Lagrange Mechanics, Lagrage Function and Properties.	*Problem Solutions.			
4.Week	*The Hamiltonian mechanics	*Some Applications.			
5.Week	*Euler-Lagrange Equation of Motion, Its Properties.	*Euler-Lagrange Equation of Motion, Its Properties and Applications			
6.Week	*Hamilton Equations of Motion and Some Applications	*Problem solving by examples of Lagrange and Hamilton Equations			
7.Week	*Motion and properties in centripetal field, Two-Body Problem	*Motion Problems in the Centripetal Field			
8.Week	*Dynamics of the System of Particles and Applications	*Dynamics of the System of Particles and Applications			
9.Week	*Accelerated Reference Systems and Movement in Accelerated Reference Systems	*Some Applications			
10.Week	*Rigid Body Problem, Its Properties and Applications.	*Some applications related to the solid body problem			
11.Week	*The Concept of Vibration and Small Oscillations, Properties, Some Applications.	*The Concept of Vibration and Small Oscillations, Properties, Some Applications.			
12.Week	*Inertial Tensor and Its Applications	*Inertial Tensor and Its Applications			
13.Week	*Nonlinear Oscillations and Chaos	*Nonlinear Oscillations and Chaos Applications			
14.Week	*Hamilton Jacobi Equation and Its Applications	*Hamilton Jacobi Equation and Its Applications			

Assesment Methods %

2 Final : 60.000

3 Mid Term Exam 1 : 40.000

ECTS Workload

Activities	Count	Time(Hour)	Sum of Workload
Ödev	1	2.00	2.00
Final	1	2.00	2.00
Attending lectures	28	5.00	140.00
Individual study before lecture	14	2.00	28.00
Homework	7	2.00	14.00
		Total :	186.00
		Sum of Workload / 30 (Hour) :	6
		ECTS :	6.00

Program And OutcomeRelation

	P.O. 1	P.O. 2	P.O. 3	P.O. 4	P.O. 5	P.O. 6	P.O. 7	P.O. 8	P.O. 9	P.O. 10	P.O. 11	P.O. 12	P.O. 13	P.O. 14	P.O. 15	P.O. 16	P.O. 17	P.O. 18	P.O. 19	P.O. 20	P.O. 21	P.O. 22	P.O. 23	P.O. 24
L.O. 1	3	3	3	4	4	4	3	3	3	4	4	3	3	4	4	3	3	3	4	4	4	3	3	3
L.O. 2	3	3	4	4	4	3	3	3	4	3	4	2	3	4	4	3	3	3	4	4	3	3	3	3
L.O. 3	4	4	4	4	5	4	5	4	4	4	5	4	3	3	4	5	4	3	4	5	4	4	4	4
L.O. 4	3	4	3	4	5	5	5	4	4	4	5	4	5	5	5	5	4	4	5	4	4	3	3	4

Ders/Program Çıktıları İlişkisi

P.O. 1	P.O. 2	P.O. 3	P.O. 4	P.O. 5	P.O. 6	P.O. 7	P.O. 8	P.O. 9	P.O. 10	P.O. 11	P.O. 12	P.O. 13	P.O. 14	P.O. 15	P.O. 16	P.O. 17	P.O. 18	P.O. 19	P.O. 20	P.O. 21	P.O. 22	P.O. 23	P.O. 24	P.O. 2
3	4	4	4	5	4	4	4	4	4	5	3	4	4	4	4	4	3	4	4	4	3	3	4	4