Fizik Bölümü / PHYSICS /

Course Code	Course Name	Teorical	Practice	Laboratory	Credits	ECTS
FZK-2010	Introduction to Symbolic Calculation in Physics	2.00	2.00	0.00	3.00	7.00

Course Detail

Course Language	:	Turkish
Qualification Degree	:	Bachelor
Course Type	:	Optional
Preconditions	:	Not
Objectives of the Course	:	The aim of this course is to analyze the mathematical problems and processes in the field of physics by using symbolic computing languages and computer technologies.
Course Contents	:	Basic operations, equations, equations systems and solutions, 2 and 3 dimensional graphical drawings, differential equations and their solutions, matrix algebra, coordinate systems and transformations, parametric graphical drawings, animated graphs.
Recommended or Required Reading	:	1) Maple ile Sembolik Hesaplama, Can Aktaş, Kriter Yayınları, 2012 2) Introduction to Maple, H. ECK, A., Springer, 2003. Maple ve Maple İle Matematik, Çelik, B., Nobel Yayınları, 2004 3) Cohen, Joel S. (2003). Computer Algebra and Symbolic Computation: Mathematical Methods. AK Peters, Ltd. p. 14. ISBN 978-1-56881-159-8
Planned Learning Activities and Teaching Methods	:	Lecture, Homework, Discussion Practice
Recommended Optional Programme Components	:	It is recommended that the student perform regular repetition and practice.
Instructors	:	Assoc. Prof. Dr. Melis Ulu Doğru
Instructor's Assistants	:	The relevant Assistant to be assigned by the Physics Department.
Presentation Of Course	:	Oral presentation, Direct application in Computer Lab.

Course Outcomes

Upon the completion of this course a student :

1 Recognize the methods of computer aided calculation techniques and symbolic solutions.

2 Describe the mathematical operations encountered in physics problems by symbolic calculation methods.

3 Ability to apply the symbolic calculation.

Preconditions

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Weekly Contents

	Teorical	Practice	Laboratory	Preparation Info	Teaching Methods
1.Week	*Introduction to symbolic calculation	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.
2.Week	*The Functions	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.
3.Week	*Equations, definition of systems of equations.	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.
4.Week	*Applications of analysis subjects	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.
5.Week	*Graphic drawings	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.
6.Week	*Three-dimensional graphical drawings	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.
7.Week	*Solutions of ordinary differential equations	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.
8.Week	*Partial differential equation solutions	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.
9.Week	*Ordinary differential equation system solutions	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.
10.Week	*Partial differential equation system solutions	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.
11.Week	*General Review, Midterm	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.
12.Week	*Matrix Algebra	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.
13.Week	*Coordinate systems and their transformations	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.
14.Week	*General applications	*The theoretical subject of the related week is applied in the computer laboratory.	*The theoretical subject of the related week is applied in the computer laboratory.	*Weekly pre-work from the proposed sources will be appropriate.	*Oral presentation and direct application in Computer Laboratory.

Assesment Methods %

1 Final : 60.000

2 Vize : 40.000

ECTS Workload

Activities	Count	Time(Hour)	Sum of Workload
Vize	1	2.00	2.00
Ödev	14	2.00	28.00
Final	1	2.00	2.00
Attending lectures	14	3.00	42.00
Application / Practice	14	2.00	28.00
Laboratory	14	1.00	14.00
Individual study before lecture	14	1.00	14.00
Individual study after lecture	14	1.00	14.00
Preparation for midterm	4	4.00	16.00
Preparation for final	4	4.00	16.00
Further Study	5	4.00	20.00
		Total :	196.00
		Sum of Workload / 30 (Hour) :	7
		ECTS :	7.00

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	4	3	3	4	3	4	5	2	4	5	4	4	3	3	4	0	0	0	0	0	0	0	0
L.O. 2	4	4	4	3	4	3	3	5	3	3	2	3	4	4	2	2	0	0	0	0	0	0	0	0
L.O. 3	3	3	4	4	3	4	4	3	4	3	3	4	3	4	3	5	0	0	0	0	0	0	0	0

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
4	5	3	5	4	3	4	4	4	5	4	5	3	5	4	5	0	0	0	0	0	0	0	0	0