COMPUTATIONAL TECHNIQUES IN HIGH ENERGY PHYSICS I

1	Course Title:	COMPUTATIONAL TECHNIQUES IN HIGH ENERGY PHYSICS I
2	Course Code:	FZK5204
3	Type of Course:	Optional
4	Level of Course:	Second Cycle
5	Year of Study:	1
6	Semester:	2
7	ECTS Credits Allocated:	6.00
8	Theoretical (hour/week):	3.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	0
11	Prerequisites:	There is no course prerequisite
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Dr. Ögr. Üyesi ZERRİN KIRCA
15	Course Lecturers:	Dr. Öğr. Üye. Zerrin KIRCA, Doç. Dr. Cem Salih ÜN
16	Contact information of the Course Coordinator:	Dr. Öğr. Üye. Zerrin KIRCA E-mail: zkirca@uludag.edu.tr İş Tel:(0224)2941704 Adres: BUÜ Fen Edebiyat Fakültesi, Fizik Bölümü, 16059 Görükle Kampusü, Bursa
17	Website:	
18	Objective of the Course:	The aim of this course is to Fortran programming language and commands, numerical analysis by using Fortran code in high energy physics, Mathematica program, drawing Feynman diagrams by using JaxoDraw.
19	Contribution of the Course to Professional Development:	learns basic concepts for numerical analysis and Fortran programming language and commands.
20	Learning Outcomes:	
	1	To learn basic concepts for numerical analysis
	2	To learn Fortran programming language and commands.
	3	To learn basic concepts for Mathematica program
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21	Course Content:	
	Course Content:	
Week	Theoretical	Practice
1	Basic concepts in Fortran I; comparison with the languages , Compilation , debugging, usage of editors, available compiling softwares, editors application and problem solving	

2	Basic concepts in Fortran I I; Types of compilation in Windows operating system, types of compilation in Linux operating system,and writing code	
3	Basic concepts in Fortran III ;Fortran variables, types of numbers, format, read and writie commands, application and problem solving	
4	Basic concepts in Fortran IV; Comparison commands, loops, application and problem solving	
5	Basic concepts in Fortran V; Subroutines, function and similar commands, calling subroutines	
6	Basic concepts in Fortran VI; Arrays, dynamic arrays, applicaitons and problem solving	
7	Basic concepts in Fortran VII; Pointers, strings, structural data types	
8	Samples on high energy physics	
9	"Mathematica" program presentation	
10	"Mathematica" program presentation – samples	
11	Mathematica; loop and samples	
12	Drawing 2D and 3D graphs in Mathematica	
13	Mathematica- samples	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	6.00	84.00
Homeworks	14	4.00	56.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	2.00	2.00
Others	0	0.00	0.00
Final Exams	1	2.00	2.00
Total Work Load			188.00
Total work load/ 30 hr			6.20
ECTS Credit of the Course			6.00

1-Nyhoff

3-The Mathematica Guidebook: Programming, Michael Trott, New York: Springer Verlag, 2004

4-The Mathematica, Stephen Wolfram, Addison-Wesley Publishing Company, 1992

5-Numerical Recipes, W. H. Press, B. P. Flannery, S. A. Teukolsky and W. T. Vetterling, Cambridge University

TERM LEARNING ACTIVITIES	NUMBE	WEIGHT
Midterm Exam	1	25.00
Quiz	0	0.00
Home work-project	1	25.00
Final Exam	1	50.00
Total	3	100.00
Contribution of Term (Year) Learning Activities to Success Grade		50.00
Contribution of Final Exam to Success Grade		50.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		The system of relative evaluation is applied.

24	**ECTS / WORK LOAD TABLE**

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	0	0	0	4	5	0	0	0	3	0	4	0	0	0	0	0
ÖK2	0	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	**1 very low**		**2 low**			**3 Medium**			**4 High**			**5 Very High**				