DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details				
Code	**Academic Year**			**Semester**
EBT104	1			2
Title	**T**	**A**	**L**	**ECTS**
Scientific Programming	2	0	2	6

Language	German					
Level	**Undergraduate**	**X**	**Graduate**		**Postgraduate**	
Department / Program	Energy Science and Technology					
Forms of Teaching and Learning	Face-to-face					
Course Type	**Compulsory**	**X**	**Elective**			
Objectives	To give basic information about Scientific Programming, data structures and algorithms					
Content	Students get an overview of the structure and operating principles of computers. They learn different programming paradigms and their advantages and disadvantages. Thus, they can choose the appropriate one for the problems they face. Theoretical computer science learning, such as data structures and algorithms, is followed by concrete applications, during which the use of program controls is reinforced. Structure and working principle of the computer, Boolean Algebra, Data structures and algorithms (List, Tree, Graph, etc.), Types of programming, Turing machine, Algorithm analysis, Computational complexity theory, Landau symbols (Big O notation), Functions and program control (Loop, Branch), Applications					
Prerequisites	None					
Coordinator						
Lecturer(s)	Assoc. Prof. Şahin UYAVER					
Assistant(s)						
Work Placement	None					

Recommended or Required Reading	
Books / Lecture Notes	• Algorithmik: Die Kunst des Rechnens, David Harel, Springer, Deutschland, 2006 (Orjinal: Algorithmics: The Spirit of Computing, David Harel, Addison-Wesley, Great Britain, 2004
Other Sources	

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences	40	%
Engineering	40	%

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Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences	20	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	40
Quiz	0	
Assignments	0	
Attendance	0	
Recitations	0	
Projects	0	
Final Exam	1	60
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	15	2	30
Self-Study	15	3	45
Assignments	5	15	75
Presentation / Seminar Preparation			
Midterm Exam			
Recitations			
Laboratory	15	2	30
Projects			
Final Exam	1	2	2
		Total Work Load	**182**
		ECTS Points (Total Work Load / Hour)	**6**

Learning Outcomes

1	To give basic information about programming, data structures and algorithms.
2	
3	
4	

Weekly Content

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1	How does a computer think? How to interact with it? How does it work?
2	Introduction to data types and structures, logical operators, functions, data analysis.
3	Programming languages used in numerical sciences
4	Package management, code profiling and optimization.
5	Algorithms
6	Flowchart
7	Creation of "if" conditional statements (if)
8	Information about loops and the establishment of loops (Loops)
9	User-defined functions and their usage
10	Case Studies from Basic Sciences I
11	Case Studies from Basic Sciences II
12	Case Studies from Basic Sciences III
13	Case Studies from Basic Sciences IV
14	Case Studies from Basic Sciences V

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1	5	5	5	5	5	5	5
2							
3							
4							
5							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High

P1 Working with modern scientific sources.
P2 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P3 Having theoretical and practical skills in the area of Energy Science and Technology.
P4 Having foreign language skills to follow the worldwide advancements in the field of Energy Science and Technology and to be able to discuss them with foreign colleagues.
P5 Having computational skills for research data analysis purposes.
P6 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P7 Having knowledge about work occupational work and safety.

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