DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details				
Code	**Academic Year**			**Semester**
EBT318	3			5
Title	**T**	**A**	**L**	**ECTS**
Operations Research	2	2	0	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	Operations research is a field of science that uses scientific methods such as mathematical modeling, algorithms and statistics to generate ideas for complex problems that arise within an organization or structure related to the coordination and execution of operations. The goal after using operations research to provide the most scientifically appropriate solution to the problem should be to improve and optimize the performance of the organization.					
Content	History and development of Operations Research, deterministic models, the art of model building and problem solving, the place of linear programming in mathematical programming, linear decision models, studies on the construction of linear decision models, solution of linear programming models, graphical, algebraic, simplex methods, computer software for solving linear programming models and their use, duality and dual simplex method, transportation models.					
Prerequisites	None					
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement	None					

Recommended or Required Reading	
Books / Lecture Notes	Operations Research: An Introduction, Hamdy Taha, Ninth Ed., Pearson, 2011.
Other Sources	Introduction to Operations Research, Frederich S. Hillier, Gerald J. Lieberman, Ninth Ed. McGraw-Hill, 2010.

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences	30	%
Engineering	30	%

DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Engineering Design	40	%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment

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

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	2	28
Self-Study	19	6	114
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	14	2	28
Laboratory	5	2	10
Projects			
Final Exam	1	2	2
		Total Work Load	**184**
		ECTS Points (Total Work Load / Hour)	**6**

Learning Outcomes

1	
2	
3	
4	
5	

DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Weekly Content	
1	History and development of Operations Research, its place and importance in industrial engineering. Introduction of Linear Programming model, expression in sum and matrix notations.
2	Sample problem studies for linear decision model setup.
3	Sample problem studies for linear decision model setup.
4	Solution of DP models, graphical and algebraic methods.
5	Solving DP models by simplex method. Typical maximization model and primal simplex method.
6	Two-stage general simplex method, big M method
7	Duality in DP models and dual simplex method
8	Midterm Exam
9	Transportation Problems
10	North West Corner Method
11	Least Cost Pancake Method
12	Row or Row Minimization Method
13	Stepping Stone Method
14	Modi Method

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

	P1	P2	P3	P4	P5	P6	P7
1							
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.

Compiled by:	
Date of Compilation:	26.08.2022