Marmara University
Department of Industrial Engineering

IE3033 Operations Research I

GENERAL COURSE INFORMATION		
Instructor	:	Gülfem Tuzkaya, PhD.
Teaching Assistant	:	Murat Bilsel, PhD.
Campus Phone	:	0216 777 3637 (G. Tuzkaya)-0216 777 3646 (M. Bilsel)
Course Hours	:	Wednesday: 14:00-16:00, Thursday: 11.30-12.30(**Lecture class**)
		Monday:13:00-15.00(**PS class**)
Office Hours	:	M5-213 – Tuesday: 14.00-16.00, Thursday: 14.00-16.00
		M5-223 – Monday: 11.30-12.20, Wednesday: 13.00-14.00(I)
E-mail	:	gulfem.tuzkaya@marmara.edu.tr
		murat.bilsel@marmara.edu.tr
Web	:	https://avesis.marmara.edu.tr/gulfem.tuzkaya
		https://avesis.marmara.edu.tr/murat.bilsel
Text Book	:	Taha H.A., Operations Research: An Introduction.,7th edition, Pearson Education Inc.
Prerequisites	:	MATH2056 Linear Algebra
		IE2032 Introduction to Operations Research
Reference Books	:	1. Winston, W.L., Operations Research: Applications and Algorithms, Brooks/Cole, Cengage Learning 2. Hillier, F.S. and Lieberman,G.J., Introduction to Operations Research, McGraw Hill International Edition.
Aims of the Course	:	The aim of the course is to teach construction of mathematical models to the problems which may be encountered in real-life and solving/analyzing these models using appropriate operations research techniques. Thereby, intensification on the analytical thinking and also improving of skills on numerical analysis are purposed.
Course Learning Outcomes		- Will be able to identify linear programming problems can be encountered in practice. - Can approach to these problems within the framework of systems approach. - Can develop linear mathematical models for problems - Can solve linear mathematical models with known numerical methods - When necessary can solve linear mathematical models by using optimization software packages. - Can increase productivity by providing best resource utilization of limited resource systems.

	• Knows operation research is constantly evolving discipline and can improve himself according to this • Can take part in operation research teams
ATTENDANCE and PARTICIPATION	• You should be in class on time. • You must attend, at least, 70% of the lecture classes. • You must attend, at least, 70% of the PS classes.
EXAMS	• There will be four written exams: three midterms and one final exam.
GRADING	• Term Grade = 75%[Midterm] + 25%[Project] • General Success Grade = 60%[Term Grade] + 40%[Final Exam]

COURSE CONTENTS		
1	**Introduction to Linear Programming (Recall)**	
	• Optimization concept and linear programming • Development of linear programming models • Solving of linear programming models using graphical method • Solving of linear programming models using the simplex method • Artificial initial solution in the simplex algorithm: • M method • Two-phase method • Special cases in the simplex method applications	
2	**Modeling with LINGO**	
3	**Simplex Method Fundamentals**	
	• Matrix definition of the standard linear programming problem • From extreme points to basic solutions • Matrix form of generalized simplex tableau • Revised Simplex Method	
4	**Duality and Sensitivity Analysis**	
	• Duality • Dual simplex method • Sensitivity Analysis	
5	**Goal Programming**	
	• Development of multi-objective models • Solving of multi-objective models using goal programming o Weighted approach o Preemptive approach	
6	**Network Models**	
	• Network definitions • Minimal spanning tree algorithm • Shortest-route problem • Maximal flow model • Minimum-cost capacitated flow problem	