COURSE SYLLABUS AND COURSE REQUIREMENTS
ACADEMIC YEAR 2022/2023 SEMESTER 2

Course title	*Decision Support Methods*
Course Code	MSM054AN
Hours/Week: le/pr/lab	2/0/0
Credits	2
Degree Programme	*MSc Structural Engineering*
Study Mode	*full time*
Requirements	*semester grade with signature*
Teaching Period	*2nd semester*
Prerequisites	
Department(s)	*Civil Engineering*
Course Director	*Dr. Sándor DANKA*
Teaching Staff	*Dr. Sándor DANKA*

COURSE DESCRIPTION

This course introduces some of the basic concepts in operations research and quantitative analysis. Students gain a working knowledge of decision theory, the process and techniques of making decision, operations research techniques that are used extensively in organizations to solve large, structured problems. Coverage includes the use of optimization (linear, integer, and non-linear programming) models, network models in developing optimal solutions to operational and strategic problems in modern organizations.

This course introduces students to the importance and use of mathematical models to formulate and develop optimal solutions to structured problems. Therefore, the most important competencies addressed by this course include critical, logical and analytical thinking skills. Students develop both the conceptual basis and the practical skills in problem solving. Secondly, formulating and solving complex mathematical models necessarily require the use of computers. Therefore, students are able to strengthen their computing skills.

SYLLABUS

1. GOALS AND OBJECTIVES
Goals, student learning outcome.

In this course, students learn:

To develop an understanding of and facility in mathematical modeling of structured and semi-structured problems.

To gain a working knowledge of OR techniques as problem solving and decision support tools.

To be able to interpret solutions and perform sensitivity analysis on these solutions.

To strengthen skills in the use of computers and software to perform analyses involving OR techniques.

2. COURSE CONTENT

	TOPICS
LECTURE	1. Introduction to Decision theory and Operations Research (OR) 2. Optimization techniques for resource allocation 3. Network optimization models 4. *Production planning, Operations management*

DETAILED SYLLABUS AND COURSE SCHEDULE

ACADEMIC HOLIDAYS INCLUDED

LECTURE

week	Topic	Compulsory reading; page number (from … to …)	Required tasks (assignments, tests, etc.)	Completion date, due date
1.	1. What is Decision Theory, process of decision 2. Importance of OR in developing optimal solutions 3. Making Decision, type of decisions 4. Decision making under complete uncertainty (MiniMax, MaxiMin,MaxiMax, Hurwicz, etc.) 5. Decision Trees 6. Types of Business Problems suitable for OR solution 7. Introduction to Modeling	Based on lecture notes	…	…

2.	1. Linear programming
	    a. Graphical analysis
	    b. Simplex algorithm
	    c. Modeling in spreadsheets
	    d. Sensitivity analysis
	2. Integer and binary integer programming
	3. Transportation and assignment models
		Based on lecture notes		

3.	1. Shortest path 2. Minimum cost 3. Maximum flow 4. PERT/CPM	Based on lecture notes		
4.	1. Capacitiy planning 2. Bottleneck analysis 3. Make or buy decisions 4. Lifecycle analysis	Based on lecture notes		

3. ASSESSMENT AND EVALUATION

ATTENDANCE

In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student may be refused a grade or qualification in the given full-time course if the number of class absences exceeds 30% of the contact hours stipulated in the course description.

Method for monitoring attendance *(e.g.: attendance sheet / online test/ register, etc.)*

Attendance sheet

ASSESSMENT

Course resulting in mid-term grade (PTE TVSz 40§(3))

Mid-term assessments, performance evaluation and their ratio in the final grade *(The samples in the table to be deleted.)*

Type	Assessment	Ratio in the final grade
Final Test	*40 points*	*100%*

Opportunity and procedure for re-takes (PTE TVSz 47§(4))

The specific regulations for improving grades and resitting tests must be read and applied according to the general Code of Studies and Examinations. E.g.: all tests and assessment tasks can be repeated/improved at least once every semester, and the tests and home assignments can be repeated/improved at least once in the first two weeks of the examination period.

According to the general Code of Studies and Examinations

Grade calculation as a percentage

based on the aggregate performance according to the following table

Course grade	Performance in %
excellent (5)	85 % …
good (4)	70 % … 85 %
satisfactory (3)	55 % … 70 %
pass (2)	40 % … 55 %
fail (1)	below 40 %

The lower limit given at each grade belongs to that grade.

4. SPECIFIED LITERATURE

COMPULSORY READING AND AVAILABILITY

[1.] Wayne L. Winston, *Operations Research, Applications and Algorithms*, 4th Edition, 2004, ISBN: 0534423620 (International Student Edition)

RECOMMENDED LITERATURE AND AVAILABILITY

[3.] Fred S. Hillier and Mark S. Hillier; *Introduction to Management Science: A Modeling and Case Study Approach*, McGraw-Hill, 2nd Edition, 2002 ISBN: 0072833475