

SYLLABUS INTRODUCTION TO MANAGEMENT SCIENCE ECMU601007 (3 Credits) Odd Semester, Academic Year 2021-2022

Lecturers

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Tutors

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Subject Code	ECMU 601007
Subject Title Introduction to Management Science	
Credit Value 3 (three)	
Year/Semester	2021/2022, 3rd Semester
Day/Hour	14/35 hours (@2,5 hours each day); Friday/14.00-16.30
Subject Type	Compulsory for students of Undergraduate Program in Management
Pre-requisite	1. Statistics for Economics (EIE 10103)
	2. Mathematics for Economics (EIE 11102)

Role and Purposes:

Management Science assistsdecision makers inbusiness organizations, thegovernment aswell individuals insolving their problems. Management Science also plays asignificant roleinresolving resources allocation problem when resources arescarceand thus, becoming the constraints. Management science is alsocalled as operations research, quantitative methods, quantitative analysis and decision science.

This course will cover several management science techniques that are important and relevant with the needs and implementation ofdecision-making. Oneof the techniques thatwillbediscussed in classis mathematical programming. This technique can be used to find an optimum solution when constraints (usually resource constraints) are present.

Subject Learning	1. LG: 4 - Oral Communication Skill
Outcomes:	LO: Students are able to orally communicate their ideas properly
	Traits:
	T2. Able to deliver content with logical structure (TLA)
	T3. Able to organize their ideas in a presentation (TLA)
	T6. Able to manage their voice and pace appropriately (TLA)
	2. LG: 5 - Written Communication Skill
	LO: Students will be able to write a clear and concise idea Traits:
	T1. Able to develop topic/main idea/focus of the essay/report (TLA)
	T3. Able to use good sentence structure (TLA)
	3. LG: 6 - Critical Thinking
	LO: Students are able to argue and draw conclusion on an issue based on
	supportive evidence
	Traits:
	T1. Able to demonstrate to deliver key idea or point (TLA)
	T2. Able to demonstrate evaluate, analysis and comparison alternatives
	choices (TLA)
	T3. Able to demonstrate to justify an argument or solution with
	supporting evidence/ relevant references (TLA)
	T4. Able to draw conclusion
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Subject Synopsis/ Indicative Syllabus

Week#	Topics	Sub Topic	Reading Materials
1	Introduction to Management Science Model Formulation of	 The Management Science Approach to Problem Solving Model Building 	Taylor, Bernard. (2019). Introduction to Management Science (13 th ed.). New Jersey: Prentice
	Linear Programming	 Maximization Minimization Complex Examples of Model Formulation Networking Irregular Types Linear Programming 	Ch 1 and 2
2	Linear Programming	1. Graphical Solution of Linear	Taylor, Introduction
	LG 6 (Traits 1)	 Simplex Method Computer Solution Sensitivity Analysis Duality 	to Management Science Ch 3, 4, and Module A
3	Integer Programming Model	 Total Integer Model Example Branch and Bound 0-1 Integer Model and Mixed Integer Model Integer Programming Graphical Solution Simplex Method Computer Solution of Integer Programming & Sensitivity Analysis Computer Solution Sensitivity Analysis 	Taylor, Introduction to Management Science Ch 5, Module C

4	Goal Programming LG 6 (Traits 1)	 Model Formulation Graphical Interpretation of Goal Programming Computer Solution of Goal Programming 	Taylor, Introduction to Management Science Ch 9
5	Transportation and Assignment Problem LG 6 (Traits 3)	 The Transportation Model The Assignment Problem Computer Solution of Transportation and assignment Problem 	Taylor, Introduction to Management Science Ch 6 and Module
6	Network Flow Models (Collaborative Learning) LG 4 (Trait 2, 3, 6) LG 6 (Traits 2)	 Network Component Shortest Route Problem Minimal Spanning Tree Problem The Maximal Flow Problem Computer Solution of Network Problem 	Taylor, Introduction to Management Science Ch 7
7	Analytical Hierarchy Process LG 6 (Traits 2)	 Pairwise Comparisons Developing Preferences within Criteria AHP Consistency 	Taylor, Introduction to Management Science Ch 9
	Λ	Aid-term exam	
8	Non-Linear Programming	 Nonlinear Profit Analysis Constrained Optimization Solution of Nonlinear Programming Problem 	Taylor, Introduction to Management Science Ch 10 and Module D
9	Dynamic Programming LG 6 (Traits 1)	 Knapsack Shortest Route or Cargo Loading Inventory 	Hillier, Frederick, Gerald Lieberman. 2015. Introduction to Operations Research (10th ed.). New York: McGraw-Hill. And Mulyono, Sri. (2004). Riset Operasi. Lembaga Penerbit FEUI.
10	Markov Chain Analysis	Markov Chain Analysis	Taylor, Introduction to Management Science Module F
11	Queuing/Waiting Line Analysis (Collaborative Learning) LG 4 (Traits 2, 3, 6) LG 6 (Traits 3)	 Definition andAssumption Single Server Model Multiple Server Model 	Taylor, Introduction to Management Science Ch 13
12	Monte Carlo Simulation	Monte Carlo Simulation	Taylor, Introduction to Management Science Ch 14
13	Group Presentation (Final Paper) LG 4 (Traits 2,3,6) LG 5 (Traits 1, 3) LG 6 (Traits 1,2,3,4)		

14	Group Presentation (Final Paper)
	LG 4 (Traits 2,3,6) LG 5 (Traits 1, 3) LG 6 (Traits 1, 2, 3, 4)
	Final-term exam

Teaching/Learning Methodology:

Teaching method used: Active Lecturing, Problem Solving, Collaborative learning, and Contextual Instruction.

Participation:

Individually, each student is required to participate actively in teaching and learning process by:

- 1. Asking and answering questions relevant to the topic.
- 2. Discussing issues related to the topic.

Tobe eligible, students must readtextbooks and other materials provided beforehand.

Attendance:

Minimum 80% of Total Lecture:

1. Only a maximum of 3 (three) times of absent without explanation are allowed.

2. Students who come 15 minutes after the class starts are considered not present.

Assessment Method in Alignment with Intended Learning Outcomes

Description	Percentage of Evaluation (%)	
Tutorials	10	
Participation & Discussions (CollaborativeLearning)	10	
Final Paper & Presentation	20	
Mid-Term Exam	30	
Final-Term Exam	30	
Total	100	

Final Paper and Presentation

- 1. Form groups, each group shall consist of a maximum of 4 students
- 2. Assignment: Each group must identify and solve actual problem in a company using one of the management science methods discussed in class. The data used can be primary or secondary data obtained through the internet, with the sources cited and must not contain any plagiarism. Case example will be provided bythe lecturer. Solutions to the problem must be obtained using an optimization software (i.e. MS Excel Solver, QM, etc)
- 3. One method can only be used by two (2) groups
- 4. Format:
 - Ch. 1: Company profile and problem formulation
 - Ch. 2: Data and solution method (use optimization software)
 - Ch. 3: Analysis
 - Ch. 4: Conclusions and recommendations
 - References
- 5. Abstract (which includes company profile, problem identification, andmethodology) must be submitted on Session 8.
- 6. Final paper must be submitted on Session 13 (before class starts) and will be presented on Sessions 13-14.
- 7. Late submission will be subject to a penalty of 10% per day, with a maximum 3 days. Papers submitted after that time will be scored as zero.
- 8. In your final paper, you should use appropriate academic rules (referencing systems, etc) and format.
- 9. During your final paper presentation:
 - Each group should develop and use visual aids or technology (such as MSPowerpoint)
 - Students should present with appropriate voice and pace.

10. Final paper and presentation marking scheme:					
		Paper content	60%		
		Paper format	10%		
		Presentation	20%		
		Question and answer	10%		
		Total	100%		
Schedule of tutorials	Tutorial will be held 12 times in this semester. During Assistance Class, assistant				
or Lab	will give you a task or questions related to the last session with the Lecturer Class				
	and help you to solve that questions. Assistant will also give you assignment		o give you assignments,		
	homework, and quizzes as a basis for assessme		nt. The w	eight for the Assistance	
Class has been		n determined at the	e previous	point.	
Student Study Effort Expected					
	Class Contac	ts:			
	Lecturers (10) sessions, @2.5 hou	rs)	25hours	
	Tutorials (12 sessions, @1.5 hours)		18hours		
	Collaborative Learning (2 sessions, @2.5 hours)		5 hours		
	Presentation (2 sessions, @2.5 hours)		5 hours		
	Other student study effort:				
	Preparation f	for project/assignm	ent/tests	24hours	

Reading List and References

Required Readings:

- Taylor, Bernard. (2019). Introduction to Management Science (13thed.). New Jersey: Prentice Hall.
 [T]
- 2. Mulyono, Sri. (2004). Riset Operasi. Lembaga Penerbit FEUI. [M]
- 3. Hillier, Frederick, Gerald Lieberman. (2015). *Introduction to Operations Research* (10thed.). New York: McGraw-Hill. **[HL]**

Plagiarism

Plagiarism is defined as inserting words/sentences/ideas belonging to other author/s in part or in whole without referring to sources. Students must indicate the source of any words/sentences from other author/s in his/her writing.

Plagiarism also refers to the copying in part or in whole other student's assignment, or copying frombooks, journals, web, magazines, newspapers, etc.

Plagiarism includes also the act of auto-plagiarism defined as the use of one's own words/sentences/ ideas taken from other assignment/paper that have been submitted for grading in other or the same course without any reference to its/their source/s.

In accordance to the disciplinary rules and code of ethics for students as indicated on the Guidebook of FEBUI, students are prohibited to conduct plagiarism, and will be sanctioned/punished accordingly.

The sanctions/punishment are as follows:

- First time offense, the minimum sanction is a Zero (0) grade for the assignment or maximum an E
- Second time offense, the grade for the course will be an E.
- Third time offense, the student will be expelled from Department of Management, FEBUI.

Statement of Authorship

It is mandatory that a Statement of Authorship be included and posted on the front page of the assignedpaper.

Statement of Authorship

I/We..... the undersigned declare to the best of my/our ability that the paper/assignment

herewith is an authentic writing carried out by myself/ourselves. No other authors or work of other authors have been used without any reference to its sources.

This paper/assignment has never been presented or used as assignment for other courses except if I/we clearly stated otherwise.

I/We fully understand that this assignment can be reproduced and/or communicated for the purpose of detecting plagiarism.

Name	:	
Student's ID Number :		
Signature	:	
Course	:	
Paper/Assignment Title:		
Date	:	
Lecturer	:	
(signed by all and every single student if it's a group assignment)		