Courses presented by different faculties - BMEEODH001

I. Subject Specification

1. Basic Data

1.1 Title

Decision Support Methods

1.2 Code

BMEEPEKMB51

1.3 Type

Module with associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Lecture	2

1.5 Evaluation

Midterm grade

1.6 Credits

2

1.7 Coordinator

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academic rank	Associate professor
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1.8 Department

Faculty of Architecture - Department of Construction Technology and Management

1.9 Website

https://epito.bme.hu/BMEEODH001
https://fiek2.mywire.org/course/view.php?id=3561

1.10 Language of instruction

english

Courses presented by different faculties - BMEEODH001

1.11 Curriculum requirements

Compulsory in the Construction Information Technology Engineering (MSc) programme

1.12 Prerequisites

1.13 Effective date

1 September 2022

2. Objectives and learning outcomes

2.1 Objectives

The aim of the course is to present the economic and mathematical models used in engineering practice, during the preparation and implementation of investments, and to get to know the application level. This is aided by the computational modeling task presented in the lectures. Key topics: MPM / PDM network time and cost planning model, resource allocation, multiattribute evaluation methods. (Bridgman model, Arimoto-Blahut method), group decision evaluation, use of learning curves in construction management.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. Knows the general principles, rules and methods of mathematics, natural sciences and information technology required to practice engineering tasks related to construction, facility design and implementation.
2. Knows the fundamental organizational and motivational factors and methods for company management and the legal background for exercise of profession.
3. Knows and understands the terminology, fundamentals and aspects of other connecting areas to the technical field, especially in the fields of environmental protection, quality assurance, law, economics and management.
4. Has the necessary information technology knowledge to develop technical systems and process automation.
5. Understands the types and capabilities of other information technology tools related to construction.

B. Skills

1. Is able to plan and manage the technical, economic, environmental and human resources integrated.
2. Is able to provide both approximate and accurate estimation of the expected costs, feasibility, technical performance, aesthetic, functional and social values and impact of a planned facili

C. Attitudes

1. Is open to solve the tasks individually and cooperate with other participants of the project.
2. Is open to apply new IT tools, methods and procedures related to a particular field.
3. Is committed to observe relevant requirements of safety, health protection, environmental protection, quality assurance and control.
4. Is open to apply new, up-to-date and innovative methods and procedures related to the sustainable construction

D. Autonomy and Responsibility

1. Gets informed on the changes and the latest developments of legal background, technical and administrative solutions of the relevant engineering field.

2.3 Methods

Essay.

2.4 Course outline

Week	Topics of lectures and/or exercise classes
1.	Introduction to the DSS; Definitions, Demand; A brief history of construction project management and decision support models/methods; Demand for decision support models course.
2.	Development of project management tools and models; Special models and methods for scheduling and cost estimation; Resource Allocation, Stochastic models, Critical Chain
3.	Classification of decision models and methods, basic models; Basic Principles, Multiattribute decision models;(Bridgman model, Arimoto-Blahut method)
4.	Models and methods of Project monitoring and tracking; Baseline plan; Milestones, comparing cost and labor hour; Earned Value Analysis
5.	A generalized scheduling model; Algorithm for critical path; A modified Bellman Ford algorithm for critical path (a modified generic shortest path); Effect of Calendars
6.	Challenges in scheduling; New models and their applications; Effect of calendars; practical examples; case study; Boolean relationships; Nonlinear activities; Stretchable activities; Bidirectional Relationships
7.	Learning Curves and their effect on activity time, project duration, scheduling, and construction cost; Wright, Stanford, De Jong models; advantages of data transformation; Computational examples
8.	The least cost scheduling; A generalized Time cost-trade off model; Effect of Calendars; Simulations, Computational examples
9.	Role of Real Estate Feasibility study; Financial indicators; A time cost trade off model for minimum Net Present Value scheduling; Examples
10.	Artificial intelligence algorithms for project scheduling and cost estimation; Traditional models; Advantages and drawbacks
11.	Diversification and risk, Risk reduction diversification; Markowitz portfolio theorem and its application in

	construction project; practical examples; Computational examples
12.	Network flows and its application in construction planning; Evacuation models, Quickest path paradox; Generalized König problem (earthmoving task); labor-work assignment problem.
13.	Introduction of a new scheduling software; Research and Development at our department; Consultations
14.	Submission of essay

The above programme is tentative and subject to changes due to calendar variations and other reasons specific to the actual semester. Consult the effective detailed course schedule of the course on the subject website.

2.5 Study materials

- A Guide to the Project Maangement Body of Knowledge (PMBOK guide), ISBN 978-1-935589-67-9, Project Management Institute
- Dennis Baker, Donald Bridges, Regina Hunter, Gregory Johnson, Joseph Krupa, James Murphy, Ken Sorenson, Guidebook to Decision-Making Methods, Department of Energy USA, (2001)
- Roy Pilcher, Princples of Construction maangement, McGraw-Hill series in Civil Engineering(1992)

2.6 Other information

2.7 Consultation

Consultation will be provided as needed.

This Subject Datasheet is valid for:

Inactive courses

II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
Homework	HW	A.1-A.5; B.1-B.2; C.1-C.4; D.1

The dates of deadlines of assignments/homework can be found in the detailed course schedule on the subject's website.

3.3 Evaluation system

Abbreviation	Score
Sum	**100%**

3.4 Requirements and validity of signature

Accepted essay. Minimum 2 consultations before submission. Acceptance of essay topic by the end of week 4, first consultation by the end of week 8, second consultation by the end of week 12. For submission, include a 5-10 minute discussion on the topic.

3.5 Grading system

Grade	Points (P)
excellent (5)	
good (4)	
satisfactory (3)	
passed (2)	
failed (1)	

3.6 Retake and repeat

3.7 Estimated workload

Activity	Hours/semester
Sum	**60**

3.8 Effective date

5 September 2022

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