

CA3422: DECISION ANALYSIS AND RISK MANAGEMENT FOR CONSTRUCTION

Effective Term

Semester A 2022/23

Part I Course Overview

Course Title

Decision Analysis and Risk Management for Construction

Subject Code

CA - Civil and Architectural Engineering

Course Number

3422

Academic Unit

Architecture and Civil Engineering (CA)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

BC3421 / CA3421 Decision Making and Operational Techniques for Engineering Management

Exclusive Courses

Nil

Part II Course Details

Abstract

This course aims to provide students with an overview of decision making and analysis, risk management in a context of complex environments in construction practices. It covers modeling uncertainty, the methods and technologies used for decision analysis and making, risk management process and techniques on construction projects.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Identify the different kinds of decision analysis and making theories	20	x		
2	Discover and apply appropriate mathematics techniques to solve managerial problems	40	x	x	
3	Apply the risk management techniques for construction projects	40	x	x	

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Lectures will teach the students the principles and process of decision making and operational techniques in engineering management	1, 2, 3
2	Tutorial	Tutorials will provide hands on experience for students on problem solving skills	1, 2

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignments	1, 2, 3	30
2	Group Projects	2, 3	20

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Additional Information for ATs

To pass a course, a student must obtain minimum marks of 30% in both coursework and examination components, and an overall mark of at least 40%

Assessment Rubrics (AR)

Assessment Task

Assignments

Criterion

Capability to correctly apply an appropriate approach/technique to solve a specific problem.

Excellent (A+, A, A-)

Very High/high

Good (B+, B, B-)

Above average

Fair (C+, C, C-)

Average

Marginal (D)

Below Average/low

Failure (F)

Very low

Assessment Task

Group Projects

Criterion

1. Capability to investigate a real case problem and apply the learnt decision making and operational techniques to solve the problem.

Excellent (A+, A, A-)

Very High/high

Good (B+, B, B-)

Above average

Fair (C+, C, C-)

Average

Marginal (D)

Below Average/low

Failure (F)

Very low

Assessment Task

Examination

Criterion

1. Understanding of the fundamental knowledge of decision making and operation techniques.
2. Capability to solve a problem using the learnt knowledge.

Excellent (A+, A, A-)

Very High/high

Good (B+, B, B-)

Above average

Fair (C+, C, C-)

Average

Marginal (D)

Below Average/low

Failure (F)

Very low

Part III Other Information**Keyword Syllabus**

Influence Diagram, Decision Tree, Sensitivity Analysis, Monte Carlo Simulation, Decision Making under Uncertainty, Utility Function, Multi Attribute Decision Making, Risk Identification, Risk Assessment, Risk Analysis, Risk Mitigation.

Reading List**Compulsory Readings**

Title	
1	Nil

Additional Readings

Title	
1	N Munier. (2014). Risk Management for Engineering Projects: Procedures, Methods and Tools. Springer.
2	S.C. Albright., W. Winston, and C. Zappe. (2012). Data Analysis and Decision Making. Cengage Learning.
3	C.T. Ragsdale. (2010). Spreadsheet Modeling & Decision Analysis: A Practical Introduction to Management Science. Cengage Learning.
4	Journal of Construction Engineering and Management. http://ascelibrary.org/journal/jcemd4 .