

# CA3422: DECISION ANALYSIS AND RISK MANAGEMENT FOR CONSTRUCTION

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## Effective Term

Semester A 2025/26

## 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 DEC-A1 DEC-A2 DEC-A3 app.)			
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.

### Learning and Teaching Activities (LTAs)

LTAs	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 ("- " for nil entry)	Allow Use of GenAI?	
1	Assignments	1, 2, 3	30	-	Yes
2	Group Projects	2, 3	20	-	Yes

#### Continuous Assessment (%)

50

#### Examination (%)

50

**Examination Duration (Hours)**

2

**Minimum Continuous Assessment Passing Requirement (%)**

30

**Minimum Examination Passing Requirement (%)**

30

**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. (20120). 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. <a href="http://ascelibrary.org/journal/jcemd4">http://ascelibrary.org/journal/jcemd4</a> .