

**Title (Units):** **COMP7210 Intelligent Decision Support Systems (3,2,1)**

**Course Aims:** After completion of this course, students will learn the concepts, methodology, models, and quantitative techniques of intelligent decision support, and the related architectural design, functions and components of intelligent decision support systems.

**Prerequisite:** Postgraduate Student Standing

**Course Intended Learning Outcomes (CILOs):**

Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
	<b>Knowledge</b>
1	Describe the main concepts in intelligent decision support
2	Explain the requirements, methodology and quantitative techniques for intelligent decision support
3	Describe the structure, functions and components of intelligent decision support systems
	<b>Professional Skill</b>
4	Recognize the type of decision problems in real-world scenarios and apply appropriate approaches to solving them
5	Design suitable structure and components for intelligent decision support systems
	<b>Attitude</b>
6	Reflect on the value and importance of intelligent decision support systems and their application in various real-world problems

**Calendar Description:** To provide a study of intelligent decision making processes and relevant tools that support such processes. Students will learn the challenges and techniques of decision support in an environment with imperfect and changing information. Both the qualitative and the quantitative aspects of intelligent decision support will be covered. They will also learn the related architectural design, structure, functions and components of decision support systems.

**Teaching and Learning Activities (TLAs):**

CILOs	Type of TLA
1, 2, 3	Lectures, written assignments, quizzes, and mini-project
4, 5	Lectures, written and laboratory assignments, quizzes, and mini-project
6	Lectures, laboratory assignments, and mini-project

**Assessment:**

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Continuous Assessment	40%	1-6	Written and laboratory assignments, quizzes, and mini-project are designed to evaluate the students' understanding of the structure, functions and components of intelligent decision support systems, as well as the techniques and models of intelligent decision support.
2	Examination	60%	1-6	The final examination is designed to measure the extent to which the students have reached all of the learning outcomes. Students are required to have a good comprehension of the fundamental concepts, methodologies, and techniques of intelligent decision support in various situations and applications.

**Assessment Rubrics:**

<b>Excellent (A)</b>	<ul style="list-style-type: none"> <li>• Achieves the first five CILOs, with strong evidence of having achieved the last CILO, demonstrating a good mastery of both the theoretical and practical aspects of the knowledge and skills associated with intelligent decision support systems</li> <li>• Able to develop and present sound arguments and correct solutions to problems, accompanied by in-depth analysis and insight</li> <li>• Demonstrates a thorough understanding and solid knowledge of intelligent decision support systems concepts, algorithms, and methodologies</li> <li>• Able to draw on a variety of techniques and relevant knowledge and appropriately apply them to new decision support situations and problems</li> </ul>
<b>Good (B)</b>	<ul style="list-style-type: none"> <li>• Achieves the first five CILOs, with evidence of having achieved the last CILO, demonstrating a good understanding of the associated concepts and underlying methodologies</li> <li>• Able to develop solutions to problems, accompanied by adequate explanations</li> <li>• Demonstrates a competent level of knowledge of intelligent decision support systems concepts, algorithms, and methodologies</li> <li>• Ability to make use of appropriate techniques and knowledge and apply them to familiar situations and problems</li> </ul>
<b>Satisfactory (C)</b>	<ul style="list-style-type: none"> <li>• Achieves most of the first five CILOs, demonstrating a basic level of understanding of the associated concepts and underlying methodologies</li> <li>• Able to provide acceptable solutions to problems</li> <li>• Demonstrates an adequate level of knowledge of intelligent decision support systems</li> <li>• Ability to make use of some techniques and knowledge and apply them to familiar situations</li> </ul>
<b>Fail (F)</b>	<ul style="list-style-type: none"> <li>• Achieves less than four of the CILOs, with little understanding of the associated concepts and underlying methodologies</li> <li>• Unable to provide solutions to simple problems</li> <li>• Knowledge of intelligent decision support systems falling below the basic minimum level</li> <li>• Unable to apply techniques or knowledge to situations or problems</li> </ul>

#### Course Content and CILOs Mapping:

<b>Content</b>		<b>CILO No.</b>
I	Introduction to Intelligent Decision Support Systems	1, 3, 6
II	Knowledge Representation in Intelligent Decision Support Systems	1, 4
III	Methods and Techniques for Intelligent Decision Support	2, 3, 4, 5
IV	Domain-Specific Intelligent Decision Support	2, 4, 5, 6
V	Case Studies in Practical Application Areas	1, 2, 3, 4, 5, 6

#### References:

- Ragsdale, C. Spreadsheet Modeling and Decision Analysis: A Practical Introduction to Business Analytics, 8th edition, Cengage Learning, 2017.
- Sharda, R., Delen D., and Turban, E. Data Science, & Artificial Intelligence: Systems for Decision Support, 11th edition, Pearson, 2019.
- Tweedale, J. W. et al., (Editors) Intelligent Decision Technology Support in Practice (Smart Innovation, Systems and Technologies), 1st edition, Springer, 2016.
- Albright, S. C. and Winston, W. L. Business Analytics: Data Analysis & Decision Making, 5th Edition, South-Western College Pub, 2014.

#### Course Content:

##### Topic

- I. Introduction to Intelligent Decision Support Systems

- A. Concepts and Features of Computer-Based Intelligent Decision Making
- B. Structure and Components of Intelligent Decision Support Systems
- C. Categorization of Intelligent Decision Support Systems
- II. Knowledge Representation in Intelligent Decision Support Systems
  - A. Rule-Based Knowledge
  - B. Protocol-Based Knowledge
  - C. Case-Based Knowledge
  - D. Model-based Knowledge
- III. Methods and Techniques for Intelligent Decision Support
  - A. Linear and nonlinear programming
  - B. Sensitivity analysis
  - C. Network flow modeling
  - D. Goal programming and multiple objective optimization
  - E. Regression models
  - F. Forecasting models
  - G. Discriminant analysis
- IV. Domain-Specific Intelligent Decision Support
  - A. Decision Analysis and Cost-Effectiveness Analysis in Business, Healthcare, and Social Services
  - B. Financial Decision Support Systems
  - C. Clinical Decision Support Systems
  - D. Social Decision Support Systems
- V. Case Studies in Practical Application Areas