

**Course Title: Decision Support System**

**Course No: CSC-460**

**Credit Hrs: 3**

**Full Marks: 60 + 20 +20**

**Pass Marks: 20 + 8 + 8**

**Nature of course:** Theory (3 Hrs.) + Lab (3 Hrs.)

**Course Synopsis:** This course covers introduction to decision support systems; DSS components; Decision making; DSS software and hardware; developing DSS; DSS models; types of DSS; data mining; artificial intelligence and expert Systems.

**Goal:** The course is devoted to introduce decision support systems; show their relationship to other computer-based information systems, demonstrate DSS development approaches, and show students how to utilize DSS capacities to support different types of decisions.

**Course Contents:**

## **Unit 1: Decision Making and Computerized Support**

### **1.1. Management Support Systems: An Overview**

**3 Hrs.**

Managers and Decision-Making; Managerial Decision-Making and Information Systems; Managers and Computer Support; Computerized Decision Support and the Supporting Technologies; A Framework for Decision Support; The Concept of Decision Support Systems; Group Support Systems; Enterprise Information Systems; Knowledge Management Systems; Expert Systems; Artificial Neural Networks; Advanced Intelligent Decision Support Systems; Hybrid Support Systems

### **1.2. Decision-Making Systems, Modeling, and Support**

**5 Hrs.**

Decision-Making: Introduction and Definitions; Systems; Models; Phases of the Decision-Making Process; Decision-Making: The Intelligence Phase; Decision-Making: The Design Phase; Decision-Making: The Choice Phase; Decision-Making: The Implementation Phase; How Decisions Are Supported; Personality Types, Gender, Human Cognition, and Decision Styles; The Decision-Makers

## **Unit 2: Decision Support Systems**

### **2.1. Decision Support Systems: An Overview**

**3 Hrs.**

DSS Configurations; What Is a DSS?; Characteristics and Capabilities of DSS; Components of DSS; The Data Management Subsystem; The Model Management Subsystem; The User Interface (Dialog) Subsystem; The Knowledge-Based Management Subsystem; The User; DSS Hardware; DSS Classifications

### **2.2. Modeling and Analysis**

**4 Hrs.**

MSS Modeling; Static and Dynamic Models; Certainty, Uncertainty, and Risk; Influence Diagrams; MSS Modeling with Spreadsheets; Decision Analysis of a Few Alternatives (Decision Tables and Decision Trees); The Structure of MSS Mathematical Models; Mathematical Programming Optimization; Multiple Goals, Sensitivity Analysis, What-If, and Goal Seeking; Problem-Solving Search Methods; Heuristic Programming; Simulation; Visual Interactive Modeling and Visual Interactive Simulation; Quantitative Software Packages; Model Base Management

### **2.3. Business Intelligence: Data Warehousing, Data Acquisition, Data Mining, Business Analytics, and Visualization 4 Hrs.**

The Nature and Sources of Data; Data Collection, Problems, and Quality; The Web/Internet and Commercial Database Services; Database Management Systems in Decision Support Systems/ Business Intelligence; Database Organization and Structures; Data Warehousing; Data Marts; Business Intelligence/Business Analytics; Online Analytical Processing (OLAP); Data Mining; Data Visualization, Multidimensionality, and Real-Time Analytics; Geographic Information Systems; Business Intelligence and the Web: Web Intelligence/Web Analytics

### **2.4. Decision Support System Development 3 Hrs.**

Introduction to DSS Development; The Traditional System Development Life Cycle; Alternative Development Methodologies; Prototyping: The DSS Development Methodology; Change Management; DSS Technology Levels and Tools; DSS Development Platforms; DSS Development Tool Selection; Team-Developed DSS; End User Developed DSS; Putting The DSS Together

## **Unit 3: Knowledge Management**

### **3.1. Knowledge Management 5 Hrs.**

Introduction to Knowledge Management; Organizational Learning and Transformation; Knowledge Management Initiatives; Approaches to Knowledge Management; Information Technology in Knowledge Management; Knowledge Management Systems Implementation; Roles of People in Knowledge Management; Ensuring Success of Knowledge Management

## **Unit 4: Intelligent Decision Support Systems**

### **4.1. Artificial Intelligence and Expert Systems: Knowledge-Based Systems 5 Hrs.**

Concepts and Definitions of Artificial Intelligence; Evolution of Artificial Intelligence; The Artificial Intelligence Field; Basic Concepts of Expert Systems; Applications of Expert Systems; Structure of Expert Systems; How Expert Systems Work; Problem Areas Suitable for Expert Systems; Benefits and Capabilities of Expert Systems; Problems and Limitations of Expert Systems; Expert System Success Factors; Types of Expert Systems; Expert Systems on the Web

### **4.2. Knowledge Acquisition, Representation, and Reasoning 5 Hrs.**

Concepts of Knowledge Engineering; Scope and Types of Knowledge; Methods of Knowledge Acquisition from Experts; Knowledge Acquisition from Multiple Experts; Automated Knowledge Acquisition from Data and Documents; Knowledge Verification and Validation; Representation of Knowledge; Reasoning in Rule-Based Systems; Explanation and

Metaknowledge; Inferencing with Uncertainty; Expert Systems Development; Knowledge Acquisition and the Internet

#### **4.3. Advanced Intelligent Systems**

**5 Hrs.**

Machine-Learning Techniques; Case-Based Reasoning; Basic Concept of Neural Computing; Learning in Artificial Neural Networks; Developing Neural Network-Based Systems; Genetic Algorithms Fundamentals; Developing Genetic Algorithm Applications; Fuzzy Logic Fundamentals; Developing Integrated Advanced Systems

#### **4.4. Intelligent Systems over the Internet**

**3 Hrs.**

Web-Based Intelligent Systems; Intelligent Agents: An Overview; Characteristics of Agents; Why Intelligent Agents?; Classification and Types of Agents; Internet-Based Software Agents; DSS Agents and Multi-Agents; Semantic Web: Representing Knowledge for Intelligent Agents; Web-Based Recommendation Systems; Managerial Issues of Intelligent Agents

**Laboratory Work:** The laboratory should contain the concepts of artificial intelligence that are applicable to the development of decision support systems.

#### **Reference Books:**

1. Decision Support Systems and Intelligent Systems, Seventh Edition, Efraim Turban, Jay E. Aronson, Richard V. McCarthy, Prentice-Hall of India, 2007
2. Decision Support Systems, A Knowledge-Based Approach, Clyde W. Holsapple and Andrew B. Whinston
3. Decision Support Systems For Business Intelligence by Vicki L. Sauter