Amrita School of Business

ADVANCED TOOLS FOR DECISION SUPPORT
Trimester VI   MBA 2016 - 2018

Instructor : **Dr. A. V. Shyam**

Introduction

Advancements in Information Technology have made data collection, storage and retrieval much easier and faster than before. The challenge before decision makers now is to make best use of the large amounts of available data and take better-informed decisions. This course aims at giving an introduction to latest trends in decision support technologies, with special emphasis on soft computing methods and simulation. Besides giving a basic understanding of the various technologies, there will be emphasis on the application of those. Spreadsheet-based tools will be used for this purpose. Since this elective course is offered after the students have had a good grounding in all the functional areas of management, representative applications will be chosen from all functional areas of management for modelling and solving. This will give the students a fair idea of how they can apply what they have learned, using user-friendly software that are spreadsheet-based.

Prerequisite for the course

Good knowledge of topics covered in the core Data Analytics courses, and their solution methodologies using spreadsheets.

Expectation from students

The students are expected to attend <u>all</u> the sessions and actively participate in the discussions. They are welcome to share their experiences and thoughts relevant to the topic being discussed to add value to the discussions.

Timely completion and submission of all assignments is compulsory. Late submissions will not be evaluated. The students are expected to come to the class on time, and after revising the topics already covered, as this will facilitate easier understanding of the advanced topics. Students are expected to abide by the strictest standards of academic integrity and ethics. Any violations would attract strict penalty.

Course Contents

Session numbers	Topics
1-2	Introduction to the course Human decision making, various approaches for decision making
3-4	Decision support systems – types, classifications, typical components, new trends
5	Introduction to soft computing
6-7	Introduction to Evolutionary approaches – Evolutionary Programming, Evolution Strategies, Genetic Algorithms, Genetic Programming. Basics of genetic algorithms (GA), motivation from nature, mechanics of GA
8-9	Artificial Neural Networks – comparison with biological neural network, models of artificial neuron, network architectures, learning approaches
10-11	Fuzzy Logic – What is fuzzy logic, brief history, introduction to fuzzy sets, linguistic variables, linguistic modifiers and fuzzy rules
12	Simulation – Types of simulation, steps in simulation,
13-14	Computer simulation using spreadsheets
15	Spreadsheet modelling (revising concepts from earlier courses)
16	Spreadsheet based tools for decision support (especially Genetic Algorithm, and Artificial Neural Network based tools)
17-24	Modelling and solution approaches for problems from different functional areas of management An indicative list of the type of problems to be covered is as follows: Airline crew scheduling, radio tower location, portfolio balancing, budget allocation, purchasing with quantity discounts, travelling salesman problem, routing with precedence constraints, portfolio optimization (with and without transaction costs), finding the efficient frontier, the scenario approach for portfolio optimisation, investment analysis with neural networks, classification problems using neural networks, numeric prediction using neural networks, k-mediod clustering, discriminant analysis, simulation models using specialised simulation tool.

Student consultation hours

Students are welcome to consult me between 2.30 and 4.00 pm Monday through Friday.

Evaluation

The following components will be used for evaluation. The respective weights of each component are given alongside. Any change in this will be notified to you in advance.

Problem Presentations	-	15%
Quizzes (3)	-	45%
Final examination	-	40%

Indicative list of References

Bojadziev, George., & Bojadziev, Maria. 1999. *Fuzzy logic for business, finance, and management*. Singapore: World Scientific Publishing.

Dhar, Vasant., & Stein, Roger. 1997. *Intelligent decision support methods: The science of knowledge work*. New Jersey: Prentice Hall International Inc.

Drummond, Helga. 2001. *The art of decision making*. Chichester: John Wiley & Sons Ltd.

Haykin, Simon. 1999. *Neural networks: A comprehensive foundation*. New Jersey: Prentice Hall, Inc.

Klein, Gary. 1998. *Sources of power: How people make decisions*. Massachusetts: The MIT Press.

Law, Averill. M. 2008. *Simulation modeling and analysis* (4th ed.). New Delhi: Tata McGraw-Hill Publishing Company Ltd.

Mallach, Efrem. G. 2005. *Decision support and data warehouse systems*. New Delhi: Tata McGraw-Hill Publishing Company Ltd.

Marakas, George. M. *Decision support systems in the 21st century*. New Delhi: Prentice Hall.

Ragsdale, Cliff. T. 2001. *Spreadsheet modeling and decision analysis*. Australia: South Western College Publishing.

Turban, Efraim., Aronson, Jay. E., Liang, Teng-Peng, & Sharda, Ramesh. 2007. *Decision support and business intelligence systems* (8th ed.). India: Prentice Hall.

Yen, John., &Langari, Reza. 2009. *Fuzzy logic: Intelligence, control, and information*. Delhi: Pearson Education, Inc.

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