



Universität Paderborn



Decision Support and Expert Systems

Undergraduate Syllabus

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Editor-in-Chief, [Decision Analytics](#)

Editor-in-Chief, [International Journal of Applied Decision Sciences](#)

Editor-in-Chief, [International Journal of Management and Decision Making](#)

Editor-in-Chief, [International Journal of Strategic Decision Sciences](#)

Editor-in-Chief, [International Journal of Enterprise Information Systems](#)

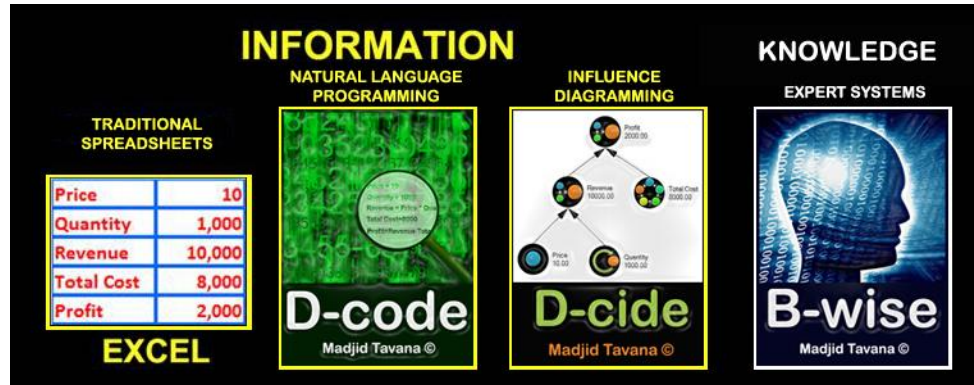
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1. COURSE DESCRIPTION:



Decision support and expert systems has become a strategic requirement that consists of two related but competing activities: supporting the existing business and enabling new business. This course is about the manager's responsibilities for problem solving and decision making, and those areas in which decision support and expert systems can be used to gain the insight needed to support selection of decision alternatives. The course focuses on information and knowledge by utilizing a series of decision support and expert systems tools to develop structured, semistructured, and unstructured decision support systems and expert systems in a hands-on environment.

2. COURSE OBJECTIVES:

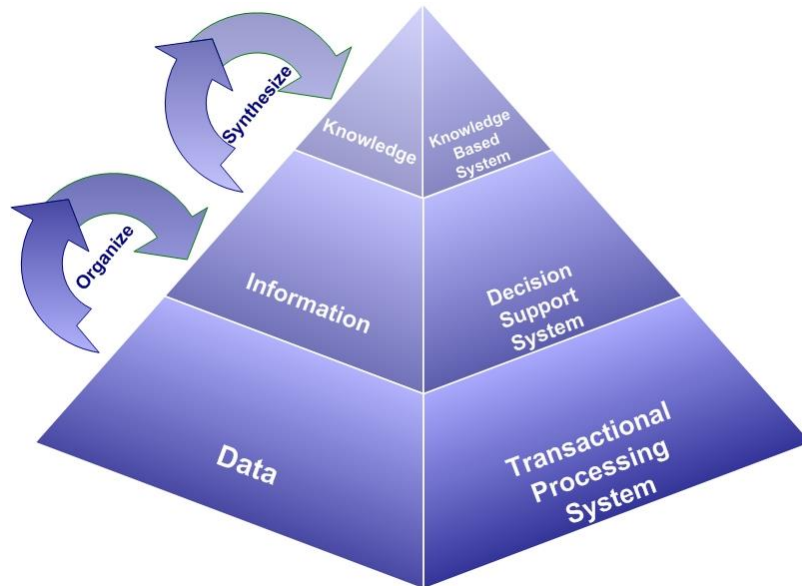
Upon completion of prescribed work for this course, the student should be able to:

- ⊕ Understand the emerging technological issues facing managers.
- ⊕ Understand the value of data, information, and knowledge to organizations.
- ⊕ Distinguish among Database Management Systems, Management Information Systems, Decision Support Systems, and expert System.
- ⊕ Utilize IT to design competitive and efficient organizations.
- ⊕ Describe the latest concepts, components, and applications of IT.
- ⊕ Utilize IT tools to design operational, managerial, and strategic systems.
- ⊕ Describe the leadership responsibilities and organizational impact of IT.
- ⊕ Utilize a series of tools to design and develop Database Management Systems, Management Information Systems, Decision Support Systems, and expert System in support of the decision making and problem solving processes.
- ⊕ Describe when and how Management Support Systems may be used to complement more analytic decision making frameworks.

3. COURSE OVERVIEW:

Computers are data, information, and knowledge processing machines. Billions of dollars are spent every year collecting, storing, processing, and retrieving data; whether it is for financial, marketing, or operational analysis and decision making. Data is a collection of bits, bytes, and characters. Raw data by itself has little or no use. No decision can be made without organizing and synthesizing data. Information is derived from organizing data and knowledge is extracted

from synthesizing information. The evolution of data and its relationship with information and knowledge can be visualized as a pyramid of interdependent layers on the top of each other with data at the bottom, information in the middle, and knowledge on the top.



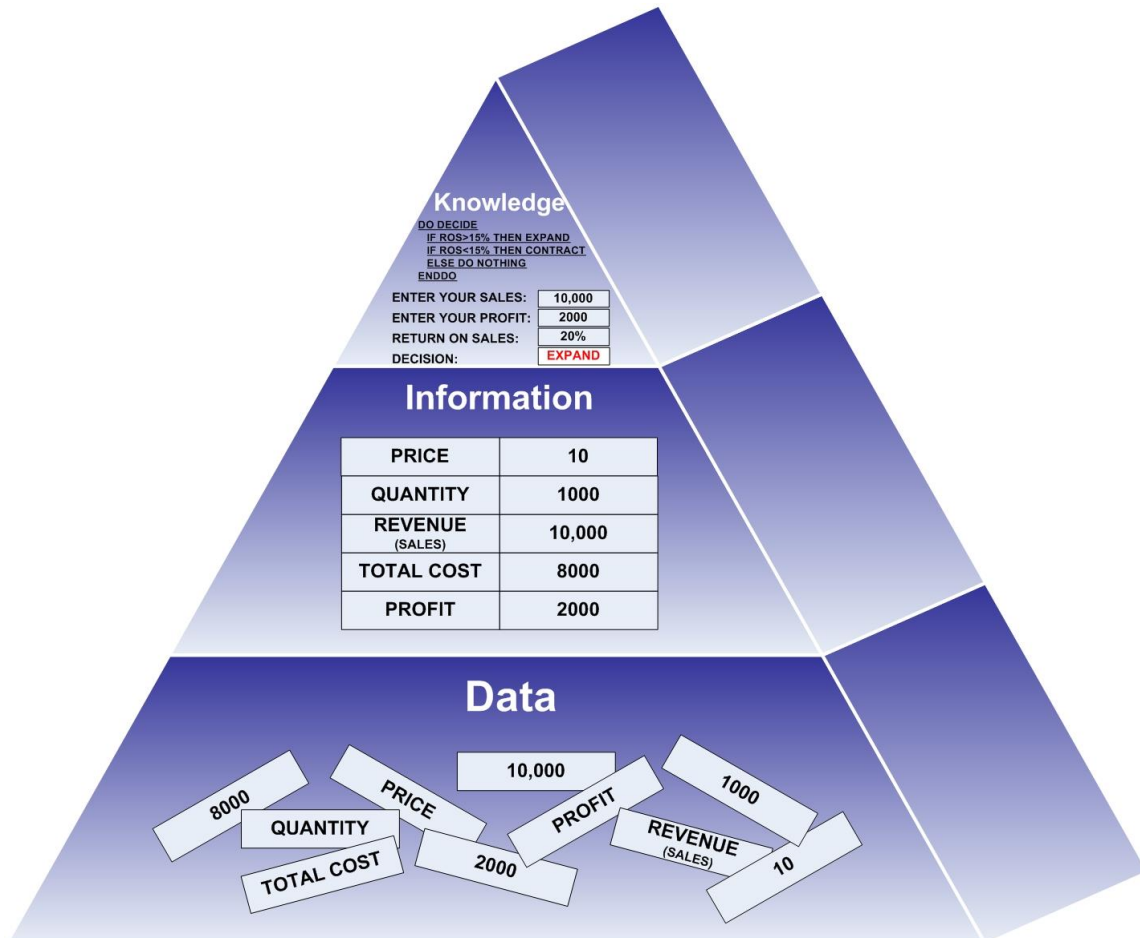
Computers are used to collect, store, and process (organize and synthesize) data, information, and knowledge. Data is collected by a Transactional Processing System (TPS) and stored in a Database Management System (DBMS). Data is organized into information by an Information System (IS) and used in a Decision Support System (DSS) for decision making. Information is organized, meaningful, and useful data. Information is synthesized into knowledge by a Knowledge Based system (KBS) and used in an Expert Systems (ES) for problem solving.



Consider the scenario depicted in the pyramid below where a retailer collects data on their revenues and expenses every time a purchase is made or every time an expense is paid. That data is then stored in the retailer’s DBMS. The accounting department can retrieve and organize this data into meaningful information by way of a report such as income statement. The operations

department can use this information in a DSS to assess profitability. The finance department can synthesize this information in a KBS and make expansion or contraction decisions.

This course focuses on data, information, and knowledge by utilizing a series of tools to develop Database Management Systems, Management Information Systems, Decision Support Systems, and expert System in support of the decision making and problem solving processes in a hands-on environment.



4. WEB RESOURCES:

<http://tavana.us/downloads/downloads.shtml>

username: tavana

password: spacewalk

5. COURSE TOPICS:

Decision Support Systems and Spreadsheets

◆ [Decision Support Systems and EXCEL \(DS-EXL-H\)](#)

◆ **Cases:**

- ✗ *American Appliances*
- ✗ *The Heinrich Company*
- ✗ *Francois Stealth*
- ✗ *Planters Nut Company*
- ✗ *Titanic Cruise Company*
- ✗ *Built-4-U*
- ✗ *Rent-A-Wreck*
- ✗ *Golden Palace Casino*
- ✗ *Impulse Shopping Network*

Decision Support Systems and Natural Language Programming (Visit [D-code.us](#))

◆ [Natural Language Programming: D-code \(DS-COL-H\)](#)

◆ [Building DSS with D-code \(DS-COP-H\)](#)

◆ **Cases:**

- ✗ *Keystone Corporation*
- ✗ *The Prolog Corporation*
- ✗ *Starship Technologies*
- ✗ *Dr. Warped*
- ✗ *Jungle Jim*

Decision Support Systems and Influence Diagramming (Visit [D-cide.us](#))

◆ [Influence Diagramming and D-cide \(DS-DCD-H\)](#)

◆ **Cases:**

- ✗ *The Procom Corporation*
- ✗ *Thrills R Us*
- ✗ *Parrot Club*
- ✗ *Southwest Airline*
- ✗ *Pick Your Own*
- ✗ *Jungle Jim*

Knowledge-Based Systems (Visit [B-wise.us](#))

◆ [Knowledge Engineering with B-wise \(DS-BWL-H\)](#)

◆ [Building Expert Systems with B-wise \(DS-BWP-H\)](#)

◆ **Cases:**

- ✗ *Check Cashing Problem*
- ✗ *College Hill Tavern*
- ✗ *Police Academy*
- ✗ *Corleone Family*
- ✗ *La Boutique*
- ✗ *Gateway Computers*

6. REQUIREMENTS:

1. Final exam contributing to 50% of the final grade:



A hands-on exam focusing on the tools and technologies utilized throughout the course (Open Book and Open Notes).

2. Two cases selected from the following list. Each case contributes to 25% of the final grade and could be a real-life problem or a hypothetical problem created and solved by each student individually.



Excel Case Analysis:

A PowerPoint Presentation with Problem Description, Excel Spreadsheet, Solver Formulation, and Optimal Solution.

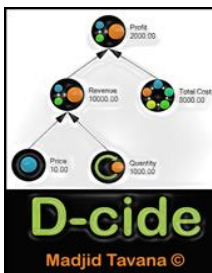
[SAMPLE EXCEL CASE](#) & [EXCEL FILE](#).



D-code Case Analysis):

A PowerPoint Presentation with Problem Description, Influence Diagram, Planners Lab Model, and Spreadsheet Solution.

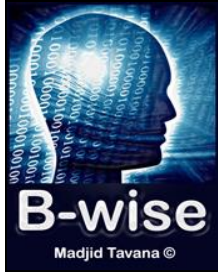
[SAMPLE D-CODE CASE](#) & [D-code FILE](#).



D-cide Case Analysis:

A PowerPoint Presentation with Problem Description, Influence Diagram Screenshot, and Spreadsheet Solution.

[SAMPLE D-cide CASE](#) & [D-cide FILE](#).



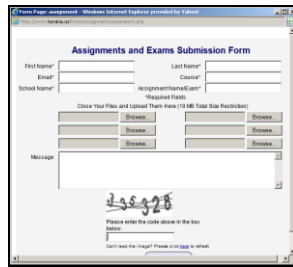
B-wise Case Analysis:

A PowerPoint Presentation with Problem Description, A listing of Factors and Choices, and Decision Tree Screenshot.

[SAMPLE B-wise CASE](#) & [B-wise FILE](#).

7. CASE GRADING POLICY:

Cases should be submitted through the following online submission system:



Grades are sent to the students through email using the following evaluation form:

Grading Criteria	0	1	2	3	4	5	6	7	8	9	10
Originality/Creativity											
Presentation											
Problem Description											
Complexity											
Solution											
Overall score											

[Click Here to open and fill out your data sheet. Please return or email your completed data sheet to your instructor during the first week of classes.](#)

