

IM210 Information Technology Management (3-0-3)

Catalog: **IM210 Information Technology Management (3-0-3).** This course provides the necessary background to enable management information systems personnel to understand tradeoffs in information systems hardware, software, and architecture for effective use in a variety of organizational environments. Topics covered include information technology planning and strategy, trends in computer hardware and systems software, telecommunications and network management, control and management of information resources, distributed and client-server technologies, and data representation and visualization. *Prereq: SI 204*

Textbook: Management Information Systems (Third Edition), Effy Oz, Thompson Learning, 2002.

Reference: None

Program Outcomes:

1. Explain and apply technical concepts and practices in the core informational technologies.
2. Communicate with clients, users and peers in verbal, visual, or written form.
3. Analyze the impact of technology on individuals, organizations and society, including ethical, legal and policy issues.

Course Goals:

1. To introduce students to the role IT plays in organizations and businesses.
2. To understand the strategic use of IT in organizations, with the tradeoffs required in decision making concerning IT assets.
3. To introduce the building blocks of IT assets, including system architecture, hardware/software, networks, and databases. This provides a link to other IT courses, including Architecture, DOD Information Systems, Networks, and Databases.
4. To introduce basic IT organizational requirements, from transaction processing systems, executive information systems, to Enterprise Resource Planning (ERP) systems.
5. To introduce IT decision making tools, including expert systems, decision support systems, and artificial intelligence systems.
6. To familiarize students in the basic role of IT managers: balancing an understanding organizational IT needs with resources available.
7. To introduce concepts of project management, acquisition process, and systems development.
8. To discuss control, security, and ethics of management information systems.

Prerequisites by Topic:

1. Elementary Programming
2. Top Down and Bottom Up Approach to Problem Solving

Major Topics Covered	Hours
1. Strategic Use of IT	2
2. IT in Organizations	2
3. IT Enterprise Architecture	2
4. Computer to Computer Communications	3
5. Global Communications (Nets)	4
6. Information Needs of Organizations	3
7. Information Resource Management	3
8. Knowledge Management and Databases	3
9. Decision Aids	3
10. Artificial Intelligence/Expert Systems	3
11. Managing the Future (Systems Development and Acquisition)	3
12. Controls, Privacy, and Security	3
13. Ethical Issues with Management Information Systems	2
14. Project Presentations (Final project for course)	4
15. Exams	2
16. Review, Course Administration	2
Total:	44

Laboratory Projects: None

Oral and Written Communications: As part of the final project each student will submit a research paper on a relevant topic (case study) and make a formal oral presentation of it. Additionally, each student will make no less than three shorter presentations to the class on a variety of relevant topics.

Social and Ethical Issues: Because the issues of IT management are both global and sensitive in nature, the course will address topics of controlling access to information, firewalls, privacy issues, and other ethical issues involving global management information systems.

Analysis and Design:

Final projects will culminate the course and provide the student the opportunity to integrate information technology, resources, management and the tradeoffs inherent in decision making. Each student will be given an IT implementation project from an organization (actual case), analyze it in terms of probable advantages and disadvantages, and scrutinize the decision making which occurred. This project will require a paper and a formal presentation to the class (approximately fifteen minutes each) on lessons to be learned from the organization's implementation project.

IM330 Decision Support Systems (3-0-3)

Catalog: **IM330 Decision Support Systems (3-0-3)** This course focuses on the decision making process using process models, bounded rationality and its implication for satisfying vs. optimizing behavior. It discusses heuristics commonly used by humans and the systematic types of errors that are a consequence of using these heuristics. A component on modeling technologies will discuss decision trees, influence diagrams, optimization models and multi-criteria decision-making. *Prereq: IM210*

Textbook: Decision Support Systems and Intelligent Systems, Efraim Turban and Jay E. Aronson, Prentice Hall, Sixth Edition, 2001.

Program Outcomes:

1. Recognize and demonstrate critical thinking and problem solving skills.
2. Employ emerging technology to satisfy challenges or opportunities faced by organizations or individuals.
3. Analyze the impact of technology on individuals, organizations and society, including ethical, legal and policy issues.

Course Objectives:

1. Identify capabilities and limitations that must be considered when designing and building decision support systems.
2. Examine concepts and theories related to the problem structure, decision outcome and control of the decision-making process.
3. Illustrate the integration of technologies such as data mining and intelligent agents into decision support systems and their impact on the operational environment.
4. Explore ethical issues relevant to the development and use of decision support systems.

Prerequisites by Topic: Role of an Information System (SI310)

Major Topics Covered:

	Hours
1. Ethics: Development and use of Decision Support Systems	1
2. Introduction to Decision Support Systems	1
3. Decisions and Decision Makers	2
4. Decisions in the Organization	2
5. Modeling Decision Processes	3
6. Group Decision Support and Groupware	2
7. Enterprise Information Systems	4
8. Expert Systems and Artificial Intelligence	3
9. Knowledge Engineering and Acquisition	4
10. Machine Learning	3
11. Introduction to Data Warehousing and Data Mining	4
12. Integrating Decision Support Systems	3

13. Creative Decision Making and Problem Solving	2
14. Intelligent Agents	2
15. Neural Computing	4
16. Exam Review, going over exams, course evaluations	2
17. Exams	2
Total	44

Oral and Written Communications:

Every student is required to submit at least one written report of typically three-five pages covering an advanced topic in current issues, limitations, and trends in decision support systems.

Laboratory Projects:

Students will learn the fundamental concepts of modeling and decision-making by employing automated tools to a wide array of realistic problems.

Social and Ethical Issues:

Students are evaluated on their understanding of the ethics related to the development and use of decision support systems by a short essay homework assignment and a final exam question.

Theoretical Content:

Foundations of knowledge representation, neural networks, rule-based reasoning and intelligent agents is covered.

Analysis and Design:

There is one major assignment that requires the student to design and develop a specialized decision support system.

**IM330 Decision Support Systems
Spring 2003**

Day	Topic #	Topics/Events	Reading
1	2-1	Introduction to Decision Support Systems (DSS).	Handouts, Chap 1
2	3-1	Decision Making. Intelligence, Design and Choice Phases	Chap 2.1 – 2.8
3	3-2	Decision Making. Implementation Phase. Personality Types.	Chap 2.9 – 2.14
4	4-1	Data Management Subsystem. Model Management Subsystem.	Chap 3.1 – 3.8
5	4-2	Knowledge-based Management Subsystem. The User.	Chap 3.8 – 3.14
6	5-1	Static and Dynamic Models.	Chap 5.1 – 5.5
7	5-2	Modeling in Spreadsheets. Demo.	Chap 5.6 – 5.8
8	5-3	Simulation. Online Analytical Processing.	Chap 5.9 – 5.14
9	6-1	Collaboration.	Chap 7.1 – 7.4
10	6-2	Group Support Systems.	Chap 7.5 – 7.10
11	7-1	Enterprise Information Systems	Chap 8.1 – 8.3
12	7-2	Executive Information Systems	Chap 8.4 – 8.7
13	7-3	Supply Chains and Decision Support	Chap 8.8 – 8.11
14	7-4	Enterprise Resource Planning and Customer Relationship Management Systems. Demo.	Chap 8.12 – 8.14
15	16-1	6-Week Review	
16	17-1	6-Week Exam	
17	11-1	Data Warehousing.	Chap 4.1 – 4.5
18	11-2	Database Management Systems.	Chap 4.6 – 4.8
19	11-3	Data Access. Data Mining. Demo.	Chap 4.9 – 4.10
20	11-4	Geographic Information Systems. Business Intelligence.	Chap 4.11 – 4.14
21	9-1	Knowledge Management.	Chap 9.1 – 9.3
22	9-2	Organizational Learning.	Chap 9.4 – 9.6
23	9-3	Knowledge Management Methods, Technologies and Tools.	Chap 9.7 – 9.9
24	9-4	Electronic Document Management.	Chap 9.10 – 9.12
25	8-1	Knowledge-based Decision Support.	Chap 10.1 – 10.8
26	8-2	Expert Systems	Chap 10.9 – 10.16
27	8-3	Knowledge Acquisition and Validation.	Chap 11.1 – 11.11
28	10-1	Machine Learning. Demo.	Chap 11.12 – 11.19
29	10-2	Knowledge Representation.	Chap 12
30	10-3	Inference	Chap 13

31	15-1	Neural Computing	Chap 15.1 – 15.13
32	15-2	Neural Networks. Demo.	Chap 15.14 – 15.22
33	16-2	12-Week Review	
34	17-2	12-Week Exam	
35	15-3	Applications of Neural Networks.	Chap 16.1 – 16.6
36	15-4	Genetic Algorithms. Fuzzy Logic.	Chap 16.7 – 16.12
37	14-1	Intelligent Agents. Demo.	Chap 17.1 – 17.6
38	14-2	Software Agents. Multiagents.	Chap 17.7 – 17.12
39	12-1	Integrating Decision Support Systems.	Chap 18.1 – 18-12
40	12-2	Impact of Decision Support Systems.	Chap 19.1 – 19.8
41	12-3	Productivity and Quality.	Chap 19.9 – 19.12
42	1-1	Ethics. Use of DSS to Make Critical Decisions.	Case Study
43	13-1	Group Presentations.	
44	13-2	Group Presentations.	

Problem Sets: Problems are available at the end of the chapters, and will be assigned at instructor discretion.

IM360 Information Resources Management (3-0-3)

Catalog: **IM360 Information Resources Management (3-0-3).** This course investigates in depth the relationships between organizational policy and institutional information requirements in the context of competitive strategy. It examines the way information technology is used to influence that strategy and to assess the impact of strategic deployment of information systems. Using actual case studies, it explores organizational use of information technology to influence competitive strategy in relation to the environment, competitors, customers, and suppliers.

Prerequisites: SI221 or IT221

Textbook: Corporate Information Strategy and Management Text and Cases. Applegate, Lynda M., Austin, Robert D., & McFarlan, F. Warren. McGraw-Hill Irwin, Sixth Edition, 2003. ISBN: 0-07-245672-8

Program Outcomes:

1. Recognize and demonstrate critical thinking and problem solving skills.
2. Design and create integrated IT-based solutions following standards and best practices.
3. Analyze the impact of technology on individuals, organizations and society, including ethical, legal and policy issues.

Course Objectives:

1. Examine the influences of 21st-century technologies on business decisions.
2. Understand the impact of information technology on industries and market (the external environment)
3. Investigate how the design of information systems impacts organizational efficiency and effectiveness, and thus competitive advantage (the internal environment).
4. Examine the interface between business and technology, including the approaches to designing and managing networked technology infrastructures.
5. Analyze the influence that the Internet has on organizations and decisions.
6. Study the leadership dimensions of IT activities, including IT functions, IT outsourcing, and risk.

Major Topics Covered:

Hours

- | | |
|---|---|
| 1. Ethics: Social and Ethical Implications of Global Networking | 1 |
| 2. Business Economics | 3 |
| 3. Introduction to Managing Information Resources | 3 |
| 4. Creating Business Advantage with IT | 4 |
| 5. Designing Business Models | 3 |
| 6. Reality of Networked Business | 4 |

7. Networked Infrastructure and its Business Implications	4
8. Risk, Reliability, and Threats to IT Services	4
9. Managing Diverse IT Infrastructures	4
10. Leading the IT Function in an Organization	4
11. Managing IT Outsourcing	4
12. Portfolio Approach to Project Management	2
13. Course Administration, Reviews	2
14. Exams	2
Totals:	<hr/> 44

Laboratory Projects:

While no specific lab is associated with this course, there will be approximately one case study assigned per week. This case study approach allows students to assess both positive and negative real world examples of strategies and decision-making involved in managing IT resources. The students will be expected to garner information and evaluate consequences of decision-making on each particular case study.

Oral and Written Communications:

Each student will submit a research paper on one aspect of managing resources. Additionally, each student will make shorter presentations to the class using case studies.

Social and Ethical Issues:

One hour will be spent on the social and ethical implications of global networking and how it influences business decisions.

IM450 Enterprise Computing (2-2-3).

Catalog: **IM450 Enterprise Computing (2-2-3).** This course develops architectures and concepts for the development of multi-tier (typically 3 tiered) distributed applications for an entire organization or enterprise. This includes a user interface called the client tier or tier 1, a server component which is controlled by the organization and provides for interaction with and data collection from the user (tier 2) and a database component that stores transactions and updates client profiles (tier 3). The course teaches advanced techniques for network programming as well as server management and programming.

Prerequisites: IT340 and IT420

Textbooks: Enterprise Integration, Fred A. Cummins, John Wiley and Sons, 2002. ISBN 0-471-40010-6

Program Outcomes:

1. Design and create integrated IT-based solutions following standards and best practices.
2. Assimilate personal initiative, group cooperation, and team leadership.
3. Analyze the impact of technology on individuals, organizations and society, including ethical, legal and policy issues.

Course Objectives:

1. Explain the basic principles of distributed applications and distributed databases.
2. Understand the evolution of the application integration and interoperability
3. Examine the critical elements involved in application integration, including middleware and components.
4. Manage the impact of changes in information systems on the user.
5. Design and implement an application integration environment.
6. Analyze the role of and reasons for using Commercial Off-the-shelf (COTS) software products as an alternative to custom-developed solutions.
7. Appraise the fundamental criticality of system integration in the emerging Electronic Business environment.

Prerequisites by Topic:

1. Database Design (IT420)
2. Basic Network Architecture (IT340)

Major Topics Covered:

	Hours
1. Ethics	1
2. Background and History of Enterprise Architectures	1
3. Enterprise Architectural Design	2
4. Architecture Components	5

5. Business System Domains	2
6. Messaging	1
7. Workflow Management	4
8. User Services	2
9. Integrating with Extensible Markup Language	3
10. System Security and Certificates	2
11. Component Technology	2
12. Enterprise System Implementation	1
13. Administration, Reviews and Exams	<u>3</u>
Totals:	29

Laboratory Projects: This course is an introduction to system integration with a focus on Enterprise Application Integration and electronic business. It will focus on integrating a variety of different applications using COTS (Commercial off the Shelf) software tools. Students will be required to write “glue-ware”, the software needed to make the various software components inter-operate. Each student will be a member of a group and support the construction of an enterprise portal based on the topics presented in the laboratory sessions.

Team Projects: The class will be divided into 3-4 person groups, which will be involved in a complete enterprise system development project. Each group will submit weekly status reports and make interim presentations at 6-Weeks and 12-Weeks. The groups will develop a common Extensible Markup Language Schema that will enable groups to share information among their class “business partners”.

Oral and Written Communications:

As part of the final project, each student will submit a group research paper on their development project. Each group will make a formal presentation of this project to the class. Additionally, each student will make three shorter presentations to the class on their project during the development process.

Social and Ethical Issues:

One hour will be spent on the social and ethical implications of project development and software reuse.

IM480 IT Research Seminar (IM)

Catalog: **IM480 Information Technology Research Seminar (Information Management) (3-0-3).** This is a capstone course that ties together information technology and information management. Each student will design and develop an information technology system involving information management using databases, web delivery and integration of two or more subsystems.

Prerequisites: 1/C ISI major

Textbook: Enterprise Integration, Fred Cummings, Wiley Publishing, 2002

Prerequisites by Topic:

1. System Analysis and Design
2. Database Development
3. Web Deployment
4. A completed Project Plan specific to the capstone project
5. Use of transaction systems and management processing reporting systems

Program Outcomes:

1. Examine system requirements and create and maintain a project plan with respect to a second discipline.
2. Communicate with clients, users and peers in verbal, visual, or written form.
3. Analyze the impact of technology on individuals, organizations and society, including ethical, legal and policy issues.

Course Goals:

1. Tie together information technology and information management.
2. Design and develop an information technology system concerning information management using databases and web delivery.
3. Assess the tradeoffs in information hardware, software and architecture.
4. Delivery of written documentation that satisfies that school-wide capstone requirement.

Major Milestones:

1. Week 2: Analysis Document including:
 - a. Use Case Diagram
 - b. Class Diagram
 - c. Sequence Diagram
 - d. Entity-Relationship Diagram
2. Week 5: Design Document including:
 - a. Database Schema
 - b. Interface Prototype
 - c. Extended Class Diagrams
 - d. Packages

- e. Test Plans
- 3. Week 15: Implementation Specific to Second Discipline including:
 - a. Working System
 - b. User Documentation
 - c. Test Results
- 4. Final Exam: Oral Presentation and System Demonstration

Sample Example of an IM480 Capstone Project

The Chemistry Exam Construction (CEC) Project provides a mechanism for the Chemistry Department at the United States Naval Academy to manually or automatically create mid-term and final exams using a common body of questions. Each question will be associated with one or more topics or subtopics. In addition, the CEC Project will take input automatically from the SCANTRON device, currently used to grade exams, and dynamically update the question's statistics and student records based on the most recent exam results. Appropriate security features will be used to protect access control to the question base and midshipmen records.