

## **C. INFORMATION TECHNOLOGY COURSES**

**ITAP 2381: Operations Research**  
**ITAP 2431: Network Management**  
**ITAP 3381: Business Process Redesign**  
**ITAP 3382: Business Intelligence**  
**ITAP 3383: Enterprise Resource Planning Systems**  
**ITAP 3431: Network Security**  
**ITAP 3471: Web Server Management**  
**ITAP 4311: Database Management**  
**ITAP 4371: E-Commerce**  
**ITAP 4372: E-Collaboration**

## **Course Title: ITAP 2381: Operations Research**

**Semester Credit Hours:** 3 (3,0)

### **I. Course Overview**

This course introduces some of the basic concepts in operations research and quantitative analysis. Students gain a working knowledge of operations research techniques that are used extensively in organizations to solve large, structured problems. Coverage includes the use of optimization (linear, integer, and non-linear programming) models, network models, simulation and risk analysis in developing optimal solutions to operational and strategic problems in modern organizations.

### **II. PMU Competencies and Learning Outcomes**

This course introduces students to the importance and use of mathematical models to formulate and develop optimal solutions to structured problems. Therefore, the most important competencies addressed by this course include critical, logical and analytical thinking skills. Students develop both the conceptual basis and the practical skills in problem solving. Secondly, formulating and solving complex mathematical models necessarily require the use of computers. Therefore, students are able to strengthen their computing skills. Further, the course involves analysis of cases for which students submit written reports to communicate results of technical analysis. The course therefore provides an opportunity to enhance students' technical writing skills. Finally, this course makes an extensive use of the PMU technology infrastructure to provide communication between faculty and students.

### **III. Detailed Course Description**

Operations research (OR) involves formulation of problems into mathematical models, and then developing optimal solutions by application of various techniques such as mathematical programming. The course introduces methods that are used extensively in business organizations to solve large, structured and semi-structured problems. Such methods generate results that support decision-making at all levels of the organization over various time horizons. Students are exposed to an approach to problem solving that helps the decision-maker to (a) consider a richer set of alternatives, (b) understand and question assumptions, and (c) consider diverse measures of performance. The course stresses model formulation, solution methods, and managerial interpretation of the results through a series of examples that emphasize multi-disciplinary nature of business problems. Students complete several skill-building exercises and cases with the support of several software packages available in Microsoft Excel.

#### **IV. Requirements Fulfilled**

ITAP 2381: Operations Research satisfies three hours of the requirements for a Bachelor of Science degree in Information Technology and is required of all students pursuing this degree program within the College of Information Technology. The course is also recommended as an elective for students majoring in computer science and management information systems. It should be taken no earlier than the first semester of the sophomore year.

#### **V. Required Prerequisites**

- GEIT 1412: Computer Science II
- MATH 1312: Calculus for Students of Business
- MATH 1321: Statistical Methods

#### **VI. Learning Outcomes**

In this course, students learn:

- To develop an understanding of and facility in mathematical modeling of structured and semi-structured problems.
- To gain a working knowledge of OR techniques as problem solving and decision support tools.
- To be able to interpret solutions and perform sensitivity analysis on these solutions.
- To strengthen skills in the use of computers and software to perform analyses involving OR techniques.
- To strengthen technical writing and communication skills.

#### **VII. Assessment Strategy**

The student's performance in this course is assessed on the basis of:

- Three (two term and a final) examinations.
- Approximately 8-10 skill-building exercise taken from the textbook to be completed by each student.
- Two cases to be completed in self-selected groups of 4-5 students.

Relative weights assigned to these items in determining student's final grade are suggested as follows:

- Each term examination accounts for 20 % of the final grade. The final examination accounts for 25%. Combined, the three examinations account for 65% of the final grade.
- Skill-building exercises account for a total of 15% of the grade.
- Each case accounts for 10%, for a combined 20% of the grade.

Problem-oriented examinations are used to assess mastery of model formulation and problem solution process. Skill-building exercises are used to measure the understanding of OR-oriented modeling and problem-solving approaches. Cases based on real-to-life situations are used to assess students' ability to identify problem(s) and constraints; develop and evaluate alternatives; formulate appropriate mathematical model(s); and reach rational, reasonable or optimal solutions.

### **VIII. Course Format**

This course utilizes a mix of lectures and out of class assignments designed to help students develop a firm foundation in the use of operations research techniques to solve structured and semi-structured problems. Lectures are utilized to introduce students to mathematical modeling as a means to formulate and solve problems. A significant portion of this course is devoted to building critical thinking, analytical, and problem solving skills. To that end, skill-building exercises and cases are assigned throughout the semester. Skill-building exercises are completed by each student individually. Students submit a written summary of their results for each exercise. Generally, at least one skill-building exercise is due during each class meeting. .

Cases, on the other hand, are completed in self-selected groups of 4-5 students. Two such cases are assigned during the term. Students submit written reports to communicate results of their technical analyses.

Following format is suggested for this technical document:

- Executive Summary. A one page executive summary should include a clear statement of the problem; discussion of alternatives evaluated; and a discussion of final recommendations, all using non-technical language.
- Analysis section. This section should include details of process followed, analyses performed, and a summary of findings.
- Appendix. All detailed supporting material such as computer printouts, tables, and equations should be relegated to the appendix.

In addition, the instructor should consider creating a Web site for this course using Web technologies such as WebCT or BLACKBOARD. At minimum, the site should include:

- Course syllabus
- Lecture material (for example, PowerPoint slides, lecture notes, etc.). These should be placed on the site ahead of class meeting so that students may use the material to prepare for the lecture
- Out-of-class assignments
- Suggested Solution to out-of-class assignments (after graded assignments have been returned)

- Keys to exams (after students have completed them)
- Mechanism for students to digitally submit their assignments
- Course calendar
- Mechanism to communicate electronically (for example e-mail)
- Discussion groups for on-line collaboration.
- Students course performance measures

## **IX. Topics to be Covered**

- A. Introduction to Operations Research
  1. What is OR
  2. Importance of OR in developing optimal solutions
  3. Types of Business Problems suitable for OR solution
  4. Introduction to Modeling
- B. Optimization techniques for resource allocation
  1. Linear programming
    - a. Graphical analysis
    - b. Simplex algorithm
    - c. Modeling in spreadsheets
    - d. Sensitivity analysis
  2. Integer and binary integer programming
  3. Transportation and assignment models
- C. Network optimization models
  1. Shortest path
  2. Minimum cost
  3. Maximum flow
  4. PERT/CPM
- D. Simulation and risk analysis
  1. Risk assessment
  2. Computer simulation

## **X. Laboratory Exercises**

This course does not require a separate lab.

## **XI. Technology Component**

- A. In class, the instructor makes use of state-of-the art multimedia projection equipment and software. These are used to project slides and Web-based content relevant to the concepts of and use of OR techniques.
- B. Outside class, the instructor uses Web-based course management software (for example WebCT, BLACKBOARD) to interact with students as described under course format section.
- C. All skill-building exercise and case studies assigned in this class require students to use software packages available in Microsoft Excel or specialized OR software.
- D. When working on case assignments, each team is set up an on-line discussion group and repository to facilitate collaboration among team members.

## **XII. Special Projects/Activities**

There are no special projects or activities assigned in this course.

## **XIII. Textbooks and Teaching Aids**

### A. Required Textbook

Fred S. Hillier and Mark S. Hillier; *Introduction to Management Science: A Modeling and Case Study Approach*, McGraw-Hill, 2nd Edition, 2002  
ISBN: 0072833475

### B. Alternative Textbooks

Cliff T. Ragsdale; *Spreadsheet Modeling and Decision Analysis: A Practical Introduction to Management Science*; Southwestern College Publishing, 4th edition, 2003  
ISBN: 0324183992

### C. Supplemental Print Materials

As available from publisher.

### D. Supplemental Online Materials

As available from publisher.

## **Course Title: ITAP 2431: Network Management**

**Semester Credit Hours:** 4 (3,1)

### **I. Course Overview**

This course introduces students to business data communications and networking concepts, tools and methods. The goal is to prepare students to apply networking tools and methods to the solution of business problems. The course covers the use of basic data communications and networking hardware such as hubs and routers, and of simple programming tools to customize and integrate existing software. It introduces networking, distributed transaction processing, and Web-related concepts. The course also covers concepts for managing distributed storage and connectivity related to data, voice, image, and video. Its specific focus is on Web-based systems. The course includes a mix of lectures, laboratory demonstrations and assignments, and discussions on contemporary articles from industry publications.

### **II. PMU Competencies and Learning Outcomes**

This course helps students become conversant with network management issues and understand the related terms and issues that are important for network management professionals around the world. Additionally, the course provides the students with the communication, leadership and teamwork skills necessary to effectively work as professionals in teams, or in charge of teams, responsible for operating complex network environments. Finally, the course imparts on the students an understanding of networks as more than webs of switches and cables – namely as resources that support the core and mission-critical business processes of an organization.

### **III. Detailed Course Description**

The course begins with a discussion of ethical issues, legal issues, and aspects conducive to effective teamwork, in the context of network management. It then proceeds with a review of key introductory topics such as packet switching, types of communication signals, types of networking media and topologies, the OSI Model, and networking protocols. Next the course covers core technological ideas and elements used for networking computers in organizations, such as local area networks (LANs), wireless LANs, wide area networks, hubs, wireless access points, and routers. The course concludes with a discussion of advanced issues in connection multimedia delivery and distributed computing using the Web. The emphasis on this course is on networking infrastructure set up and management, rather than on distributed programming and other programming-related topics.

#### **IV. Requirements Fulfilled**

This course is required for all students majoring in Information Technology in the College of Information Technology. It is also recommended as an elective for students in majoring in programs focusing on computer science, computer engineering, and management information systems.

#### **V. Required Prerequisites**

- GEIT 1411: Computer Science I
- GEIT 1412: Computer Science II
- GEIT 1311: Computer Organization I.

#### **VI. Learning Outcomes**

In this course, students learn:

- To become conversant with network management issues and understand the related terms and issues relevant to network management professionals around the world.
- To acquire the communication, leadership and teamwork skills necessary for effectively work as professionals in teams, or in charge of teams, responsible for operating complex network environments.
- To understand the role of networks as more than switches and cables, that is, as resources that support the core and mission-critical business processes of an organization.

#### **VII. Assessment Strategy**

Students are assessed based on: their performance in two exams (midterm and final); their performance in connection with laboratory assignments; their class participation, which includes the discussion of recent articles taken from online industry publications; and the quality of a final team project and related oral presentation. The relative weights of each of these items on the final grade are as follows:

- The midterm and final exams each account for 15% of the grade. Combined, they account for 30% of the grade.
- The successful completion of laboratory assignments accounts for 20% of the grade.
- Class participation accounts for 10% of the grade, and is evaluated based on the ability of students to add to the material already provided by the instructor to them.

- The final team project accounts for 40% of the grade. It is evaluated based on a project document, oral presentation, and client perceptions of the team project. The project must be conducted in collaboration with a client organization (for example, a department at a large company or non-profit organization). A letter from the main contact person at the client organization, discussing and evaluating the project and its outcomes, must be provided to the instructor. The letter should contain the contact information of the person writing so the instructor can call him/her up and inquire about the project.

The exams encourage the students to review all of the concepts and methods discussed in class, which are primarily based on textbook material. This is complemented by laboratory assignments, where students apply the concepts and methods learned in practice. Another complement are the class discussions on recent articles taken from online industry publications, which help the students to become conversant with the industry-specific lingo related to network management issues. The final project provides an experience where concepts, methods, and industry-relevant issues are all brought together in a very applied manner to solve a real problem faced by a real organization. While this project is not as extensive as a program capstone project, it gives the students the necessary exposure to industry-relevant issues to prepare them for the future challenge of conducting a final program capstone project, and subsequently pursuing a successful career as IT professionals.

### **VIII. Course Format**

The course is made up of a mix of class meetings and laboratory activities geared at helping the students learn the several steps involved in designing, implementing and managing a computer network infrastructure. The class meetings are split into two main components: lectures, and class discussions. The lectures cover topics outlined in this syllabus. The class discussions are based on recent articles taken from online industry publications such as *Network Computing* and *CIO Magazine*, which are freely available from the Web. The instructor provides the links to the articles, which are then downloaded by the students and read prior to class. In class, the students discuss the articles in small teams for about 20 minutes, developing three provocative questions per team. This is followed by a discussion involving the whole class, where each team asks one of the questions they developed, and other teams answer them, until all teams asked at least one of their questions. This discussion format is likely to lead to lively debate on topics that are directly addressed by the article, as well as on topics that are indirectly related to the article.

**Classroom Hours (6 hours per week)**

**Class: 3**

**Lab: 3**

## **IX. Topics to be Covered**

- A. Ethical issues, legal issues, and effective teamwork
  - 1. Ethical and legal issues in network management
  - 2. Typical network management team composition
  - 3. Conflict resolution in network management teams
  - 4. Effective teamwork in network management teams
- B. Concepts and methods
  - 1. Basic networking components
  - 2. Packet switching
  - 3. Types of communication signals
  - 4. Types of networking media and topologies
  - 5. The OSI Model
  - 6. Networking protocols
- C. Networking in organizations
  - 1. Local area networks (LANs)
  - 2. Wireless LANs
  - 3. Wide area networks
  - 4. Hubs
  - 5. Wireless access points
  - 6. Routers
- D. Advanced issues
  - 1. Audio and video streaming
  - 2. Web-based multimedia applications
  - 3. Virtual private networks
  - 4. Distributed computing

## **X. Laboratory Exercises**

The laboratory component of this course consists of a weekly series of activities spanning a period of three hours. The laboratory activities involve demonstrations and practical assignments. The topics to be covered are:

- A. Coax and twisted pair cabling
- B. Hubs and local area networks (LANs)
- C. Isolated LANs
- D. Isolated wireless LANs
- E. Hubs versus routers
- F. Basic router set up and configuration
- G. Static and dynamic IP addressing
- H. Bus versus star topologies
- I. Internet connectivity of LANs and wireless LANs
- J. Multiple hot spots and portable wireless computing
- K. Performance analysis in wired and wireless LANs
- L. Audio and video streaming
- M. Distributed computing

## **XI. Technology Component**

- A. In class, the instructor makes use of state-of-the art multimedia projection equipment and software. These are used to project slides and Web-based content, as well as play freely available Web-based video clips from Web sites covering topics relevant to the class (for example, CNN.com Technology).
- B. Outside class, the instructor uses Web-based course management software to interact with students, provide feedback on their performance, make available links to online articles, as well as receive documents (for example, draft versions of project reports) and provide feedback on them.
- C. Outside class, in the laboratory setting, the instructor makes use of commercial networking equipment and software to create a simulated business networking environment.

## **XII. Special Projects/Activities**

The team project consists of meeting with members of a client organization (for example, a department at a large company or non-profit organization), gathering relevant information from them, and developing a document containing the following elements:

- A set of organizational problems that could potentially be solved through the implementation of a technology related to one or more of the topics covered in this course. For example, a team may study a manufacturing plant and find out that the deployment of a particular wireless LAN technology could solve key problems in one of its assembly lines.
- A detailed description of a technology solution to the problems above. This description should include hardware and software details, as well as details in connection with how the technology is integrated with existing technologies in the client organization.
- A detailed description of the costs and potential benefits, from an organizational perspective, associated with the technology solution.

Oral presentation. Teams summarize and explain the information contained in their project document in an oral presentation in class at the end of the semester.

### **XIII. Textbooks and Teaching Aids**

#### A. Required Textbook

Jerry FitzGerald and Alan Dennis, *Business Data Communications and Networking*; 8th edition (July 9, 2004) John Wiley & Sons  
ISBN: 0471348074.

#### B. Alternative Textbooks

Teresa Rubinson Piliouras, Piliouras Rubinson, Teresa C. Mann-Rubinson and Kornel Terplan; *Network Design: Management and Technical Perspectives*; ; 2nd edition (October 2004); Auerbach Pub  
ISBN 0849316081.

#### C. Supplemental Print Materials

None

#### D. Supplemental Online Materials

Recent articles taken from online industry publications such as Network Computing and CIO Magazine. The instructor provides the links to the articles, which are freely available from the Web.

## **Course Title: ITAP 3381: Business Process Redesign**

**Semester Credit Hours:** 3 (3,0)

### **I. Course Overview**

The objective of this course is to give students an understanding of key issues involved in business process redesign in organizations. The course is designed so as to cover topics that are relevant from a business process redesign perspective. Some of those topics are more conceptual, such as business process modeling methods, while others are more applied, such as IT-based business process change implementation approaches. The course includes a mix of lectures and discussions on contemporary articles from industry publications.

### **II. PMU Competencies and Learning Outcomes**

This course helps students develop the ability to become conversant with business process redesign topics and understand the related terms and issues that are important for business process redesign practitioners around the world. Additionally, the course provides the students with the communication, leadership and teamwork skills necessary to effectively work as professionals in teams, or in charge of teams, responsible for business process redesign projects. Finally, the course looks at business process redesign from both an incremental and radical perspective. The former, incremental perspective is aligned with total quality management and related quality certification problems ISO 9000 and Software Engineering Institute's Capability Maturity Model. The latter, radical perspective is aligned with business process re-engineering approaches, and involves the use of significant changes in business processes (implemented within a short timeframe) as a key competitiveness-enhancing tool for organizations, both large and small.

### **III. Detailed Course Description**

The course begins with a discussion of ethical issues, legal issues, and aspects conducive to effective teamwork, in the context of business process redesign projects. It then proceeds with a historical review of business process redesign. This covers several fundamental management movements that shaped modern business process redesign practices, from the emergence of Taylor's scientific management movement in the 1800s to that of the business process re-engineering movement in the 1990s. Next the course covers key concepts and methods. These include topics such as business process modeling, communication flow-oriented business process redesign, and business process outsourcing. The course concludes with a discussion of advanced issues in connection with business process redesign, such as Web-based IT-driven business process redesign and the use of data mining as a basis for business process change decisions. The emphasis in this course is more on conceptual and management-relevant business process redesign issues (including high-level IT implementation issues) than on database design or programming issues, whose coverage here is minimal.

#### **IV. Requirements Fulfilled**

This course is required for all students majoring in Information Technology in the College of Information Technology.

#### **V. Required Prerequisites**

- GEIT 1411: Computer Science I
- GEIT 1412: Computer Science II
- GEIT 1311: Computer Organization I
- GEIT 3341: Database Design.

#### **VI. Learning Outcomes**

In this course, students learn:

- To become conversant with business process redesign topics and understand the related terms and issues relevant to business process redesign professionals around the world.
- To acquire the communication, leadership and teamwork skills necessary for effectively work as professionals in teams, or in charge of teams, responsible for business process redesign projects.
- To understand the role of business process redesign as a key competitiveness-enhancing tool for organizations, both large and small.

#### **VII. Assessment Strategy**

Students are assessed based on: their performance on two exams (midterm and final); their class participation, which includes the discussion of recent articles taken from online industry publications; and the quality of a final team project and related oral presentation. The relative weights of each of these items on the final grade are as follows:

- The midterm and final exams each account for 25% of the grade. Combined, they account for 50% of the grade.
- Class participation accounts for 10% of the grade, and is evaluated based on the ability of students to add to the material already provided by the instructor to them.
- The final team project accounts for 40% of the grade. It is evaluated based on a project document, oral presentation, and client perceptions of the team project. The project must be conducted in collaboration with a client organization (for example, a department at a large company or non-profit organization). A letter from the main contact person at the client organization, discussing and evaluating the project and its outcomes, must be provided to the instructor. The letter should contain the contact information of the person writing so the instructor can call him/her up and inquire about the project.

The exams encourage the students to review all of the concepts and methods discussed in class, which are primarily based on textbook material. This is complemented by the class discussions on recent articles taken from online industry publications, which allow the students to become conversant with the industry-specific lingo related to business process redesign issues. The final project provides an experience where concepts, methods, and industry-relevant issues are all brought together in a very applied manner to solve a real problem faced by a real organization. While this project is not as extensive as a program capstone project, it gives the students the necessary exposure to industry-relevant issues to prepare them for the future challenge of conducting a final program capstone project, and subsequently pursuing a successful career as IT professionals.

### **VIII. Course Format**

The class meetings are split into two main components: lectures, and class discussions. The lectures cover topics outlined in this syllabus. The class discussions are based on recent articles taken from online industry publications such as *Optimize* and *CIO Magazine*, which are freely available from the Web. The instructor provides the links to the articles, which are then downloaded by the students and read prior to the class. In class, the students discuss the articles in small teams for about 20 minutes, developing three provocative questions per team. This is followed by a discussion involving the whole class, where each team asks one of the questions they developed, and other teams answer them, until all teams asked at least one of their questions. This discussion format is likely to lead to lively debate on topics that are directly addressed by the article, as well as on topics that are indirectly related to the article.

**Classroom Hours (3 hours per week)**

**Class: 3**

**Lab: 0**

### **IX. Topics to be Covered**

- A. Ethical issues, legal issues, and effective teamwork
  - 1. Ethical and legal issues in business process redesign (BPR)
  - 2. Typical BPR team composition
  - 3. Conflict resolution in BPR teams
  - 4. Effective teamwork in BPR teams
- B. A historical view of BPR
  - 1. Taylor's scientific management method
  - 2. Total quality management
  - 3. Business process re-engineering
  - 4. IT-driven BPR
  - 5. Contemporary BPR practices

- C. Concepts and methods
  - 1. Business process modeling
  - 2. The hypercommunication syndrome
  - 3. Communication flow-oriented BPR
  - 4. Workflow-oriented BPR
  - 5. Information and knowledge flow redesign
  - 6. Business process outsourcing
  - 7. Off-the-shelf package customization to support BPR
- D. Advanced issues
  - 1. Web-based IT-driven BPR
  - 2. Data mining applications for BPR
  - 3. BPR types and failure rates
  - 4. Personnel issues in connection with BPR
  - 5. Combining incremental and radical forms of BPR

## **X. Laboratory Exercises**

There is no laboratory component in this course.

## **XI. Technology Component**

- A. In class, the instructor makes use of state-of-the art multimedia projection equipment and software. These are used to project slides and Web-based content, as well as play freely available Web-based video clips from Web sites covering topics relevant to the class (for example, CNN.com Technology).
- B. Outside class, the instructor uses Web-based course management software to interact with students, provide feedback on their performance, make available links to online articles, as well as receive documents (for example, draft versions of project reports) and provide feedback on them.

## **XII. Special Projects/Activities**

The team project consists of meeting with members of a client organization (for example, a department at a large company or non-profit organization), gathering relevant information from them, and developing a document containing the following elements:

- A set of organizational problems that could potentially be solved through a business process redesign project. For example, a team may study a car rental company and find out that redesigning its car maintenance process could solve key problems facing the organization – for example, a shift from a remedial to predictive maintenance process structure may reduce costs and increase customer satisfaction.
- A detailed description of the current business process, and of the redesigned version of the business process. Both descriptions should incorporate tables and diagrams, which serve as a reference for the discussion of the several business process activities involved.
- A detailed description of the costs and potential benefits, from an organizational perspective, associated with the business process redesign project.

Oral presentation. Teams summarize and explain the information contained in their project document in an oral presentation in class at the end of the semester.

### **XIII. Textbooks and Teaching Aids**

#### **A. Required Textbook**

Paul Harmon, *Business Process Change: A Manager's Guide to Improving, Redesigning, and Automating Processes*; Morgan Kaufmann; (December 18, 2002)  
ISBN: 1558607587.

#### **B. Alternative Textbooks**

Ned Kock, *Business Process Improvement through E-Collaboration: Knowledge Sharing through the Use of Virtual Groups*; Idea Group Publishing; (December 2004).

#### **C. Supplemental Print Materials**

1. Ned Kock and Fred Murphy, *Redesigning Acquisition Processes: A New Methodology Based on the Flow of Knowledge and Information*; (2001), Defense Acquisition University Press, Fort Belvoir, VA. (Available for free download from: <http://www.dau.mil/pubs/misc/earp.asp>)
2. Kock, N. (2002), *Managing with Web-based IT in Mind*, *Communications of the ACM*, V.45, No.5, pp. 102-106, The Association for Computing Machinery, New York, NY]

#### **D. Supplemental Online Materials**

Recent articles taken from online industry publications such as Optimize and CIO Magazine. The instructor provides the links to the articles, which are freely available from the Web.

## **Course Title: ITAP 3382: Business Intelligence**

**Semester Credit Hours:** 3 (3,0)

### **I. Course Overview**

The objective of this course is to give students an understanding of key issues involved in business intelligence applications in organizations. The course is designed so as to cover topics that are relevant from a business intelligence perspective. It is oriented toward the provision of online access to aggregate data analysis results to a variety of physically distributed organizational users. It includes a mix of lectures (some of which are conducted in the laboratory) and discussions on contemporary articles from industry publications.

### **II. PMU Competencies and Learning Outcomes**

This course helps students develop the ability to become conversant on business intelligence topics and understand the related terms and issues that are important for business intelligence professionals around the world. Additionally, the course provides the students with the communication, leadership and teamwork skills necessary to effectively work as professionals in teams, or in charge of teams, responsible for business intelligence projects and applications. Finally, the course goes beyond looking at business intelligence as a “toy” tool, by imparting on the students an understanding of business intelligence as a key competitiveness-enhancing tool for organizations, both large and small.

### **III. Detailed Course Description**

The course begins with a discussion of ethical issues, legal issues, and aspects conducive to effective teamwork, in the context of business intelligence applications and projects. It then proceeds with an introductory discussion of business intelligence applications in organizations. This covers several fundamental topics such as qualitative vs. quantitative data analysis, data warehousing for business intelligence applications, analytical data processing, and data mining. Next the course covers key concepts and methods. These include graphical and statistical analyses, time series analyses, cluster analysis, exploratory factor analysis, simple and multiple regression analyses, exploratory structural equation modeling, and multidimensional scaling. The course concludes with a discussion of advanced issues in connection with business intelligence applications, particularly Web-based applications. The emphasis in this course is more on data collection and analysis issues than on database design or programming issues, whose coverage here is minimal.

### **IV. Requirements Fulfilled**

This course is required for all students majoring in Information Technology in the College of Information Technology.

## **V. Required Prerequisites**

- GEIT 1411: Computer Science I
- GEIT 1412: Computer Science II
- GEIT 1311: Computer Organization I
- GEIT 3341: Database Design.

## **VI. Learning Outcomes**

In this course, students learn:

- To become conversant with business intelligence topics and understand the related terms and issues relevant to business intelligence professionals around the world.
- To acquire the communication, leadership and teamwork skills necessary for effectively work as professionals in teams, or in charge of teams, responsible for business intelligence applications and projects.
- To understand the role of business intelligence as a key competitiveness-enhancing tool for organizations, both large and small.

## **VII. Assessment Strategy**

Students are assessed based on: their performance in two exams (midterm and final); their class participation, which includes the discussion of recent articles taken from online industry publications; and the quality of a final team project and related oral presentation. The relative weights of each of these items on the final grade are as follows:

- The midterm and final exams each account for 25% of the grade. Combined, they account for 50% of the grade.
- Class participation accounts for 10% of the grade, and is evaluated based on the ability of students to add to the material already provided by the instructor to them.
- The final team project accounts for 40% of the grade. It is evaluated based on a project document, oral presentation, and client perceptions of the team project. The project must be conducted in collaboration with a client organization (for example, a department at a large company or non-profit organization). A letter from the main contact person at the client organization, discussing and evaluating the project and its outcomes, must be provided to the instructor. The letter should contain the contact information of the person writing so the instructor can call him/her up and inquire about the project.

The exams encourage the students to review all of the concepts and methods discussed in class, which are primarily based on textbook material. This is complemented by the class discussions on recent articles taken from online industry publications, which allow the students to become conversant with the industry-specific lingo related to business intelligence issues. The final project provides an experience in which concepts, methods, and industry-relevant issues are all brought together in a very applied manner to solve a real problem faced by a real organization. While this project is not as extensive as a program capstone project, it gives the students the necessary exposure to industry-relevant issues to prepare them for the future challenge of conducting a final program capstone project, and subsequently pursuing a successful career as IT professionals.

### **VIII. Course Format**

Four of the course's class meetings are used for laboratory demonstrations and activities geared at helping the students learn the several steps involved in using business intelligence methods and techniques in the context of a business process redesign project; from data gathering to analysis and decisions regarding business process redesign. The other class meetings are split into two main components: lectures, and class discussions. The lectures cover topics outlined in this syllabus. The class discussions are based on recent articles taken from online industry publications such as the *Intelligent Enterprise* and *CTO* magazines, which are freely available from the Web. The instructor provides the links to the articles, which are then downloaded by the students and read prior to class. In class, the students discuss the articles in small teams for about 20 minutes, developing three provocative questions per team. This is followed by a discussion involving the whole class, where each team asks one of the questions they developed, and other teams answer them, until all teams asked at least one of their questions. This discussion format is likely to lead to lively debate on topics that are directly addressed by the article, as well as on topics that are indirectly related to the article.

**Classroom Hours (3 hours per week)**

**Class/lab: 3**

### **IX. Topics to be Covered**

- A. Ethical issues, legal issues, and effective teamwork
  - 1. Ethical and legal issues in business intelligence (BI)
  - 2. Typical BI team composition
  - 3. Conflict resolution in BI teams
  - 4. Effective teamwork in BI teams
- B. Business intelligence for the enterprise
  - 1. Identifying data for BI applications
  - 2. Qualitative vs. quantitative data analysis
  - 3. Data warehousing for BI applications
  - 4. Analytical data processing
  - 5. Data mining

- C. Concepts and methods
  - 1. Graphical and statistical analyses
  - 2. OLAP cubes
  - 3. Time series analyses
  - 4. Cluster analysis
  - 5. Exploratory factor analysis
  - 6. Simple and multiple regression analyses
  - 7. Exploratory structural equation modeling
  - 8. Multidimensional scaling
- D. Advanced issues
  - 1. Using the Web for BI applications
  - 2. Key institutional Web-based data sources and uses in BI applications
  - 3. Conducting Web-based comparative analyses
  - 4. Mining Web logs
  - 5. E-commerce applications of BI techniques

## **X. Laboratory Exercises**

This course has four laboratory sessions, which are scheduled using time from standard class meetings. In the laboratory sessions, students learn the several steps involved in using business intelligence methods and techniques in the context of a business process redesign project; from data gathering to analysis and decisions regarding business process redesign. A business intelligence software suite (for example, SPSS) is used by students to compile and analyze data provided by the instructor in connection with a key business process of a fictitious organization.

## **XI. Technology Component**

- A. In class, the instructor makes use of state-of-the art multimedia projection equipment and software. These are used to project slides and Web-based content, as well as play freely available Web-based video clips from Web sites covering topics relevant to the class (for example, CNN.com Technology).
- B. Outside class, the instructor uses Web-based course management software to interact with students, provide feedback on their performance, make available links to online articles, as well as receive documents (for example, draft versions of project reports) and provide feedback on them.
- C. Outside class, in the laboratory setting, the instructor makes use of industry-strength commercial business intelligence software to illustrate, in a simulated way, the application of key techniques to the improvement of business processes in real organizations.

## **XII. Special Projects/Activities**

The team project consists of meeting with members of a client organization (for example, a department at a large company or non-profit organization), gathering relevant information from them, and developing a document containing the following elements:

- A set of organizational problems that could potentially be solved through a business intelligence project. For example, a team may study an online retailer, and find out that a data-mining project could solve key problems facing the organization – for example, the clustering of online customers may lead to significant savings in connection with advertising.
- A detailed description of a business intelligence solution to the problems above.
- A detailed description of the costs and potential benefits, from an organizational perspective, associated with the business intelligence solution.

## **XIII. Textbooks and Teaching Aids**

### **A. Required Textbook**

Elizabeth Vitt, Michael Luckevich and Stacia Misner; *Business Intelligence*; 1 edition (April 17, 2002); Microsoft Press  
ISBN: 0735616272.

### **B. Alternative Textbooks**

Marija J. Norusis; *SPSS 11.0 Guide to Data Analysis* Book and CD-ROM edition (April 10, 2002); Prentice Hall  
ISBN: 0130348309.

### **C. Supplemental Print Materials**

SPSS, Inc.; *SPSS 11.0 for Windows* (Student Version), Book and CD-ROM edition (November 26, 2001); Prentice Hall  
ISBN: 0130348465.

### **D. Supplemental Online Materials**

Recent articles taken from online industry publications such as the Intelligent Enterprise and CTO magazines. The instructor provides the links to the articles, which are freely available from the Web.

## **Course Title: ITAP 3383: Enterprise Resource Planning Systems**

**Semester Credit Hours: 3 (3,0)**

### **I. Course Overview**

The course is intended to introduce students to the underlying need for information and business process integration in large organizations. It takes an overview look at the functional areas of a business and the business processes that support the functional areas. The emphasis is on the use of advanced information technology for integrating business functions through distributed databases for support of internal business functions. It includes a discussion of the idea behind selection and implementation of enterprise resource planning (ERP) systems. A part of the course is set aside for demonstrations and "hands on" exercises with one of the available ERP software. Students use this software to perform some of the processes and tasks to create, track, and communicate enterprise information.

### **II. PMU Competencies and Learning Outcomes**

This course introduces students to the design and development of enterprise resource planning systems. Students develop both the conceptual basis and the practical skills in the design and implementation of enterprise-wide information systems to support the core and mission-critical business processes of an organization. They gain an understanding of and appreciation for the need for integrating business processes and information in large organizations for the purpose of not only planning and control but also to gain strategic competitive advantage. Additionally, this course makes an extensive use of the PMU technology infrastructure to provide communication between faculty and students. While the course does not include a structured laboratory component, out-of-class assignments are assigned to ensure students gain an introductory experience in working with an ERP system. The course includes group projects and provide opportunities for the presentation and defense of their designed solution.

### **III. Detailed Course Description**

The course is designed to provide an overview of enterprise resource planning systems. In particular, the course focuses on the ERP life cycle. The course introduces students to problems that traditionally fragmented information systems create and therefore, to the underlying need for integration of business processes and information in large organizations. Further, the course focuses on implementation difficulties inherent in installing such systems and permit students to become knowledgeable about the issues and challenges in introducing such systems in large organizations. A part of the course is set aside for demonstrations and "hands on" exercises with one of the available ERP software. Students use this software to perform some of the processes and tasks to create, track, and communicate enterprise information.

The course covers three areas, which are somewhat interleaved during the term.

- The first area acquaints students with the conceptual problems of integration in organizations, the organizational characteristics that tend to make these problems more or less severe, and possible courses of action for firms faced with severe enough problems that they wish to take action. Attention is focused on ERP systems as a particularly interesting possible solution.
- The Second part of the course gives students an overview of one particular ERP system (SAP is strongly recommended). This portion of the course covers overall architecture, the user interface, and the major points of integration between its modules. Students learn how to enter transactions on the system, and to track the interactions and information flows between different business functions.
- The third part of the course focuses on how to implement an integrated enterprise-wide system into a large organization.

A running case study is used to illustrate above concepts. The mastery of these concepts and skills is demonstrated via an end-of-term team project. This course may be taught using one of the many ERP software available such as SAP, PeopleSoft, Oracle, or J.D. Edwards. SAP is highly recommended for several reasons. For one, it is the leading ERP software in use today. Secondly, SAP offers a program through which academic institutions can acquire SAP software and sample database at little or no cost. Universities that do not wish to install their own instance of SAP can use a hosted instance at one of the many universities worldwide. Finally, textbooks are easily available for SAP then other ERP software.

#### **IV. Requirements Fulfilled**

This course is required for all students majoring in Information Technology in the College of Information Technology. It is also recommended as an elective for students majoring in computer science and management information systems. It should be taken no earlier than the first semester of the junior year.

#### **V. Required Prerequisites**

GEIT 1411: Computer Science I  
GEIT 1412: Computer Science II  
GEIT 2341: Database Design.

## **VI. Learning Outcomes**

In this course, students learn:

- To become familiar with the need for integrating business processes.
- To understand concepts of enterprise-wide resource planning systems.
- To become familiar with one of the many available ERP software to implement an ERP solution.
- To acquire introductory skills in the design and development of various enterprise information system modules using the selected ERP software.
- To acquire an appreciation for issues relevant to the design and implementation of enterprise-wide resource planning systems.
- To acquire the communication, leadership and teamwork skills necessary to work in teams, or in charge of teams, that are responsible for implementing mission-critical ERP solutions.

## **VII. Assessment Strategy**

The student's performance in this course may be assessed on the basis of:

- Three examinations, including two term and one final examination.
- At least five out-of-class assignments. The assignments are to be accomplished in teams of 3-4 students each.
- One comprehensive final team project to be completed outside of class.

Relative weights assigned to these items in determining student's final grade are suggested as follows:

- The three examinations each account for 20% of the grade. Combined, the three examinations account for 60% of the grade.
- Laboratory exercises account for 25% of the grade.
- Final team project accounts for 15% of the grade.

Examinations assess mastery of ERP design principles and implementation concepts, methodology, and tools discussed in class and assigned laboratory exercises. Assigned laboratory exercises are designed to provide students, working in teams, with "hands-on" experience in implementing various parts of an ERP system. The final team project is designed to permit students to apply concepts, methods, and tools learned in class to implement an ERP solution for a fictitious company. The grade on the final project depends on the quality of completed project, written technical documentation, and an oral presentation of the implemented solution.

## VIII. Course Format

This course utilizes a mix of in-class lectures, discussions, and software demonstrations designed to help students learn the various tasks involved in designing and implementing an ERP solution. While class meetings are utilized to emphasize conceptual foundation in topics related to these tasks, software demonstrations are used to provide students with hands-on training in performing these tasks. For best results, a part of this course should be taught in a lab-environment where students can follow the instructor during software demonstrations and discussion of key development strategies. Initial class meetings introduce students to the theoretical concepts. Most of the later meetings are used for laboratory software demonstrations geared at helping students master skills for designing and developing various parts of an ERP system. A running case study is used for this purpose so that students see an end-to-end development cycle. Students are expected to attend three hours of lecture per week. There are no scheduled lab hours for this course.

In addition, the instructor should consider creating a Web site for this course using Web technologies such as WebCT or BLACKBOARD. At minimum, the site should include:

- Course syllabus
- Lecture material (for example PowerPoint slides, lecture notes, etc.). These should be placed on the site ahead of class meeting so that students may use the material to prepare for the lecture
- Software demonstration exercises completed in class
- Out-of-Class assignments and end-of-term project
- Keys to exams (after students have completed them)
- Solution to Laboratory Exercises (after graded assignments have been returned)
- Mechanism for students to digitally submit their assignments
- Course calendar
- Mechanism to communicate electronically (for example e-mail)
- Discussion groups
- Students course performance measures

**Classroom Hours (3 hours per week)**

**Class: 3**

**Lab: 0**

## **IX. Topics to be Covered**

- A. ERP concepts
  1. Evolution of information systems
  2. Emergence of ERP software
- B. Business functions, process and data requirements
  1. Functional areas and business processes
  2. Functional area information systems
- C. Planning, design, and implementation of ERP systems
  1. ERP data inputs
  2. ERP output capabilities
  3. Selecting an ERP solution
  4. Designing an ERP solution
  5. Implementing an ERP solution
  6. Manage the “go live” phase
- D. ERP system in a large organization
  1. ERP modules for sales and marketing
  2. ERP modules for accounting and finance
  3. ERP modules for production and materials management
  4. Complete ERP solution
- E. ERP and e-commerce: using ERP through the Web

## **X. Laboratory Exercises**

Students are assigned one out-of-class application development exercise every three weeks. These hands-on exercises are expected to be done in a team setting (generally 3-4 students/team) and are designed to illustrate various development concepts covered during lecture meetings. Thus, students are expected to complete about five such exercises. Collectively, these exercises enable students to learn the several steps involved in the design and implementation of a relatively simple ERP application. The following major areas should be covered in these exercises:

- Identify and design various modules for an ERP solution
- Design, and develop sales order processing and distribution module
- Design and develop production planning process module
- Design and develop an accounting module to generate financial statements and product profitability analyses reports
- Design and develop an human resource module to manage employee benefits

## **XI. Technology Component**

- A. In class, the instructor makes use of state-of-the art multimedia projection equipment and software. These are used to project slides and Web-based content relevant to the concepts of enterprise resource planning systems.
- B. In class, in a laboratory setting, the instructor makes use of a commercial ERP software to demonstrate various tasks involved in successful design and implementation of an enterprise-wide resource planning system.

- C. Outside class, the instructor uses Web-based course management software (for example WebCT, BLACKBOARD) to interact with students as described under course format section.

## **XII. Special Projects/Activities**

An end-of-term team project is required in this course. This project is designed to permit students to apply concepts, methods, and tools learned in class to develop an ERP solution for a fictitious company. The project is require students, working in teams, to design and implement a complete ERP solution using ERP software such as SAP. Student teams are expected to:

- Design, test, and deploy the application,
- Prepare a complete technical manual, and
- Make an oral presentation of their solution.

The final project is thus designed to assess competency in performing various tasks related to the conceptual design and implementation of an ERP system.

## **XIII. Textbooks and Teaching Aids**

### **A. Required Textbook**

Joseph Brady, Ellen Monk, and Bret Wagner; *Concepts in Enterprise Resource Planning*, Course Technology; 2003  
ISBN: 0619015934.

### **B. Alternative Textbooks**

Daniel E. O'Leary; *Enterprise Resource Planning Systems: Systems, Life Cycle, Electronic Commerce, and Risk*; Cambridge University Press; First Ed. 2000  
ISBN: 0521791529.

### **C. Supplemental Print Materials**

As available from publisher.

### **D. Supplemental Online Materials**

As available from publisher.

## **Course Title: ITAP 3431: Network Security**

**Semester Credit Hours:** 3 (2,3)

### **I. Course Overview**

This course examines the basic principles, techniques and technologies associated with securing local area networks. Topics covered include security threats, data protection including cryptography and authentication, a review of network security applications and techniques for the management of intruders, malicious software and other internal and external threats to the network

### **II. PMU Competencies and Learning Outcomes**

This course is highly practical in nature. Effective management of network security is a matter of practical skill and effective management and oversight as much as it is academic. This course primarily addresses two of the PMU competencies, critical thinking and teamwork. Network security requires the examination of network activity and response to potential threats as they arise. Team-based responses are essential to ensure that security is not dependent upon a single individual and so the course models the professional environment.

### **III. Detailed Course Description**

ITAP 3431: Network Security examines the techniques used by network administrators and network security technicians in protecting and securing local area networks. Techniques for ensuring the confidentiality of messages are examined, including public and private key encryption, message and target authentication, digital signatures and key management issues. Network security applications are discussed in detail including authentication, email and web security, IP security and network management security. Techniques for detecting and defending against intruders, malicious software and other forms of attack are also covered.

### **IV. Requirements Fulfilled**

This course satisfies three hours of the requirements for degrees in Information Technology and Computer Engineering. It is an available elective for the degree in Computer Science. It should be taken no earlier than the junior year.

### **V. Required Prerequisites**

ITAP 2431 Network Management

## **VI. Learning Outcomes**

In this course, students learn:

- To develop an understanding of the available techniques for securing communication through cryptography and authentication techniques and to apply them in a practical environment.
- To develop skills and establish techniques in securing networks from external and internal integrity threats.
- To enhance professional adaptability and performance in reacting to new and unexpected security threats
- To develop improved communication and collaborative skills in meeting security threats as a team member or team leader.

## **VII. Assessment Strategy**

This course is designed to introduce students to the concepts and practical skills and techniques involved in securing local area networks from internal and external threats. With this in mind, the course grade involves an assessment of their performance on, and understanding of the threats, the application of techniques for minimizing risk associated with those threats and to the solution of security problems and the communication of designed solutions to those problems to an audience. Course grades are based on

- Weekly assigned homework to motivate students to do the work and earn credit accordingly.
- Weekly structured laboratory exercises designed to guide students through specific course topics.
- Two in-class exams to assess students' accumulative mastery of content covered prior to time of exam.
- A comprehensive final exam to assess students' accumulative mastery of course material.

Students' final grades are based on 20% credit for homework, 10% for presentations and participation in classroom discussion, 30% for weekly lab exercises, 20% on in-class exams and 20% for the final examination.

Students are required to maintain a journal of thoughts and commentaries during the course. The journal contains daily entries including the identification of areas of interest and concern, notes on the preparation of presentation and comments and analysis of classmate's presentations. The journal is reviewed weekly by the instructor to provide feedback to the students.

Final grades and the student and instructor observations from reflective notebooks are included in the student's portfolio for use in the final assessment capstone course. The intent is to document the student's maturation as he proceeds through the curriculum.

## VIII. Course Format

This course utilizes both lecture/discussion and laboratory exercises. Students are expected to attend two hours of lecture/discussion per week and three hours of laboratory per week. At least once per week students should be prepared to make presentation on the design and implementation of a solution to a problem selected by the instructor and to take part in a discussion based on that presentation. Once a week students should have at least 30 minutes of collaborative problem solving activity.

**Classroom Hours (5 hours per week)**

**Class: 2**

**Lab: 3**

**Web supplement:** Course home page (the university's Web tool, WebCT or Blackboard) should contain the following:

- Course syllabus
- Course assignments
- Sample solutions to examinations (after being graded and returned)
- Sample solutions to programming assignments (after being graded and returned)
- Course calendar (an active utility)
- Course e-mail (an active utility)
- Course discussion list (an active utility)
- Student course performance (an active utility)

## IX. Topics to be Covered

- A. Security Principles and Standards
  1. Basic Security Concepts
  2. OSI Security architecture
  3. ANSI Security Standards
- B. Cryptography
  1. Symmetric encryption and message confidentiality
  2. Public Key Cryptography
  3. Authentication
- C. Network Security applications
  1. Authentication
  2. Email and Web Security
  3. IP Security
  4. Network Management Security
- D. System Security
  1. Intruder Management
  2. Malicious Software
  3. Firewall Management

## **X. Laboratory Exercises**

This course requires a weekly 3-hour lab component. Topics to be covered in the laboratory sessions should include:

- Security overview – Using NTFS to secure local resources
- Device & System Management – Installing service packs and hotfixes. Protecting the systems account database. Configuring Network Settings
- Media – transferring NTFS encrypted files, NetMon, autocleaning applications
- Authentication – Setting access policies and techniques for bypassing access control
- Attacks & malicious code – at, DDOS attacks, Netbus Trojan horses
- Remote access – Configuring VPN's, remote access policy
- Email – PGP, passphrase caching, public key management and malicious file detection
- Web Security – IE security, Content filtering
- Directory and file Transfer Services – FTP configuration and restrictions
- Wireless and Instant Messaging – wireless security options, telnet management
- Network Security topologies – RRAS and NAT, Configuring I/O filters and VLAN's
- Intrusion Detection – Detection applications, honeypots
- Security Baselines –Defining security templates, IIS lockdown, Security analyzers
- Cryptography –certification management
- Physical Security – Physical Barriers, biometrics, Social Engineering
- Disaster recovery and Business continuity

## **XI. Technology Component**

This course makes use of the university's wireless access infrastructure during the class/lecture sessions. The course relies on the university and the students having access to an isolated professional grade network environment for the students to use.

## **XII. Special Projects/Activities**

Students are required to keep a “reflective notebook” in which, after each class, they enter their own assessments of what they learned, and what questions remain from the class. From each exercise set, each student selects one problem, which the student thinks best reflects the way the mathematical topic is used in a technical context. A detailed solution to the problem is included in the student's reflective notebook.

### **XIII. Textbooks and Teaching Aids**

#### A. Required Textbook

Stallings, W. (2003) *Network Security Essentials: Applications and Standards*, Pearson Education, Inc., Upper Saddle River, New Jersey 07458  
ISBN: 0-13-035128-8

#### B. Alternative Textbooks

None

#### C. Supplemental Print Materials

Cretaro, P. *Lab manual for Security+ Guide to Network Security Fundamentals* (2003) Thomson/Course Technology  
ISBN 0-619-13104-7

#### D. Supplemental Online Materials

As available from publisher.

## **Course Title: ITAP 3471: Web Server Management**

**Semester Credit Hours:** 4 (3,1)

### **I. Course Overview**

The primary objective of this course is to give students a comprehensive overview of the tools and techniques needed to successfully administer Web servers. The course is designed so as to cover topics that are relevant to the role of a Web server administrator. Topics include installation, configuration, and administration of Web servers on common hardware/software platforms.

### **II. PMU Competencies and Learning Outcomes**

This course helps students develop proficiency in the installation, configuration, and administration of commonly used Web server. Students develop both the conceptual basis and the practical skills in the design and implementation of Web server software to support the core and mission-critical Internet-based business processes of an organization. The course covers the material necessary to prepare students for the CIW (Certified Internet Webmaster) Associate professional certification. Additionally, this course makes extensive use of the PMU technology infrastructure to provide communication between faculty and students. The course includes a structured laboratory component to ensure that students gain the necessary experience and skill in handling Web server environment. The course includes individual as well as group projects and provides opportunities for the presentation and defense of their designed architectural solution.

### **III. Detailed Course Description**

The course begins with an introduction to the role of server and Web server in Web environment. It then proceeds with a review of major tasks performed by Web administrators. This sets the stage for discussing in detail the process of installing, configuring, deploying, testing and monitoring a Web server. In learning the installation task, students acquire proficiency in installing various component software (server operating system, Web server, Domain Name Server), setting up IP addressing schemes, and configuring TCP/IP. In configuring Web server, students are exposed to the process for authenticating users, establishing network policies, setting file permissions, and sharing network resources within the Web server environment. The task of securing Web server permits students to understand the role of security and provides hands-on practice in installing and configuring security-related software (firewall, proxy server and intrusion detection). Finally, students have an opportunity to deploy, test and monitor the Web server. This step familiarizes students with installing and supporting various components of an Internet-based information system. Students are exposed to these tasks for the most commonly used Web server software in industry. Both Microsoft and non-Microsoft platforms are covered so that students get a vendor-neutral perspective of this job role.

#### **IV. Requirements Fulfilled**

This course is required for all students majoring in Information Technology in the College of Information Technology. It is also recommended as an elective for students majoring in computer science and management information systems. It should be taken no earlier than the first semester of the junior year.

#### **V. Required Prerequisites**

GEIT 1411: Computer Science I  
GEIT 1412: Computer Science II  
ITAP 2431: Network Management.

#### **VI. Learning Outcomes**

In this course, students learn:

- To become familiar with the role of Web servers in mission-critical, Internet-based information systems.
- To become proficient in tasks performed by Web server administrator.
- To acquire an appreciation for issues relevant to Web server administration in a global business environment.
- To acquire the communication, leadership and teamwork skills necessary to work in teams, or in charge of teams, that are responsible for operating Web server environments.

#### **VII. Assessment Strategy**

The student's performance in this course may be assessed on the basis of:

- Three examinations, including two term and one comprehensive final examination.
- Laboratory exercises completed during scheduled lab sessions.
- One comprehensive final project completed outside of class.
- Class participation.

Relative weights assigned to these items in determining student's final grade are suggested as follows:

- The two term examinations each account for 20% of the grade. The final examination accounts for 20% of the grade. Combined, the three examinations account for 60% of the grade.
- Laboratory exercises account for 20% of the grade.
- Final team project accounts for 15% of the grade.
- Class participation accounts for 5% of the final grade.

The examinations are designed to assess the mastery of concepts, methodology, and tools discussed in class and assigned laboratory exercises. Assigned laboratory exercises are designed to provide students an opportunity to implement material covered in lectures. The final team project is designed to permit students to apply concepts, methods, and

tools learned in class to support a real system. The project requires students, working in teams, to install, configure and manage a Web server to support a specified Internet-based information system. Each team designs and develops a solution to support a different system. The grade on the final project depends on the quality of completed project, written technical documentation, and an oral presentation of implemented architecture. The final project is thus designed to assess competency in performing various tasks related to managing a Web server in a real-world situation. These assessments are complemented by class discussions on recent articles and case studies taken from various industry sources.

### **VIII. Course Format**

This course utilizes a mix of in-class lectures, discussions, and hands-on demonstrations designed to help students learn the various tasks involved in designing, installing, configuring, securing, and monitoring Web server environment. While class meetings are utilized to emphasize conceptual foundation in topics related to these tasks, laboratory sessions are used to provide students with hands-on training in performing these tasks. At least one class meeting during the week should be devoted to discussing an article or case study that focuses on relevant issues or illustrate best practices in Web server administration. Students are expected to attend three hours of lecture/discussion per week and three hours of laboratory per week.

In addition, the instructor should consider creating a Web site for this course using Web technologies such as WebCT or BLACKBOARD. At minimum, the site should include:

- Course syllabus.
- Lecture material (for example PowerPoint slides, lecture notes, etc.). These should be placed on the site ahead of class meeting so that students may use the material to prepare for the lecture.
- Laboratory assignments and other projects.
- Keys to exams (after students have completed them).
- Solution to Laboratory Exercises (after graded assignments have been returned).
- Course calendar.
- Mechanism to communicate electronically (for example e-mail)
- Discussion groups.
- Students course performance measures.

**Classroom Hours (6 hours per week)**

**Class: 3**

**Lab: 3**

## **IX. Topics to be Covered**

- A. The basics of server and Web server administration
  - 1. Basics of server and Web server administration
  - 2. Common tasks performed by administrators
  - 3. Compare Web server platforms
- B. Preparing for server installation and configuration
  - 1. Identify server categories and evaluate server components
  - 2. Planning for system disasters and recovery
  - 3. Understand the installation process
  - 4. Install Windows Server 2003 and Red Hat Linux
  - 5. Set up IP addressing and configure TCP/IP
  - 6. Install and configure domain name server (DNS)
  - 7. Install and configure IIS and Apache Web servers
- C. Managing a Web server
  - 1. User authentication
  - 2. Manage users, groups, and file system permissions
  - 3. Share resources in a network
  - 4. Enforce network policies
- D. Securing a Web server
  - 1. Identify threats and vulnerabilities
  - 2. Secure data transmission, OS, and server applications
  - 3. Authenticate Web users
  - 4. Install firewall, proxy server, and intrusion detection software
- E. Performance tuning
  - 1. Monitor Web servers and Web applications
  - 2. Analysis tools for Web servers
- F. Deploy, test and extend Web server
  - 1. Understand the Web-based programming environment
  - 2. Provide E-mail, FTP, and remote access, streaming media services
  - 3. Programming languages, DBMS, Web services

## **X. Laboratory Exercises**

Each week, students attend three one-hour scheduled laboratory sessions. During these sessions, students learn the several steps involved in the design, installation, configuration, and administration of a Web server environment. The following administration tasks should be covered in these labs. Because of extensive nature of certain tasks, some of these topics may have to be spread over multiple lab sessions.

- Install server operating system
- Set up IP addressing and Configure TCP/IP
- Install and configure DNS
- Install and configure Web server software
- Implement user authentication, user groups, and file permissions
- Set up and implement network policies
- Install and configure firewall, proxy server, and intrusion detection.
- Deploy, test, and monitor Internet-based applications such as e-mail, FTP, database, Web services, and e-business applications.

## **XI. Technology Component**

- A. In class, the instructor makes use of state-of-the art multimedia projection equipment and software. These are used to project slides and Web-based content relevant to Web server administration.
- B. Outside class, the instructor uses Web-based course management software (for example WebCT, BLACKBOARD) to interact with students as described under course format section.
- C. Outside class, in the laboratory setting, the instructor makes use of commercial Web server software (Microsoft and Non-Microsoft) to demonstrate various tasks involved in successfully installing, configuring, and managing a Web server.

## **XII. Special Projects/Activities**

A team project is described in Section VII. Assessment Strategy

## **XIII. Textbooks and Teaching Aids**

### A. Required Textbook

Steve Silva, *Web Server Administration*, Course Technology, 2003, ISBN: 0-619-06439-0.

### B. Alternative Textbooks

Byron Wright, *Hands-on Microsoft Windows Server 2003 Networking*, Course Technology, 2003, ISBN: 0-619-18609-7.

### C. Supplemental Print Materials

As available from publisher.

### D. Supplemental Online Materials

As available from publisher.

Recent articles and case studies taken from online industry sources such as Microsoft.com and IBM.com. The instructor provides the links to these articles and case studies, which are freely available.

## **Course Title: ITAP 4311: Database Management**

**Semester Credit Hours:** 3 (3,0)

### **I. Course Overview**

The objective of this course is to give students an understanding of key issues involved in the management of data resources in organizations. The course is designed so as to cover topics that are relevant from a data center management perspective; particularly one that involves the provision of online access to data resources to a variety of physically distributed organizational users. It includes a mix of lectures (some of which are conducted in the laboratory) and discussions on contemporary articles from industry publications.

### **II. PMU Competencies and Learning Outcomes**

This course helps students develop the ability to become conversant on database management issues and understand the related terms and issues that are important for database management professionals around the world. Additionally, the course provides the students with the communication, leadership and teamwork skills necessary to effectively work as professionals in teams, or in charge of teams, responsible for operating complex database environments. Finally, the course imparts on the students an understanding of databases as more than data repositories, that is, as resources that support the core and mission-critical business processes of an organization.

### **III. Detailed Course Description**

The course begins with a discussion of ethical issues, legal issues, and aspects conducive to effective teamwork, in the context of database management. It then proceeds with a review of major types of databases. This covers traditional types such as unstructured and relational databases, as well as more contemporary types such as object-oriented, temporal, and large-scale databases. Next the course covers key concepts and methods. These include the various native database formats available (for example, Access, DB2, Oracle, Sybase), with a discussion of relative advantages and disadvantages of each format, as well as development-oriented elements such as database manipulation languages (with special emphasis on SQL) and client/server database development issues. The course concludes with a discussion of advanced issues in connection with setting up data centers and allowing secure and balanced online access to databases by various organizational stakeholders. The emphasis in this course is more on data center set up and management than on database design issues, whose coverage here is minimal.

### **IV. Requirements Fulfilled**

This course is an elective for students in the College of Information Technology. It can be taken to satisfy the three-credit IT elective requirement of the B.S. in Information Technology.

## **V. Required Prerequisites**

GEIT 1411: Computer Science I  
GEIT 1412: Computer Science II  
GEIT 1311: Computer Organization I  
GEIT 3341: Database Design

## **VI. Learning Outcomes**

In this course, students learn:

- To become conversant on database management issues and understand the related terms and issues relevant to database management professionals around the world.
- To acquire the communication, leadership and teamwork skills necessary for effectively work as professionals in teams, or in charge of teams, responsible for operating complex database environments.
- To understand the role of databases as resources that support the core and mission-critical business process of an organization.

## **VII. Assessment Strategy**

Students are assessed based on: their performance in two exams (midterm and final); their class participation, which includes the discussion of recent articles taken from online industry publications; and the quality of a final team project and related oral presentation. The relative weights of each of these items on the final grade are as follows:

- The midterm and final exams each account for 25% of the grade. Combined, they account for 50% of the grade.
- Class participation accounts for 10% of the grade, and is evaluated based on the ability of students to add to the material already provided by the instructor to them.
- The final team project accounts for 40% of the grade. It is evaluated based on a project document, oral presentation, and client perceptions of the team project. The project must be conducted in collaboration with a client organization (for example, a department at a large company or non-profit organization). A letter from the main contact person at the client organization, discussing and evaluating the project and its outcomes, must be provided to the instructor. The letter should contain the contact information of the person writing so the instructor can call him/her up and inquire about the project.

The exams encourage the students to review all of the concepts and methods discussed in class, which are primarily based on textbook material. This is complemented by the class discussions on recent articles taken from online industry publications, which allow the students to become conversant with the industry-specific lingo related to database

management issues. The final project provides an experience where concepts, methods, and industry-relevant issues are all brought together in a very applied manner to solve a real problem faced by a real organization. While this project is not as extensive as a program capstone project, it gives the students the necessary exposure to industry-relevant issues to prepare them for the future challenge of conducting a final program capstone project, and subsequently pursuing a successful career as IT professionals.

### **VIII. Course Format**

Four of the course's class meetings are used for laboratory demonstrations and activities geared at helping the students learn the several steps involved in setting up a database server and controlling user access to it. The other class meetings are split into two main components: lectures, and class discussions. The lectures cover topics outlined in this syllabus. The class discussions are based on recent articles taken from online industry publications such as *Computerworld* and *CIO Magazine*, which are freely available from the Web. The instructor provides the links to the articles, which are then downloaded by the students and read prior to class. In class, the students discuss the articles in small teams for about 20 minutes, developing three provocative questions per team. This is followed by a discussion involving the whole class, where each team asks one of the questions they developed, and other teams answer them, until all teams asked at least one of their questions. This discussion format is likely to lead to lively debate on topics that are directly addressed by the article, as well as on topics that are indirectly related to the article.

**Classroom Hours (3 hours per week)**

**Class/lab: 3**

### **IX. Topics to be Covered**

- A. Ethical issues, legal issues, and effective teamwork
  - 1. Ethical and legal issues in database management
  - 2. Typical database management team composition
  - 3. Conflict resolution in database management teams
  - 4. Effective teamwork in database management teams
- B. Types of databases
  - 1. Unstructured databases
  - 2. Relational databases
  - 3. Object-oriented databases
  - 4. Temporal databases
  - 5. Large-scale databases
- C. Concepts and methods
  - 1. Native database formats
  - 2. Database indexing
  - 3. Database manipulation languages
  - 4. Structured query language (SQL)
  - 5. Client/server database development

- D. Advanced issues
  1. Web-based database management
  2. Database security methods and tools
  3. Data warehousing
  4. Database performance
  5. Database servers and clusters
  6. Database management outsourcing
  7. Database access priority setting and QoS

## **X. Laboratory Exercises**

This course has four laboratory sessions, which are scheduled using time from standard class meetings. In the laboratory sessions, students learn the several steps involved in setting up a database server and controlling user access to it. The database server is set up separately from a Web server, whereby data is accessed by users by means of Web browsers (simulating what usually happens in organizational settings). Access to the database server is controlled by the creation of two main database user groups, and setting the database server up in such a way as to provide higher access priority to one of those user groups.

## **XI. Technology Component**

- A. In class, the instructor makes use of state-of-the art multimedia projection equipment and software. These are used to project slides and Web-based content, as well as play freely available Web-based video clips from Web sites covering topics relevant to the class (for example, CNN.com Technology).
- B. Outside class, the instructor uses Web-based course management software to interact with students, provide feedback on their performance, make available links to online articles, as well as receive documents (for example, draft versions of project reports) and provide feedback on them.
- C. Outside class, in the laboratory setting, the instructor makes use of industry-strength commercial Web and database server software to create a simulated data center environment.

## **XII. Special Projects/Activities**

The team project consists of meeting with members of a client organization (for example, a department at a large company or non-profit organization), gathering relevant information from them, and developing a document containing the following elements:

- A set of organizational problems that could potentially be solved through the implementation of a technology related to one or more of the topics covered in this course. For example, a team may study a manufacturing organization that posts extensive product information online, and find out that the deployment of a particular database management technology could solve key problems facing the organization.

- A detailed description of a technology solution to the problems above. This description should include hardware and software details, as well as details in connection with how the technology is integrated with existing technologies in the client organization.
- A detailed description of the costs and potential benefits, from an organizational perspective, associated with the technology solution.

Oral presentation. Teams summarize and explain the information contained in their project document in an oral presentation in class at the end of the semester.

### **XIII. Textbooks and Teaching Aids**

#### A. Required Textbook

Jeffrey A. Hoffer, Mary B. Prescott and Fred R. McFadden; *Modern Database Management*, 6th edition (January 15, 2002), Prentice Hall ISBN: 0130339695.

#### B. Alternative Textbooks

Philip J. Pratt and Joseph J. Adamski; *Concepts of Database Management*, 4 edition (June 20, 2002); Course Technology ISBN: 0619064625.

#### C. Supplemental Print Materials

None

#### D. Supplemental Online Materials

Recent articles taken from online industry publications such as Computerworld and CIO Magazine. The instructor provides the links to the articles, which are freely available from the Web.

## **Course Title: ITAP 4371: E-Commerce**

**Semester Credit Hours:** 3 (3,0)

### **I. Course Overview**

The primary objective of this course is to expose students to the advanced use of information technology in the design and implementation of Web-based business applications to support e-commerce. The course presents concepts, methodology, and tools for designing, implementing, and management of e-commerce applications in a business-to-business paradigm..

### **II. PMU Competencies and Learning Outcomes**

This course helps students develop proficiency in the design and development of e-commerce applications within the framework of business-to-business paradigm. Students develop both the conceptual basis and the practical skills in the design and implementation of Web-based applications to support the core and mission-critical Internet-based business processes of an organization. Additionally, this course makes extensive use of the PMU technology infrastructure to provide communication between faculty and students. While the course does not include a structured laboratory component, out-of-class projects are assigned to ensure students gain the necessary experience and skill developing e-commerce applications. The course includes individual as well as group projects and provide opportunities for the presentation and defense of their designed solution.

### **III. Detailed Course Description**

The course is designed to provide coverage of technologies available to design, develop, implement, and manage business information processing applications that support e-commerce in a business-to-business, as opposed to business-to-consumer, paradigm. The course begins with an overview of the E-Commerce framework, highlighting model-view-controller (MVC) design paradigm and component-based implementation framework (for example J2EE or .Net). It then introduces students to the use of an integrated development environment based on J2EE and/or .Net framework (for example IBM WebSphere Studio or Visual Studio .Net) in the development of various components that make up an E-Commerce application. Next, students learn to develop server-side components to implement the controller and model layers of the MVC paradigm using technologies such as JavaBeans, Web Services, Servlets, Active Server Pages, Java Server Pages and Java Server Faces. Connectivity of the server-side components to back-end databases is introduced next. Finally, the development of client-side components (View layer of the MVC paradigm) via HTML and XML is introduced. unit testing of each component is emphasized throughout the development cycle. Students acquire these skills via a series of mini-projects, which build up to a complete e-commerce application. The mastery of these concepts and skills is demonstrated via an end-of-term team project.

This course may be taught using one of the two competing object-oriented technologies, namely industry-standard J2EE platform or Microsoft's .Net framework. The choice of technology should depend largely on student's programming background (Java versus C++ or C#), industry demands, and availability of faculty with requisite skills. For these reasons, the topical outline is left generic enough to be compatible with either technology. J2EE is currently the most commonly used framework for e-commerce applications. However, Microsoft's .Net framework is gaining momentum.

#### **IV. Requirements Fulfilled**

This course is required for all students majoring in Information Technology in the College of Information Technology. It is also recommended as an elective for students majoring in computer science and management information systems. It should be taken no earlier than the first semester of the senior year.

#### **V. Required Prerequisites**

GEIT 1411: Computer Science I  
GEIT 1412: Computer Science II  
GEIT 2341: Database Design  
ITAP 3471: Web Server Administration.

#### **VI. Learning Outcomes**

In this course, students learn:

- To become familiar with e-commerce framework and its design considerations.
- To become familiar with n-tier framework within the MVC design paradigm for designing e-commerce applications.
- To become proficient in the design, development and implementation of server-side components that constitute an e-commerce enterprise application with mission-critical functionality within an n-tier framework
- To develop proficiency in the use of software platform (for example J2EE or .Net) for the development and operation of medium- to large-scale enterprise applications.
- To acquire skills in the use of one commonly used integrated development environment for example IBM WebSphere for J2EE or Visual Studio .Net for the .Net framework.
- To acquire an appreciation for issues relevant to the design of enterprise-level e-commerce applications.
- To acquire the communication, leadership and teamwork skills necessary to work in teams, or in charge of teams, that are responsible for implementing mission-critical e-commerce applications.

## VII. Assessment Strategy

Student's performance in this course may be assessed on the basis of:

- Three examinations, including two term and one comprehensive final examination. Each examination is an applied, "hands-on" mini project to be completed within allotted time under supervision in a computer lab setting. Term examinations assess mastery of E-Commerce design principles and specific component development while the final examination should be designed to test skills for putting together a simplified e-commerce application that includes development of all MVC components.
- At least five out-of-class application development exercises. The assignments, to be accomplished in teams of 2-3 students, provide the student with "hands-on" experience analyzing, designing and constructing Web-based solutions for business. One comprehensive final team project to be completed outside of class
- Each student is responsible for four professional reading assignments during the term. The instructor is evaluate summaries and critiques of these readings, which are based on recent articles recommended by the instructor from on-line or printed sources.

Relative weights assigned to these items in determining student's final grade are suggested as follows:

- The two term examinations each account for 20% of the grade. The final examination accounts for 20% of the grade. Combined, the three examinations account for 60% of the grade.
- Laboratory exercises account for 20% of the grade.
- Final team project accounts for 15% of the grade.
- Professional reading assignments account for 5% of the final grade.

The examinations are designed to assess the mastery of concepts, methodology, and tools discussed in class and assigned laboratory exercises. Assigned laboratory exercises are designed to provide students, working in teams, an opportunity to gain "hands-on" experience analyzing, designing and implementing various components of e-commerce applications. The final team project is designed to permit students to apply concepts, methods, and tools learned in class to support a real system. The project requires students, working in teams, to design and implement a complete Web-based, n-tiered e-commerce application of reasonable complexity. This may be an application simulated to expose students to what a real-system would entail or it may be a real application for a real client. In either case, the grade on the final project depends on the quality of completed project, written technical documentation, and an

oral presentation of the implemented architecture. The final project is thus designed to assess competency in performing various tasks related to the design, development and implementation of a complete e-commerce application. These assessments are complemented by class discussions on professional readings taken from various industry sources to illustrate “best practices.”

## **VIII. Course Format**

This course utilizes a mix of in-class lectures, discussions, and software demonstrations designed to help students learn the various tasks involved in designing, installing, configuring, securing, and monitoring an e-commerce application. While class meetings are utilized to emphasize conceptual foundation in topics related to these tasks, software demonstrations are used to provide students with hands-on training in performing these tasks. For best results, this course is taught in a lab-environment where students can follow the instructor during software demonstrations and discussion of key development strategies. Initial class meetings introduce students to the theoretical concepts. Most of the later meetings are used for laboratory software demonstrations geared at helping students master skills for designing and developing various E-Commerce application components. A running case study is used for this purpose so that students see an end-to-end development cycle. Students are expected to attend three hours of lecture (includes discussion/software demonstrations) per week.

In addition, the instructor should consider creating a Web site for this course using Web technologies such as WebCT or BLACKBOARD. At minimum, the site should include:

- Course syllabus
- Lecture material (for example PowerPoint slides, lecture notes, etc.). These should be placed on the site ahead of class meeting so that students may use the material to prepare for the lecture
- Software demonstration exercises completed in class
- Out-of-Class assignments and end-of-term project
- Keys to exams (after students have completed them)
- Solution to Laboratory Exercises (after graded assignments have been returned)
- Mechanism for students to digitally submit their assignments
- Course calendar
- Mechanism to communicate electronically (for example e-mail)
- Discussion groups
- Students course performance measures

**Classroom Hours (3 hours per week)**

**Class: 3**

**Lab: 0**

## **IX. Topics to be Covered**

- A. Introduction to the e-commerce application development landscape
  1. E-business application framework
  2. MVC design paradigm
  3. N-tier development framework
  4. Development platforms and roles of components
  5. Competing technologies - J2EE and .Net
- B. Development of Web-based and middleware components
  1. Developing server-side components
    - a. Controllers (Servlets, ASP)
    - b. Database connectivity (JDBC, ADO .Net)
    - c. Encapsulating business rules (JavaBeans, EJBs, Web services)
    - d. XML as an information exchange mechanism
  2. Developing client-side components
    - a. Views or presentation components (HTML, JSP, ASP)
    - b. Application clients, applets, Web-based interactions
    - c. Validation and user authentication
- C. Test, debug and deploy
  1. Unit testing
  2. Debugging tools
  3. Deployment environment to include Web and application servers
- D. Securing e-commerce application
  1. Identify threats and vulnerabilities
  2. Understand various aspects of security such as authentication and authorization.
  3. Symmetric and asymmetric encryption, SSL, HTTPS, Certificates
  4. Mechanism for securing applications
    - a. Declarative
    - b. Programmatic
  5. Test and deploy secured application

## **X. Laboratory Exercises**

Students are assigned one out-of-class application development exercise every three weeks. These hands-on exercises are expected to be done in a team setting (generally 3-4 students/team) and are designed to illustrate various development concepts covered during lecture meetings. Thus, students are expected to complete about 5 such exercises. Collectively, these exercises enable students to learn the several steps involved in the design, development and implementation of a relatively complex e-commerce application. The following major areas should be covered in these exercises.

- Identify and design components for an e-commerce application based on MVC paradigm and n-tier architecture. This would involve architecting an application to distribute its presentation, business logic, data access and storage logic across multiple layers.
- Design, develop, and test server-side components. This would include components to perform the role of controller and that encapsulate business rules as well as connectivity to data stores.

- Design, develop and test client-side components to exchange information with users or user-applications.
- Unit test and debug application
- Implement declarative and programmatic security in application.

## **XI. Technology Component**

- A. In class, the instructor makes use of state-of-the art multimedia projection equipment and software. These are used to project slides and Web-based content relevant to the design of E-Commerce applications.
- B. In class, in the laboratory setting, the instructor makes use of a commercial integrated development environment based on J2EE or .Net framework to demonstrate various tasks involved in successful design and development of an enterprise-level, mission-critical E-Commerce application.
- C. Outside class, the instructor uses Web-based course management software (for example WebCT, BLACKBOARD) to interact with students as described under course format section.

## **XII. Special Projects/Activities**

An end-of-term team project is required in this course. This project is designed to permit students to apply concepts, methods, and tools learned in class to support a real system. The project requires students, working in teams, to design and implement a complete Web-based, n-tiered e-commerce application of reasonable complexity. This may be a simulated application designed to expose students to tasks involved in assembling a real-system or it may be a real application for a real client. In either case, student teams are expected to:

- Design, test, and deploy the application,
- Prepare a complete technical manual, and
- Make an oral presentation of their design architecture to a panel of judges comprising of the instructor and other faculty members or client.

The final project is thus designed to assess competency in performing various tasks related to the design, development and implementation of a complete E-Commerce application.

### **XIII. Textbooks and Teaching Aids**

#### **A. Required Textbook**

1. If course is based on J2EE platform:

Budi Kurniawan; *Java for the Web with Servlets, JSP, and EJB: A Developer's Guide to Scalable J2EE Solutions*; New Riders; (Pearson Education); 2002  
ISBN: 073571195X

2. If the course is based on .Net framework:

Lyn Robison; *Implementing B2B Commerce with .NET: A Guide for Programmers and Technical Managers*; Publisher: Addison Wesley Professional; 2002  
ISBN: 0201719320

#### **B. Alternative Textbooks**

- 1 If the course is based on J2EE platform:

Dale Nilsson and Louise Mauget; *Building J2EE Applications with IBM WebSphere*; Wiley Publishing, Inc.; 2003  
ISBN: 0471281573

Rod Johnson; *Expert One-on-One J2EE Design and Development*; Wrox Press; 2002  
ISBN: 0764543857

2. If the course is based on .Net framework:

Dino Esposito; *Programming Microsoft ASP.Net*; Microsoft Press; 2003  
ISBN: 0735619034

Dave Mercer; *Programming the Web with ASP.Net*; McGraw-Hill; 2004  
ISBN: 0072949384

#### **C. Supplemental Print Materials**

As available from publisher.

Trade publications such as JavaWorld, .Net Developer

#### **D. Supplemental Online Materials**

As available from publisher.

Recent articles, case studies, and professional readings taken from online industry sources such as Microsoft, Sun, Oracle, and IBM websites. The instructor provides the links to these resources, which are freely available.

## **Course Title: ITAP 4372: E-Collaboration**

**Semester Credit Hours:** 3 (3,0)

### **I. Course Overview**

The objective of this course is to give students an understanding of key issues involved in using e-collaboration technologies to support teams conducting collaborative tasks in organizations. The course is designed so as to cover topics that are relevant from an e-collaboration technology implementation and use perspective; particularly one that addresses collaborative tasks conducted by physically distributed organizational users. It includes a mix of lectures (some of which are conducted in the laboratory) and discussions on contemporary articles from industry publications.

### **II. PMU Competencies and Learning Outcomes**

This course helps students develop the ability to become conversant with e-collaboration topics and understand the related terms and issues that are important for professionals around the world who are responsible for the implementation, use and management of e-collaboration technologies. Additionally, the course provides the students with the communication, leadership and teamwork skills necessary to effectively work as professionals in e-collaboration technology-supported teams, or managers in charge of e-collaboration technology-supported teams, conducting complex collaborative tasks in organizations. Finally, the course imparts on the students an understanding of e-collaboration technologies as more than electronic communication toys, that is, as important technologies that support the core and mission-critical business processes of organizations.

### **III. Detailed Course Description**

The course begins with a discussion of ethical issues, legal issues, and aspects conducive to effective teamwork, in the context of e-collaboration. It then proceeds with a review of basic e-collaboration technologies, such as e-mail, instant messaging, text-based asynchronous conferencing systems, multimedia asynchronous conferencing systems, collaborative workspaces, and electronic calendaring systems. Next the course covers advanced e-collaboration technologies. These include client-server and peer-to-peer e-collaboration system development suites, desktop video-conferencing implementation suites, synchronous e-collaboration system development suites, and virtual reality environments. The course concludes with a discussion of organizational effects of e-collaboration technologies. That discussion addresses effects in connection with several types of tasks and group configurations. The emphasis in this course is on rapid e-collaboration technology implementation using development suites, as well as on the use and management of e-collaboration technologies, rather than on low-level design and implementation of e-collaboration technologies (whose coverage here is minimal).

#### **IV. Requirements Fulfilled**

This course is an elective for students in the College of Information Technology. It can be taken to satisfy the three-credit IT elective requirement of the B.S. in Information Technology.

#### **V. Required Prerequisites**

GEIT 1411: Computer Science I  
GEIT 1412: Computer Science II  
GEIT 1311: Computer Organization I  
GEIT 3341: Database Design

#### **VI. Learning Outcomes**

In this course, students learn:

- To become conversant with e-collaboration issues and understand the related terms and issues relevant to e-collaboration technology implementers, users, and managers around the world.
- To acquire the communication, leadership, and teamwork skills necessary for effectively work as professionals in teams, or in charge of teams, employing e-collaboration technologies to perform complex collaborative tasks.
- To understand the role of e-collaboration technologies as resources that support the core and mission-critical business processes of organizations.

#### **VII. Assessment Strategy**

Students are assessed based on: their performance in two exams (midterm and final); their class participation, which includes the discussion of recent articles taken from online industry publications; and the quality of a final team project and related oral presentation. The relative weights of each of these items on the final grade are as follows:

- The midterm and final exams each account for 25% of the grade. Combined, they account for 50% of the grade.
- Class participation accounts for 10% of the grade, and is evaluated based on the ability of students to add to the material already provided by the instructor to them.
- The final team project accounts for 40% of the grade. It is evaluated based on a project document, oral presentation, and client perceptions of the team project. The project must be conducted in collaboration with a client organization (for example, a department at a large company or non-profit organization). A letter from the main contact person at the client organization, discussing and evaluating the project and its outcomes, must be provided to the instructor. The letter should contain the contact information of the person writing so the instructor can call him/her up and inquire about the project.

The exams encourage the students to review all of the concepts and methods discussed in class, which are primarily based on textbook material. This is complemented by the class discussions on recent articles taken from online industry publications, which allow the students to become conversant with the industry-specific lingo related to e-collaboration. The final project provides an experience where concepts, methods, and industry-relevant issues are all brought together in a very applied manner to solve a real problem faced by a real organization. While this project is not as extensive as a program capstone project, it gives the students the necessary exposure to industry-relevant issues to prepare them for the future challenge of conducting a final program capstone project, and subsequently pursuing a successful career as IT professionals.

### **VIII. Course Format**

Four of the course's class meetings are used for laboratory demonstrations and activities geared at helping the students learn the several steps involved in implementing, using, and managing an e-collaboration environment aimed at supporting the work of teams engaged in complex collaborative tasks. The other class meetings are split into two main components: lectures, and class discussions. The lectures cover topics outlined in this syllabus. The class discussions are based on recent articles taken from online industry publications such as *Computerworld* and *CTO Magazine*, which are freely available from the Web. The instructor provides the links to the articles, which are then downloaded by the students and read prior to class. In class, the students discuss the articles in small teams for about 20 minutes, developing three provocative questions per team. This is followed by a discussion involving the whole class, where each team asks one of the questions they developed, and other teams answer them, until all teams asked at least one of their questions. This discussion format is likely to lead to lively debate on topics that are directly addressed by the article, as well as on topics that are indirectly related to the article.

**Classroom Hours (3 hours per week)**

**Class/lab: 3**

### **IX. Topics to be Covered**

- A. Ethical issues, legal issues, and effective teamwork
  - 1. Ethical and legal issues related to e-collaboration
  - 2. Typical team structures for e-collaboration technology-supported tasks
  - 3. Conflict resolution in e-collaboration technology-supported teams
  - 4. Effective teamwork in e-collaboration technology-supported teams
- B. Basic e-collaboration technologies
  - 1. E-mail
  - 2. Instant messaging
  - 3. Text-based asynchronous conferencing systems
  - 4. Multimedia asynchronous conferencing systems
  - 5. Collaborative workspaces
  - 6. Electronic calendaring systems

- C. Advanced e-collaboration technologies
  - 1. Client-server e-collaboration system development suites
  - 2. Peer-to-peer e-collaboration system development suites
  - 3. Desktop video-conferencing implementation suites
  - 4. Synchronous e-collaboration system development suites
  - 5. Virtual reality environments
- D. Organizational effects of e-collaboration technologies
  - 1. Effects on relationship building tasks
  - 2. Effects on knowledge transfer tasks
  - 3. Effects on simple tasks
  - 4. Effects on complex collaborative tasks
  - 5. Effects on dyads
  - 6. Effects on small groups
  - 7. Effects on large groups

## **X. Laboratory Exercises**

This course has four laboratory sessions, which are scheduled using time from standard class meetings. In the laboratory sessions, students learn the several steps involved in implementing, using, and managing an e-collaboration environment aimed at supporting the work of teams engaged in complex collaborative tasks. The e-collaboration environment implemented includes most of the technological features necessary for synchronous and asynchronous team interaction, using audio, video, text, or combinations of these media. The e-collaboration environment also includes public and private workspaces, where team members can share files and documents in connection with their main collaborative task and related subtasks.

## **XI. Technology Component**

- A. In class, the instructor makes use of state-of-the art multimedia projection equipment and software. These are used to project slides and Web-based content, as well as play freely available Web-based video clips from Web sites covering topics relevant to the class (for example, CNN.com Technology).
- B. Outside class, the instructor uses Web-based course management software to interact with students, provide feedback on their performance, make available links to online articles, as well as receive documents (for example, draft versions of project reports) and provide feedback on them.
- C. Outside class, in the laboratory setting, the instructor makes use of industry-strength commercial e-collaboration technology development software to create a simulated e-collaboration environment.

## **XII. Special Projects/Activities**

The team project consists of meeting with members of a client organization (for example, a department at a large company or non-profit organization), gathering relevant information from them, and developing a document containing the following elements:

- A set of organizational problems that could potentially be solved through the implementation of an e-collaboration technology. For example, a team may study a manufacturing organization that is working toward certification based on a quality standard (for example, ISO 9000), and find out that the use of a particular e-collaboration technology could solve key problems facing the organization - for example, by allowing quality improvement teams whose members work different shifts to interact asynchronously.
- A detailed description of an e-collaboration technology solution to the problems above. This description should include hardware and software details, as well as details in connection with how the e-collaboration technology is integrated with existing technologies in the client organization.
- A detailed description of the costs and potential benefits, from an organizational perspective, associated with the e-collaboration technology solution.

Oral presentation. Teams summarize and explain the information contained in their project document in an oral presentation in class at the end of the semester.

### **XIII. Textbooks and Teaching Aids**

#### **A. Required Textbook**

Ned Kock, *Business Process Improvement through E-Collaboration: Knowledge Sharing through the Use of Virtual Groups*, Idea Group Publishing; (December 2004).

#### **B. Alternative Textbooks**

Ned Kock, *Process Improvement and Organizational Learning: The Role of Collaboration Technologies*, Idea Group Publishing, (December 1999)  
ISBN: 1930708734.

#### **C. Supplemental Print Materials**

1. Kock, Ned (2001), *Asynchronous and Distributed Process Improvement: The Role of Collaborative Technologies*, Information Systems Journal, V.11, No.2, pp. 87-110, Blackwell Science, Oxford, England
2. Kock, Ned and D'Arcy, John, *Resolving the E-collaboration Paradox: The Competing Influences of Media Naturalness and Compensatory Adaptation*, Information Management and Consulting (Special Issue on Electronic Collaboration), (2002), V.17, No.4, pp. 72-78, Information Management Institute, Frankfurt, Germany

#### **D. Supplemental Online Materials**

Recent articles taken from online industry publications such as Computerworld and CTO Magazine. The instructor provides the links to the articles, which are freely available from the Web.