Syllabus

ITM 100 Introduction to Information Technology as a Profession
2 credit hours / 30 contact hours

Instructor: Ray Trygstad and ITM Department Faculty

Textbook: Material for the course is provided as online reading and handouts, along with other supplemental material on the course web site at http://blackboard.iit.edu.

Course Description: This course introduces students to the steps necessary to analyze a problem in information technology and identify and define the computing requirements appropriate to its solution, with a focus on how to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs. Students learn to analyze the local and global impact of computing on individuals, organizations, and society. This course leads students to recognize the need for continuing professional development and imparts an understanding of professional, ethical, legal, security and social issues, and responsibilities in information technology. Students write and present, building their ability to communicate effectively with a range of audiences, and work in teams learning to function effectively together to accomplish a common goal.

Prerequisites: None

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: Students completing this course will be able to discuss what is interesting and compelling about each area of specialization in the field of information technology. The goal of the course is not to teach students specific skills but to convey WHY each topic studied is critical to business, why it is a key piece in the information technology profession, why it is interesting, and why it is FUN. It will be as broad an overview as possible with a strong, key focus on the mission of information technology: providing technology solutions for business problems. Each two-session topic, presented by faculty from across the department, will attempt to fulfill the course description in a microcosm.

Course Objectives: At the conclusion of this course, each successful student will able to:

• Explain the role of information technology as the facilitating function in a modern business enterprise
• Describe considerations for deployment of technology in a business setting
• Recall fundamental concepts and principles of project management and apply them in planning an information technology project
• Describe the role of desktop and personal computers, servers, and their operating systems in the enterprise, and select optimal systems and configurations to meet business needs
• Explain the role of digital data, voice, and video communications in the enterprise, and how voice and data networks are deployed and configured to connect enterprise systems
• Describe basic concepts of software development and its role in connecting enterprise systems
• Explain the key role of data in a business and describe how that data is managed and conveyed to users as information
• Describe how use of the World Wide Web extends and supports the enterprise
• Discuss how systems, networks, and data are protected and secured
• For each topic covered, describe the need for continuing professional development and discuss professional, ethical, legal, security, and social issues and responsibilities
• Working as a team, create and present a comprehensive information system design proposal for an existing business enterprise

**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(d) An ability to function effectively on teams to accomplish a common goal
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities
(f) An ability to communicate effectively with a range of audiences
(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society
(h) Recognition of the need for and an ability to engage in continuing professional development
(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
(l) An ability to effectively integrate IT-based solutions into the user environment.
(n) An ability to assist in the creation of an effective project plan.

**Topics to be covered:**

- **Topic 01** Introduction to Information Technology – Ray Trygstad
- **Topic 02** Project Management I – Dennis Hood
- **Topic 03** Project Management II – Dennis Hood
- **Topic 04** Desktops, Servers and Operating Systems I – Jeremy Hajek
- **Topic 05** Desktops, Servers and Operating Systems II – Jeremy Hajek
- **Topic 06** Data Networks & Communication I – Carol Davids
- **Topic 07** Data Networks & Communication II – Carol Davids
- **Topic 08** Software Development I – James Papademas
- **Topic 09** Software Development II – James Papademas
- **Topic 10** Managing Data I – Luke Papademas
- **Topic 11** Managing Data II – Luke Papademas
- **Topic 12** Web Development I – Brian Bailey
- **Topic 13** Web Development II – Brian Bailey
- **Topic 14** Information Security I – William Lidinsky
- **Topic 15** Preliminary Project Presentations
- **Topic 16** Information Security II – Bonnie A. Goins
- **Topic 17** Putting it All Together: Project Presentations – Faculty
Syllabus

ITM 300 Communication in the Workplace
3 credit hours / 45 contact hours

Instructor: TBD

ISBN: 978-0321916785

Other supplemental material may be found on the course web site at http://blackboard.iit.edu.

Course Description: Review, analyze and practice verbal and written communication formats found in the workplace. Emphasis on developing skills in technical writing and oral presentations using electronic and traditional media. Credit not granted for both ITM 300 and COM 421. INTM 301 may be substituted for this course. Prerequisites: None

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Students completing this course will be able to:

- Develop skills in writing quality technical proposal.
- Develop skills in conducting technical presentations
- Understand the communications styles, ethics, and résumé writing
- Develop skills in effective written memos and letters
- Understand problem solving skills in effective group communications

Course Objectives: At the conclusion of this course, each successful student will able to:

- Demonstrate proficiency in verbal communications by giving a technical presentation on a proposal
- Demonstrate proficiency in written communications by completing a comprehensive technical proposal
- Apply the principles of written communication by writing letters, résumés, and reports

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(f) An ability to communicate effectively with a range of audiences
(h) Recognition of the need for and an ability to engage in continuing professional development

Topics to be covered:

- Topic 01 Introduction. Principles of Communications
- Topic 02 Communication Styles and Strategies
- Topic 03 Readability and Style
- Topic 04 Editing, Design, and Formats
- Topic 05 Technical Reports and Research Proposals
- Topic 06 Test #1
- Topic 07 Writing Letters and Résumés, Interviewing
- Topic 08 Group Communications and Efficiency
- Topic 09 Data Bases and library searches–guest speaker, details given in class
Topic 10  Conducting Technical Presentations
Topic 11  Interpersonal, Verbal, Nonverbal Communications, and Emotional Intelligence
Topic 12  Test #2
Topic 13  Proposal Presentations
Syllabus

ITM 301—Introduction to Contemporary Operating Systems and Hardware I
3 Credit Hours / 45 contact hours

Instructor: Louis F. McHugh IV


Course Description: Students study the basics of computer architecture and learn to use a contemporary operating system. Hardware requirements, microcomputer components, software compatibility and system installation and options are covered, along with post-installation topics, storage, security and system diagnosis and repair. Prerequisites: None
This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: The course is a foundation course in the basics of PC functioning from a hardware level to the upper level operating system. It is intent is to serve as a basis for practical studies in other topics in IT.

Upon completion, a student should be able to understand how a PC functions be able to troubleshoot and repair a PC, and understand its workings in a networked environment from a hardware level to OS level. As well, as be comfortable understanding concepts of Linux, virtualization, servers, and tools for managing IT.

Course Objectives:

- History of modern computing and the Internet
- Electricity and power supplies
- How computers actually work, starting from the i4004 microprocessor
- Numbering systems (Base2, Base10, Binary, Hex)
- Processors from the i4004 to the Intel i7
- Experience with motherboards, buses, architecture, memory, etc.
- Experience with storage, monitors, and other peripherals
- Operating systems and architecture (Windows, Linux, and Mac)
- Troubleshooting hardware and software
- Batch commands, & Scripting language
- Networking, physical media, devices, protocols, standards
- Information Security Topics
- OS Utilities, Cloud computing
- Laws, regulations, and compliance frameworks that affect IT professionals
- Current events in computing, especially related to security

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(l) An ability to effectively integrate IT-based solutions into the user environment.

(m) An understanding of best practices and standards and their application.

**Topics Covered:**

Topic 01 First Look at Computers and Tools
Topic 02 Working Inside the Computer
Topic 03 All About Motherboards
Topic 04 Supporting Processors and Upgrading Memory
Topic 05 Supporting Hard Drives
Topic 06 Supporting I/O & Storage Devices
Topic 07 Troubleshooting Hardware Problems
Topic 08 Satisfying Customers’ Needs
Topic 09 Intro to Windows OS
Topic 10 Installing Windows
Topic 11 Maintaining, Windows
Topic 12 Optimizing Windows
Topic 13 Troubleshooting Windows and Applications
Topic 14 Troubleshooting Windows Startup Problems
Topic 15 Connecting to and Setting up a Network
Topic 16 Networking Types, Devices, and Cabling
Topic 17 Security Strategies
Topic 18 Supporting Notebooks
Topic 19 Mobile Devices and Client-side Virtualization
Syllabus

ITM 301—Introduction to Contemporary Operating Systems and Hardware I
3 Credit Hours / 45 contact hours

Instructor: William Slater


Course Description: Students study the basics of computer architecture and learn to use a contemporary operating system. Hardware requirements, microcomputer components, software compatibility and system installation and options are covered, along with post-installation topics, storage, security and system diagnosis and repair. Prerequisites: None

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: The course is a foundation course in the basics of PC functioning from a hardware level to the upper level operating system. It is intent is to serve as a basis for practical studies in other topics in IT.

Upon completion, a student should be able to understand how a PC functions be able to troubleshoot and repair a PC, and understand its workings in a networked environment from a hardware level to OS level. As well, as be comfortable understanding concepts of Linux, virtualization, servers, and tools for managing IT.

Course Objectives: At the completion f this course, students should have acquired a basic understanding of and experience with

- History of modern computing and the Internet
- Electricity and power supplies
- How computers actually work, starting from the i4004 microprocessor
- Numbering systems
- Processors from the i4004 to the Intel i7
- Motherboards, buses, architecture, memory, etc.
- Storage, monitors, and other peripherals
- Operating systems and architecture (Windows, Linux, and Mac)
- Troubleshooting hardware and software
- Batch command language
- Networking, physical media, devices, protocols, standards
- Security
- OS Utilities
- Cloud computing
- Laws, regulations, and compliance frameworks that affect IT professionals
- Current events in computing, especially related to security
- Certifications and have the opportunity to acquire some important free certifications (for extra credit)
The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(l) An ability to effectively integrate IT-based solutions into the user environment.

(m) An understanding of best practices and standards and their application.

**Topics Covered:**

Topic 01  Introduction, Number Systems, History of Computers, Electricity
Topic 02  Processor Types and Specifications – CPU
Topic 03  Motherboards, BIOS, Buses, Power Supplies
Topic 04  BIOS and Memory
Topic 05  Storage Drive Technologies
Topic 06  Compliance Management, Risk Management and Data Center Safety & Security
Topic 07  File Systems and Partitions and more discussion on Batch Files
Topic 08  Compliance Management, Risk Management and Data Center Safety & Security
Topic 09  Video Hardware, Printers & Laptops, Netbooks, Smartbooks, Review
Topic 10  Networking configuration and tools
Topic 11  Vista vs. XP, Windows 7, Windows 8, Windows 10 Preview
Topic 12  Windows Lab Installation day; Windows Extras – Bootloaders and tools
Topic 13  Survey of Virtualization, Linux, and computer design
Topic 14  Class Practicum Project – Hands-on Hardware identification
Syllabus

ITM 311 Introduction to Software Development
3 credit hours / 45 contact hours

Instructor: James Papademas

ISBN: 978-1285081953

Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: A broad introduction to object-oriented programming and the related knowledge necessary to program in a contemporary programming language. This would include coverage of an Application Development Kit, a standard integrated Development environment, and the use of GUI components. Prerequisites: None

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: Upon completion of this course the student should be able to do the following:

• Gain experience and skills to write, compile, execute, troubleshoot, and resolve problems using Java Programming Language utilizing Java Application or Java Applet
• Acquire the ability to develop, understand and implement the concept of Object Oriented Programming and Methodology in program development
• Acquire the ability to develop and identify important Java standard libraries and classes
• Gain the ability to locate and use of Help Resources
• Enhance confidence in developing and writing Object Oriented Java Programs
• Experience software application and development theory and concepts

Course Objectives: At the conclusion of this course, each successful student will able to:

• Develop the ability to write and resolve programming problems using Java Language
• Build Java Applications and Java Applets
• Identify Java standard libraries and classes
• Write, compile, execute and troubleshoot Java programming
• Understand and utilize Java Graphical User Interface in the program writing
• Understand Java programming syntax, control structures and Java programming concepts
• Understand, locate and Use Help Resources
• Build the confidence in “speaking” and writing programs in Java

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

- **Topic 01** Introduction to Java and the IDE
- **Topic 02** Java Methods and code blocks
- **Topic 03** OOP concepts and design techniques in JAVA
- **Topic 04** Decision making
- **Topic 05** Loops
- **Topic 06** Characters and the String Class
- **Topic 07** Arrays
- **Topic 08** Intro to Inheritance
- **Topic 09** Advanced Inheritance. Packages. Mid Term.
- **Topic 10** Exception Handling
- **Topic 11** File Processing
- **Topic 12** Intro to GUI components
- **Topic 13** Advanced GUI topics
- **Topic 14** Graphics.
- **Topic 15** Applets, Images & sound. / Final Exam Review
- **Topic 16** Final Examination
Syllabus

ITM311 Introduction to Software Development
3 credit hours / 45 contact hours

Instructor: Sheikh Shamsuddin (Sam)


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description
A broad introduction to object-oriented programming and the related knowledge necessary to program in a contemporary programming language. This would include coverage of an Application Development Kit, a standard integrated Development environment, and the use of GUI components. Prerequisites: None

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcomes
This course introduces the concepts of object-oriented design and implementation approach in Java programming language. Participants will use different tools to understand some basic design patterns and know how to apply them into real world situations. Object-Oriented based design knowledge and how to implement in Java language will be discussed. Some basic HTML World Wide Web programming will also be included. Upon completion of this course the student should be able to do the following:

- Gain experience and skills to write, compile, execute, troubleshoot, and resolve problems using Java Programming Language utilizing Java Application or Java Applet
- Acquire the ability to develop, understand and implement the concept of Object Oriented Programming and Methodology in program development
- Acquire the ability to develop and identify important Java standard libraries and classes
- Gain the ability to locate and use of Help Resources
- Enhance confidence in developing and writing Object Oriented Java Programs
- Experience software application and development theory and concepts

Course Objectives: At the conclusion of this course, each successful student will able to:

- Develop the ability to write and resolve programming problems using Java Language
- Build Java Application and Java Applet
- Identify Java standard libraries and classes
- Write, compile, execute and troubleshoot Java programming
- Understand and utilize Java Graphical User Interface in the program writing
- Understand Java programming syntax, control structures and Java programming concepts
- Understand, locate and Use Help Resources
- Build the confidence in “speaking” and writing programs in Java
**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, *programming*, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

- **Topic 01** Introduction to programming logic. Pseudo code an
- **Topic 02** Java data types, variable names, primitive data t
- **Topic 03** Expression, selection control, Java Swing, Java F
- **Topic 04** Programming loops
- **Topic 05** Methods
- **Topic 06** Arrays
- **Topic 07** Characters, strings, and string class
- **Topic 08** File I/O manipulation
- **Topic 09** Objects and Classes
- **Topic 10** Object Oriented Programming
- **Topic 11** Inheritance, Polymorphism, and Abstract Classes
- **Topic 12** Programming Labs, Assignments, Quizzes, and Exams
Syllabus

ITM 312 Introduction to Systems Software Programming (C++ Programming)
3 credit hours / 45 contact hours

Instructor: James Papademas


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Introduces basic concepts of systems programming. Students learn to apply basic programming concepts toward solving problems, create source files and implement header files, work with and effectively use basic data types, abstract data types, control structures, code modularization and arrays. Students will be introduced to object paradigm including, classes, inheritance, and polymorphism applications. Prerequisites: None

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: Upon completion of this course the student should be able to do the following:

- Write, compile, execute, troubleshoot, and resolve problems using the C++ Programming Language and its features
- Develop, understand and implement the concept of Object Oriented Programming methodology in programming development
- Develop and identify important C++ standard libraries and classes
- Locate and use Help Resources
- Develop and write Object Oriented Programs
- Analyze and evaluate software application and development theory and concepts

Course Objectives: At the conclusion of this course, each successful student will able to:

- Write computer programs using the C++ language
- Recall key elements of the C++ language, its structure, syntax concepts, libraries and application
- Compile, execute and debug programs
- Explain input/output, functions, data types and control structures
- Construct arrays, data structures and use pointers as references
- Implement C++ classes and objects, constructors and destructors
- Apply Object Oriented Programming (OOP) concepts
- Test, design and solve problems using the C++ language

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application.

Topics to be covered:

Topic 01 Introduction to C++ and the IDE
Topic 02 Data types, variables, naming conventions & declarations
Topic 03 Expressions, decision making, control structures
Topic 04 Loops
Topic 05 Functions. Header and Implementation files.
Topic 06 Arrays and Vectors.
Topic 07 Searching and Sorting Array techniques
Topic 08 Pointers, characters and strings
Topic 09 String class. Intro to Data Structures. Mid Term.
Topic 10 File processing
Topic 11 Exception handling
Topic 12 Inheritance
Topic 13 Polymorphism
Topic 14 Virtual Functions, function overloading vs. Function overriding
Topic 15 Final Exam Review
Topic 16 Final Examination
Syllabus

ITM 312 Intro to Systems Programming
3 credit hours / 45 contact hours

Instructor: Sheikh Shamsuddin (sam)


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description
This course introduces basic concepts of systems programming. Students learn to apply basic programming concepts toward solving problems, create source files and implement header files, work with and effectively use basic data types, compile source code into binary executable files, and understand the use of project management.

Course Outcome: Upon completion of this course the student should be able to do the following:

- Write, compile, execute, troubleshoot, and resolve problems using the C++ Programming Language and its features
- Develop, understand and implement the concept of Object Oriented Programming methodology in programming development
- Develop and identify important C++ standard libraries and classes
- Locate and use Help Resources
- Develop and write Object Oriented Programs
- Develop the ability to analyze and evaluate software application and development theory and concepts

Course Objectives: At the conclusion of this course, each successful student will able to:

- Write computer programs using the C++ language
- Recall key elements of the C++ language, its structure, syntax concepts, libraries and application
- Compile, execute and debug programs
- Explain input/output, functions, data types and control structures
- Construct arrays, data structures and use pointers as references
- Implement C++ classes and objects, constructors and destructors
- Apply Object Oriented Programming (OOP) concepts
- Test, design and solve problems using the C++ language

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application

**Topics to be covered:**

- Topic 01 Introduction to programming logic. Pseudo code and flowcharts
- Topic 02 C++ data types, variable names and input/output
- Topic 03 Expression and selection control
- Topic 04 Programming loops
- Topic 05 Functions and Arrays
- Topic 06 Searching, Sorting, and C++ STL
- Topic 07 C++ pointers
- Topic 08 Characters, strings, and string class
- Topic 09 File I/O manipulation
- Topic 10 C++ Structure
- Topic 11 Object Oriented Programming
- Topic 12 Inheritance and Polymorphism
- Topic 13 Programming Labs, Assignments, Quizzes, and Exams
**Syllabus**

**ITMD 312 Introduction to Systems Software Programming (C++ Programming)**
3 credit hours / 45 contact hours

**Instructor:** Dr. Kenneth Straus


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

**Course Description:** Introduces basic concepts of systems programming. Students learn to apply basic programming concepts toward solving problems, create source files and implement header files, work with and effectively use basic data types, abstract data types, control structures, code modularization and arrays. Students will be introduced to object paradigm including, classes, inheritance, and polymorphism applications. *Prerequisites:* None

This is a required course in the Bachelor of Information Technology and Management degree.

**Course Outcome:** This course introduces basic concepts of systems programming. Students learn to write computer programs in C++ that solve problems; solving problems with programs is the focus. As part of learning to program, students learn to create source files and implement header files, work with and effectively use basic data types, compile source code into binary executable files, and understand the use of project management.

**Course Objectives:** At the conclusion of this course, each successful student will able to:

- Design an algorithm to solve a problem.
- Translate that algorithm into a C++ program.
- Debug, test, and verify that the program solves the original problem.
- Apply Object-Oriented-Programming methods in developing a program.
- Use C++ standard libraries and classes.
- Analyze programs for efficiency; change techniques and data structures to improve efficiency.

**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, *programming*, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application.
Topics to be covered:

Topic 01  Variables
Topic 02  Data Types
Topic 03  Basic I/O
Topic 04  Branching
Topic 05  Strings
Topic 06  Arithmetic Operators
Topic 07  Loops
Topic 08  Vectors/Arrays
Topic 09  Functions
Topic 10  References
Topic 11  Searching
Topic 12  Sorting
Topic 13  Pattern Matching
Topic 14  Iterators
Topic 15  Structs
Topic 16  File I/O
Topic 17  Classes
Topic 18  Object-Oriented Techniques
Syllabus

ITM 497 Independent Study
Variable 1 to 6 credit hours

Instructor: As assigned. Full-time faculty may schedule students for ITM 497 as the faculty member’s schedule allows. Adjunct faculty are under no obligation to conduct independent study with students as they receive no additional compensation for this, so their participation is entirely voluntary. Course coordinator is Ray Trygstad.

Textbook: Selected by the instructor and student as appropriate for topics covered in the course.

Course Description: Special Projects.
Prerequisites: Defined by the department or by instructor teaching the course
This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student in this independent study course will demonstrate knowledge as defined by the selected topics for the term.

Course Objectives: At the conclusion of this course, each successful student will able to:
• Meet objectives defined by the instructor for the topics covered in the course

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.
(m) An understanding of best practices and standards and their application.
(n) An ability to assist in the creation of an effective project plan.

Topics to be covered: Topics for the course will be defined by the instructor and student. Registration is by permit only; students must prepare and submit a written research prospectus, proposal, or abstract of material to be studied to the faculty member before they issue a permit to register. The faculty member will work with the student as necessary to refine the prospectus, proposal, or abstract to their mutual satisfaction. The prospectus, proposal, or abstract will define the topics to be covered in the course.
Syllabus

ITMD 361 Fundamentals of Web Development
3 credit hours / 45 contact hours

Course Coordinator: Brian Bailey


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: This course will cover the creation of Web pages and sites using HTML, CSS, Javascript, jQuery and graphical applications, as well as the client and server architecture of the Internet and related web technologies. The creation and deployment of modern, standards-compliant web pages are addressed. Students create and deploy a Web site with multiple pages and cross-linked structures. Prerequisites: None

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: Students completing this course will be able to:
- Recognize HTML, CSS and JavaScript mark-up and code in a web page/application.
- Select the proper mark-up tags or code to achieve a particular result.
- Identify improperly used mark-up and code.
- Produce modern standards compliant web pages.
- Deploy web pages to a public server.

Course Objectives: At the conclusion of this course, each successful student will able to:
- Explain the client and server architecture of the Internet and related web technologies.
- Use a basic text editor and other software tools to create web pages using HTML, CSS, JavaScript, jQuery, and images.
- Deploy web pages to a Linux-based web server using sftp

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(f) An ability to communicate effectively with a range of audiences

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application.
Topics to be covered:

Topic 01 Introduction / Focus on Underlying Technologies / HTTP Request / Response
Topic 02 Technology Continued & Introduction to HTML, CSS, JS
Topic 03 HTML Markup Introductions and Basics
Topic 04 HTML Markup Text & Images
Topic 05 HTML Markup Images & Tables
Topic 06 HTML Markup Forms
Topic 07 CSS Introductions and Basics
Topic 08 CSS Rules & Properties
Topic 09 CSS Box Model
Topic 10 CSS Float, Position, Page Layout
Topic 11 JavaScript Introduction and Language Basics
Topic 12 JavaScript – Google Maps API
Topic 13 jQuery Introductions
Topic 14 JavaScript and jQuery Examples
Syllabus

ITMD 362 Human-Computer Interaction and Web Design
3 credit hours / 45 contact hours

Instructor: TBD


Course Description: Students in this course will learn the importance of human computer interaction design and the effectiveness of user-centered design. The course will cover a survey of methods frequently used by the HCI profession, such as usability testing and prototyping, as well as general design principles and how to use design guidelines. A particular emphasis will be placed on usability for Web site engineering, and students will apply knowledge from the field in the design and construction of user-centered Web sites. Prerequisites: ITMD 361

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: Students completing this course will be able to:

- Describe the diversity of information system users and tasks, and their impact on design.
- Describe the core concepts, applicability, and cost benefits of user-centered design.
- Demonstrate how user-centered concerns can be incorporated into system development life cycles.
- Explain the need to evaluate system usability.
- Describe and apply general principles of design.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Recall, describe and apply principles of user-centered design.
- Conduct task analysis & apply the information to user-centered design.
- Evaluate user interface designs with human subjects.
- Recall, explain, and apply the design principles of alignment, contrast, proximity, and repetition.
- Design and build a user-centered Web site applying HCI methods and good principles of design.
- Apply color and typography in Web design to optimize the interface.

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(d) An ability to function effectively on teams to accomplish a common goal
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(f) An ability to communicate effectively with a range of audiences

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(l) An ability to effectively integrate IT-based solutions into the user environment.

(m) An understanding of best practices and standards and their application.

Topics to be covered:
Topic 01 Introduction to Human Computer Interaction
Topic 02 Interface quality and evaluation
Topic 03 Interactive system and interface design examples
Topic 04 Dimensions of interface variability
Topic 05 User-centered design and task analysis
Topic 06 User interface implementation
Topic 07 User interface implementation: prototyping
Topic 08 Evaluation
Topic 09 UX Methods for Agile Development
Topic 10 No Class: Spring Break
Topic 11 UX & Web Design Guidelines
Topic 12 Designing the Web interface & navigation
Topic 13 Color & Graphics for the Web
Topic 14 Web Typography and Advanced Design
Topic 15 Making UX Work In The Real World
Topic 16 Project Presentations and Exam Review
Topic 17 Final Examination as per the IIT Final Exam schedule
Syllabus

ITMD 411 Intermediate Software Development
3 credit hours / 45 contact hours

Instructor: James Papademas


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: This course covers a broad spectrum of object-oriented programming concepts and application programming interfaces. The student considers the details of object-oriented development in topics of multi-threading, data structure collections, stream I/O and client interfaces. Software engineering topics of packaging and deployment are covered as well. Hands-on exercises reinforce concepts taught throughout the course. Prerequisites: ITM 311

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: This course covers object oriented programming concepts in the Java Standard Edition platform. Employing the latest software development kit, the student considers software development topics in data structures, stream I/O, serialization, concurrency and graphical clients. Software engineering topics including packaging, deployment, debugging and unit testing. Hands on exercises reinforce concepts gained throughout the course. A final project integrates course topics into a contemporary Graphical User Interface client application. Upon completion of this course the student should be able to do the following:

- Understand basic Object Oriented programming concepts.
- Apply Test Driven Development methodologies.
- Understand packaging and deployment Java SE applications.
- Describe Software development terminology.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Write Object Oriented Java SE code.
- Create a Java based Graphical User Interface.
- Locate application functionality from a large programmer API.
- Author well - constructed code and software documentation.
- Utilize an IDE to develop, test and debug Java SE code.

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

Topic 01  Java Syntax review, Algorithm Development, Java Eclipse Compiler.
Topic 02  Data Types, Operators, Strings, Expressions,
Topic 03  Statements and Blocks. Control Flow Statements
Topic 04  Object-Oriented Programming Concepts.
Topic 05  Interfaces and Inheritance and packages
Topic 06  Collections, Generics
Topic 07  Try/Catch, Exceptions. Junit Testing
Topic 08  JDBC Database Access. DAO Design PatternS & DRY. Refactoring.
Topic 09  Threads, Concurrency, Single Responsibility principle, IO Serialization. Mid Term.
Topic 10  Networking TCP/IP, UDP, socket programming
Topic 11  Coupling and Cohesion
Topic 13  Android SDK introduced.
Topic 14  Final Project.
Topic 15  Final Exam Review
Topic 16  Final Examination
**Syllabus**

**ITMD 411 Intermediate software development**
3 credit hours / 45 contact hours

**Instructor:** Luke Papademas


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

**Course Description:** This course covers a broad spectrum of object-oriented programming concepts and application programming interfaces. The student considers the details of object-orientated development in topics of multi-threading, data structure collections, stream I/O and client interfaces. Software engineering topics of packaging and deployment are covered as well. Hands-on exercises reinforce concepts taught throughout the course. **Prerequisites:** ITM 311

This is a required course in the Bachelor of Information Technology and Management degree.

**Course Outcome:** This course covers object oriented programming concepts in the Java Standard Edition platform. Employing the latest software development kit, the student considers software development topics in data structures, stream I/O, serialization, concurrency and graphical clients. Software engineering topics including packaging, deployment, debugging and unit testing. Hands on exercises reinforce concepts gained throughout the course. A final project integrates course topics into a contemporary Graphical User Interface client application. Upon completion of this course the student should be able to do the following:

- Understand basic Object Oriented programming concepts.
- Apply Test Driven Development methodologies.
- Understand packaging and deployment Java SE applications.
- Describe Software development terminology.

**Course Objectives:** At the conclusion of this course, each successful student will able to:

- Write Object Oriented Java SE code.
- Create a Java based Graphical User Interface.
- Locate application functionality from a large programmer API.
- Author well - constructed code and software documentation.
- Utilize an IDE to develop, test and debug Java SE code.

**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to use and apply current technical concepts and practices in the core information
technologies of human computer interaction, information management, programming,
networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection,
creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

Topic 01  Java Syntax review, Algorithm Development, Java Eclipse Compiler.

Topic 02  Data Types, Operators, Strings, Expressions,

Topic 03  Statements and Blocks. Control Flow Statements

Topic 04  Object-Oriented Programming Concepts.

Topic 05  Interfaces and Inheritance and packages

Topic 06  Collections, Generics

Topic 07  Try/Catch, Exceptions. Junit Testing

Topic 08  JDBC Database Access. DAO Design PatternS & DRY. Refactoring.

Topic 09  Threads, Concurrency, Single Responsibility principle, IO Serialization. Mid Term.

Topic 10  Networking TCP/IP, UDP, socket programming

Topic 11  Coupling and Cohesion


Topic 13  Android SDK introduced.

Topic 14  Final Project.

Topic 15  Final Exam Review

Topic 16  Final Examination
Syllabus

ITMD 412 – Advanced Structured and Systems Programming
3 credit hours

Instructor: Sheikh Shamsuddin (sam)


Supplemental material on Data Structure and Algorithms are provided on the course web site at http://blackboard.iit.edu

Course Description:
Structured programming continues with advanced concepts including strings, arrays, pointers, data structures, file manipulation, and dynamic memory management. Students create more complex applications that work with user input, manipulate user supplied text or text obtained from a file, apply standard library routines for working with literal text, use pointers to store complex structures within arrays, and read and write data from files, the console, and the terminal. The object-oriented programming (OOP) paradigm is covered in depth including the philosophy of OOP, classes and objects, inheritance, template classes, and making use of class libraries. Current technologies included in this course include the C++ programming language.

Prerequisite: ITM 312.

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcomes
Upon completion of this course, the student should be able to do the following:

- Develop and apply Data Structure Algorithms such as Stack, Linked-List, Queues and Binary Trees
- Develop programs and apply C++ Standard Template Library (STL)
- Mine the language additional Standard Library
- Analyze, evaluate and implement the reuse Programming Methodology
- Distinguish between Object Oriented Programming (OOP) and Structured Programming
- Develop and enhance OOP skills

Course Objectives

- Enrich program writings by implementing Object Oriented Programming Methodology
- Integrate language Standard Libraries in program design
- Implement data structure and algorithms
- Apply programming language Templates features
- Improve program Design and Analysis
ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application

Topics to be covered

Topic 01 Review C++, Standard Template Library (STL)
Topic 02 Advanced File I/O
Topic 03 Objects, Classes and Friends
Topic 04 Inheritance and Polymorphisms
Topic 05 Virtual functions and functions templates
Topic 06 Error exceptions, Searching, and Sorting
Topic 07 Single and Double-linked List
Topic 08 Stacks and Hashing
Topic 09 Queues
Topic 10 Algorithms, Searching, Sorting, and Big Notation
Topic 11 Recursive
Topic 12 Binary Trees
Topic 13 Programming Labs, Assignments, Quizzes, and Exams
Syllabus

ITMD 413 Open Source Programming (Python – Summer 2015)
3 credit hours / 45 contact hours

Instructor: Industry Professor James Papademas

ISBN: 978-0132576376

Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Contemporary open-source programming languages and frameworks are presented. The student considers design and development topics in system, graphical user interface, network, and web programming. Dynamic scripting languages are covered using object-oriented, concurrent, and functional programming paradigms. Concepts gained throughout the course are reinforced with numerous exercises which will culminate in an open-source programming project. Prerequisites: ITMD 411

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Upon completion of this course the student should be able to do the following:

- Understand basic Python language and multi-functionality from procedural programming to Object Oriented programming concepts.
- Develop an understanding of scripting and the contributions of scripting languages.
- Develop an understanding of the built-in objects of Python.
- Be exposed to advanced applications such as TCP/IP network, GUI, Systems, Scientific and Database programming.
- Perform multithreaded programming, Web applications with popular frameworks such as Django.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Write Procedural and Object Oriented Python code.
- Write Python programs using subset of data types and using assignment, method calls, while loops, for loops, and conditionals.
- Use and manipulate several core data structures: Lists, Dictionaries, Tuples, and Strings.
- Employ objects, functions and modularity.
- Read data from text files, and write formatted text files.
- Interact with websites and load data from them (web scraping).
- Read and write data to/from SQL databases.
- Create a Python based Graphical User Interface using Python interfaces such as Tkinter.
- Author well constructed code and software documentation.
- Utilize an IDE to develop, test and debug Python code.
- Learn TDD (Test Driven Development) techniques to test and verify code structure.
**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, **programming**, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

- Topic 01  Intro to Python. IPO.
- Topic 02  Simple Functions
- Topic 03  Decision Structures and Boolean Logic
- Topic 04  Repetition Structures
- Topic 05  Value-Returning Functions and Modules
- Topic 06  Files and Exceptions
- Topic 07  Lists and Tuples
- Topic 08  More about Strings
- Topic 09  Dictionaries and Sets. Mid Term.
- Topic 10  Classes and OOP
- Topic 11  Recursion
- Topic 12  Inheritance
- Topic 13  GUI programming
- Topic 14  Systems and Networking Programming Techniques
- Topic 15  Webwork, working with the DJANGO database, Final Exam Review
- Topic 16  Final Examination
Syllabus

ITMD 415 Advanced Software Development
3 credit hours / 45 contact hours

Instructor: Scott Spyrison


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: This course considers Web container application development for enterprise systems. The primary focus is on database connectivity (JDBC) integration with Web application programming using an enterprise-level application framework. A Web application term project considers the design and implementation of a database instance that serves as the information tier in a contemporary 3-tier enterprise solution. Prerequisites: ITMD 411

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Upon completion of this course the student will have designed, produced, and documented several projects using the Java EE platform, culminating in a comprehensive and multi-tiered final project that builds cumulatively on prior work. Students will have deployed enterprise applications to modern application server and PaaS environments. Students will have demonstrated knowledge of Java EE specifications, APIs, architectures and techniques, including security, database persistence, business components, web services and presentation components.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Use and administer modern Java EE application server and PaaS environments
- Explain the benefits and best practices associated with multi-tier/multi-layer enterprise applications
  - Persistence Layer (a.k.a. Information or Database Tier)
  - Business and/or Service Layer (a.k.a. Business Tier)
  - Presentation Layer (a.k.a. Web Tier)
- Describe the concepts of Declarative Programming, Inversion of Control and Configuration by Exception, and correlate these concepts with Spring, CDI and other Java EE specifications
- Explain the use of design patterns within the Java EE platform
- Describe the origins, benefits and weaknesses of JSP and JSTL technology
- Create JSP and JSTL pages consisting of several standard tags
- Produce Servlet code to process HTTP requests
- Differentiate between JDBC and JPA
- Implement Java code that uses common JPA annotations and JPA Query Language
- Use associations and inheritance to demonstrate Object-Relational Mapping
- Create business components with EJB technology
- Create web service producers based on EJB business components
- Differentiate between EL, JSF, JSP, JSTL and Servlet technologies
- Produce MVC web applications
- Explain how JSF and Spring MVC relate to the MVC architecture
- Differentiate between authentication and authorization as security mechanisms
- Contrast Java EE with other modern frameworks
- Explain the benefits of Platform as a Service
**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, *programming*, networking, and *web systems and technologies*.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

Topic 01 Introduction to Tools, Java EE, PaaS and Web Applications
Topic 02 JSP, JSTL, Servlets and MVC
Topic 03 Platform Basics, CDI, JDBC and Bean Validation
Topic 04 JPA and ORM
Topic 05 ORM and Managing Persistence
Topic 06 EJB
Topic 07 Midterm
Topic 08 Web Application Security
Topic 09 JSF and Spring MVC
Topic 10 JSF and Spring MVC
Topic 11 Additional Topics (PaaS, JAXB, JMS, WS, JavaMail, Spring, etc)
Topic 12 Additional Topics (PaaS, JAXB, JMS, WS, JavaMail, Spring, etc)
Topic 13 Putting it all Together
Topic 14 Final Project Workshop
Topic 15 Final Exam
Syllabus

ITMD 419 Topics in Software Development
Variable but normally 3 credit hours / 45 contact hours

Instructor: As assigned.

Textbook: Selected by the instructor as appropriate for the topic covered in the course.

Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: This course will cover a particular topic in software development, varying from semester to semester, in which there is particular student or staff interest. This course may be taken more than once but only 9 hours of ITMD 419/519 credit may be applied to a degree.

Prerequisites: Defined by the department or by instructor teaching the course

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate knowledge of software development as defined by the selected topic for the term.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Meet objectives defined by the instructor for the topic covered in the course

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application.

Topics to be covered: Topics will be defined by the instructor for the topic covered in the course.
Syllabus

ITMD 421 Data Modeling and Applications
3 credit hours / 45 contact hours

Instructor: Katherine Papademas


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Basic data modeling concepts are introduced. Hands-on database design, implementation, and administration of single-user and shared multi-user database applications using a contemporary relational database management system. Prerequisites: None

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: Upon completion of this course the student should be able to do the following:

  a) Use a Data Base Management System (DBMS) to create and manage files of data on a microcomputer system (data control language). The data structures for specific business applications will be created;
  b) Enter, manipulate, and organize the data (data manipulation language);
  c) Issue data queries;
  d) Use a report generator;
  e) Restructure files;
  f) Use the screen for input and output;
  g) Establish relationships between multiple files. The student will become aware of the need for security and back-up procedures as an integral part of data integrity; and
  h) Work with such database management systems as Oracle 12c and Microsoft Acess, and SQL Developer.

Course Objectives: At the conclusion of this course, each successful student will able to:

  • Write and resolve record retrieval using SQL scripting
  • Create the five database objects: Tables, Views, Sequences, Indices, and Synonyms
  • Perform simple and complex queries
  • Perform queries using aggregate functions
  • Create reports, text and graphical, using SQL Developer
  • Recall and describe PL/SQL programming syntax, control structures and programming concepts
  • Use functions (intrinsic and extrinsic), procedures, and packages.
  • Perform simple and complex joins
**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computer Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, *information management*, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

**Course Topics:**
Topics to be presented for students to achieve course objectives include:

- **Topic 01** Introduction to Databases and Database Modeling
- **Topic 02** Basic SELECT statements using Relational and Logical Operators
- **Topic 03** Single Row Functions - Character Functions
- **Topic 04** Aggregate Functions
- **Topic 05** Joins: Cross Joins, Inner Joins, Outer Joins, Self Joins
- **Topic 06** Subqueries; Inline Views; Multiple Row Operators (IN, ANY, ALL)
- **Topic 07** Views, With clause, Merge
- **Topic 08** Sequences, Indices, Synonyms - Creation syntax and use
- **Topic 09** Data Control Language: Commit, Rollback, Savepoint
- **Topic 10** Introduction to PL/SQL
- **Topic 11** PL/SQL – Selective Control Statements
- **Topic 12** PL/SQL – Iterative Control Statements, Cursors
- **Topic 13** PL/SQL – Data Collection Objects (Arrays, vArrays)
- **Topic 14** SQL Developer Report Generation; Triggers
- **Topic 15** Functions, Procedures, Packages.
Syllabus

ITMD 422 Advanced Database Management
3 credit hours / 45 contact hours

Instructor: TBD


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Advanced topics in database management and programming including client server application development are introduced. Expands knowledge of data modeling concepts and introduces object-oriented data modeling techniques. Students will learn the use of Structured Query Language in a variety of application and operating system environments.

Prerequisites: ITMD 421

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate advanced knowledge of relational database management using Structured Query Language (SQL), knowledge of SQL security, and will be able to use SQL in all major industry relational database management systems.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Use advanced tools to manage data in the Oracle RDBMS
  - Demonstrate use of online analytical processing (OLAP)
- Recall and describe common SQL security vulnerabilities
  - Explain methods and procedures to secure SQL data
- Use Microsoft SQL Server tools to manage data
  - Construct, manage, and query relational database structures using SQL in Microsoft SQL Server
  - Connect SQL Server database structures to XML and .Net
- Construct, manage, and query relational database structures using SQL in IBM DB2
- Construct, manage, and query relational database structures using SQL in PostgreSQL
- Construct, manage, and query relational database structures using SQL in MySQL

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application.
Topics to be covered:

Topic 01 Introduction to the Course
Topic 02 Advanced SQL statements
Topic 03 Advanced features of SQL commands and operator use
Topic 04 Grouping & Aggregation
Topic 05 Functions and Procedures
Topic 06 Advanced use of joins and correlated/non correlated subqueries
Topic 07 Stored procedures, triggers, and cursors
Topic 08 Recursive Queries
Topic 09 Advanced Aggregation Features
Topic 10 Accessing SQL from a Programming Language
Topic 11 Data and Referential Integrity
Topic 12 Transaction processing including locking processes
Topic 13 OLAP
Topic 14 Oracle Concurrency Control and Recovery
Topic 15 Oracle System Architecture
Topic 16 Oracle Database Administration Tools
Topic 17 SQL Vulnerabilities and Security
Topic 18 Introduction to Microsoft SQL Server
Topic 19 SQL Server: SQL Variations and Extensions
Topic 20 SQL Server: Query Processing and Optimization
Topic 21 SQL Server: Distributed Heterogeneous Query Processing
Topic 22 SQL Server: Server Programming in .NET
Topic 23 SQL Server: XML Support
Topic 24 SQL Server: SQL Server Service Broker
Topic 25 Introduction to IBM DB2
Topic 26 Using IBM DB2
Topic 27 Introduction to PostgreSQL
Topic 28 Using PostgreSQL
Topic 29 Introduction to MySQL
Topic 30 Using MySQL
Syllabus

ITMD 453 Intelligent Device Applications
3 credit hours / 45 contact hours

Instructor: Martin Schray


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Intelligent device application development is covered with proprietary enterprise and open-source technologies on media device, mobile and robotic platforms. Utilizing contemporary toolkits, the student considers design and development on simulated and real “smart” devices including smart phones, tablets, sensors, actuators, drones, and robots. Numerous exercises reinforce concepts gained throughout the course. A term project will integrate course topics into a comprehensive intelligent device application.

Prerequisites: ITMD 311

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Engage students in learning about Mobile Application development. This course will focus on mobile applications for the Windows Store (e.g. Windows RT Apps) and Windows Phone stores via Universal Apps. Students will learn how to successfully build apps and have their apps accepted for the Windows/Windows Phone Store. You’ll complete this course with practical ideas and skills letting you build cool, edgy and useful apps that will be successful in the Windows/Windows Phone 8 Stores.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Create new universal applications projects targeting Windows and Windows Phone
- Create working universal applications for Windows and Windows Phone
- Design their application for low power consumption
- Read and write local files from their application
- Read and write network files from their application
- Create, read, update and delete database tables from their application
- Access web services from their application
- Use user interface components and layout techniques to create sophisticated user interfaces
- Use source control to perform source code management for their application
- Use unit testing to thoroughly test their application code
- Successfully submit and have their application accepted into the Windows and Windows Phone stores

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of *human computer interaction, information management, programming, networking, and web systems and technologies*.

**Topics to be covered:**

- Topic 01 Introduction to the C# language
- Topic 02 Introduction to XAML
- Topic 03 Creating user interfaces in XAML
- Topic 04 Introduction to building universal apps
- Topic 05 Reuse of code and asset for universal app targeting Windows and Windows Phone
- Topic 06 File IO and Network File IO
- Topic 07 Using web services in your app
- Topic 08 Using databases in your app
- Topic 09 Using source management tools and techniques
- Topic 10 Using unit testing to improve the quality and testability of your apps
- Topic 11 Using Model View ViewModel (MVVM) to improve the quality of your apps
- Topic 12 Using asynchronous programming technique to improve your application responsiveness
- Topic 13 Target specific device features with your app
- Topic 14 Designing and develop for low battery consumption
- Topic 15 Store submission process
- Topic 16 Final project
Syllabus

ITMD 454 Mass-Market Intelligent Device Applications
3 credit hours / 45 contact hours

Instructor: Peisong Huang


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Intelligent device application development is covered with leading mass-market and open-source technologies on media device, mobile and robotic platforms. Utilizing contemporary toolkits, the student considers design and development on simulated and real “smart” devices including smart phones, tablets, sensors, actuators, drones, and robots. Numerous exercises reinforce concepts gained throughout the course. A term project will integrate course topics into a comprehensive intelligent device application.

Prerequisites: ITM 311
This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: This course will focus on mobile applications design and development for the latest iOS platforms. Utilizing the latest contemporary toolkits, SDK/APIs, the student learns about the Apple iOS architectures and fundamentals; software engineering principles and best practices; design and development of iOS-based applications for iPhone and iPad devices. The student will create a number of small applications; each will highlight specific iOS features. These exercises reinforce concepts gained throughout the course. A term project will integrate course topics into a comprehensive intelligent device application. This course will help the student to lay a solid foundation down the path to creating your own user-friendly, robust, efficient iOS applications in the future. By the end of the course, students will have the ability to create intermediate level iOS applications using key iOS features, the Swift programming language, and development/debugging tools. They will be better prepared to become professionals in the field of commercial iOS application development.

Course Objectives: At the conclusion of this course, each successful student will able to

- Describe the iOS Application development process including the use of iOS SDK/APIs
- Use development toolkits, XCode, Emulator, debugger, and logging mechanisms
- Employ Swift Programming language constructs such as class definitions
- Describe iOS UI components, controls and views, i.e. Navigation Controller, Table View
- Perform multimedia processing including image, sound and video animation
- Describe/create common applications such as messaging, maps, databases & networking
- Successfully build and publish apps for the Apple Store
ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.
(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
(m) An understanding of best practices and standards and their application.

Topics to be covered:

Topic 01  Intro to iOS app, XCode, Simple App, UI elements
Topic 02  Swift Values and Types
Topic 03  Simple App and Handling Basic Interaction
Topic 04  Swift Control Structures
Topic 05  More UI, Rotation and Layout
Topic 06  Multi-view Apps
Topic 07  Swift Classes and Objects
Topic 08  Tab Bars and Pickers
Topic 09  Table Views
Topic 10  Navigation Controllers and Table Views
Topic 11  Collection Views
Topic 12  Using Split Views and Popovers
Topic 13  Application Settings and User Defaults
Topic 14  Basic Data persistence
Topic 15  Documents and iCloud
Topic 16  Grand Central Dispatch, Background and You
Topic 17  Final Examination
Syllabus

ITMD 455 Intelligent Device Applications (iOS Development)
3 credit hours / 45 contact hours

Instructor: Peisong Huang


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Intelligent device application development is covered with various technologies on mobile and robotic platforms. Utilizing contemporary toolkits, the student considers design and development on emulated and real "smart" devices including smart phones, personal digital assistants, sensors, actuators, and robots. Numerous exercises reinforce concepts gained throughout the course. A term project will integrate course topics into a comprehensive intelligent device application. This course may be taken more than once but only for 6 hours of ITM 455/555 or ITMD 455/555.

Prerequisites: ITM 311

This course is an elective in the Bachelor of Information Technology and Management degree.

Course Outcome: This course will focus on mobile applications design and development for the latest iOS platforms. Utilizing the latest contemporary toolkits, SDK/APIs, the student learns about the Apple iOS architectures and fundamentals; software engineering principles and best practices; design and development of iOS-based applications for iPhone and iPad devices. The student will create a number of small applications; each will highlight specific iOS features. These exercises reinforce concepts gained throughout the course. A term project will integrate course topics into a comprehensive intelligent device application. This course will help the student to lay a solid foundation down the path to creating your own user-friendly, robust, efficient iOS applications in the future. By the end of the course, students will have the ability to create intermediate level iOS applications using key iOS features, the Swift programming language, and development/debugging tools. They will be better prepared to become professionals in the field of commercial iOS application development.

Course Objectives: At the conclusion of this course, each successful student will able to

- Describe the iOS Application development process including the use of iOS SDK/APIs
- Use development toolkits, XCode, Emulator, debugger, and logging mechanisms
- Employ Swift Programming language constructs such as class definitions
- Describe iOS UI components, controls and views, i.e. Navigation Controller, Table View
- Perform multimedia processing including image, sound and video animation
- Describe and create common applications such as messaging, maps, databases and networking
- Successfully build and publish apps for the Apple Store
**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

- **Topic 01** Intro to iOS app, XCode, Simple App, UI elements
- **Topic 02** Swift Values and Types
- **Topic 03** Simple App and Handling Basic Interaction
- **Topic 04** Swift Control Structures
- **Topic 05** More UI, Rotation and Layout
- **Topic 06** Multi-view Apps
- **Topic 07** Swift Classes and Objects
- **Topic 08** Tab Bars and Pickers
- **Topic 09** Table Views
- **Topic 10** Navigation Controllers and Table Views
- **Topic 11** Collection Views
- **Topic 12** Using Split Views and Popovers
- **Topic 13** Application Settings and User Defaults
- **Topic 14** Basic Data persistence
- **Topic 15** Documents and iCloud
- **Topic 16** Grand Central Dispatch, Background and You
- **Topic 17** Final Examination
Syllabus

ITMD 455 Intelligent Device Applications
3 credit hours / 45 contact hours

Instructor: James Papademas

ISBN: 978-1118102275

Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Intelligent device application development is covered with various technologies on mobile and robotic platforms. Utilizing contemporary toolkits, the student considers design and development on emulated and real "smart" devices including smart phones, personal digital assistants, sensors, actuators, and robots. Numerous exercises reinforce concepts gained throughout the course. A term project will integrate course topics into a comprehensive intelligent device application. This course may be taken more than once but only for 6 hours of ITM 455/555 or ITMD 455/555. Prerequisites: ITM 311

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Upon completion of this course the student should be able to do the following:

- Understand the technical challenges posed by current mobile devices, including competitive devices and wireless communications; be able to evaluate and select appropriate solutions.
- Appreciate the need to keep up with rapid changes and new developments; be able to identify current trends in mobile communications technologies and systems and use of mobile analytics.
- Select and evaluate suitable software tools and Google APIs for the development of a particular mobile application and understand their strengths, scope and limitations.
- Use an appropriate application development to design, write and test small interactive programs for mobile devices (cells or tablets).
- Demonstrate a working app deployed to Google’s Play store.
- Work a fully documented, including wiring the prototype model of the app and presentation of the mobile app. Themes are selected based on current trends in the mobile world.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Describe and discuss Mobile Application development for Android platforms
- Successfully build and publish apps for the Android Marketplace.
- Utilize an IDE to develop, test and debug code for this development platform.
- Learn TDD (Test Driven Development) techniques to test and verify code structure

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

Topic 01 Intro to Android sdk and the Eclipse IDE
Topic 02 Application interface building, use of resources. Working the AVD. Debug monitoring.
Topic 03 Intro to fragments, views and adapters.
Topic 04 Intents and Broadcast receivers.
Topic 05 Use of Internet resources. XML parsing.
Topic 06 File saving states and preferences.
Topic 07 SQLite database. CRUD operations. Content values and cursors.
Topic 08 Content provider. Search activity.
Topic 09 Services, loaders, threads, alarms. Mid Term.
Topic 10 Expanding the UI. Working with action bars, navigation behavior, menus, dialogs & messaging. Notification management.
Topic 11 Advance user experience. Screen optimization, scalable graphics. Hardware sensors and acceleration. API Geocoding and maps.
Topic 12 Digitally signing applications.
Topic 13 Analytics.
Topic 14 Final project.
Topic 15 Final Exam Review
Topic 16 Final Examination
Syllabus

ITMD 455 Open Source Intelligent Device Applications
3 credit hours / 45 contact hours

Instructor: James Papademas

ISBN: 978-1118102275

Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Intelligent device application development is covered with mainstream open-source technologies on media device, mobile and robotic platforms. Utilizing contemporary toolkits, the student considers design and development on simulated and real “smart” devices including smart phones, tablets, sensors, actuators, drones, and robots. Numerous exercises reinforce concepts gained throughout the course. A term project will integrate course topics into a comprehensive intelligent device application. Prerequisites: ITM 311

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Upon completion of this course the student should be able to do the following:

- Understand the technical challenges posed by current mobile devices, including competitive devices and wireless communications; be able to evaluate and select appropriate solutions.
- Appreciate the need to keep up with rapid changes and new developments; be able to identify current trends in mobile communications technologies and systems and use of mobile analytics.
- Select and evaluate suitable software tools and Google APIs for the development of a particular mobile application and understand their strengths, scope and limitations.
- Use an appropriate application development to design, write and test small interactive programs for mobile devices (cells or tablets).
- Demonstrate a working app deployed to Google’s Play store.
- Work a fully documented, including wiring the prototype model of the app and presentation of the mobile app. Themes are selected based on current trends in the mobile world.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Describe and discuss Mobile Application development for Android platforms
- Successfully build and publish apps for the Android Marketplace.
- Utilize an IDE to develop, test and debug code for this development platform.
- Learn TDD (Test Driven Development) techniques to test and verify code structure
**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

- (b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- (c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- (h) Recognition of the need for and an ability to engage in continuing professional development
- (i) An ability to use current techniques, skills, and tools necessary for computing practice.
- (j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.
- (k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
- (m) An understanding of best practices and standards and their application.

**Topics to be covered:**

- **Topic 01**  Intro to Android sdk and the Eclipse IDE
- **Topic 02**  Application interface building, use of resources. Working the AVD. Debug monitoring.
- **Topic 03**  Intro to fragments, views and adapters.
- **Topic 04**  Intents and Broadcast recievers.
- **Topic 05**  Use of Internet resources. XML parsing.
- **Topic 06**  File saving states and preferences.
- **Topic 07**  SQLite database. CRUD operations. Content values and cursors.
- **Topic 08**  Content provider. Search activity.
- **Topic 09**  Services, loaders, threads, alarms. Mid Term.
- **Topic 10**  Expanding the UI. Working with action bars, navigation behavior, menus, dialogs & messaging. Notification management.
- **Topic 11**  Advance user experience. Screen optimization, scalable graphics. Hardware sensors and acceleration. API Geocoding and maps.
- **Topic 12**  Digitally signing applications.
- **Topic 13**  Analytics.
- **Topic 14**  Final project.
- **Topic 15**  Final Exam Review
- **Topic 16**  Final Examination
Syllabus

ITMD 460 Fundamentals of Multimedia
3 credit hours / 45 contact hours

Instructor: Ray Trygstad


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Students are introduced to computer-based multimedia theory, concepts and applications. Topics include desktop publishing, hypermedia, presentation graphics, graphic images, animation, sound, video, multimedia on the World Wide Web and integrated multimedia authoring techniques. Prerequisites: Ability to use a graphical operating system.
This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student in this survey course will be brought “up to speed” on the latest multimedia concepts, terms, and software types. While designed to give an overview of today’s multimedia world and production methods, students in the course will gain enough practical knowledge to begin creating productions for desktop and Internet use.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Describe and discuss current trends in multimedia by experiencing a variety of applications and development packages.
- Explain the preproduction process including content acquisition and development, process flow, team management and integration, and legal issues surrounding multimedia.
- Demonstrate technical knowledge and limited proficiency in designing production elements in each of the multimedia disciplines.
- Create a multimedia project for the desktop or Internet.

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities
(f) An ability to communicate effectively with a range of audiences
(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(l) An ability to effectively integrate IT-based solutions into the user environment.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

*Topic 01* Introduction to Multimedia  
*Topic 02* Design Concepts  
*Topic 03* Presentation Graphics  
*Topic 04* Typefaces & Fonts  
*Topic 05* What is Multimedia?  
*Topic 06* Digital Graphics  
*Topic 07* Multimedia Hardware & Software  
*Topic 08* Use of Color and Cultural Contexts of Color  
*Topic 09* Desktop Publishing  
*Topic 10* Preproduction  
*Topic 11* Production Planning and Design  
*Topic 12* Hypermedia Authoring Concepts  
*Topic 13* User Interface Design  
*Topic 14* Presentation Graphics Design  
*Topic 15* Multimedia Sound  
*Topic 16* The Multimedia Team  
*Topic 17* File Compression  
*Topic 18* Animation  
*Topic 19* Video Production  
*Topic 20* Digital Video  
*Topic 21* Authoring Part 2: HTML & Web-Based Multimedia  
*Topic 22* Designing Web-based Multimedia  
*Topic 23* Producing Multimedia  
*Topic 24* Content & Legal Considerations for Multimedia  
*Topic 25* Multimedia Distribution  
*Topic 26* Networking Multimedia  
*Topic 27* Final Project Presentations
Syllabus

ITMD 462 Web Site Application Development
3 credit hours / 45 contact hours

Instructor: Jason Lambert

Textbook: Text will be assigned from online resources – Optional Textbooks include: Brown, Jeff Scott *The Definitive Guide to Grails 2*, Apress 2012 ISBN: 978-1430243779


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Programming the Common Gateway Interface (CGI) for Web pages is introduced with emphasis on creation of interfaces to handle HTML form data. CGI programming is taught in multiple languages. Security of Web sites is covered with an emphasis on controlled access sites. Setup, administration and customization of content management systems including blog and portal sites is introduced. Students design and create a Web site including basic CGI programs with Web interfaces and process data flows from online forms with basic database structures. *Prerequisites: ITMD 361 or ITMD 461*

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate a strong knowledge in the design and development of web applications. Students will be able to use both PHP and Joomla and additionally Groovy and Grails to create robust web applications that support modern web-services and interfaces. Students on completing this course will be able to successfully design, install, develop and rollout production-ready web applications. These web applications will connect securely to databases, handle user-entered data, and provide robust responses by using template html generated through PHP and Groovy as well as basic RESTful web services.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Outline the role of web applications in the modern web
- Identify the classes of application used across popular websites
- Detail server programming as a concept and demonstrate working functionality implementing those concepts
- Detail the use of PHP variables including arrays, functions and objects
- Explain the role of forms in web site applications
- Implement and describe basic security for form processing
- Outline the types of resources server applications can connect to and their advantages and disadvantages
- Outline the use and advantages of using source control for team-based development
- Describe the components and advantages of the Model View Controller architecture
- Describe and implement extensions of the MVC framework Joomla!
- Outline why Object-Oriented-Programming is essential for creating advanced and reusable functionality
- Explain the concept of scaffolding and ‘rails’ and the advantages it affords developers
- Create a basic web application using Grails and Groovy
• Describe how servers support dynamic interfaces and web services by creating JSON responses
• Implement basic RESTful web services and describe their role supporting modern user interfaces and inter-application communication
• Extend a Grails web application using plugins and extensions
• Outline server functionality required to support HTML5 web socket

**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

- Topic 01 Introduction to server side scripting with PHP
- Topic 02 Implementing Basic Scripting for common server processing tasks
- Topic 03 Connecting to resources
- Topic 04 Managing projects with source control
- Topic 05 Building Objects and reusable functionality with MVC
- Topic 06 Introduction to Server Frameworks with Wordpress
- Topic 07 Extending Server Frameworks
- Topic 08 Introduction to Grails
- Topic 09 Building with scaffolding, templates and Groovy
- Topic 10 Exchanging data via services
- Topic 11 Rapid deployment with plugins
Syllabus

ITMD 463 Intermediate Web Application Development
3 credit hours / 45 contact hours

Instructor: Raj Krishnan

Textbook: Web Resources: http://www.asp.net/web-forms;
http://www.microsoftvirtualacademy.com/training-courses/c-fundamentals-for-absolute-beginners

Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: In-depth examination of the concepts involved in the development of Internet applications. Participants will learn the differences and similarities between Internet applications and traditional client/server applications. A discussion of the technologies involved in creating these Internet applications is included, and participants will learn to use these technologies to create robust server-side applications Prerequisites: ITMD 411 and ITMD 461 This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate the ability to build and deploy web forms applications using Visual Studio, and will understand the lifecycle of ASP.NET Web forms application and the basics of the C# language.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Describe the Application Life Cycle and Page life cycle in a web application running on IIS Server
- Build a basic data driven application using Webforms or MVC
- Use the assemblies, namespaces, packages and tools to build a web application
- Work with Visual Studio as an Integrated Development Environment to build a web application
- Utilize an application management system for lifecycle management particularly for source control
- Deploy a web application on Microsoft Azure

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

**Topic 01** Preparation for web development and .Net Framework  
Getting ready for the course – Installing Visual Studio Ultimate, Setting up Visual Studio On line account, Subscription to Azure, Familiarize with Visual Studio 2013 Update 3 IDE, Walk through a simple web project from end to end with source control and Azure Deployment; Introduction to .Net framework - CLR, CTS, IL, Module, Assembly, Name spaces, Framework Class Library

**Topic 02** Anatomy of a web application  
ASP.NET application and Page cycle; Tools to monitor web application (Fiddler, Developer tools); Web application architecture – Presentation, Business Logic, Data Access; Visual Studio 2013 IDE and how to use it: tips and Tricks

**Topic 03** Basic tools and technique for building web application using Visual Studio 2013

**Topic 04** Types of web application - Web Forms, MVC, Web Api, Single Page Application; HTML 5, CSS; BootStrap; Building a static web application, Master Page, Styles

**Topic 05** Using C# to build web application  
C# Fundamentals - Classes, Libraries

**Topic 06** Web Form Applications - Basic Server Controls

**Topic 07** ADO.NET connecting to data for Web Application  
ADO.NET architecture and overview  
ADO.NET Technology Options - Entity Framework, Linq; WCF data Services

**Topic 08** Data Driven Web applications and advanced Server Control  
Building simple data driven web form application; Model data binding in .Net 4.5; Advanced Server Controls

**Topic 09** Entity Framework and Web Applications  
Building an end to end web form application using Entity Framework  
Completing the data driven web form application with CRUD capabilities

**Topic 10** Introduction to Model View Controller; Building an MVC application using Visual Studio 2013

**Topic 11** Building simple services using Visual Studio - WCF, WCF data Services, Web Api

**Topic 12** Using Service layer in a Web Application  
Building a Web application that consumes services  
Building Modern Web Applications - Using Visual Studio to build HTML 5, CSS and JavaScript; Review of client side development framework,

**Topic 13** Introduction to Mobile Application development - Architectural choices; leveraging Visual Studio for Mobile Development

**Topic 14** Trends in Web Application Development

**Topic 15** Framework and Libraries; Angular, Ember, Knockout, Typescript; Node.Js; Other programming languages - Python; Database - NoSQL, Big Data

**Topic 16** Review of core technologies; Discussion of student projects
Syllabus

ITMD 464 Advanced Web Application Development
3 credit hours / 45 contact hours

Instructor: Raj Krishnan


Other supplemental material may be found on the course website at http://blackboard.iit.edu

Course Description: Strategies for management of electronic commerce allow students to learn to re-engineer established business processes to increase enterprise competitive advantage, provide better customer service, reduce operating costs, and achieve a better return on investment. Students will learn to evaluate, use, and deploy state-of-the-art tools and techniques needed to develop a reliable e-commerce offering on the Web. The course will cover state-of-the-art programming and development tools. This class will provide students with hands-on exposure needed to design and build a fully functional e-commerce Web site. Prerequisites: ITMD 463

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: This course builds on the foundation of intermediate web application development course ITMD-463 and will explore advanced tools and techniques to build and deploy web applications. Each successful student will learn how to architect web applications, evaluate and choose the right architecture for a web application depending on the requirements. Application Life Cycle management tools will also be introduced to understand how large software projects can be managed end to end. Students will use the free Visual Studio 2013 community edition to build advanced web application using Web Forms, MVC, Web Api and Single Page Application templates. In addition to C#, the students will also use HTML 5, CSS and JavaScript to build the applications and experience deploying the applications on Microsoft Azure.

Course Objectives: At the conclusion of this course, each successful student will be able to:

• architect a layered web application using Application Life Cycle Management tool
• explain the Application Life Cycle and Page life cycle in a web application running on IIS Server
• use any of the application templates to build a web application - Web Forms, MVC, Web Api, Single Page Application
• use the advanced capabilities of C# Language, Entity Framework, LINQ
• secure application using authentication model
• apply Application Development best practices like SOLID principles
• Describe application of some of the advanced features like asynchronous programming, Socket programming (SignalR)
• Recall and describe options for mobile application development
**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

Review Application Life Cycle, Page Life Cycle, Basic ASP.NET concepts

Review C#, Entity Framework and LINQ

Advanced C# Language

Advanced Entity Framework concepts

Using LINQ

Working with Web Forms, MVC and Web API

Architecting Web Application

N Layered Web Application, Architecture tool in Visual Studio

ASP.NET Web Forms

Data Binding - Review

Ajax

Http Modules and Http Handlers

User Profiles, Authentication and Authorization

Enabling authentication, authorization in Web Forms; User Profile, ASP.NET memberships

MVC Application

Building Services

Building Mobile Application

Modern Web Application
Syllabus

ITMD 465 Rich Internet Applications
3 credit hours / 45 contact hours

Instructor: Jason Lambert


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Students learn to create interactive rich internet applications using web development frameworks, applications, and techniques that primarily operate on the client-side. These applications often exhibit the same characteristics as desktop applications and are typically delivered through a standards-based web browser via a browser plug-in or independently via sandboxes or virtual machines. Current software frameworks used to download, update, verify, and execute these applications are addressed as well as writing applications for deployment in these frameworks. Prerequisites: ITMD 361 or ITMD 461

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will be proficient in JavaScript and be able to use it to implement internet applications that utilize rich features.

Course Objectives: At the conclusion of this course, each successful student will able to:

• design and develop JavaScript powered internet applications
• use the suite of HTML5 JavaScript APIs, with advanced JavaScript programming and debugging techniques
• create user interfaces for responsive applications in modern browsers
• style their interfaces with modern applications of CSS and the standards in CSS3
• effectively utilize JavaScript libraries such as WebRTC, jQuery, processing and Node.js to enable rapid JavaScript application development..

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities
(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.
(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
(l) An ability to effectively integrate IT-based solutions into the user environment.
(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

- **Topic 01** Server and client side technology
- **Topic 02** History of Internet applications and the web technologies
- **Topic 03** Browser technology and mobile applications
- **Topic 04** JavaScript as an enabling technology in modern web-based applications
- **Topic 05** Cascading Style Sheets (CSS) in modern web-based applications – specifically noting new CSS3 applications for animation
- **Topic 06** Applications deployment and scaling
- **Topic 07** Traditional and assisted AJAX techniques for asynchronously loading content
- **Topic 08** Interface mockups into working code prototypes
- **Topic 09** Advanced JavaScript programming paradigms including: Prototype, Object Oriented Programming (OOP), JavaScript Object Notation (JSON)
- **Topic 10** Potential security threats posed to internet applications
- **Topic 11** Programming cross-browser applications.
- **Topic 12** jQuery animations and CSS3 animation features.
- **Topic 13** Responsive design principles and techniques
- **Topic 14** Supporting of HTML5 features
- **Topic 15** Graphical applications utilizing the HTML5 canvas API
- **Topic 16** Geolocation HTML5 API
- **Topic 17** HTML5 file API and JavaScript
- **Topic 18** HTML5 Local Storage API
- **Topic 19** HTML5 Markup and DOCTYPE
- **Topic 20** HTML5 Audio and Video APIs
- **Topic 21** WebRTC library and legacy messaging solutions
- **Topic 22** Web Sockets for continuous communication
- **Topic 23** Node.js framework for application development
- **Topic 24** JavaScript HTML5 libraries including: Three.js; Processing.js; Angular.js; jQueryUI and CreateJS
Syllabus

ITMD 466 Service-Oriented Architecture
3 credit hours / 45 contact hours

Instructor: Omar Aldawud, PhD.


Box, Skonnard & Lam Essential XML: Beyond MarkUp, 1/E Addison-Wesley Professional 2000 ISBN: 978-0201709148

Additional Resources: Developing RESTful APIs with JAX-RS http://javabrains.koushik.org/ also look SOA demonstration using live web services. Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: This course covers IT enterprise systems employing web services technologies in SOA and ESB architectural patterns. The student considers SOA which defines and provisions IT infrastructure and allows for a loosely-coupled data exchange over disparate applications participating in business processes. The simplification of integration and flexible reuse of business components within SOA is greatly furthered by ESB. Lab exercises using contemporary tool-kits are utilized to reinforce platform-agnostic course topics. Prerequisites: ITMD 361 or ITMD 461 and ITMD 411

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Students completing this course will be able to:

- Describe Service Oriented Architecture (SOA) Computing and all of its building components including Service Depository, Service Producers and Consumer; SOA Design Principles; and OOP design principles
- Work with services in a heterogeneous environment
- Describe the working of SOA along with the protocols used
- Demonstrate an understanding of XML and related technologies
- Consider SOA which defines and provisions IT infrastructure and allows for a loosely-coupled data exchange over disparate applications participating in business processes
- Describe the Enterprise Service Bus as a framework and technology for SOA
- Build a complete SOA application to cover all components of an SOA architecture.
- Build the confidence in “speaking SOA”

Course Objectives: At the conclusion of this course, each successful student will able to:

- Develop an applications in a heterogeneous environment using state of the art SOA technologies.
- Develop, understand and implement the concept of service oriented architecture
- Demonstrate an understanding of XML including XML scheme, DTD, XPATH, XSLT
- Develop a DOM and Even based XML parsers
- Demonstrate an understanding of Web Services and related technologies: WSDL, SOAP
- Develop web services including deployment and associated WSDL, XML, SOAL documents and messages.
- Develop a complete SOA application with all of its components
Demonstrate an understanding of the ESB architecture

Demonstrate an understanding of the ESB architecture current implementations by major software development shops such as Oracle, IBM and Microsoft.

**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(f) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to effectively integrate IT-based solutions into the user environment.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

**Topic 01** SOA Introduction: Service and Objects/Components

**Topic 02** Service Oriented Design Principles

**Topic 03** Case Study building a complete SOA application in a heterogeneous environment

**Topic 04** Web Services Specifications: Web Services Description Language (WSDL), Web Services Dynamic Discovery (WS-Discovery),

**Topic 05** Web Services Endpoint Language (WSEL), Web Services Metadata Exchange (WS-MetaDataExchange), Web Services Policy Framework (WS-Policy)

**Topic 06** XML Specification, DTD, XML Scheme, JAPX, XPath 1.0 and XPath 2.0, Creating XML Documents

**Topic 07** XML Parsers (DOM, SAX)

**Topic 08** SOAP, RESET, JSON

**Topic 09** Web Service, Web Services Description Language (WSDL), Service Repositories: Universal Description, Discovery, and Integration (UDDI)

**Topic 10** University Holiday

**Topic 11** Web Services using SOAP, Web Services using REST, Web Services using JSON

**Topic 12** Web Services Case Study

**Topic 13** XML Document Design

**Topic 14** Enterprise Service Bus (ESB) principles of the ESB architecture, ESB as service mediator, ESB as a framework, current implementations of ESB by vendor

**Topic 15** Project Demonstration and implementation details in a heterogeneous environment

**Topic 16** Final Examination
Syllabus

ITMD 467 Web Systems Integration
3 credit hours / 45 contact hours

Instructor: Jason Lambert

Textbook: Material for the course is provided as online reading and handouts, along with other supplemental material on the course web site at http://blackboard.iit.edu.

Course Description: In this project-based course, student teams will build an enterprise-grade website and web infrastructure integrating server-side applications, databases, and client-side rich internet applications as a solution to a defined business problem.

Prerequisites: ITMD 462 and ITMD 465

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Students completing this course will be able to integrate the creation and deployment of an enterprise web site utilizing HTML5, CSS, and JavaScript; responsive server-side scripting, programming, applications, and databases; dynamic client-side programming; and responsive design principles and techniques. Students will learn principles of both ground-up and framework approaches to site creation for both local server and cloud-based deployments.

Course Objectives: At the conclusion of this course, each successful student will able to:
- Identify, analyze and determine user needs and optimal interface design for the users of an enterprise web system
- Create and manage a project plan for web site design, construction, and deployment
- Manage and configure web server infrastructure
- Create and deploy a modern enterprise web site including dynamic client-side applications; server-side scripting, applications, and database integration; and responsive design principles and techniques
  - Design and implement the web site using industry-standard tools
  - Design and implement the web site using existing industry-standard frameworks
  - Design, and implement the web site in a cloud environment using Software as a Service (SaaS) and Platform as a Service (Pass)

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(f) An ability to communicate effectively with a range of audiences
(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.
(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(l) An ability to effectively integrate IT-based solutions into the user environment.

(m) An understanding of best practices and standards and their application.

(n) An ability to assist in the creation of an effective project plan.

**Topics to be covered:**

- **Topic 01** Problem definition and requirements
- **Topic 02** Project planning and management
- **Topic 03** System integration principles
- **Topic 04** Optimal database integration
- **Topic 05** Integration using frameworks
- **Topic 06** Server configuration and management
- **Topic 07** Cloud-based deployment models
- **Topic 08** Project creation and deployment
- **Topic 09** Project presentation
Syllabus

ITMD 469 Topics in Application Development
Variable but normally 3 credit hours / 45 contact hours

Instructor: As assigned.

Textbook: Selected by the instructor as appropriate for the topic covered in the course.

Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: This course will cover a particular topic in application development, varying from semester to semester, in which there is particular student or staff interest. This course may be taken more than once but only 9 hours of ITMD 469/569 credit may be applied to a degree.

Prerequisites: Defined by the department or by instructor teaching the course

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate knowledge of application development as defined by the selected topic for the term. The topics will most often be web or mobile device applications.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Meet objectives defined by the instructor for the topic covered in the course

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

   (b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

   (c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

   (i) An ability to use current techniques, skills, and tools necessary for computing practice.

   (j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

   (m) An understanding of best practices and standards and their application.

Topics to be covered: Topics will be defined by the instructor for the topic covered in the course.
Syllabus

ITMM 470 Fundamentals of Management for the Technical Professional
3 credit hours / 45 contact hours

Instructor: Madeleine England


Supplemental material is provided on the course web site at http://blackboard.iit.edu.

Course Description: This course serves as an introduction to the discipline of management, with a special emphasis being paid to managing and management issues in an innovative and high-tech organization and an IT environment. It is designed to integrate accepted theories with real world applications to provide students with basic knowledge and skills needed for managing technology organizations and the people who work in those organizations. This course covers current issues in management, the managerial environment, integrative management issues, and the traditional functions of management: planning, organizing, leading, and controlling. Lecture, discussion and class assignments given in the course are intended to help students understand the needs of organizations. Prerequisites: None

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Students completing this course will be equipped with skills and knowledge allowing them to navigate the complexity of managing technical professionals in a high-technology environment, to optimize the effectiveness of technology staff and the impact of technology as a facilitating function in the modern business. They will be able to identify the principals of managing formal organizations, recognize the various challenges faced by today’s managers, and give examples of organizations engaging in the management functions of planning, organizing, leading and controlling.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Discuss the complexity of real-life organizations and management in a technology setting.
- Demonstrate an ability to function as a part of a team.
- Demonstrate an understanding of how to communicate to a wide range of audiences through effective and efficient presentations.
- Define organizational culture and explain how it impacts an organization, a group and an individual.
- Demonstrate the ability, through weekly discussions, to aptly challenge their own and other’s ideas with the goals of arriving at a more complete understanding.

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(d) An ability to function effectively on teams to accomplish a common goal
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities
(f) An ability to communicate effectively with a range of audiences
(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society
(h) Recognition of the need for and an ability to engage in continuing professional development

(n) An ability to assist in the creation of an effective project plan.

**Topics to be covered:**

Topic 01  Hello & Welcome / Introductions  
Topic 02  Review Course Expectations and Syllabus, Plagiarism  
Topic 03  Management Environment & Organizational Culture  
Topic 04  Financial Statements  
Topic 05  Managerial Issues  
Topic 06  Budgets  
Topic 07  Planning  
Topic 08  Project Management  
Topic 09  IT Priorities: Prioritizing a Portfolio of Projects  
Topic 10  IT and the Board of Directors: Governance and IT  
Topic 11  Crisis: When Disaster Strikes IT  
Topic 12  Damage: Dealing with the After-Effects of a Security Crisis in IT  
Topic 13  Communication: Rebuilding Confidence in IT in the Wake of a Security Crisis  
Topic 14  Organization Structure and Design  
Topic 15  Project Overview  
Topic 16  Effective Communication  
Topic 17  Human Resources  
Topic 18  Emerging Technology: Realizing Business Value and Managing Risk in IT  
Topic 19  Vendor Partnering: Important Considerations When IT Outsources IT  
Topic 20  Leadership & Trust  
Topic 21  Managing Talent: Maximizing the Value of IT Talent  
Topic 22  Standardization and Innovation: Managing and Investing in IT Infrastructure  
Topic 23  Decision Making  
Topic 24  Managing Risk  
Topic 25  Managing Change  
Topic 26  Innovation  
Topic 27  Motivation  
Topic 28  Foundations of Control  
Topic 29  Project Consultation  
Topic 30  Class Presentations  
Topic 31  Final Examination
Syllabus

ITMM 471 Project Management for ITM
3 credit hours / 45 contact hours

Instructor: Dennis J. Hood


Course Description: Basic principles of project management are taught with a particular focus on project planning for information technology hardware, software and networking project implementation. Management of application development and major Web development projects will also be addressed. Prerequisites: None

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate a solid foundation in project management concepts and best practices with an emphasis on information technology projects and the unique challenges they pose including technical, financial and human resource issues; and will demonstrate effective planning and decision making skills for both near-term operational and long-term strategic situations.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Describe using appropriate terminology the current state and best practices of information technology project management.
- Analyze project management decisions in terms of technical, cost-benefit and human resource considerations.
- Assess the risk exposure of an IT project and develop plans for mitigating and managing risks.
- Develop mechanisms for capturing and reporting objective measures of project progress.
- Apply frameworks for effective planning and decision making regarding IT project management.
- Describe the human resource, financial, and technical responsibilities of an IT project manager, including the unique challenges associated with outsourcing, off-shoring, and globalization.
- Discuss the impact of quality management and process maturity on IT project management.
- Discuss the role of portfolio management in realizing corporate strategic vision.

ABET Criterion 3 Outcomes The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(d) An ability to function effectively on teams to accomplish a common goal.
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities.
(f) An ability to communicate effectively with a range of audiences.
(h) Recognition of the need for and an ability to engage in continuing professional development.
(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

(n) An ability to assist in the creation of an effective project plan.

**Topics to be covered:**

Topic 01 Terminology
Topic 02 Life cycles and process
Topic 03 Strategy, scope and project initiation
Topic 04 Planning, communication and documentation
Topic 05 Risk management and uncertainty
Topic 06 Schedule management and estimation
Topic 07 Monitoring and control
Topic 08 Budget management and value
Topic 09 Programs and portfolio management
Topic 10 Quality and stakeholder management
Topic 11 Auditing and closing
Topic 12 Process improvement and distressed projects
Topic 13 Teams, outsourcing and off-shoring
Topic 14 Agile and Extreme projects
Topic 15 Enterprise project management
Topic 16 Final examination
Syllabus

ITMM 481 IT Entrepreneurship
3 credit hours / 45 contact hours

Instructors: Carl Robert Carlson, Ph.D. and Adarsh K. Arora, Ph.D


Course Description: This course prepares students to become leaders in information technology and to build ITM companies. Students design and develop a prototype ITM product and prepare a business plan and venture proposal presentation. Prerequisite: Experience in IT field.

Prerequisites: None

This is a selected elective in the Bachelor of Information Technology & Management degree.

Course Outcome: This course offers a comprehensive, integrated, and proven step-by-step approach to creating innovative, highly successful IT enterprises. Students follow a multi-step process resulting in their presenting a product/service plan for building a start-up IT enterprise. Students are expected to be prepared to discuss their ideas in each class as venture experience faculty mentor them in the formulation of their plan.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Analyze a problem, and identify and define the computing requirements appropriate to its solution, specifically by developing a technology based solution to a real world problem as the basis for a start-up venture
- Assist in the creation of an effective project plan, specifically through developing and presenting a product/service plan for a possible IT start-up
- Analyze the local and global impact of computing on individuals, organizations, and society, specifically by articulating the value proposition associated with their proposed product/service and the scope of its marketability
- Function effectively on teams to accomplish a common goal, specifically by contributing to the development of the product/service business plan
- Exhibit an ability to communicate effectively with a range of audiences

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(d) An ability to function effectively on teams to accomplish a common goal

(f) An ability to communicate effectively with a range of audiences

(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society

(n) An ability to assist in the creation of an effective project plan.
Topics to be covered:
Follows the 24 step methodology described in the textbook, which the instructors have had success applying in their start-up ventures

Topic 01  Course Overview & Possible Projects
Topic 02  Market Segmentation & Select a Beachhead Market
Topic 03  Build End User Profile
Topic 04  TAM Analysis, Customer Profile and Next 10 Customers
Topic 05  Use Case Needs Analysis
Topic 06  High Level Product Specification, Prototype Specification
Topic 07  Quantify Value Proposition
Topic 08  Define Your Core Values
Topic 09  Chart Competitive Position
Topic 10  Determine Customer Decision Making Unit, Roles, Influences
Topic 11  Define Process To Acquire Paying Customer
Topic 12  Sales Process
Topic 13  Design a Business Model
Topic 14  Market Structure
Topic 15  Calculate Lifetime Value and Cost of Customer Acquisition
Topic 16  Identify Key Assumptions
Topic 17  Test Key Assumptions
Topic 18  Show the Dogs Will Eat the Dog Food
Topic 19  Determine Market Size & Product Plan
Topic 20  Fund Strategy
Topic 21  Review Presentation Outlines
Topic 22  Student Presentations
Syllabus

ITMD 485 Legal and Ethical Issues in Information Technology
3 credit hours / 45 contact hours

Instructor: Ray Trygstad


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Current legal issues in information technology are addressed including elements of contracting, payment systems and digital signatures, privacy concerns, intellectual property, business torts, and criminal liability including hacking, computer trespass and fraud. Examination of ethical issues including privacy, system abuse, and ethical practices in information technology equip students to make sound ethical choices and resolve legal and moral issues that arise in information technology. Prerequisites: None

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate an understanding of professional, ethical, legal, security and social issues and responsibilities in information technology; and will demonstrate an ability to make sound ethical choices and resolve legal and moral issues that arise in professional practice.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Discuss basic concepts of ethics, morality and the law.
- Describe the differences between ethics, morality and law.
- Identify ethical procedures and behaviors in the organization related to the employment and use of information technology.
- Identify key ethical concerns of information technology professionals.
- Recognize and describe Codes of Ethics and Professional Conduct and identify the industry organizations they are associated with.
- Describe issues related to privacy and confidentiality as they relate to information technology.
- Identify key laws and regulations related to privacy and confidentiality.
- Discuss issues in cybercrime and technology-facilitated crime.
- Identify key laws and regulations related to cybercrime.
- Describe issues related to intellectual property, intellectual property law, freedom of expression, and intellectual freedom as they relate to information technology.
- Describe the differences between copyrights, patents, trademarks and trade secrets.
- Explain specific issues of contract law common in information technology.
- Describe and discuss issues related to outsourcing and Service Level Agreements.
- Discuss the social impact of information technology on society.
- Explain the concept of “digital divide”, identify some causes and discuss possible solutions.
- Identify underlying gender, cultural and diversity related issues in information technology.
- Create policies and procedures for an organization that are ethically, morally and legally sound.
- Produce an Acceptable Use Policy with appropriate mechanisms for enforcement.
ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(f) An ability to communicate effectively with a range of audiences

(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society

(h) Recognition of the need for and an ability to engage in continuing professional development

Topics to be covered:

01 Introduction to Ethics and the Law
02 Ethical Concepts and Theories
03 Ethics, Law and Conflict
04 Professional Ethics in Information Technology
05 Privacy
06 Security and Compliance
07 CyberCrime and Technology-Facilitated Crime
08 Intellectual Property Issues
09 Regulating Commerce and Speech
10 Information Technology Contract Law: SLAs and Outsourcing
11 Technology, Work and the Digital Divide
12 Online Identity and Community
13 Ethics, Law and Emerging Technologies
14 IT Law and Ethics in Context
15 Final Project Presentations / Final Exam Review
16 Final Examination
Syllabus

ITMO417 Shell Scripting for System Administration
3 credit hours / 45 contact hours

Instructor: Sheikh Shamsuddin (sam)


Other supplemental material (Awk, Perl, PowerShell) may be found on the course web site at http://blackboard.iit.edu

Course Description: Focuses on preparation of shell scripts to enhance and streamline system administration tasks in all contemporary server operating systems. Scripting will be taught in both native and portable environments. The course will address shell programming, regular expressions, common and system-specific shell utilities and built-in commands, user defined and shell variables, flow control structures, shell functions, and the creation and execution of shell scripts. Homework and hands-on exercises will provide practical experience in contemporary server environments. Prerequisite: ITMO 456

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcomes: Each successful student will gain the experience and skills necessary to write, compile, execute, troubleshoot, and resolve problems using major Shell Scripting Languages - Bash, AWK, Perl, and PowerShell. They will develop the ability to develop and identify important language standard libraries and utilities; the ability to locate and use help resources; experience in software application and development theory and concepts; and skills necessary to write system programs in Linux and Windows operating systems

Course Objectives: At the conclusion of this course, each successful student will able to:
- Write scripts and resolve programming problems using Bash, Perl, and PowerShell
- Describe the use of and apply script utilities such as grep, sed, and system commands
- Complete programming assignments using various scripting languages
- Explain and perform the integration and implementation of scripting and operating system commands
- Recall scripting syntax and the language features
- Effectively write Shell Scripting Programs

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application.
Topics to be covered

Topic 01  Linux operating system review
Topic 02  Shell commands. Shell Variables. Linux utilities
Topic 03  Selection control, I/O, redirection, file I/O
Topic 04  Loops, functions, and array
Topic 05  Regular expressions, grep and sed Linux utilities
Topic 06  AWK Programming
Topic 07  Perl Programming – scalar variables, Lists and Arrays
Topic 08  Hashes
Topic 09  Perl selection control, loop and subroutine
Topic 10  Perl file I/O
Topic 11  Programming in PowerShell: Variable, selection control, and loop
Topic 12  Array, modules, and File I/O
Topic 13  Programming Labs, Assignments, Quizzes, and Exams
Syllabus

ITMO433  Enterprise Server Administration
3 credit hours / 45 contact hours

Instructor: Sheikh Shamsuddin (Sam)


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Catalog Description: Students learn to set up, maintain, and administer x86-based servers and associated networks using a contemporary industry-standard proprietary operating system. Topics include hardware requirements; software compatibility; system installation, configuration and options, and post-installation topics; administrative and technical practices required for system security; process management; performance monitoring and tuning; storage management; back-up and restoration of data; and disaster recovery and prevention. Also addressed is configuration and administration of common network and server services such as DNS, DHCP, remote access, email, basic virtualization, web and web services, and more.

Prerequisites: ITM 301 and ITMO 440

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Upon successful completion of the course the student will able to:

- Administer x86-based servers such as Windows Enterprise Server 2008 and 2012
- Configure server, network, and software applications setup environment
- Set up Active Domain within a Client Server Environment
- Describe a server administrator’s responsibilities and support of enterprise applications
- Analyze server recurring issues and work on sustainable solutions
- Provide support the planning, development, integration, testing and management of IT services

Course Objectives: At the conclusion of this course, each successful student will able to:

- Install and manage Windows Enterprise Server 2008 and Active Directory Domains
- Manage server, active directory, client computers and users
- Apply server security, software distribution and updates
- Perform schedules vulnerability-assessment scans and monitoring server performance
- Design Infrastructure requirements
- Set up and manage server system virtualization
Perform day-to-day management of the server operating system, file structure, and directory services

Monitor logs for firewalls and intrusion detection systems

**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application.

**Topics to be covered**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Installation and configuration of Windows Server</td>
</tr>
<tr>
<td>02</td>
<td>Account Management and Active Directory implementation</td>
</tr>
<tr>
<td>03</td>
<td>Managing and Troubleshooting Resource Access</td>
</tr>
<tr>
<td>04</td>
<td>Configuring and Managing Data Storage, Application and Data Provisioning</td>
</tr>
<tr>
<td>05</td>
<td>Managing Network Services, Server, and Network Monitoring</td>
</tr>
<tr>
<td>06</td>
<td>Deploying IIS and Active Directory Certificate Services</td>
</tr>
<tr>
<td>07</td>
<td>Configuring Remote Access Service</td>
</tr>
<tr>
<td>08</td>
<td>System and desktop Virtualization</td>
</tr>
<tr>
<td>09</td>
<td>Securing the Operating System. Managing Reliability and Availability</td>
</tr>
<tr>
<td>10</td>
<td>Hands-on Labs, Assignments, Quizzes, and Exams</td>
</tr>
</tbody>
</table>
Syllabus

ITMO 440 Introduction to Data Networks and the Internet
3 credit hours / 45 contact hours

Instructor: Carol Davids


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Catalog Description: This course covers current and evolving data network technologies, protocols, network components, and the networks that use them, focusing on the Internet and related LANs. The state of worldwide networking and its evolution will be discussed. This course covers the Internet architecture, organization, and protocols including Ethernet, 802.11, routing, the TCP/UDP/IP suite, DNS, SNMP, DHCP, and more. Students will be presented with Internet-specific networking tools for searching, testing, debugging, and configuring networks and network-connected host computers. There will be opportunities for network configuration and hands-on use of tools. Prerequisites: none

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcomes: The successful student will be able to use protocol analysis tools combined with the native tools provided by computer Operating Systems and basic network protocols to analyze network problems and their solutions. Additionally, the successful student will be able to design simple data networks composed of hubs, switches and routers and create the necessary network and sub-network IDs for those networks. The successful student will refer to original sources including standards bodies to keep their knowledge and skills current.

Course Objectives: At the conclusion of this course, the successful student will be able to:

- Explain the use of the layered data communications model and use that model in the analysis of a data application on an IP data network.
- Capture and analyze a trace of the protocol data messages on an IP network.
- Explain physical-layer operations that enable the transfer of digital information by means of physical signals, including the use of analog signals to represent digital data.
- Explain the significance of the data-link layer and give examples of data-links in common use today, including DOCSIS, Ethernet II and IEEE 802.11.
- Solve problems based on the header and trailer fields of the Ethernet II and IEEE 802.3.
- Locate ARP messages in a protocol trace and explain the reason for their presence.
- Identify network problems using the information available in ICMP messages.
- Solve problems and explain functions and behaviors such as fragmentation, type of service and routing, based on identification of the values of the header fields of the IP Datagram
- Solve problems related to IPv4 address space, including the creation of IP sub-networks.
- Solve problems and explain functions and behaviors related to a router’s use of its routing table to determine where to send an incoming IP datagram.
- Choose whether a network should use RIP, OSPF or Border Gateway routing protocol
Explain how Connections are created by TCP, how Applications send data using message sequence charts, and describe the use of Sequence and Acknowledgement Numbers.

Analyze protocol traces of applications based upon HTTP and other Layer 5 protocols.

Explain the concept of State and solve problems related to the state of a TCP connection at both the client side and the server side using a State Transition Diagram.

Explain the use of UDP and identify applications that use UDP for their transport.

Explain the functions provided by the DHCP and DNS services on an IP network.

Explain the difference between streaming-media applications and real-time media applications and identify these differences on an IP network using protocol traces.


Write a project technical paper which presents results and draws conclusions.

**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

**Topics to be covered:**

Introduction, Terminology, Standards

01 Layer 1: Analog Signals
02 Layer 1: Digital Signals
03 Layer 1: Digital Transmission
04 Layer 2: Ethernet LAN - Ethernet Frame
05 Layer 2: Connecting Devices: Hubs, Switches, Routers
06 Layer 3: Internet Protocol – PDU
07 Layer 3: IP Addresses
08 Layer 3: ARP & DHCP
09 Layer 3: ICMP
10 Layer 3: Routing and Routing Protocols
11 Layer 3: Error Control - Detection and Correction
12 Layer 4: Process to Process Delivery - UDP and TCP
13 Layer 4: UDP
14 Layer 4: TCP
15 Layer 5: Domain Name Service / Written Project Report Submission
16 Final Examination
Syllabus

ITMO 440 Introduction to Data Networking and the Internet
3 Credit Hours / 45 Contact Hours

Instructor: Louis F. McHugh IV


Course Description: This course covers current and evolving data network technologies, protocols, network components, and the networks that use them, focusing on the Internet and related LANs. The state of worldwide networking and its evolution will be discussed. This course covers the Internet architecture, organization, and protocols including Ethernet, 802.11, routing, the TCP/UDP/IP suite, DNS, SNMP, DHCP, and more. Students will be presented with Internet-specific networking tools for searching, testing, debugging, and configuring networks and network-connected host computers. There will be opportunities for network configuration and hands-on use of tools. Prerequisites: None

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: The course is a foundation course in the basics of Data Communications and Computer Networks. It is intend is to serve as a basis for practical studies in field of Computer Networking and Network Administration. Upon completion, a student should be able to understand how a Computer Network works from both a practical and theoretical perspective. They should understand OSI & TCP/IP Models, Various Networking Protocols, Data Circuits, Switches, and Routers. They will also have an understanding of troubleshooting and management of networks by usage of various tools.

Course Objectives: At the conclusion of this course, each successful student will able to:

• Outline the basics components of a computer network using both the TCP/IP protocol suite and the OSI model.
• Identify the various types of network systems, including local area networks, metropolitan area networks, wide area networks, and voice/data delivery networks.
• Enumerate the various transmission media commonly used in carrier systems, i.e. twisted pair, coaxial cable, fiber optic cable, terrestrial microwave, satellite, as well as other wireless technologies.
• Recognize the basics of data communications, including data, signals, conversions between data and signals, encoding techniques, multiplexing, and modulation.
• Identify the various types of error detection and error corrections schemes.
• Identify the basics of T-carrier systems, frame relay, asynchronous transfer mode, DSL, and cable modems, and be able to compare and contrast their characteristics.
• Describe the basic operating procedures of the Internet and how it relates to data and voice communications.
• Enumerate the differences between the wireless telephone systems D-AMPS, TDMA, CDMA, GSM, and others.
• Document the characteristics of local area networks, including hub and switch technologies.
• Complete a case study in which, given a minimum set of requirements, the student will recommend wide area network solutions.
**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, *networking*, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

**Topics Covered:**

- Topic 01 Introduction to Computer Networks and Data Communications
- Topic 02 Fundamentals of Data and Signals
- Topic 03 Conducted and Wireless Media
- Topic 04 Making Connections
- Topic 05 Making Connections Efficient: Multiplexing and Compression
- Topic 06 Errors, Error Detection, and Error Control
- Topic 07 Local Area Networks
- Topic 08 Local Area Networks: Part II
- Topic 09 Introduction to Metropolitan and Wide Area Networks
- Topic 10 The Internet
- Topic 11 Voice and Data Delivery Networks
- Topic 12 Network Security
- Topic 13 Network Design and Management
Syllabus

ITMO 441 Network Administration and Operations
3 credit hours / 45 contact hours

Instructor: Kevin Vaccaro


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Students learn the details, use, and configuration of network applications. Currently protocols and application technologies considered include SNMP, SMTP, IMAP, POP, MIME, BOOTP, DHCP, SAMBA, NFS, AFS, X, HTTP, DNS, NetBIOS, and CIFS/SMB. Windows workgroups and domains: file and printer sharing, remote access, and Windows networking are addressed. A research paper in the above topic areas is required.

Prerequisite: ITMO 440

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each student will be able to understand and implement various protocol service using the Linux operating system. Each student will be able to understand how data flows thru the local network and the internet. A paper will be required on a research topic of their choice.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Recall and describe the different services available at the Application Level of the TCP/IP model using the Linux operating System
- Explain each application protocol in detail
- Use the Linux operating system to implement different application services as hands on labs
- Perform original research on a chosen Network related topic

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(l) An ability to effectively integrate IT-based solutions into the user environment.
Topics to be covered:

- Topic 01  Dynamic Host Configuration Protocol
- Topic 02  The Domain Name System
- Topic 03  File Transfer Protocol
- Topic 04  SMTP and Email
- Topic 05  Hypertext Transfer Protocol
- Topic 06  Securing Sockets with SSL
- Topic 07  Simple Network Management Protocol
- Topic 08  Secure Shell (Remote Access)
- Topic 09  Firewalls
- Topic 10  IP Security
- Topic 11  Multimedia Technologies
- Topic 12  Network File Systems
- Topic 13  Final Paper / Final Exam Review
- Topic 14  Final Examination
Syllabus

ITMO 444 Cloud Computing Technologies
3 credit hours / 45 contact hours

Instructor: Jeremy Hajek


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: The elements of elastic, fault tolerant computing applications hosted on dynamically-sealed virtual resources that are available as services will be studied in this course. Commercial and local cloud architectures are examined and compared. An integration of course topics will result in a project employing various cloud technologies. Prerequisites: ITMD 411 and ITMO 456

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate an understanding how component failure is tolerated in an elastic cloud system. They will be able to administer and choose components from industry standard cloud platforms. Students will be able to successfully build their own elastic scaling cloud application.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Discuss basic concepts of cloud elasticity and fault tolerance
- Make application decisions based on these concepts
- Describe how development decisions effect Operations actions
- Design cloud systems with proper tooling and introspection to manage large scale systems
- Describe proper system scaling techniques – scale up vs scale out and when to use them
- Explain XYZ scaling
- Explain design patterns for scalability
- Explain the different types of load-balancing
- Explain and deploy auto-scaling architectures
- Use industry standard source control

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(m) An understanding of best practices and standards and their application.
Topics to be covered:

Topic 01  Introduction to the Distributed World
Topic 02  Designing for a Distributed World
Topic 03  Introduction to AWS, Azure, and Eucalyptus cloud services
Topic 04  History of AWS services
Topic 05  Deployment of AWS infrastructure (EC2, S3, EBS)
Topic 06  Deployment of AWS advanced infrastructure
Topic 07  Designing for Operations
Topic 08  Selecting a service platform
Topic 09  Application Architectures
Topic 10  Design Patterns for Scaling
Topic 11  Design Patterns for Resiliency
Topic 12  Operations in a Distributed World
Topic 13  Service Delivery: The Build Phase
Topic 14  Service Delivery: The Deployment Phase
Topic 15  AWS Cloud Formation and automated deployment of cloud resources
Topic 16  Final Examination
Syllabus

ITMO 450 Enterprise End-User System Administration
3 credit hours / 60 contact hours

Instructor: Jeremy Hajek

Textbook: Ballew, Jolli Configuring Windows 8.1, Microsoft Press 2014
ISBN: 978-0735684775

Thomas, Orin Managing Enterprise Devices and Apps, Microsoft Press 2014

Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Students learn to set up, configure, and maintain end-user desktops and portable devices in an enterprise environment using contemporary proprietary operating systems, including the actual installation of the operating system in a networked client-server environment. User account management, security, printing, disk configuration, and backup procedures are addressed. Administration of central server resources associated with management and provisioning of end-user systems in workgroups, domains, is addressed. Prerequisites: None

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will be able to demonstrate an understanding of operating system capabilities to best choose the correct technology fit for enterprise requirements. This involves physical, virtual, mobile/tablet based computing and security for these distinct areas.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Discuss the basic history of Microsoft Windows and different versions
- Describe the differences and reasons why between each version.
- Prepare a system for upgrade to the latest Windows operating system.
- Be able to install Windows
- Explain how drivers are installed and how driver signing works
- Describe the nature of the Windows Store and Store Apps
- Deploy Group Policy in conjunction with App Locker, IE, and Hyper-V
- Describe the nature of Workgroup networking and security levels
- Maintain system updates and the options for Web based and local updates
- Use Intune service to manage tablet and mobile devices.
- Use third party deployment tools
ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(l) An ability to effectively integrate IT-based solutions into the user environment.

(m) An understanding of best practices and standards and their application.

Topics to be covered:

Topic 01  Introduction to History of Windows
Topic 02  Comparison of Window’s Versions
Topic 03  Windows 8.1 upgrade readiness
Topic 04  Windows Data Migration & Installation
Topic 05  Migration of User Data
Topic 06  Device Drivers and Window’s Store
Topic 07  App Locker. IE, Hyper-V
Topic 08  Network Connectivity
Topic 09  Authentication & File Access
Topic 10  WSUS & BitLocker
Topic 11  Managing Applications
Topic 12  Managing Mobile Devices
Topic 13  Third Part Deployment Tools
Topic 14  Discussion of Domains and Windows Deployment Services
Topic 15  Final Project Presentations / Final Exam Review
Topic 16  Final Examination
Syllabus

ITMO 453 Open Source Server Administration
3 credit hours / 45 contact hours

Instructor: Jeremy Hajek


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Students learn to set up, configure, and administer an industry-standard open source server operating system including integration with client systems using a variety of operating systems in a mixed environment. Topics include hardware requirements; software compatibility; administrative and technical practices required for system security; process management; performance monitoring and tuning; storage management; back-up and restoration of data; and disaster recovery and prevention. Also addressed are configuration and administration of common network and server services such as DNS, DHCP, firewall, proxy, remote access, file and printer sharing, email, web, and web services as well as support issues for open source software. Prerequisites: ITM 301 and ITMO 456

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate an understanding of creating and maintaining Linux based networks and services. They will have the ability to maintain existing networks and services as well as understand the right tools and services to deploy in a new Linux network.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Discuss basic concepts of system resources and resource use
- Be able to load kernel modules and compile a Linux kernel
- Understand init systems and discuss the differences between SysVInit and system
- Understand the system boot and loading process with boot loaders
- Understand the Linux filesystem, including mount points and LVM partitioning
- Understand how to use iSCSI and other networked filesystems such as NFS and SAMBA
- Understand the use of webservers, and other networked based servers and their implementation

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

Topics to be covered:

- Topic 01 Measure and Troubleshoot Resource Usage and Predict Future Resource Needs
- Topic 02 Kernel Components
- Topic 03 Kernel runtime management and troubleshooting
- Topic 04 Customizing SysV-init system startup
- Topic 05 Systemd start up and introduction
- Topic 06 System Recovery
- Topic 07 Alternate bootloaders
- Topic 08 Filesystem and Devices
- Topic 09 Maintaining a Linux filesystem
- Topic 10 Advanced Storage Device Administration
- Topic 11 Adjusting Storage Device Access
- Topic 12 Logical Volume Manager
- Topic 13 Network Configuration
- Topic 14 System Maintenance tools, Domain Name Server, Web Services, and Apache and Nginx
- Topic 15 File Sharing E-Mail Services, and System Security
- Topic 16 Final Exam
Syllabus

ITMO 454/ITMO 554 - Operating System Virtualization  
3 Credit Hours / 45 Contact Hours  

Instructor: Adjunct Professor Louis F. McHugh IV  


Optional Texts (Available online from books24x7, IIT Galvin Library):  
[Books24x7 version] Available from  
[Books24x7 version] Available from  

Course Description: This course will cover technologies allowing multiple instances of operating systems to be run on a single physical system. Concepts addressed will include hypervisors, virtual machines, para-virtualization, and virtual appliances. Both server and desktop virtualization will be examined in detail, with brief coverage of storage virtualization and application virtualization. Business benefits, business cases, and security implications of virtualization will be discussed. Extensive hands-on assignments and a group project will allow students to gain first-hand experience of this technology. Prerequisites: ITMO 456  

This is a selected elective in the Bachelor of Information Technology and Management degree.  

Course Outcome: The course is a course in the understanding, planning, design, implementation, and support of operating systems from a virtual perspective. Upon completion, a student should be able to understand how a hypervisor, virtual machines, para-virtualization, and virtual appliances from both a desktop and server approach.  

Course Objectives: At the conclusion of this course, each successful student will able to:  

- Demonstrate foundation knowledge and application of operating system virtualization as it applies in the management of servers and desktop workstation in a business environment  
- Install, configure, use and manage a variety of operating system virtualization environments  
- Intelligently assess enterprise needs for virtualization, then select and apply the best solution.
ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(d) An ability to function effectively on teams to accomplish a common goal

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice

(m) An understanding of best practices and standards and their application

Topics Covered:

Topic 01 Introduction to Virtualization
Topic 02 Virtualization Application Overview
Topic 03 Hypervisors, VMs, and Paravirtualization
Topic 04 Prepare for Virtualization
Topic 05 Virtual Appliances
Topic 06 Testing and the Lab
Topic 07 Server Virtualization
Topic 08 Deploying Server Virtualization
Topic 09 Desktop Virtualization
Topic 10 Application Virtualization
Topic 11 Storage Virtualization
Topic 12 Managing Virtualization
Topic 13 Security Implications of Virtualization
Topic 14 The Future of Virtualization
Syllabus

ITMO 456 Introduction to Open Source Operating Systems
3 credit hours / 45 contact hours

Instructor: Jeremy Hajek


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Students learn to set up and configure an industry-standard open source operating system, including system installation, and basic system administration; system architecture; package management; command–line commands; devices, filesystems, and the filesystem hierarchy standard. Also addressed are applications, shells, scripting and data management; user interfaces and desktops; administrative tasks; essential system services; networking fundamentals; and security, as well as support issues for open source software. Multiple distributions are covered with emphasis on the two leading major distribution forks.

Prerequisites: None

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate an understanding of installation, configuration, and administration of industry standard open source operating systems. They will be able to troubleshoot and resolve Linux installation and common systems issues. They will be able to use and administer Linux as both a server and a desktop operating system.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Explain and understand the Unix/Linux philosophy
- Explain the difference between Free Software and Open Source software
- Describe what Linux is and how it relates to different distributions
- Install a Linux operating system
- Explain the structure of the Linux filesystem
- Explain pathing
- Describe and use the Linux Shell
- Recall and employ Linux command line utilities
- Use the vi editor
- Explain the nature of various administration tasks

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accreditating Computing Programs are met all or in part by this course:

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities
(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

Topics to be covered:

   Topic 01  Introduction to Opensource software
   Topic 02  Installing Linux Operating Systems
   Topic 03  Using Fedora Linux
   Topic 04  Linux Filesystems
   Topic 05  Linux Shell
   Topic 06  Linux Utilities
   Topic 07  vi and text editors
   Topic 08  Bash shell scripting
   Topic 09  Administration tasks
   Topic 10  Remote Administration - SSH
   Topic 11  Deployment tools
   Topic 12  Files Directories and FileSystems
   Topic 13  Mounting and formatting of drives
   Topic 14  Building and compiling a kernel
   Topic 15  Final Exam Review
   Topic 16  Final Examination
Syllabus

ITMD 456 Introduction to Open Source Operating Systems
3 credit hours / 45 contact hours

Instructor: Sean Hughes-Durkin


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Students learn to set up and configure an industry-standard open source operating system, including system installation, and basic system administration; system architecture; package management; command–line commands; devices, filesystems, and the filesystem hierarchy standard. Also addressed are applications, shells, scripting and data management; user interfaces and desktops; administrative tasks; essential system services; networking fundamentals; and security, as well as support issues for open source software. Multiple distributions are covered with emphasis on the two leading major distribution forks.

Prerequisites: None.

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: Students completing this course will demonstrate an understanding of installation, configuration, and administration of industry standard opensource operating systems. They will be able to troubleshoot and resolve Linux installation and common systems issues. They will be able to use and administer Linux as both a server and a desktop operating system.

Course Objectives: At the conclusion of this course, each successful student will able to:
- Describe the GPL, GNU, and history of the Linux operating system
- Install different Linux distributions with custom partitioning
- Navigate the graphical interface of the Linux operating system
- Navigate the filesystem using the command line
- Interact with the Linux shell
- Utilize key Linux utilities
- Install software for use with the Linux operating system
- Administer a Linux system
- Utilize networking service and how to troubleshoot issues
- Utilize SSH for remote administration
- Create customer host firewall rules
- Configure an Apache web server
- Create shell scripts for use with automation
ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

Topics to be covered:

Topic 01  Introduction to Open Source Software
Topic 02  Installing Linux
Topic 03  Using Fedora and the Shell
Topic 04  Linux Filesystem
Topic 05  Bourne Again Shell (BASH)
Topic 06  Linux Utilities
Topic 07  Midterm Exam
Topic 08  Installing Software
Topic 09  System Administration
Topic 10  Linux Networking
Topic 11  OpenSSH & Host Firewall
Topic 12  Apache Webserver
Topic 13  BASH Scripting
Topic 14  Final Exam Review
Topic 15  Final Examination
Syllabus

ITMO 456 Introduction to Open Source Operating Systems
3 credit hours / 45 contact hours

Instructor: Ray Trygstad


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Students learn to set up and configure an industry-standard open source operating system, including system installation, and basic system administration; system architecture; package management; command–line commands; devices, filesystems, and the filesystem hierarchy standard. Also addressed are applications, shells, scripting and data management; user interfaces and desktops; administrative tasks; essential system services; networking fundamentals; and security, as well as support issues for open source software. Multiple distributions are covered with emphasis on the two leading major distribution forks.

Prerequisites: None.

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will be able to demonstrate foundation knowledge of the Linux operating system and will be familiar with knowledge required to pass the Linux+ certification exams from CompTIA. The course will be taught to the current Linux+ objectives (Exams LX0-103 and LX0-104) which are the same as the Linux Professional Institute LPIC-1 level. Exam objectives that are covered in other courses in the ITM curriculum, such as ITMD 440 will not be covered in this course. While this course is taught to published exam standards, it is not an exam preparation course and there is no guarantee or expectation that students completing the course will be able to pass the Linux+/LPIC-1 exams.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Describe the origins of and explain the philosophy of Open Source Software
- Install, configure and administer an industry-standard distribution of the Linux operating system.
- Troubleshoot and resolve Linux installation problems and common system problems.
- Use and administer Linux as both a server and desktop operating system.

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.
(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

- **Topic 01** Introduction to Linux  
  - Lab 01 Lab Intro and Using boot-from-CD distributions of Linux
- **Topic 02** Linux Installation and Usage  
  - Lab 02 Installing Linux and Introduction to the BASH Shell
- **Topic 03** The Linux Filesystems  
  - Lab 03 Filesystem Navigation and Commands, & Using vi
- **Topic 04** Managing Filesystems  
  - Lab 04 Directories, Links, File Search & Permissions
- **Topic 05** Administering Filesystems  
  - Lab 05 Device Files, Mounting, Usage & Errors
- **Topic 06** Linux Server Deployment  
  - Lab 06 Server Configuration, Installation and ZFS
- **Topic 07** Linux Command Line: the BASH Shell  
  - Lab 07 Working with the BASH shell & Shell Scripts
- **Topic 08** System Initialization and X Windows  
  - Lab 08 System Boot and Configuring Desktops
- **Topic 09** Managing Linux Services and Processes  
  - Lab 09 Start, Stop, PS, Top and Kill: managing processes and services
- **Topic 10** Linux System Administration: root  
  - Lab 10 Common Administrative Tasks
- **Topic 11** Software Installation and System Backup  
  - Lab 11 Archives & Installing and Managing Packages
- **Topic 12** Networking Linux  
  - Lab 12 Linux Network Configuration & Remote Access
- **Topic 13** Configuring & Using Network Services  
  - Lab 13 Configuring Network Services
- **Topic 14** Linux Troubleshooting & Security  
  - Lab 14 Monitoring and Securing Linux
- **Topic 15** Linux, Virtualization, and the Cloud  
  - Lab 15 Lab Wrap-Up
Syllabus

ITMS 428 Database Security
3 credit hours / 45 contact hours

Instructor: TBD

ISBN: 978-1435453906

Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Students will engage in an in-depth examination of topics in data security including security considerations in applications and systems development, encryption methods, cryptography law and security architecture and models. Prerequisite: ITMD 421

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each student will learn the fundamentals of database security as well as concepts and technologies such as encapsulation (information hiding) and using relational database security management techniques. They will be conversant with database hardening on a variety of platforms, defense against the most common threats and attacks, and the legal and regulatory environment impacting database security.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Recall and describe concepts of information security
- Describe and explain security architectures for protection of database resources
- Secure and harden database deployments using leading industry-standard database management systems
- Recall and describe access control approaches, including authentication, authorization, privileges and roles
- Discuss cryptography and encryption
  - Identify elements of a cryptographic system
  - Describe how crypto can be used, strengths and weaknesses, modes, and issues that have to be addressed in an implementation
- Describe the technical details of SQL injection attacks
- Explain how to protect against SQL injection attacks
- Discuss issues and recall techniques and best practices in the protection of Big Data and data in the cloud
- Recall and describe legal and regulatory compliance issues in database protection
- Describe and discuss the processes of auditing and testing database security

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application.

Topics to be covered:

- Topic 01 Introduction: Security and Information Technology
- Topic 02 Database Review
- Topic 03 Database Hardening: MySQL
- Topic 04 Database Hardening: SQL Server
- Topic 05 Database Hardening: Oracle
- Topic 06 Passwords, Profiles, Privileges, and Roles
- Topic 07 Encryption
- Topic 08 SQL Injection I: Identification
- Topic 09 SQL Injection II: Exploitation and Defense
- Topic 10 Securing Big Data
- Topic 11 Cloud-based security
- Topic 12 Regulations and Compliance
- Topic 13 Database Security Auditing
- Topic 14 Database Security Testing
Syllabus

ITMS 443 Vulnerability Analysis and Control
3 credit hours / 45 contact hours

Instructor: Kevin Vaccaro


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: This course addresses hands-on ethical hacking, penetration testing, and detection of malicious probes and their prevention. It provides students with in-depth theoretical and practical knowledge of the vulnerabilities of networks of computers including the networks themselves, operating systems, and important applications. Integrated with the lectures are laboratories focusing on the use of open source and freeware tools; students will learn in a closed environment to probe, penetrate, and hack other network. It is recommended, but not required, that students also take ITMS 448 prior to or in parallel with this course. Prerequisite: None. This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each student will be able to explain the professional hacker’s methodology for attacking a network and differentiate between different methods of attacks and countermeasures.

Course Objectives: At the conclusion of this course, each successful student will able to:

• Explain the professional hacker’s methodology for attacking a network.
• Explain the script kiddie’s methodology for attacking network.
• Explain Network Security vulnerabilities.
• Explain Hackers, hacker techniques, tools and methodologies
• Describe hacker motivation, perform network reconnaissance and network scanning methods
• Describe and perform covering tracks after gaining access to a network.
• Describe the general symptoms of a virus attack
• Define and describe the two basic approaches to antivirus software.
• Describe how to defend against a worm and virus attack.
• Describe the steps in planning for a computer incident.
• Identify the difficulty is establishing who has jurisdiction over a computer crime.
• Understand the legal issues with regard to preserving digital evidence.
• Identify and describe the incident response goals and priorities.
• Describe the factors involved in identifying a computer incident.
• Describe and use the various tools associated with identifying an intruder.
• Describe how to handle and evaluate a computer incident.
• Recognize the role of law enforcement and rule of particularity in executing a search warrant.
• Describe the role the network security specialist would play in assisting the law enforcement and prosecution effort.
• Describe the difficulties in prosecuting a computer crime incident.
Differentiate between competitive intelligence, economic intelligence, and industrial espionage.
Differentiate between information, data, knowledge and intelligence.
Specify the advantages of intelligence in industrial espionage.
Describe the various factors that make up the intelligence lifecycle.
Describe the foreign intelligence organizations interested in economic intelligence and their general methodology.
Describe operational, personnel, physical and technical countermeasure factors.
Describe the history of warfare and its relationship to information warfare.
Explain the concerns of the US. Government with regard to the information

**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities.
(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.
(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

- **Topic 01** Introduction / Ethics of Hacking and Cracking
- **Topic 02** Reconnaissance
- **Topic 03** Scanning Tools
- **Topic 04** Sniffers
- **Topic 05** TCP/IP Vulnerabilities
- **Topic 06** Encryption and Password Cracking
- **Topic 07** Spoofing
- **Topic 08** Session Hijacking
- **Topic 09** Hacking Network Devices
- **Topic 10** Trojan Horses /Malware
- **Topic 11** Denial of Service Attacks
- **Topic 12** Buffer Overflows/Programming Exploits
- **Topic 13** Web Application Vulnerabilities
- **Topic 14** Windows Vulnerabilities
- **Topic 15** Unix/Linux Vulnerabilities
- **Topic 16** Final Examination
Syllabus

ITMS 448 Cyber Security Technologies
3 credit hours / 52 contact hours

Instructor: Shawn Davis


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: Prepares students for a role as a network security administrator and analyst. Topics include viruses, worms, other attack mechanisms, vulnerabilities and countermeasures, network security protocols, encryption, identity and authentication, scanning, firewalls, security tools, and organizations addressing security. A component of this course is a self-contained team project that, if the student wishes, can be extended into a fully operational security system in a subsequent course. Prerequisites: ITMO 440

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will gain an in-depth understanding of various important network and computer security concepts and practices. Additionally, each student will become an expert in the specific facet of security associated with her/her team project. Students, through their course exams and team project presentations, will demonstrate the ability to apply information assurance and security concepts, specifically on the topics of malware analysis, attack vectors, mitigation/deterrents, cryptography, Steganography basics, firewalls, IDS/IPS, internet security protocols, authentication, and wireless network security.

Course Objectives: At the conclusion of this course, each successful student will be able to:

- Discuss general information security concepts and core principles as well as identify common insider and outsider threats.
- Describe common types of malware and web exploit kits as well as identify common signatures and remediation techniques.
- Create an isolated environment for performing malware analysis using static and dynamic techniques.
- Discuss and identify common attack vector types and methods.
- Identify and explain the Open Web Application Security Project (OWASP) top ten critical web application security vulnerabilities as well as associated attack methods.
- Describe how public and private key cryptography can be used to achieve confidentiality, integrity, authentication, and non-repudiation.
- Discuss and demonstrate hiding covert information in common types of carrier files using various steganographic methods and tools.
- Describe and demonstrate components of host and network based intrusion detection and prevention systems using the SecurityOnion Linux distribution.
- Demonstrate firewall rule creation and discuss the usage and proper placement of stateless and stateful packet inspection filters, and proxy servers for securing networks.
- Describe wireless security components, architecture, security protocols, common threats, and attack types as well as demonstrate common attack scenarios.
• Discuss common methods for user and network authentication and demonstrate how an attacker can utilize John the Ripper to crack various types of password hashes.
• Discuss and demonstrate expertise in a particular area of information security following the outcome of their semester long security project.

**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
(d) An ability to function effectively on teams to accomplish a common goal.
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities.
(f) An ability to communicate effectively with a range of audiences.
(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(m) An understanding of best practices and standards and their application.
(n) An ability to assist in the creation of an effective project pla

**Topics to be covered:**

Topic 01 Information Security Overview
Topic 02 Malware and Exploit Kit Overview
Topic 03 Malware Analysis
Topic 04 Attack Vectors & Mitigation Techniques
Topic 05 Attack Vectors II & Mitigation Techniques
Topic 06 Private Key Cryptography
Topic 07 Public Key Cryptography, Midterm Review
Topic 08 Midterm Examination
Topic 09 Steganography
Topic 10 Intrusion Detection & Prevention Systems
Topic 11 Firewalls
Topic 12 Wireless Network Security & Attacks
Topic 13 User and Network Authentication
Topic 14 Final Presentations & Demonstrations of Projects
Topic 15 Final Examination
**Syllabus**

**ITMD 458 Operating System Security**  
3 credit hours / 45 contact hours

**Instructor:** Sean Hughes-Durkin

**Textbook:** No formal textbook. Course material may be found on the course web site at http://blackboard.iit.edu

**Course Description:** This course will address theoretical concepts of operating system security, security architectures of current operating systems, and details of security implementation using best practices to configure operating systems to industry security standards. Server configuration, system-level firewalls, file system security, logging, anti-virus and anti-spyware measures and other operating system security strategies will be examined.  
*Prerequisites:* ITMO 456

This is a selected elective in the Bachelor of Information Technology and Management degree.

**Course Outcome:** Each successful student will be able to describe the different types of malicious threats targeted to an operating system. The student will be able to explain ways to mitigate these threats, correct vulnerable configurations, and use best practices to harden systems. This course and the concepts described in the class cover topics included on the Certified Information Systems Security Professional (CISSP). The GIAC Security Essentials (GSEC) certification is another recognized security certification that covers the concepts the student will learn throughout this course.

**Course Objectives:** At the conclusion of this course, each successful student will able to:

- Discuss basic concepts of system security
- Discuss different malicious software and attacks
- Understanding the different types of attacks and software for use in protecting system security
- Explain ways to authenticate users and control their access
- Understand how to use different cryptographic tools to secure a system
- Implement host based intrusion detection and host based firewalls
- Explain different ways to secure operating systems
- Understand how to harden Linux and Windows systems
- How to implement secure communication
- Post system hardening testing and analysis

**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

Topic 01  Overview of Security
Topic 02  Malicious Software
Topic 03  Malicious Attacks
Topic 04  User Authentication & Access Control
Topic 05  Cryptographic Tools
Topic 06  Host Based Intrusion Detection – Part 1
Topic 07  Host Based Intrusion Detection – Part 2
Topic 08  Midterm Exam
Topic 09  System Firewalls
Topic 10  OS agnostic hardening
Topic 11  Linux Hardening
Topic 12  Windows Hardening
Topic 13  Secure Communication
Topic 14  Post OS Hardening Testing
Topic 15  Final Exam Review
Topic 16  Final Examination
Syllabus

ITMS 478 Cyber Security Management
3 credit hours / 45 contact hours

Instructor: William Slater


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: In-depth examination of topics in the management of information technology security including access control systems & methodology, business continuity & disaster recovery planning, legal issues in information system security, ethics, computer operations security, physical security and security architecture & models using current standards and models. Students will be required to complete a research paper. Prerequisites: None.

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate foundation knowledge and application of information system (IS) security concepts as they to apply the management of IS security in a large organizational environment. Students will be able to develop controls used to enforce confidentiality, integrity and availability. Students will describe and identify policy frameworks, legal and moral implications, and best practices in information security management.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Identify categorizations of information assets using risk assessment and risk analysis tools.
- Identify vulnerabilities and threats associated with information assets.
- Define threats based on computer and systems architectures.
- Implement policies, standards, procedures and guidelines to ensure the confidentiality, integrity and availability of assets.
- Incorporate security and contingency planning.
- Develop a Security Awareness Program
- Develop a Security Program utilizing standard security management models and practices.
- Develop controls used to enforce confidentiality, integrity and availability.
- Identify legal and ethical issues associated with the management of information assets.

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(f) An ability to communicate effectively with a range of audiences
(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society

(h) Recognition of the need for and an ability to engage in continuing professional development

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

- Topic 01 Introduction to Management of Information Security
- Topic 02 Planning for Security
- Topic 03 Planning for Contingencies
- Topic 04 Information Security Policy
- Topic 05 Developing the Security Program
- Topic 06 Security Management Models
- Topic 07 Security Management Practices
- Topic 08 Risk Management: Identifying and Assessing Risk
- Topic 09 Risk Management: Controlling Risk
- Topic 10 Protection Mechanisms
- Topic 11 Personnel and Security
- Topic 12 Law and Ethics
- Topic 13 Managing Security Projects
- Topic 14 Designing and Implementing Security Awareness
- Topic 15 Designing and Implementing a Security Program
Syllabus

ITMS 478 Cyber Security Management
3 credit hours / 45 contact hours

Instructor: Ray Trygstad


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: In-depth examination of topics in the management of information technology security including access control systems & methodology, business continuity & disaster recovery planning, legal issues in information system security, ethics, computer operations security, physical security and security architecture & models using current standards and models. Students will be required to complete a research paper. Prerequisites: None. This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate foundation knowledge and application of information system (IS) security concepts as they apply the management of IS security in a large organizational environment. Students will describe and identify policy frameworks, legal and moral implications, and best practices in information security management. Students will be able to conduct a security audit of an organization and report on the results with appropriate suggestions for amelioration of problem areas identified.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Explain what cyber security is and discuss the history of computer & information security
- Identify, list, and define key terms and critical concepts of the Information Assurance/Cyber Defense discipline
- Recall the principal components of cyber security system implementation planning
- Describe the threats posed to security and discuss common attacks
- Explain the need for contingency planning and describe the major components
- Define information security policy and explain its central role in a successful information security program
- Define risk management and its role in the organization
- Use risk management to identify and prioritize risk factors for information assets
- Assess risk based on the likelihood of occurrence and impact on an organization
- Identify risk control classification categories and evaluate risk controls
- Explain what an information security audit is, and the relationship of information security policies to the audit process
- Describe how an information security audit is conducted
- List and describe functional components of the information security program
- Determine how to plan and staff an organization’s information security program
- Explain how to develop a security program, identifying goals, objectives and metrics
- Select and customize an information security management model to meet the needs of a particular organization
- List and implement the elements of key information security management practices
• Discuss emerging trends in the certification and accreditation of U.S. federal IT systems
• Describe cyber defense tools, methods and components
• Describe how fundamental concepts of cyber defense can provide system security
• Identify skills and requirements for information security positions
• Explain the role of information security in hiring, training, evaluations, and terminations
• Identify major national and international laws that relate to the practice of cyber security and cyber defense
• Describe the ethical foundations and approaches that underlie ethics in cyber security
• Describe the impact of legal/regulatory standards on a given system
• Conduct audits to determine compliance with laws.

**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(d) An ability to function effectively on teams to accomplish a common goal

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(f) An ability to communicate effectively with a range of audiences

(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society

(h) Recognition of the need for and an ability to engage in continuing professional development

(m) An understanding of best practices and standards and their application.

**Topics to be covered:**

Topic 01 Introduction to Information Security
Topic 02 Planning for Security
Topic 03 Security Policy
Topic 04 Risk Management I
Topic 05 Risk Management II
Topic 06 The Information Security Audit
Topic 07 Disaster Recovery & Business Continuity
Topic 08 Developing Security Programs
Topic 09 Security Management Models
Topic 10 Security Management Practices
Topic 11 Protection Mechanisms
Topic 12 Personnel and Security
Topic 13 Legal, Ethical & Professional Issues
Topic 14 HIPAA - Privacy & Security in Heath Care
Topic 15 IS Audit Class Presentations
Syllabus

ITMD 479 Topics in Information Security
Variable but normally 3 credit hours / 45 contact hours

Instructor: As assigned.

Textbook: Selected by the instructor as appropriate for the topic covered in the course.

Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: This course will cover a particular topic in Information Security, varying from semester to semester, in which there is particular student or staff interest. This course may be taken more than once but only 9 hours of ITMS 479/579 credit may be applied to a degree.

Prerequisites: Defined by the department or by instructor teaching the course

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate knowledge of an information security topic as defined by the selected topic for the term.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Meet objectives defined by the instructor for the topic covered in the course

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs may be met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(m) An understanding of best practices and standards and their application.

Topics to be covered: Topics will be defined by the instructor for the topic covered in the course.
**Syllabus**

**ITMS 484 Governance, Risk and Compliance**  
3 credit hours / 45 contact hours

**Instructor:** Bonnie A. Goins

**Textbook:** None. Publicly available deliverables on the topic are used for the course.

Other supplemental material may be found on the course web site at http://blackboard.iit.edu

**Course Description:** In-depth examination of topics in governance, risk and compliance, including Information Assurance policies, standards and compliance, as well as the examination of security risk analysis and the performance of systems certification and accreditation. Homework and a paper are required for this course. **Prerequisites:** None. This is a selected elective in the Bachelor of Information Technology and Management degree.

**Course Outcome:** Each successful student will demonstrate foundation knowledge of governance, risk and compliance (GRC) concepts as they apply to legal, regulatory and standards-based environments, such as HIPAA, FISMA, NERC, PCI DSS, GLBA, SOX, FERPA, COPPA and others. Students will describe and identify policy frameworks, legal and compliance implications, and best practices.

**Course Objectives:** At the conclusion of this course, each successful student will able to:
- Describe how risk relates to a system security policy.
- Students will be able to describe various risk analysis methodologies.
- Students will be able to evaluate and categorize risk 1) with respect to technology; 2) with respect to individuals, and 3) in the enterprise, and recommend appropriate responses.
- Students will be able to compare the advantages and disadvantages of various risk assessment methodologies.
- Students will be able to select the optimal methodology based on needs, advantages and disadvantages.
- Students will be able to describe the impact of legal/regulatory standards on a given system.
- Students will be able to describe how standards, such as the Orange Book, may be applied to the requirements for a sub-contractor or customer.
- Students shall be able to describe what the laws mandate and where they apply.
- Students will be able to conduct audits to determine compliance with laws.
- Students will be able to list the applicable laws and policies related to cyber defense and describe the major components of each pertaining to the storage and transmission of data.
- Students will be able to describe their responsibilities related to the handling of information about vulnerabilities.
- Students will be able to describe how the type of legal dispute (civil, criminal, private) affects the evidence used to resolve it.
- Students will be able to describe the DoD system certification and accreditation processes.
- Students will be able to define certification and accreditation and identify/discuss concepts.
**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(f) An ability to communicate effectively with a range of audiences

(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society

(h) Recognition of the need for and an ability to engage in continuing professional development

**Topics to be covered:**

Topic 01  Introduction to Risk Analysis
Topic 02  Risk Assessment/Analysis Methods
Topic 03  Risk Management Models and Processes
Topic 04  Risk Measurement, Evaluation and Communication
Topic 05  Risk Treatment Methods & Economics
Topic 06  Information Assurance
Topic 07  Legal, Regulatory and Standards Compliance
Topic 08  Policies, Laws, Regulation and Ethics
Topic 09  Conducting Audits, Assessments and Certification/Accreditation
Topic 15  Final Project Presentations / Final Exam Review
Topic 16  Final Examination
Syllabus

ITMT 430 Systems Integration
3 credit hours / 45 contact hours

Instructor: Jeremy Hajek / Ray Trygstad

Textbooks: Cox, Iain R. Enterprise Architecture: How to get EA optimized, Iain R. Cox
November 15, 2014; ASIN: B00PPI7104

Pew, Richard W. and Anne S. Mavor, editors. Human-system integration in the system
development process: a new look, Committee on Human-System Design Support for Changing

Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: In this capstone course, students will identify, gather, analyze, and write
requirements based on user needs and will then design, construct, integrate, and implement an
information system as a solution to a business problem. Students will document integration
requirements using business process models and will learn and apply key systems integration
architecture, methodologies, and technologies using industry best practices. User needs and user
centered design will be applied in the selection, creation, evaluation, and administration of the
resulting system. The system design process will take into account professional, ethical, legal,
security, and social issues and responsibilities and stress the local and global impact of
computing on individuals, organizations, and society. Discussion will also cover the need to
engage in continuing professional development.

Prerequisites: ITMD 411, ITMD 421, ITMD 361, ITMD 362, ITMM 471, ITMO 440, and
ITMO 456.

This is a required course in the Bachelor of Information Technology and Management degree.

Course Outcome: Students completing this course will be able to:

- Integrate hardware and software into a complete information system to meet identified
user needs as a solution to a defined business problem.
- Demonstrate professionalism, ethics, and an understanding of legal, security, and social
issues and responsibilities in information systems.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Identify, gather, analyze, and write information system requirements based on user needs.
- Document integration requirements using business process models.
- Design, construct, integrate, and implement an information system as a solution to a
business problem.
- Apply key systems integration architecture, methodologies, and technologies in the
construction of an information system using industry best practices.
- Based on identified user needs, demonstrate the use of user centered design in the
selection, creation, evaluation, and administration of an information system.
- Recall and explain professional, ethical, legal, security, and social issues and
responsibilities in information systems.
- Describe the local and global impact of computing on individuals, organizations, and society.
- Describe the need to engage in continuing professional development and explain how this
may be achieved.
**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(d) An ability to function effectively on teams to accomplish a common goal

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(l) An ability to effectively integrate IT-based solutions into the user environment.

(m) An understanding of best practices and standards and their application.

(n) An ability to assist in the creation of an effective project plan.

**Topics to be covered:**

Topic 01  The systems integration process
Topic 02  Business process modeling and analysis
Topic 03  User-centered design considerations
Topic 04  Information gathering and collection
Topic 05  Creating system requirements
Topic 06  Systems integration: architecture, methodologies, and technologies
Topic 07  Software and application selection
Topic 08  Hardware selection
Topic 09  System construction and network integration
Topic 10  Software deployment and integration
Topic 11  Security models, integration, and lifecycle
Topic 12  Professional, ethical, legal, and social issues and responsibilities
Topic 13  Local and global impact of computing
Topic 14  Personal professional development and growth
Topic 15  Project presentation
Syllabus

**ITMT 491 Undergraduate Research**
Variable 1 to 6 credit hours

**Instructor:** As assigned. Full-time faculty may schedule students for ITMT 491 as the faculty member’s schedule allows. Adjunct faculty are under no obligation to conduct undergraduate research with students as they receive no additional compensation for this, so their participation is entirely voluntary.

**Textbook:** Selected by the instructor and student as appropriate for topics covered in the course.

**Course Description:** Undergraduate research. Written consent of instructor is required.

**Prerequisites:** Defined by the department or by instructor teaching the course

This is a selected elective in the Bachelor of Information Technology and Management degree.

**Course Outcome:** Each successful student in this independent study course will demonstrate knowledge as defined by the selected topics for the term.

**Course Objectives:** At the conclusion of this course, each successful student will:

- present a project or research results in a formal presentation;
- produce a paper suitable for publication.

**ABET Criterion 3 Outcomes:** The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application.

(n) An ability to assist in the creation of an effective project plan.

**Topics to be covered:** Topics for the course will be defined by the instructor and student. Registration is by permit only; students must prepare and submit a written research prospectus, proposal, or abstract of material to be studied to the faculty member before they issue a permit to register. The faculty member will work with the student as necessary to refine the prospectus, proposal, or abstract to their mutual satisfaction. The prospectus, proposal, or abstract will define the topics to be covered in the course.
Syllabus

ITMT 492 Embedded Systems and Reconfigurable Device Logic
3 credit hours / 60 contact hours

Instructor: Jeremy Hajek


Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: This course covers reconfigurable intelligent devices programmed with modern high level languages and integration into modern environments. This course also covers the issue of deployment of wireless sensor networks and the use of rapid prototyping for commercial application. Students will discover hardware, software, and firmware design trade-offs as well as best-practices in current embedded systems development. A final project will integrate course concepts in a system using an embeddable single board microcontroller.

Prerequisites: ITM 311 or ITM 312

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate a proficiency in using a VOM meter to measure power values. Each student will produce a report on electronic components. Each student will complete and embedded systems circuit design project and present the working prototype of the device. The final course project is an embedded systems project that incorporates your ability to apply the concepts outlined in the objectives and final rubric.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Explain and implement basic electronic components and electrical diagrams
- Be able to properly implement these parts
- Understand the difference between a computer and a microcontroller
- Implement intelligence and decision constructs to give digital and analog sensors intelligence
- Understand the nature if processor timing and code execution on the microcomputer scale.
- Understand the nature of radio waves and communication
- Understand battery drain and usage while operating a microcontroller
- Be able to implement wireless networks (Mesh and P2P)
- Be able to use diagraming tools and draw schematics of their project design.

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline
(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(d) An ability to function effectively on teams to accomplish a common goal
(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(m) An understanding of best practices and standards and their application.
(n) An ability to assist in the creation of an effective project plan.

**Topics to be covered:**

- **Topic 01** Principles of Electricity and Electronics
- **Topic 02** Components and Semi-conductors
- **Topic 03** Passive and Active Components
- **Topic 04** Circuit assembly
- **Topic 05** Electronics Quiz
- **Topic 06** Getting Started with Arduino Microcontrollers
- **Topic 07** Introduction to sensor components
- **Topic 08** Introduction to control structures
- **Topic 09** Introduction to environmental monitoring
- **Topic 10** Introduction to Networking in microcontrollers
- **Topic 11** Introduction to Wireless Networking
- **Topic 12** Mesh Networks and P2P
- **Topic 13** Introduction to wearable computing
- **Topic 14** Introduction to batteries and solar power
- **Topic 15** Final Project Presentations
- **Topic 16** Final Examination
Syllabus

ITMT 495 Topics in Information Technology
Variable but normally 3 credit hours / 45 contact hours

Instructor: As assigned. Course coordinator is Ray Trygstad.

Textbook: Selected by the instructor as appropriate for the topic covered in the course.

Other supplemental material may be found on the course web site at http://blackboard.iit.edu

Course Description: This course will cover a particular topic, varying from semester to semester, in which there is particular student or staff interest.

Prerequisites: Defined by the department or by the instructor teaching the course

This is a selected elective in the Bachelor of Information Technology and Management degree.

Course Outcome: Each successful student will demonstrate knowledge of subject matter as defined by the selected topic for the term.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Meet objectives defined by the instructor for the topic covered in the course

ABET Criterion 3 Outcomes: While specific outcomes must be mapped for each offering of the course, the following ABET Criterion 3 outcomes for Accrediting Information Technology Programs may be met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(l) An ability to effectively integrate IT-based solutions into the user environment.

(m) An understanding of best practices and standards and their application.

Topics to be covered: Topics will be defined by the instructor for the topic covered in the course.
Syllabus

TECH 465 Introduction to Social Commerce
3 credit hours / 45 contact hours

Instructor: Bruce A. Mueller

Textbook: None. Excerpts from books, web sites, articles and class lecture notes will be used. Other supplemental materials and tools as well as introduction to mobile software/technology; developing an application; data base; data mining, analysis and reporting. Other supplemental material may be found on the course web site at http://blackboard.iit.edu.

Course Description: Provides the student with an introduction and basic knowledge of social commerce to help the student develop a practical understanding of the design, construction, market readiness and synergistic integration of a business mobile application used in social commerce. The course will provide a practitioner focus that will benefit the student in a start-up or company/corporate setting. Prerequisites: None

This is a selected elective in the Bachelor of Information Technology and Management degree and is available as an elective for students in other degrees.

Course Outcomes: Each successful students will demonstrate an understanding of the basic concepts of: social commerce, mobile applications, algorithms, data analytics, market research, customer identification and evaluation, reward techniques and how to win in business; and will demonstrate an ability to work in a team to produce and communicate a social commerce application that can win the marketplace.

Course Objectives: At the conclusion of this course, each student will be able to:

- Understand and articulate the basic concepts of social commerce
- Comprehend the definition and structure of social commerce
- Design a social commerce mobile application that meets customer needs
- Understand technology factors of data bases and all aspects of a mobile application
- Know, develop and apply basic market focused and reward algorithms
- Recognize and perform basic data analytics and data mining from data bases
- Create the integration of partner and customer applications, systems and rewards
- As part of a team, design, develop and prepare a written report and presentation for an actual social commerce mobile application and business model
- Realize what it takes to win in the marketplace with a social commerce application

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Computing Programs are met all or in part by this course:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(d) An ability to function effectively on teams to accomplish a common goal
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(f) An ability to communicate effectively with a range of audiences

(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.

(l) An ability to effectively integrate IT-based solutions into the user environment.

(m) An understanding of best practices and standards and their application.

(n) An ability to assist in the creation of an effective project plan.

**Topics to be covered:**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Topic 01</td>
<td>Introduction to definition, structure, scope and needs of business</td>
</tr>
<tr>
<td>Topic 02</td>
<td>Components of Social Commerce: needs, configuration and design</td>
</tr>
<tr>
<td>Topic 03</td>
<td>Customer needs research and analysis</td>
</tr>
<tr>
<td>Topic 04</td>
<td>Customer factors and ideation</td>
</tr>
<tr>
<td>Topic 05</td>
<td>Competitive Advantage including competition research</td>
</tr>
<tr>
<td>Topic 06</td>
<td>Market Research: Proof of Idea and Market for Idea</td>
</tr>
<tr>
<td>Topic 07</td>
<td>Final design of Idea (project)-Lean Canvas</td>
</tr>
<tr>
<td>Topic 08</td>
<td>Algorithms: basic design, customer experiences, partner experiences and rewards</td>
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<tr>
<td>Topic 09</td>
<td>Data Analytics</td>
</tr>
<tr>
<td>Topic 10</td>
<td>Data Mining: design, development, integration and synergies</td>
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<td>Topic 11</td>
<td>System requirements for data bases, files and structure</td>
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<tr>
<td>Topic 12</td>
<td>Mobile application: design, data handling, transactions, transmission, security, order process, payment, data base design and uses, testing, integration with other applications and systems</td>
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<tr>
<td>Topic 13</td>
<td>Business model, plan and project plan for a successful social commerce application</td>
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<tr>
<td>Topic 14</td>
<td>Team project on the design, development, testing, implementation, roll-out, pricing, distribution and feedback on a social commerce mobile application</td>
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<tr>
<td>Topic 15</td>
<td>Final team presentation of project to actual “shark” judges for opportunity of investment</td>
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<tr>
<td>Topic 16</td>
<td>Ten case studies on identified companies which reviews the company’s mobile customer applications, strengths and weaknesses, ways to incorporate social commerce improvements and the impact of the new solution on company’s employees, legal, financials, competition and customers</td>
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Syllabus

TECH 497 Special Projects
Variable 1 to 6 credit hours

Instructor: As assigned. Course coordinator is Ray Trygstad.

When taught as independent study, full-time faculty may schedule students for TECH 497 as the faculty member’s schedule allows. Adjunct faculty are under no obligation to conduct independent study with students as they receive no additional compensation for this, so their participation is entirely voluntary.

Textbook: Selected by the instructor or instructor and student as appropriate for topics covered in the course.

Course Description: Independent study and projects in applied technology that are multi/cross-disciplinary not tied to a specific department.

Prerequisites: Defined by the department or by instructor teaching the course

This is a selected elective in the Bachelor of Information Technology and Management degree and is available as an elective for students in other degrees.

Course Outcome: Each successful student in this independent study or project course will demonstrate knowledge as defined by the selected topics for the term.

Course Objectives: At the conclusion of this course, each successful student will able to:

- Meet objectives defined by the instructor for the topics covered in the course

ABET Criterion 3 Outcomes: The following ABET Criterion 3 outcomes for Accrediting Information Technology Programs are met all or in part by this course:

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

(m) An understanding of best practices and standards and their application.

(n) An ability to assist in the creation of an effective project plan.

Topics to be covered: When offered as a projects course, topics will be defined by the instructor for the topic covered in the course.

When taken as independent study, topics for the course will be defined by the instructor and student. Registration is by permit only; students must prepare and submit a written research prospectus, proposal, or abstract of material to be studied to the faculty member before they issue a permit to register. The faculty member will work with the student as necessary to refine the prospectus, proposal, or abstract to their mutual satisfaction. The prospectus, proposal, or abstract will define the topics to be covered in the course.