
ITE 350 IT System Integration, Administration, and Management**4 cr.****Catalog Description:**

Virtually all organizations have IT needs. It is the role of the IT professional to design, select, apply, deploy and manage computing systems to support the organization. This course presents methods, tools, and techniques used to design, build, and administer a viable IT environment. It assumes prior knowledge of computer architecture, IT fundamentals, networking, programming, and information management. Topics to be presented include Installing and configuring operating systems and applications, IT administrative activities, administrative domains, software requirements and testing, software acquisition and sourcing, Integration and deployment, project management, testing and quality assurance, and system architecture. Three lecture hours per week and three hours of scheduled laboratory per week.

Prerequisite(s): ITE 315, ITE320**Course Narrative:**

This course topics consists of skills and concepts that are essential to the administration of operating systems, networks, software, file systems, file servers, web systems, database systems, and system documentation, policies, and procedures. This also includes education and support of the users of these systems. One of the roles of the IT professional is to design and build systems and integrate them into an organization. This course develops the skills to gather requirements, then source, evaluate and integrate components into a single system, and finally validate the system. It also covers the fundamentals of project management and the interplay between IT applications and organizational processes.

The emphasis of this course is on rules and regulations, standards, and technical methods and tools used by IT professionals to design, implement, and manage complex IT environments. An IT environment starts as a set of requirements formulated by a user and ends as a working infrastructure that includes a multitude of computers, networks, security mechanisms, data storage and information management subsystems, etc. all working together to perform necessary work. IT professionals must know how to analyze the requirements, how to develop the full set of documents that describe the functioning of the infrastructure (so-called policies and procedures), and how to create actual blueprints of the infrastructure being built. IT professionals must know how to evaluate and acquire hardware and software components necessary to implement the infrastructure and be proficient in usage of tools and mechanisms used to configure and manage the environment according to the developed specification. All these topics are covered in the course.

Definitions:

Information Architecture is a discipline that describes how to design an architecture that stores, processes, and provides access to information. An **Information Technology** infrastructure is a system built according to specific rules and standards, which becomes the foundation for working **Information Technology Environment** that supports information processing activities (whatever these activities are).

The course consists of lectures, a group project, homework assignments, quizzes, and two exams – a midterm and a final. Lectures include exercises that may consist of:

- Discussions of the material presented during lectures
- Exercises designed to help students to understand practices used by IT specialists in designing and managing large IT environments
- Analysis of existing IT infrastructures from different points of view (performance, robustness, vulnerability, recovery, etc.) and writing reports
- Analysis of formal procedures and documents required by the process of creating an IT environment
- Usage of tools available to IT professionals to configure and manage IT infrastructures

Group discussion time and group presentations will be conducted as part of the lectures are an integral component of the course, serving to reinforce material presented during lectures.

Goals:

Upon successful completion of the course, a student should be able to do the following:

- G1: identify basic issues, problems, and solutions in designing, creating, and managing an IT environment
- G2: list and explain standard practices when analyzing requirements and designing IT environments, and describe rules, regulations, legal issues, and necessary documentation required in this process
- G3: describe all elements (software and hardware) used in complex IT environments
- G4: analyze components, tools, and organizational methods used by administrators to ensure functionality and stability (security, availability, reliability, etc.) of a simple/complex IT environment

Course Objectives:

Upon successful completion of the course, a student will have demonstrated the ability to:

- O1: install and configure at least one current operating system;
- O2: distinguish between server and client services;
- O3: install and configure at least one current application;
- O4: describe the importance of application maintenance for an organization;
- O5: Identify situations in which administrative activities are required;
- O6: determine the need for documentation, policies and procedures for IT systems and describe education and support for users of IT systems and policies.

Program Objective / Course Objective matrix (For ABET Accreditation Purposes)

(The following Matrix maps the Program Objectives for Information Technology Program outlined by Accreditation Board of Engineering Technology (ABET) with the Course Objectives. The check marks below the course objective represent that those course objectives accomplish specific program objectives set forth by ABET. The program objectives that have a * in front of them means that that course does not address those program objectives.)

Program Objective	O1	O2	O3	O4	O5	O6
PO-A: An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline.	✓					
PO-B: An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.			✓	✓	✓	✓
PO-C: An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.	✓	✓	✓	✓		
PO-D: An ability to function effectively on teams to accomplish a common goal.		✓	✓	✓		✓
PO-E: An understanding of professional, ethical, legal, security and social issues and responsibilities.	✓			✓	✓	✓
PO-F: An ability to communicate effectively with a range of audiences.	✓	✓				✓
PO-G: An ability to analyze the local and global impact of computing on individuals, organizations, and society.			✓			
*PO-H: Recognition of the need for and an ability to engage in continuing professional development.						
PO-I: An ability to use current techniques, skills, and tools necessary for computing practice.	✓	✓	✓	✓	✓	
PO-J: An ability to use and apply current technical concepts and practices in the core information technologies.			✓	✓		
PO-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.	✓	✓	✓	✓	✓	
*PO-L: An ability to effectively integrate IT-based solutions into the user environment.						
PO-M: An understanding of best practices and standards and their application.	✓					
*PO-N: An ability to assist in the creation of an effective project plan.						

Course Topics:

The column on the right hand side represents the Body of Knowledge and number of hours (in parenthesis) set forth by ABET accreditation board for accomplishing minimum required hours assigned for different categories. More information on this body of knowledge can be found in Appendix A "The IT Body of Knowledge" on Page 68 of the following document.

<http://www.acm.org/education/curricula/IT2008%20Curriculum.pdf>

- **Operating Systems and Applications** SA1(2), SA2(1), IAS3(1), IPT2(1), IPT4(2), PT1(1)
 - Installation of an operating system and an application
 - Configuration of an operating system and an application
 - Maintenance (Service Pack and Patches)

- Server Services (Print, file, DHCP, DNS, FTP, HTTP, Mail, SNMP, telnet)
- Client Services
- Server Administration and Management
- Backup and Disaster Recovery
- User Support and documentation

- **Administrative Activities** **SA3(1), IPT3(2)**
 - Need of Managing IT Resources
 - Identify when administrative activities are required
 - Need of Policy governing IT Systems
 - Content Management
 - Content Deployment(file system planning and structure)
 - Server Administration and Management
 - User and Group Management

- **Administrative Domains** **SA3(1), IAS10 (1), ITF4(1), IAS6(1)**
 - Responsibilities common to the various administrative domain
 - Responsibilities unique to each of the various administrative domain
 - Web Domains
 - Network Domains
 - Database Domains
 - Operating System Domains
 - Support Domain
 - Security Domains
 - Responsibilities in each domain that support activities in other domain

- **Software Requirements and Testing** **SIA1(6), IM6 (1)**
 - Requirements Elicitation, documentation and Maintenance
 - Stakeholders of a system and their needs
 - Modeling Requirements
 - Various requirements modeling techniques
 - Non-functional and functional requirements
 - Classify the roles played by external users of a system
 - Use Case Model
 - Explain and give examples of use cases
 - Structure of detailed use case
 - Use case based on relating functional requirements
 - Types of event flows in a use case and under which conditions they occur
 - Testing-How use case driven testing throughout the system lifecycle
 - SDLC: How requirements gathering first into a system development life cycle

- **Software Acquisition and Sourcing** **SIA2(4)**
 - Build and Buy
 - In-Sourcing and Outsourcing
 - System Architecture: Hardware, Software, and Virtual
 - Testing, Evaluation and Benchmarking
 - Contracts and RFPs
 - Quality

- **Integration and Deployment** **SIA3(4), IM6(1), IPT1(3), PT4(1)**
 - Components, Interfaces and Integration
 - Infrastructure, Middleware and Platforms
 - Techniques- Data warehouses, extending framework, wrappers
 - System Release: Pilot & acceptance testing and defect repair
 - System Support strategies and User Support plans
 - Enterprise Integration approaches, standards and Best Practices

- **Project Management** **SIA4(3), SP2(1)**
 - Key components of project plan
 - Importance of cost/benefit Analysis to the successful implementation of project plan
 - Roles and responsibilities for key project personnel and stakeholders
 - Project planning and tracking tools
 - Issues involved in creating a project schedule
 - Risk Management
 - Lessons learned in a project closeout and review session

- **Testing and Quality Assurance** **SIA5(1)**
 - Current testing standards
 - Components of Usability Testing
 - How acceptance test is executed and evaluated

- **Organizational Context** **SIA6(1)**
 - Relationship between business processes and system integration
 - Need of considering Current IT environment- in defining system architecture and in system integration
 - Importance of organizational Culture in any system integration project

- **Architecture** **SIA7(1)**
 - System architecture in the context of system integration
 - Information architecture views and system evolution over time
 - Specific architecture views – how they relate to the system life cycle
 - Examples of architectural frameworks and associated best practice models(SOA, Zachman framework, ITIL, COBIT, ISO 20,000)
 - Examples of modeling tools that support description and management of architectural views.

Student Experiences:

Assignments

Homework assignments, given weekly, consist of exercises that cover different stages of an IT environment creation process and working on practical examples. Assignments require students to use information given during the lectures and textbooks, and perform Internet research. Regular writing assignments include but are not limited to:

- review of technical articles;
- presentation of research findings;

- proposals to solve different issues that arise during the IT environment creation process;
- analysis and evaluation of methodologies used in building IT environments;

Specific requirements for each assignment will be stated when the assignment is distributed; all written submissions will be graded against the Writing rubric. Presentations will be assessed based on the Presentation rubric.

Group project

Group project includes analysis and design of an IT infrastructure according to a formulated set of requirements. Project reports must conform to guidelines announced in class. Projects will be assessed and graded against the Project Implementation rubric.

Lab Assignments

Conducted as part of the scheduled laboratory sessions, labs are an integral component of the course, serving to reinforce the concepts and techniques presented in lectures.

Quizzes, Tests and Examinations

There will be four quizzes (each covering a major topic), a midterm, and a cumulative final. Quizzes and exams will include multiple choice and problem solving tasks.

Final Grade

Final grade will be determined on the basis of the following weights:

Grading Categories	Weights (%)
Group project	20
Lab Assignments	25
Quizzes	25
Midterm exam	15
Final exam	15
Total	100

Course Objective / Assessment Mechanism matrix

	Group project	Lab Assignments	Quizzes	Midterm exam	Final Exam
O1	✓	✓	✓	✓	✓
O2	✓	✓	✓	✓	✓
O3	✓	✓			
O4	✓	✓	✓	✓	✓
O5	✓	✓	✓	✓	✓
O6	✓				

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Ward, Brian. **How Linux Works: What Every Superuser Should Know**. Second Edition. No Starch Press, 2014.

E. Nemeth; G. Snyder; T.R. Hein; B. Whaley. **UNIX and Linux System Administration Handbook**. Fourth Edition. Prentice Hall, 2010.
