

Course Descriptions

Core Classes

IT507 Measurement and Evaluation in Industry and Technology An introduction to measurement strategies in industrial, technical, and human resource development environments. The evaluation of measurement outcomes will be the primary focus of the course.

IT508 Quality and Productivity in Industry and Technology Examines the contemporary issues of continuous improvement in quality and productivity in manufacturing and service industries. Includes a close examination of the evolving philosophies bearing on the scope, improvement, and costs of quality assurance programs in industry and technology.

TECH646 Analysis of Research in Industry and Technology Analysis of research and evaluation of research reports. Emphasis on understanding the application of fundamental statistical methods in design and interpretation of research findings in industrial, technical, and human resource development environments.

TECH598 Directed MS Project A formal investigation of a particular problem under the guidance of the advisory committee. Not applicable to a thesis option plan of study. Enrollment during at least two consecutive terms for a total of three credits is required.

Suggested Technical Electives

Technology from a Global Perspective Introduction to the challenges faced by the practicing technologist when working and interacting with international technical personnel, both here and abroad, including history, standards, education, and practice of technology outside the United States.

Project Management The factors influencing decisions during the initiation, implementation, and termination of industrial and manufacturing projects are examined. Students work as project teams, using project management tools to develop implementation strategies.

Leadership & Ethics An examination of ethical, legal and policy issues facing business and technology leaders. Topics include ethical decision-making, corporate social responsibility, codes of ethics, public policies and government regulations, international business practices, technology innovation, risk management in a global environment, and specific areas of law – employment, health and safety, environmental, contract, warranties and liabilities, intellectual property, technology law, and international laws and regulations. This course uses the case study method and involves active discussion and debate.

Computer Graphics Technology

Interactive Multimedia Development And Research A survey of the interactive multimedia development process, knowledge base, and applications in business and industry. Particular attention is paid to research issues surrounding theoretical, technological, and interactive techniques, and validating those approaches through applied research. Emphasis is placed on the interdisciplinary nature of the development of new media tools.

Human Factors of Computer Interface Design Addresses an array of human factors issues related to human computer interaction and the graphic user interface. Theoretical and practical relationships are drawn between aesthetics and the cognitive sciences in the development of primarily multimedia and hypermedia products. Methods to validate design solutions are learned through controlled usability testing and assessment through small and large prototype projects.

Production for Computer Animation No description available.

Workshop In Computer Graphics Technology Advanced study of technical and professional topics. Emphasis is on new developments relating to technical, advanced study of technical and professional topics. Emphasis is on new developments relating to technical, operational, and training aspects of industry and technology education.

Computer Information Technology

Data Warehousing and Business Intelligence

This course covers Data Warehousing and Business Intelligence Concepts with an emphasis on dimensional modeling as it applies to business intelligence .

Course Objectives/Learning Outcomes: Upon successful completion of the course, a student will be able to:

- ❖ Create the target dimensional model
- ❖ Design the data warehouse infrastructure
- ❖ Create the relational atomic database
- ❖ Create the analysis services databases
- ❖ Design and build the standard report set
- ❖ Implementing security
- ❖ Analyze metadata
- ❖ Manage ongoing maintenance of the DW/BI system.

Network Security

This course will cover advanced conceptual and technological aspects of network security for voice and data networks. The course will deal with the advanced analysis, design, implementation and management issues surrounding effective network security. Technology research and presentation of results as well as security technology implementation will be required course outcomes.

Data Management Security Advanced study of technical and professional topics. Emphasis is on new developments relating to technical, operational, and training aspects of industry and technology education.

Database Object-Oriented Modeling and Architecture

This seminar course covers the concepts of database modeling and architecture including topics as relational modeling, advanced object-oriented modeling and object persistence.

Course Objectives/Learning Outcomes: Upon successful completion of the course, a student will be able to:

- ❖ Employ database object-oriented modeling knowledge and skills to the real-world or research problems.
- ❖ Have a good grasp of the full life cycle of I.T. solution design process.
- ❖ Collaborate with team members to deliver a solution with limited resources and time.
- ❖ Conduct independent research under the supervisor's guidance.
- ❖ Develop sophisticated I.T. solutions that satisfy customer's needs.

Information Security Management This seminar course will address current issues in trust in information systems intra-organizationally, inter-organizationally, nationally, and internationally. Topics include: industries affected, security management, risk assessment models, standards and regulations, information security policy, and select topics in operations security. Information security is a ubiquitous issue; it cuts across all industry sectors (critical infrastructures such as finance, transportation, utilities, energy, and telecommunication; manufacturing, service, etc), it cuts across several different job functions (executives and managers, IT, accounting, audit, users, etc.) and disciplines (computer science, law, computer engineering, management, economics, sociology, psychology, accounting, etc.) within those various sectors, and across borders.

Distributed Computer Forensics The class will be basically looking at the two paradigms of computer forensics in large environments. The pre-requisites are a basic understanding of networking, operating systems, and information security.

Database Application Integration This seminar course covers the concepts of database application integration and implementation including topics such as transaction management, database integration, and implementation of database design.

Service-Oriented Computing No description available.

Emerging/Collaborative Web Technologies No description available.

Advanced XML Technologies No description available.

Software Applications in Life Sciences No description available.

Topics in Distributed Enterprise Application Systems No description available.

Visualization in Biomedicine No description available.

Web Server Administration This course is a study of the implementation, configuration, management, and monitoring of Web server software. Topics include Web server architecture, planning, installation, configuration, security, testing, performance tuning, and backup and recovery procedures, security and secure transactions and logging and auditing.

Computer Network Operations: Computer network operations is the description of various activities including auditing and actively evaluating network security. It spans the areas of computer network attack, computer network exploitation, and computer network sabotage. This course will examine the relevant tools, techniques, skills, methods, ethics, and associated principles of computer network operations from a red teaming perspective. This course has a laboratory component.

Prerequisite knowledge: No prerequisite courses are required, though students should have a basic knowledge of networking, operating systems, and information assurance and security.

Web Application Security This is a seminar course covering Web application security with focus on the latest Web technologies including Web services and Web 2.0 technology.

Software Development for Virtual Reality This is a seminar course covering topics related to software development for virtual reality.

Topics in Application Integration "The course covers service oriented computing, integration of disparate enterprise applications, and implementing interfaces between platforms and applications. Included in the discussions are underlying technologies for XML-based service oriented computing as well as Web service interoperability and security. Extensive laboratory exercises are assigned. Students will be required to complete a semester project."

CIT Security Topics This topics course is a seminar covering a variety of information assurance and security topics from privacy to cyberwarfare. This class brings timely and current topics to the classroom.

Construction Management Engineering Technology

Highway Construction and Maintenance

Temporary Structures in Construction

Temporary Structures in Construction. Design, construction, inspection and maintenance of temporary structures. Includes business practices, legal concerns, industry codes and standards, and safety requirements.

Advanced Construction Operations No description available.

Durability of Materials No description available.

Infrastructure Asset Management This course is to introduce the concepts of asset management as an integrated part of organization's activities and lifecycle asset management based on costs associated with all

stages of a transportation infrastructure asset's life as an example. Sound management of infrastructure assets entails good combination of engineering and management principles. Thus, this course covers the principles and processes for asset management planning, asset management guidelines and techniques. The course includes discussions on performance measures, condition assessment, demand forecasting, data analysis, risk management methods, and optimized decision-making that are mainly relevant to typical infrastructure asset management. Upon successful completion of this course, students would acquire understanding of fundamentals in asset management and learn how to assess the current infrastructure system, forecast demands, and make decisions in asset management using the techniques discussed in class. Course will discuss water treatment facility and highway as two main applications.

Green Construction (LEED) A survey of the LEED ©Green Building Rating System. A overview of the system will be discussed and each environmental category will be covered. An in depth analysis of each possible credit in each category will be discussed. Students will develop strategies for each credit's attainment; listing the advantages and disadvantages of each strategy. Necessary documentation for credit attainment will also be covered.

Electrical and Computer Engineering Technologies

Battery and Hybrid Energy Technology This course will study different sources of energy and perform the comparison between these sources. Battery and storage technology, charging systems, and battery life cycle will be studied. Solar thermal systems, solar Photovoltaic systems, wind, biomass and wave energy systems will be discussed and practical examples will be given. Hybrid Systems, the need for hybrid systems, range and type of hybrid systems, case studies of diesel-PV, wind-PV, gas-PV, biomass-diesel systems, gas-electric and hybrid electric vehicles will be given.

Optical Networking An introduction to components, systems and the enabling technology underlying the optical networking technology. The course also introduces the Wavelength Division Multiplexing (WDM) technology. Optical layer architecture and design will be the primary focus of the course which includes SONET architecture, fault and alarm handling and protection schemes, the optical access schemes and network management.

System Reliability **Course Topics**

1. Reliability testing, analyzing reliability data
2. Reliability of manufacturing processes
3. Reliability of electrical and electronic components

4. Setting reliability requirements
5. Design for variability
6. Reliability of manufacturing processes - applications
7. Taguchi approach

Wireless Networking An introduction to components, systems and the enabling technology underlying the wireless networking technology. Topics include basics of cellular telephony, paging, antenna diversity, spread spectrum, carrier hopping, mobile and multi-user access, Wi-Fi, and Wi-Max, CDMA, GSM, Bluetooth technology and ad-hoc networking. Wireless access architectures and design will be the primary focus of the course which includes architectures, fault and alarm handling, protection schemes and network management

Nano-Photonics No description available.

Embedded Linux System Design No description available.

Web Based Distributed System Design No description available.

Robotic System Design No description available.

Digital Image Processing No description available.

Linear control systems No description available.

Advanced Board Design No description available.

Solar Energy Systems: An introduction to energy from the sun, technology and design of photovoltaic systems, solar thermal systems, solar lighting systems and solar-bio systems. The topics will also cover the energy storage using hydrogen and new advancements in solar technology.

Alternative Energy Technology No description available.

Industrial Engineering Technology

Design of Experiments for Industry and Technology Design of Experiments (DOE) is an efficient statistical procedure for planning a series of experiments such that the data obtained can be analyzed to yield valid and objective conclusions. It can be used to screen a set of variables to identify those with most effect, optimize an experimental process or retrospectively analyze a set of experimental data. Both the design and analysis steps require the application of techniques for statistical data analysis.

Global Supply Chain Management using RFID This course is designed to provide students with an understanding of business processes and strategies needed to integrate logistical system management.

The importance of good supply chain design, planning, operation and performance improvement in an organization is discussed.

Project Management The factors influencing decisions during the initiation, implementation, and termination of industrial and manufacturing projects are examined. Students work as project teams, using project management tools to develop implementation strategies.

Applied Research in Nanotechnology No description available.

Application of Advanced Quality Techniques Students will conduct research on use of emerging business practices that are geared toward making an organization more effective and efficient. Highlighted topics will include use of lean and six sigma methodologies in today's business environments. These methods are used for achieving long term profits through customer satisfaction, waste elimination and elevation of employee skills to eliminate waste and defects at the source. Application of these methods in various environments such as service, health care and manufacturing organizations will be explored. Supporting concepts such as implementation of new business practices and culture change will also be explored. Students are expected to pass applicable national quality certification exams upon completion of this course.

Applications of Quality Techniques in Healthcare This course focuses on an interdisciplinary approach to solving modern healthcare issues related to process improvement and optimization by adapting and applying traditional systems based engineering techniques that originated in manufacturing industries to healthcare environments.

Topics include:

- History of Quality and performance improvement in healthcare
- Application of Quality tools in healthcare
- Evidence-Based Practice and its link to Quality
- The role of project management in a Quality culture
- Six Sigma applied to healthcare
- Lean Methods applied to healthcare
- Value Stream Mapping
- The use of simulation for process improvement in healthcare
- The supply chain and inventory management in healthcare

Simulation No description available.

Mechatronics

System Reliability **Course Topics**

1. Reliability testing, analyzing reliability data

2. Reliability of manufacturing processes
3. Reliability of electrical and electronic components
4. Setting reliability requirements
5. Design for variability
6. Reliability of manufacturing processes - applications
7. Taguchi approach

Quality Advances in Process and Product Design No description available.

Manufacturability Application of the principles of production design, design of manufacturing processes, tooling specification, and metrology. Rapid design and prototyping and design for manufacturability are discussed. The study of advanced manufacturing processes including non-traditional machining, assembly, fabrication, and processing of non-traditional materials.

Linear Control Systems No description available.

Mechanical Engineering Technologies

Facilities Engineering Technology A study of the application of the engineering sciences and technology to the solution of problems associated with mechanical and electrical systems in buildings. Emphasizes commercial and industrial facilities. Identifying energy conservation measures for both mechanical and electrical systems and evaluating their economic impact are an important focus of the course.

Simulation No description available.

Process and Product Reliability No description available.

Quality Advances in Process and Product Design (design for X) No description available.

System Reliability **Course Topics**

1. Reliability testing, analyzing reliability data
2. Reliability of manufacturing processes
3. Reliability of electrical and electronic components
4. Setting reliability requirements
5. Design for variability
6. Reliability of manufacturing processes - applications
7. Taguchi approach

Manufacturability

Application of the principles of production design, design of manufacturing processes, tooling specification, and metrology. Rapid design and prototyping and design for manufacturability are

discussed. The study of advanced manufacturing processes including non-traditional machining, assembly, fabrication, and processing of non-traditional materials.

Mechanical Design No description available.

Mechanical Vibrations No description available.

Small Arms Design, 3-0-3

Pre-requisites: MET211, MET218, or equivalent.

A review of the scientific and mechanical engineering technology aspects of small arms design. The course includes a brief review of historical technology and an examination of current technology. Applications of engineering technology to specific design requirements provide the necessary background for an extensive design project.

Organizational Leadership and Supervision

OLS550

OLS576 Advanced Topics in Human Resource Management Current topics and issues in the legal, behavioral, and technical environment of human-resources management. Topics may include employment practices, labor-management relations, wage and salary administration, treatment of employees on the job, or productivity-improvement programs. Employs seminar format with emphasis on applications research.

OLS580 Interpersonal Skills for Leaders Development and improvement of interpersonal and group dynamic skills for effective leadership in organizations. Emphasis on action learning and real-world application of skills. Open to all graduate students with special consideration given to senior OLS students with 3.0 GPA and School of Technology graduate students.

OLS581 Workshop in OLS Advanced study of technical and professional topics. Emphasis is on new developments relating to technical, operational, and training aspects of industry and technology education. Course may be offered in traditional, distance, or blended format. Course format may vary, depending upon topic of course.

OLS583 Coaching and Mentoring in Organizations This course explores issues and practices in technologically-driven organizations pertaining to the roles and functions that coaching and mentoring play in employee development. A "best practices" approach, utilizing the case method, is emphasized. Presented from the point of view of a human resource manager/leader, the focus of the course is on identifying coaching opportunities, enhancing communication skills, developing and implementing

coaching and mentoring strategies, and evaluating the outcomes of these strategies. Attention is directed to facilitating personal coaching mentoring skills.

Leadership & Ethics An examination of ethical, legal and policy issues facing business and technology leaders. Topics include ethical decision-making, corporate social responsibility, codes of ethics, public policies and government regulations, international business practices, technology innovation, risk management in a global environment, and specific areas of law – employment, health and safety, environmental, contract, warranties and liabilities, intellectual property, technology law, and international laws and regulations. This course uses the case study method and involves active discussion and debate.

[OLS 582] **Leading Organizational Change** This course explores issues in leadership and organizational change. Included are change theories, utilizing resistance to change, contemporary approaches to change, the future workplace, and researching best practices in organizational change

OLS590A Fundamentals of Homeland Security

OLS590 Homeland Security The course provides examples and practice in applying and managing the resources, including technologies, used in the private and public sectors for Homeland Security programs. The interdisciplinary approach addresses issues including: terrorism, corporate security, biosecurity, healthcare preparedness, personal/community preparedness, risk transfer, information security and privacy. Content will explore the local, state, and federal preparedness program issues in the private and public sectors that are designed to ensure survival during a continuum of emergency events ranging from off-normal events through catastrophe while providing continued practice in using a collaborative application of team building skills.

OLS574 Managerial Training and Development Review of current managerial education and development theories and practices; discussion of fundamental social, economic, and political changes affecting business and the work of managing; implications of these changes for individual manager development and continued growth.

OLS577 Organization and Administration of Training and Development The function and management of training and development in the world of work. Prerequisite: [OLS 375](#); Masters Student Standing or higher, First Semester Senior Standing or higher; Corequisite: [OLS 574](#). Authorized equivalent courses or consent of instructor may be used in satisfying course pre- and co-requisites.

OLS590 Research Problems in Supervision and Personnel Opportunity to study specific problems in the field of supervision and personnel under the guidance of a qualified faculty member within the department. Does not include thesis work.

General

TECH590 **Special Problems in Technology** Graduate Independent Study: various topics; preapproval and instructor consent required.