COURSE DESCRIPTIONS IN ELECTRONICS AND COMPUTER TECHNOLOGY

Undergraduate

ECT 101. Microcomputer Applications Credit 3(2-2)
This course is designed to provide the student with basic computer skills as required in a typical business and technical environment. Emphasis is on business and technical software packages including spreadsheets, database management, word-processing, etc. as run on a Windows platform. **(F;S;SS)**

ECT 103. Colloquium 1: University Experience Credits 1(0 -2)
This colloquium will emphasize the role of the University Studies program and present a broad overview of the curriculum structure and rationale, including an introduction to a variety of interdisciplinary themes within the UNST program. Introductory discussions on ethics, wellness and healthy lifestyles, diversity and civic engagement will be included. In addition, this course provides a forum for dialogue among students, industry, and academia to work in partnership to define current and emerging issues in technology. Prerequisites: None **(F;S;SS)**

ECT 104. Colloquium II Credit 0(0-1)
This course is a continuation of ECT 103. It provides a forum for dialogue among students, industry, and academia to work in partnership to define current and emerging issues in technology. Prerequisites: ECT 103 **(F;S;SS)**

ECT 119. Introduction to Electronic Circuit Fabrication Techniques Credit 0(0-1)
This course introduces the basic skills required for electrical/electronics technologist. Topics include soldering, desoldering, safety practices, test equipment, American Wire Gauge (AWG) table, the resistor color code, electronic symbols and schematics, and use of hand tools. This class will be graded on a pass/fail basis. **(F;S;SS)**

ECT 120. Quantitative Fundamentals of Electronics and Computer Technology Credit 3(3-0)
This course provides the quantitative background needed in the field of electronics, computer, and information technology. Topics include arithmetic review, algebra, basic trigonometry, complex algebra, statistics, and boolean algebra and fundamental units, as they relate to electronics, information and computer technology. **(F;S;SS)**

ECT 121. Electronic Circuit Fabrication Techniques Credit 1(0-2)
This course is designed to facilitate the integration of electronic circuit construction techniques into multiple electronic courses. This course is further designed to teach the student how to construct electronics circuits on breadboards and printed circuit boards. The students will also be exposed to the technique of hand soldering. **(F;S;SS)**

ECT 197. Co-Operative Training in Industry I Credit 1(0-2)
This course allows students to earn university credit while they are employed as an intern or on cooperative assignment in industry. Students must be employed for the entire semester on assignments that are representative of the student's field of study in the department. The student and employer will be required to submit reports and evaluations on the experience to the departmental internship coordinator by the conclusion of the semester the student enrolled into the course. Prerequisites: ECT 120. **(F;S;SS)**

ECT 198. Freshman Project Credits 1(0 -3)
Under the direction and guidance of departmental faculty, the student will perform independently selected laboratory experiments to reinforce concepts and experimental techniques learned in the first year of study in the major. In addition, the student will build and test a series of approved software and electronic projects. Each project will be accompanied by an exam which will test the student's understanding of basic concepts underlying the project. Prerequisites: ECT 101, 120, 201, and 211. **(F;S;SS)**

ECT 201. Introduction to Computer Programming Credit 3(2-2)
This course gives an introduction to computer programming. Topics include structured program development and the use of a high level programming language to develop software applications. Prerequisites: ECT 101. **(F;S;SS)**

ECT 203. Colloquium III Credit 0(0-1)
This course is a continuation of ECT 104. This course provides a forum for dialogue among students, industry, and academia to work in partnership to define current and emerging issues in technology. Prerequisites: ECT 104

ECT 204. Colloquium IV Credit 0(0-1)
This course is a continuation of ECT 203. This course provides a forum for dialogue among students, industry, and academia to work in partnership to define current and emerging issues in technology. Prerequisites: ECT 203 **(F;S;SS)**

ECT 211. Electric Circuits I Credit 3(2-2)
This course is a study of the fundamentals of direct current electrical circuits. Topics include series, parallel, series -parallel networks, Ohm's Law, Kirchhoff's Laws, network theorems, and practical applications. Prerequisites: ECT 120 and MATH 110 or 111. **(F;S;SS)**

ECT 212. Electric Circuits II Credit 3(2-2)
This course is a continuations of Electric Circuits I. Topics include network analysis, power factor correction, complex impedance, polyphase systems, filters, resonance, and simple dynamos. Prerequisite: ECT 211. **(F;S;SS)**

ECT 213. Digital Circuits Credit 3(2-2)
This course deals with digital logic fundamentals. Topics include combinational and sequential circuits and systems. Karnaugh maps and software tools are utilized. Prerequisite: ECT 211. **(F;S;SS)**

ECT 297. Co-Operative Training in Industry II Credit 1(0-2)
The description of this course is the same as ECT 197 and is normally the second co-op experience of the student. This course allows students to earn university credit while they are employed as an intern or on cooperative assignment in industry. Students must be employed for the entire semester on assignments that are representative of the student's field of study in the department. The student and employer will be required to submit reports and evaluations on the experience to the departmental internship coordinator by the conclusion of the semester the student enrolled into the course. Prerequisites: ECT 197, 212, 213. **(F;S;SS)**

ECT 298. Sophomore Project Credits 2(0 -4)
Under the direction and guidance of departmental faculty, the student will perform independently selected laboratory experiments to reinforce concepts and experimental techniques learned in the second year of study in the major. In addition, the student will build and test a series of approved software and electronic projects. Each project will be accompanied by an exam, which will test the student's understanding of basic concepts underlying the project. Prerequisites: ECT 212, 213, 312, and 313. **(F;S;SS)**

ECT 299. Survey of Electronics and Computer Technology Credit 3(2-2)
This course provides a comprehensive introductory survey of analog and digital electronics. Some of the topics covered in this course include: voltage, current, resistance, types of electronic components and circuits, semiconductor devices, and hands-on lab instructions. This course is intended as a bridge course for non-majors who are interested in taking more advance electronics, computer and information technology classes. Prerequisites: MATH 102 or 110 or 111 or ECT 120. **(F;S;SS)**

ECT 312. Electronic Devices and Circuits I Credit 3(2-2)
This course provides a comprehensive treatment of topics in electronic devices. Topics to be covered include basic to advance theories of electronics devices such as diodes, Bipolar-Junction transistors, and Operational amplifiers with hands on laboratories to be complemented by the use of software simulation packages. Prerequisites: ECT 212 or 299. **(F;S;SS)**

ECT 313. Electronic Microcomputer Systems I Credit 3(2-2)
This course addresses the programming and interfacing of microcomputer based systems. Prerequisite: ECT 213. **(F;S;SS)**

ECT 314. Electronic Devices and Circuits II Credit 3(2-2)
This course is a continuation of ECT 312. This course is designed to give the student an understanding of the fundamental theories and applications of electronic devices such as Junction Field-Effect Transistors, Metal Oxide Semiconductor Field-Effect Transistors, Operational Amplifiers, Thyristors, and active filters. The course will include hands on laboratories which will be complemented by the use of software simulation packages. Prerequisites: ECT 312. **(F;S;SS)**

ECT 330. Robotics and Controls I Credit 3(2-2)
This course deals with the fundamentals of first and second order electromechanical dynamic systems, frequency

and time domain analysis of the systems, sensors and actuators, structure and specification of industrial robots, and robot control fundamentals. Prerequisites: ECT 312 and MATH 132. **(F;S;SS)**

ECT 334. Electronic Instrumentation Credit 3(2-2)
This course is designed to develop basic competencies related to components and circuits used in instrumentation to include basic transistor configurations; voltage regulators; integrated circuit operational amplifiers, amplifier feedback principles and DC to DC converters. Prerequisite: ECT 312. **(F;S;SS)**

ECT 350. Communications Systems Credit 3(2-2)
This course investigates the fundamental concepts of electronic communications systems. Topics include: Amplitude Modulation (AM), Frequency Modulation (FM), Phase Modulation (PM), digital modulation schemes, principles of power spectra and time domain analysis. Prerequisite: ECT 312. **(F;S;SS)**

ECT 355. Electrical Power and Machinery Credit 3(2-2)
This course is a study of electrical machines and power systems. Topics include dc motors, single phase and 3 phase induction motors, synchronous generators, motor drives and power system transmission and distribution. Prerequisite: ECT 212. **(F;S;SS)**

ECT 360. Industrial Electronics and Controls Credit 3(2-2)
This course addresses the role of electronic circuits and control systems in industry. The topics include application of power semiconductor devices for conversion and control of electrical energy, electromechanical devices, fundamentals of open and closed loop control systems, process control, and Programmable logic controllers. Prerequisite: ECT 312. **(F;S;SS)**

ECT 390. Special Topics in Electronics, Computer, and Information Technology Credit 3(2-2)
This course is used to introduce new topics in the field of electronics, computer or information technology. The subject matter will be identified prior to the beginning of the course. Prerequisite: Consent of chairperson. **(F;S;SS)**

ECT 397. Co-Operative Training in Industry III Credit 2(0-4)
The description of this course is the same as ECT 197 and is normally the third co-op experience of the student. This course allows students to earn university credit while they are employed as an intern or on cooperative assignment in industry. Students must be employed for the entire semester on assignments that are representative of the student's field of study in the department. The student and employer will be required to submit reports and evaluations on the experience to the departmental internship coordinator by the conclusion of the semester the student enrolled into the course. Prerequisites: ECT 297 and 312. **(F;S;SS)**

ECT 398. Junior Project Credits 2(0 -4)
Under the direction and guidance of departmental faculty, the student will perform independently selected laboratory experiments to reinforce concepts and experimental techniques learned during the third year of study. In addition, the student will build and test a series of approved software and electronic projects. Each project will be accompanied by a formal report on the project. Also examinations will be given to test the student's understanding of basic concepts underlying the projects. Technical writing and project management skills will be emphasized throughout the course. Prerequisites: Junior Standing. **(F;S;SS)**

ECT 399. Independent Study in Electronics, Computer and Information Technology Credit 3(0-6)
This course allows a student to select a technical problem from the fields of electronics, computer or information technology for special research and study in consultation with a faculty member in the area of interest. Prerequisite: Consent of instructor. **(F;S;SS)**

ECT 413. Electronic Microcomputer Systems II – Embedded Systems Credit 3(2-2)
This project oriented course will introduce students to standalone measurement and control systems. Programming and interfacing at both the hardware and software level will also be emphasized. Prerequisite: ECT 313. **(F;S;SS)**

ECT 414. Introduction to Semiconductor Device Physics and Fabrication Credit 3(2-2)
The course provides basic treatment of the physics of semiconductor materials and of solid state electronics and photonic devices (eg. low frequency diodes, bipolar transistors, microwave Gunn diodes, semiconductor lasers, etc.). Techniques used in micro-, nano-, and mems - technologies for fabricating devices are detailed. Laboratory work includes simple measurements and tests of semiconductor materials and device characteristics. Prerequisites: PHYS 242, 252, ECT 314. **(F;S;SS)**

ECT 430. Robotics and Controls II Credit 3(2-2)
The course is the continuation of ECT 330. Emphasis of the course will be on the details of control systems, foundations and principle of robotic manipulation, and detailed case studies of the exis ting systems. The course will also discuss the programming, design and building of a prototype robot. Prerequisite: ECT 330. **(F;S;SS)**

ECT 460. Industrial Electronics and Controls II Credit 3(2-2)
This course is the continuation of ECT 360. Emphasis is on the analysis of complex industrial control systems, robotics, advanced topics in programmable logic controllers, and the role of electronics in industry. Prerequisite: ECT 360. **(F;S;SS)**

ECT 497. Co-Operative Training in Industry IV Credit 2(0-4)
This course allows students to earn university credit while they are employed as an intern or on cooperative assignment in industry. Students must be employed for the entire semester on assignments that are representative of the student's field of study in the department. The student and employer will be required to submit reports and evaluations on the experience to the departmental internship coordinator by the conclusion of the semester the student enrolled into the course. Prerequisite: ECT 397. **(F;S;SS)**

ECT 498. Co-Operative Training in Industry V Credit 2(0-4)
The description of this course is the same as ECT 497. This course allows students to earn university credit while they are employed as an intern or on cooperative assignment in industry. Students must be employed for the entire semester on assignments that are representative of the student's field of study in the department. The student and employer will be required to submit reports and evaluations on the experience to the departmental internship coordinator by the conclusion of the semester the student enrolled into the course. Prerequisite: ECT 497. **(F;S;SS)**

ECT 598. Senior Project: A Capstone Experience Credit 3(0-6)
Under the direction and guidance of departmental faculty, the student will perform independently selected laboratory experiments to reinforce concepts and experimental techniques learned during the fourth year of study. In addition, the student will build and test a series of approved software and electronic projects. Each project will be accompanied by a formal report on the project. Also examinations will be given to test the student's understanding of basic concepts underlying the projects. Technical writing and project management skills will be stressed throughout the semester. Prerequisite: Senior Standing. **(F;S;SS)**

ECT 599. Independent Study Credit 3(0-6)
The student selects a technical problem in electronics or computer technology for special research and study in consultation with a faculty member in area of interest. The student will spend a minimum of six (6) hours per week in library research or laboratory experimentation. A technical report in standard format is required for completion and approved by faculty. Prerequisite: Junior or senior standing with department chair approval. **(F;S;SS)**

Undergraduate/Graduate
ECT 600. Electromechanical Systems Analysis Credit 4(4-0)
This course deals with the fundamentals of electrical and mechanical dynamical systems. Frequency and time domain analysis techniques are utilized. Electrical and mechanical applications of first and second order linear differential and difference equations are examined through transform techniques. Specialized applications software packages are examined. Prerequisite: Departmental approval. **(F;S;SS)**

ECT 613. Advanced Digital Circuits Credit 3(2-2)
This course will place emphasis on logic families, state machines, shift registers, timers, analog-to-digital, digital-to-analog, programmable logic devices, and practical development of digital systems. Pre requisites: ECT 313 or consent of instructor. **(F;S;SS)**

ECT 614. Microelectronic Fabrication Technology Credit 3(1-4)
This course provides basic lab works on processes as wafer preparation, oxidation, photolithography, doping and deposition used in semiconductor device fabrication. Wafer test equipments, measurement/evaluation techniques, as well as clean room microcontamination control and operation/safety practices are taught through industry field trips and hands-on experiments. Economics and industrial production control issues are examined. Students project on simple mask-making, and fabricating a working transistor-based IC. Prerequisite: ECT 314 or 414. **(F;S;SS)**

ECT 615. Introduction to Semiconductor Manufacturing Equipment Technology Credit 3(1-4)
This course teaches basic industrial instrumentation (electrical and non-electrical) and automation, as well as

associated fundamental concepts used to develop various applications for the semiconductor industry. This course covers various industrial applications including: Vacuum theory and technology, Design and Installation of industrial clean room facilities and equipments for photolithography, CVD/PVD,RF plasma, etc. Prerequisites: ECT 360 and 414. **(F;S;SS)**

ECT 616. Applied Materials, Semiconductors, and Superconductivity Credit 3(2-2)
This course covers band theory of solids, crystal imperfections; mechanical and thermal properties; microscopic theory of conductivity, polarizability, permeability, including high frequency effect; Elemental and compound semiconductors; Introduction to BCS theory of superconductivity, Josephson tunneling, type II superconductors. Laboratory experiments conducted in the course includes: basic measurements of mechanical, chemical, thermal, electrical and magnetic properties of various electronic materials; fabrication and testing of solar cells, Josephson junction, cryogenics, and vacuum deposition of films. Prerequisites: PHYS 225, 226, 235, and 236. **(F;S;SS)**

ECT 617. Advanced Solid State Devices Credit 3(2-2)
This course covers band model and carrier transport in semiconductors; excess carriers; Interfaces; Physics of the p-n junction and MOS sandwich; IC design at low frequencies for TTL, CMOS, and analog circuitry. The course also includes a broad review of the theory/design/fabrication of monolithic, film, heterojunction, and high frequency semiconductor devices involving quantum dots/wires, mesoscopic devices, Rf Gunn effect, laser sources etc. for integrated optics, nanotechnology, and quantum computing. Students shall use advanced simulation tools for extensive numerical modeling of semiconductor devices and fabrication processes. Prerequisite: ECT 414. **(F;S;SS)**

ECT 635. Analysis and Design of Mechatronic Systems Credit 3(1-4)
This course deals with the principles of analyzing and designing mechatronics systems. This course includes a review of logic gates, microprocessor architecture, sensors and actuators, A/D and D/A conversion techniques, real-time multi-tasking programming concepts, and direct digital control implementation. The course includes "hands-on" experiences through several laboratory assignments and a final team project. Prerequisites: ECT 201, 312, 313. **(F;S;SS)**

ECT 640. Electronic Automated Testing Systems Credit 3(2-2)
This course addresses the fundamentals of electronic automated testing systems. Topics include: Production, reliability, and maintenance testing. Various types of Automated Test Equipment (ATE) are addressed, including Built in Test Equipment (BITE) and stand alone systems. Prerequisite: ECT 360. **(F;S;SS)**
ECT 645. Power Electronics I Credit 3(2-2)

This course addresses the principles and applications of Power Electronics. Topics include power semiconductor switches, phase-controlled rectifiers, DC-to-DC converters, DC-to-DC inverters, motor drives, and power quality. Prerequisites: ECT 314 and 355 or graduate standing. **(F;S;SS)**

ECT 681. Power System Analysis and Control Credit 3(3-0)
This course covers the development of methods for power system analysis and control. An analysis and implementation of systems for steady state, transient, and dynamic conditions will be studied. Digital solutions will be emphasized. Prerequisite: ECT 355. **(F;S;SS)**

ECT 682. Controls and Applications of Electric Machines Credit 3(3-0)
This course will cover the dynamics and control of different applications of electric machines, such as DC machines, synchronous machines, polyphase induction machines and fractional horsepower machines. This course will investigate the dynamics and control of electric machines driven by electronic power converters. Prerequisite: ECT 355. **(F;S;SS)**

ECT 683. Electric Power Quality for the Digital Economy Credit 3(3-0)
This course will cover the causes, consequences and solutions of power quality problems that affect the operation of computerized processes and electronic systems. This course will discus the industry standards, monitoring techniques and economic consideration of power quality issues. Prerequisite: ECT 355. **(F;S;SS)**

ECT 684. Energy and Environmental Policy Credit 3(3-0)
This course covers the development and current status of energy sources, technologies, consumption patterns, conservation and energy policies. The course will place emphasis on the environmental effects of various choices made at each step of the energy cycle. The course will also examine those choices from technological and socioeconomic points of view. Prerequisite: ECT 355. **(F;S;SS)**

ECT 685. Energy Power and the Environment Credit 3(3-0)

This course will cover the bas ic concepts of electric power generation, utilization, and power networks. How total energy consumption and the global economy, affects the environment will be studied. Prerequisite: ECT 355. **(F;S;SS)**

ECT 686. Energy Management and Environmental Impact in the Energy Market Credit 3(3-0)
The purpose of this course is to provide state-of-the-art education in the field of power generation and energy utilization in a deregulated competitive energy services market. Prerequisite: ECT 355. **(F;S;SS)**

ECT 690. Special Problems in Electronics and Computer Technology Credit 3(3-0)
This lecture course is used to introduce new topics in the field of electronics and computer technology. The subject matter will be identified prior to the beginning of the course. Prerequis ite: Departmental approval. **(F;S;SS)**

ECT 695. Alternate Energy Systems Credit 3(3-0)
This course will cover the production of electric energy from alternate energy sources including solar, wind, hydro, biomass, geothermal and ocean. Also, this course will provide the background knowledge of the characteristics of direct conversion, electromechanical conversion, and storage devices used in alternate energy systems. This course will also cover power system issues associated with integration of small scale energy sources into the electricity grid will be fully investigated. Prerequisite: ECT 355 or departmental approval. **(F;S;SS)**

ECT 699. Independent Study in Electronics and Computer Technology Credit 3(3-0)
The student selects a problem (technical or managerial) in consultation with a faculty member in an area related to Electronics Technology or Computer Technology or Telecommunications or Networking. The student along with the faculty member defines the problem's objectives and a solution is pursued. Prerequisite: Graduate standing. **(F;S;SS)**

COURSE DESCRIPTIONS IN INFORMATION AND TELECOMMUNICATION TECHNOLOGY
ITT 236. Applied C Programming I Credit 3(2-2)
This course covers the study of programming language structure concepts for microcomputers. The course emphasizes programming in C and its application to software and hardware development for technological applications. Topics covered in the course include C operators, flow control statements, function, pointers and arrays, I/O structures and library routines. Prerequisite: ECT 201. **(F;S;SS)**

ITT 237. Applied C++ Programming I Credit 3(2-2)
This is an introductory course in computing in C++. The course places emphasis on algorithm development and problem solving. Particular elements include: careful and methodical development of C++ programs from specifications; documentation and style; appropriate use of control structures, data types and subprograms; data abstraction and verification; numeric and nonnumeric applications; introduction to object-oriented programming and design. Prerequisite: ECT 201. **(F;S;SS)**

ITT 238. Applied RPG Programming I Credit 3(2-2)
This course introduces computer programming using the Report Program Generator (RPG) programming language. Topics include input/output operations, sequence, selection, iteration, arithmetic operations, arrays/tables, and other related topics. Upon completion, students should be able to design, code, test, and debug RPG language programs. Prerequisite: ECT 201. **(F;S;SS)**

ITT 239. Applied Visual Basic Programming I Credit 3(2-2)
A course covering the fundamentals of the Windows GUI (Graphical User Interface) operating system and Visual Basic as a Windows -based application development language. This course will use practical problems to illustrate application-building techniques as well as take advantage of new capabilities of building applications in a graphical environment, such as building special-purpose, professional-looking applications. Topics include input/output operations, sequence, selection, iteration, arithmetic operations, arrays, forms, sequential files, and other related topics. Prerequisite: ECT 201. **(F;S;SS)**

ITT 240. Applied JAVA Programming Credit 3(2-2)
The course provides a comprehensive overview of basic programming concepts, the Java programming language using an object-oriented approach, and the software development life cycle. The course emphasizes problem solving and good practices for program construction, documentation, testing, and debugging. Prerequisite: ECT 201. **(F;S;SS)**

ITT 300. Introduction to Project Management for Information Technology Professionals Credit 3(2-2)

This course introduces the concept of project management to information technology majors. It will also teach students to create work breakdown structures, identify task dependencies and prerequisites, and identify a critical path to completion of a project. Prerequisites: Sophomore standing. **(F;S;SS)**

ITT 301. Managing, Maintaining, and Troubleshooting Hardware Credit 3(2-2)
This course will introduce the student to the practical hardware aspects of personal computers. Topics include installation of hardware, configuration, troubleshooting, and networking. Prerequisites: ECT 213 and sophomore standing. **(F;S;SS)**

ITT 302. Managing, Maintaining, and Troubleshooting Credit 3(2-2)
This course will introduce the student to the practical software aspects of personal computers. Topics include the installation of operating systems, configuration, and troubleshooting, and basic networking. Prerequisite: ITT 301. **(F;S;SS)**

ITT 303. Introduction to High Performance Computing Credit 3(2-2)
This course provides an overview of the basic system, network, security, and programming aspects of High Performance Computing. Students will be introduced to the advantages and disadvantages of various machine architectures, programming models, and problem types. Students will learn basic high performance computing cluster configuration and use. Prerequisite: ECT 213. **(F;S;SS)**

ITT 304. High Performance Computing Architecture and System Administration Credit 3(2-2)
Topics covered in this course include: classification and management of high performance computing clusters. The course also includes an in-depth study of high performance system board components, memory management, supporting input and output devices, troubleshooting, and disaster recovery techniques. Prerequisite: ITT 303. **(F;S;SS)**

ITT 305. Foundations of Storage Technology Credit 3(2-2)
This course provides a comprehensive introduction to data storage technology fundamentals using case studies and laboratory experiments. Students will gain knowledge of the core logical and physical components that make up a storage system's infrastructure. Prerequisite: ITT 301 or consent of chairperson. **(F;S;SS)**

ITT 306. Storage Networking Technology Credit 3(2-2)
This course provides an in-depth study of networked storage technologies including Storage Area Networks (SAN) and Networked Attached Storage (NAS) environments. Prerequisites: ITT 305 or consent of chairperson. **(F;S;SS)**

ITT 307. Storage Networking Management Credit 3(2-2)
This course provides an in-depth study of management and data recovery processes for networked storage devices and systems. Prerequisite: ITT 305 or consent of chairperson. **(F;S;SS)**

ITT 315. Network Security Applications for Information Technology Professionals Credit 3(2-2)
This course focuses on basic concepts in network security. It aims to introduce students to the fundamental techniques used in implementing secure network communications, and to give them an understanding of common threats and attacks, as well as some practical experience in attacking and defending networked systems. Prerequisites: Sophomore standing. **(F;S;SS)**

ITT 320. Telecommunications Management Credits 3(2 -2)
This course addresses fundamental principles of telecommunications management, which includes network management and administration, the telecommunications marketplace, and the planning and evaluation of systems. The technology of modern telecommunications systems is also reviewed. Prerequisite: Junior Standing. **(F;S;SS)**

ITT 325. Computer Database Management Credits 3(2 -2)
This course focuses exclusively on the design and system issues related to distributed database systems. Students will learn the usage of different design strategies for distributed databases, and they will study query processing techniques and algorithms as well as transaction management and concurrency control concepts used in such systems. Design and implementation issues related to multi-database systems also will be discussed. In addition, the course focuses on applying the techniques learned in the course to commercial database management systems. Prerequisite: None. **(F;S;SS)**

ITT 329. Computer Networking I Credit 3(2-2)
This course introduces the student to Local Area Networks (LAN) and introduction to Wide Area Networks

(WAN). The course also will provide the basic understanding of network concepts and router programming. Prerequisites: ECT 212 and 213 or 299. **(F;S;SS)**

ITT 330. Compu ter Networking II Credit 3(2-2)
This course covers the advanced study of Local Area Networks (LAN) and Wide Area Networks (WAN). The students will develop competences in designing and implementing enterprise-wide networks using routers and switches. Prerequisite: ITT 329. **(F;S;SS)**

ITT 337. Applied C++ Programming II Credit 3(2-2)
This course is a continuation of ITT 237 using C++ with structured programming principles. The course will solve representative technology problems using advanced C++ commands, with a focus on: writing in object oriented style, computer control of input/output port control, stand-alone executable code, and library linking for various applications. Prerequisite: ITT 237. **(F;S;SS)**

ITT 338. Applied RPG Programming II Credit 3(2-2)
This course is a continuation of ITT 238 using RPG with structured programming principles. Emphasis is placed on advanced arrays/tables, file management/processing techniques, sub-programs, interactive processing, sort/merge routines, and libraries. Upon completion, students should be able to design, code, test, debug, and document programming solutions. Prerequisite: ITT 238. **(F;S;SS)**

ITT 339. Applied Visual BASIC Programming II Credit 3(2-2)
This course is a continuation of ITT 239. The topics of the course are designed to provide the Visual Basic student with knowledge of additional tools, advanced concepts, and code syntax to create Visual Basic programs that conform to the Windows standards. The intent is to provide the student with advance knowledge to create programs that meet the demand of today's information technology environment. Prerequisite: ITT 239. **(F;S;SS)**

ITT 340. Introduction to Mainframe Operations Credit 3(2-2)
This course is an introduction to mainframe operations including concepts and functions of the OS/MVS operating system. Topics include virtual storage, Job Control Language (JCL), data management, data set organization, compilers, and linkage editor. Additional, topics include the study of instream data sets, portioned data sets, temporary and cataloged sequential data sets, and cataloged procedures. Prerequisite: Junior standing. **(F;S;SS)**

ITT 350. Introduction to Database 2 (DB2) Concepts Credit 3(2-2)
This course covers the concepts, approaches, and techniques for using the Database Management Systems (DBMS) included with the Multiple Virtual Storage (MVS) operating system. Prerequisite: Junior standing. **(F;S;SS)**

ITT 355. Network Servers Credit 3(2-2)
This course covers the activities and methods required to assure productive and reliable operation of network servers. Topics include planning, installing, configuring, and maintaining servers, including knowledge of server level hardware implementations, operating systems, data storage subsystems, data recovery, and I/O subsystems.
Upon completion, students should be able to configure and maintain a network server. Prerequisite: Junior standing. **(F;S;SS)**

ITT 385. Economic and Social Impacts of Information Technology Credits 3(2 -2)
This course is designed to assess critically the institutional forces that shape and create the demand for information technology (IT). It will also discuss how the consumption of IT impacts the economy and society. This course will help participants think about how changing social and economic conditions determine what technologies are consumed and how they are consumed, who consumes them and where they are consumed. Prerequisite: Junior standing. **(F;S;SS)**

ITT 398. Junior Project Credits 2 (0 -4)
Under the direction and guidance of departmental faculty, the student will perform independently selected laboratory experiments to reinforce concepts and experimental techniques learned in the first two years of study in the major. In addition, the student will build and test project(s). Prerequisite: Junior standing. **(F;S;SS)**

ITT 401. Introduction to Parallel Programming Credit 3(2-2)

This course covers parallel computing fundamentals including models of parallel computing, architecture taxonomy, memory architecture, performance, design, and scalability considerations, parallel programming paradigms, techniques and issues in parallel program creation, and parallel programming examples. Prerequisite:

ECT 201 or consent of instructor. **(F;S;SS)**

ITT 420. Introduction to Unix/Linx Credit 3(2-2)
The course will cover network management utilizing various Unix products, such as Linux and Solaris operating systems. Topics will include networking operating system (NOS) setup, network resource management, user and group management, and the security model. Prerequisite: ECT 201. **(F;S;SS)**

ITT 423. Computer Systems Architecture Credit 3(2-2)
This course introduces the organization and design philosophy of computer systems with respect to resource management, throughput, and operating system interaction. Topics include instruction sets, registers, data types, memory management and hierarchy, virtual memory, cache, storage management, vector and multi-processing, CPU design, arithmetic algorithms, I/O communication techniques, RISC architectures, and pipelining. Prerequisite: ECT 313. **(F;S;SS)**

ITT 430. Linux Systems Administration Credit 3(2-2)
This course presents the fundamental knowledge and skills needed to install, manage, and maintain a Linux Operating System. Students will learn to install the system, add users, configure devices, and maintain system security. Prerequisite: ITT 420. **(F;S;SS)**

ITT 431. Advanced Programming Techniques with an OOP Language Credit 3 (2-2)
This course uses programming examples (employing an object-oriented programming language such as Visual C++ / J++ to introduce concepts in advanced data structures (stacks, queues, trees, graphs, hash tables, etc.) and algorithms (sorting, searching, etc.). Object-oriented programming techniques are also detailed. Application to design of large scale programs and software engineering. Prerequisite: ECT 201. **(F;S;SS)**

ITT 598. Senior Project: An Information Technology Capstone Experience Credit 3(0-6)
Under the direction and guidance of departmental faculty, the student will perform independently selected information technology (IT) laboratory experiments to reinforce concepts and experimental techniques learned during the four years of study. In addition, the student will build and test a series of approved IT projects. Each IT project will be accompanied by a formal report on the project. Also, examinations will be given to test the student's understanding of basic concepts underlying the projects. Technical writing and IT project management skills will be stressed throughout the course. Prerequisite: Senior standing. **(F;S;SS)**

Undergraduate/Graduate
ITT 600. Project Management for Information Technology Credit 3(3-0)
This course delves into the unique challenges of managing information technology projects, and offers a road map to success. The course is specifically designed to address the skills inventory and performance outcomes that a student needs to be successful in today's volatile information technology market. Prerequisite: Senior standing. **(F;S;SS)**

ITT 601. Wireless Application Protocols Credit 3(2-2)
This course takes you through the basics of Wireless Application Protocols (WAPs), and provides all the information needed to create WAP pages using the Wireless Markup Language (WML). The course will include an introduction to WAP and WML, cards and decks, text formatting elements, navigational commands in WML, and WML variables. Prerequisites: ECT 201 and junior standing. **(F;S;SS)**

ITT 602. Architecture of Networked Storage Technology Credit 3(2-2)
This course exposes students to the architecture and administration of networked storage solutions. It will also equip students with the knowledge to understand and explain storage networking concepts, the storage networking market and technologies, and key storage applications. Prerequisites: Consent of instructor. **(F;S;SS)**

ITT 605. Principles of Computer Networking Credit 3(2-2)
This course explores all the hardware and software that drives local and Internet computing. Special emphasis is placed on connectivity and throughput. Prerequisite: ECT 313. **(F;S;SS)**

ITT 610. Digital Communications I Credit 3(2-2)
The class will investigate digital communications systems for various signals including audio, video and data. Topics include: sampling, quantization, multiplexing, coding, modems, various compression schemes, signal impairments, and various digital modulation schemes. Prerequisite: ECT 350. **(F;S;SS)**

ITT 611. Digital Communications II Credit 3(2-2)
This course is a continuation of ECT 610. Emphasis is placed on multimedia networks and their supporting

platforms. Topics include audio and video standards and compression schemes, cable modems and xDSL schemes. Prerequisite: ECT 610 or departmental approval. **(F;S;SS)**

ITT 615. Networking Security Applications Credit 3(2-2)
This course explores security terms, definitions, concepts, and issues that face industries today. This course also will examine how the concept of security, and being secure, integrates into the overall enterprise mission. The importance of user involvement, security training, ethics, trust, and informed management will be explored. Prerequisite: ITT 605. **(F;S;SS)**

ITT 620. Telecommunications Management Credit 3(2-2)
This course addresses fundamental principles of telecommunications management, which includes network management and administration, the telecommunications marketplace, and the planning and evaluation of systems. The technology of modern telecommunications systems is also reviewed. Prerequisite: ECT 350. **(F;S;SS)**

ITT 625. Computer Database Management Credit 3(2-2)
This course focuses exclusively on the design and system issues related to distributed database systems. Students will learn the usage of different design strategies for distributed databases, and they will study query processing techniques and algorithms as well as transaction management and concurrency control concepts used in such systems. Design and implementation issues related to multidatabase systems also will be discussed. In addition, the course focuses on applying the techniques learned in course to commercial database management systems. Prerequisite: ITT 600. **(F;S;SS)**

ITT 629. Computer Networking I Credit 3(2-2)
This course introduces the student to Local Area Networks (LAN) and introduction to Wide Area Networks (WAN). The course also will provide the basic understanding of network concepts and router programming. Prerequisites: ECT 212 and 213, or 299. **(F;S;SS)**

ITT 630. Computer Networking II Credit 3(1-4)
This course covers the advanced study of Local Area Networks (LAN) and Wide Area Networks (WAN). The students will develop competences in designing and implementing enterprise-wide networks using routers and switches. Prerequisite: ITT 629. **(F;S;SS)**

ITT 634. Electronic Instrumentation for Remote Sensing Applications Credit 3(2-2)
This course will provide practical knowledge of the operation of electronics instruments used in the applications of telemetry, remote sensing and detection. Possible electronic systems that will be discussed include RADAR, SONAR, LIDAR, and SODAR. Prerequisite: ECT 350 or departmental approval. **(F;S;SS)**

ITT 635. Administration and Security of Wireless Local Area Network I Credit 3(2-2)
This course will introduce students to wireless network protocols, access modes, portable communications and computing devices, management tools, security solutions, and current industry best practices for managing wireless networks in a secure environment. Case studies will be used throughout the course. Prerequisite: Junior standing. **(F;S;SS)**

ITT 640. Administration and Security of Wireless Local Area Network II Credit 3(2-2)
A continuation of ITT 635, this course provides students with an in-depth understanding of the security vulnerabilities to wireless networks and their corresponding countermeasures. This course includes training on practical methods for designing, configuring, testing, and maintaining wireless networks appropriate to their organizations' operating requirements. Prerequisite: ITT 635 or 646. **(F;S;SS)**

ITT 645. Analysis and Troubleshooting of Wireless LAN Systems Credit 3(1-4)
This course presents an in -depth understanding of the frame structure of 802.11 frames, frame exchange processes between wireless nodes, analyzing security solutions for both effectiveness and weaknesses, analyzing performance in both pure and mixed-mode environments, and using analyzers for site surveying and intrusion detection. Prerequisite: ITT 635 or 646. **(F;S;SS)**

ITT 646. Wireless Computer Networking I Credit 3(2-2)
This course covers a broad range of wireless computer networking topics including Wi-Fi, Bluetooth, WiMAX, ZigBee, and infrared wireless technology. The course covers wireless technologies and standards, hardware and software installation, radio frequency (RF) fundamentals, and wireless applications support and security. Prerequisite: Junior standing. **(F;S;SS)**

ITT 650. Wireless Communication Systems I Credit 3(2-2)
This course covers fundamental theory and design of high capacity wireless communication systems. Topics include trunking, propagation effects, frequency reuse, modulation methods, coding and equalization. Emerging cellular and next generation personal communication systems will also be analyzed. Prerequisite: ECT 350. **(F;S;SS)**

ITT 655. Optical Communication Systems I Credit 3(2-2)
This course covers free space and fiber optic technologies (including lasers, optical amplifiers and optical filters) with applications to high-speed long distance systems, local area networks and communication systems. Prerequisite: ECT 350. **(F;S;SS)**

ITT 660. Satellite and Personal Communication Systems Credit 3(2-2)
This course covers the theory and practice of satellite communications including: orbits, launchers, spacecraft link budgets, modulation techniques, coding, multiple access techniques, propagation effects and earth terminals. Prerequisite: ECT 350. **(F;S;SS)**

ITT 665. Wireless Geo-location Systems I Credit 3(2-2)
This course will describe the basic concepts and mechanics of Global Positioning Systems (GPS) and Inertial Navigation Systems (INS). Practical applications of GPS, INS and GPS/INS will be covered. Simple algebraic mathematical calculations will be completed. Prerequisite: ECT 350 or departmental approval. **(F;S;SS)**

ITT 670. Communication Circuit Development Laboratory I Credit 3(1-4)
This course studies advanced methods of analysis of communication circuits including oscillators, radio frequency amplifiers, matching networks, modulators, mixers, and detectors for HF through UHF frequency range using Y- and S- parameter methods. Prerequisite: ECT 350. **(F;S;SS)**

ITT 675. Video Communication Systems Credit 3(2-2)
This course will study the techniques used to transmit and receive analog and digital video information. This course will also discuss current state of the art video technology such as High Definition Television (HDTV). Prerequisite: ECT 350. **(F;S;SS)**

ITT 680. Radio Wave and Optical Signal Propagation Credit 3(2-2)
This courses models the behavior of unguided electromagnetic and optical waves in the atmosphere, space, urban and indoor environments. The course will also discuss path, frequency and antenna selection for practical radio wave communication systems. Prerequisite: ECT 350. **(F;S;SS)**

ITT 684. Introduction to Optical Information Processing Credit 3(2-2)
This course covers modern wave optics including the application of Fourier transforms to image analysis, optical spatial filtering, and image processing. Prerequisite: ECT 350 or permission of the instructor. **(F;S;SS)**

ITT 685. Ethical issues in Information Technology Credit 3(3-0)
This course explores issues on the interface between information technology and society, with a special focus on ethical issues. Topics include ethical theory, privacy and security, spam, electronic commerce, the digital divide, open source software, medical informatics, bioinformatics, actor-network theory, ethnomethodology, and some neo-classical economics. Prerequisite: Senior or graduate standing. **(F;S;SS)**

ITT 688. Microwave and Radar Systems Analysis Credit 3(2-2)
This is an advanced course in microwave and radar systems analysis with application to airborne and navigation systems. Prerequisites: ECT 314 and 350. **(F;S;SS)**

ITT 689. Antenna Systems Technology Credit 3(2-2)
This course provides knowledge in general properties of antennas, the electromagnetic theory behind their operation, and an overview of different antenna systems. Equal weight is placed on the electromagnetic aspects important for antenna design and on systems aspects. Among the systems discussed are radar, cellular, and adaptive antenna systems. Prerequisite: ECT 350. **(F;S;SS)**

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