AIRET Major Course Descriptions:

ITEC 130: 3 s.h. <u>Production Materials and Processes</u> The integration and interrelationships of materials and processes for construction and manufacturing, including the application of math and scientific principles and the technological impacts on industry and society. Requires experiences in materials processing and production tooling. 2 hrs. lec., 3 hrs lab. Offered fall, spring.

ITEC 241: 3 s.h. <u>Drafting Communications</u> Introductory technical sketching, conventional drafting and computer-aided drafting (CAD). Experiences with equipment use and care, lettering, geometric constructions, multiview projection, dimensioning, sectioning and pictorial representation. 2 hrs. lec., 3 hrs. lab. Offered fall, spring.

ITEC 261: 3 s.h. <u>Electronic Systems</u> Survey of electricity and electronics, including typical direct current and alternating current applications, safe practices and technological impacts. Experiences include breadboarding, design and problem solving, use of test equipment and electronic project assembly/troubleshooting. 2 hrs. lec., 3 hrs. lab. Offered fall, spring.

ITEC 262: 3 s.h. <u>Semiconductor Electronics</u> In-depth study of semiconductor theory, including diodes, transistors and silicon-controlled rectifiers. Emphasizes digital, linear and hybrid integrated circuits. Covers surface mount and emerging technologies, such as nanotechnology and biotechnology. Practical applications include prototyping circuits, design and problem solving, use of test equipment and troubleshooting. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 261 or permission of instructor.

ITEC 325: 3 s.h. <u>Power Conversion and Control</u> Electric motors as conversion devices explored. Experiences include designing, creating and testing fluid and electrical energy conversion circuitry to perform specific control applications. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 120 or 261.

ITEC 326: 3 s.h. <u>Fluid Power</u> Investigation of scientific, mathematical and technological principles. Experiences with the design, creation, use and repair of hydraulic and pneumatic systems. A research and development activity required. 2 hrs. lec., 3 hrs. lab. Offered annually. Prereq: ITEC 120 or 325.

ITEC 342: 3 s.h. <u>Computer-Aided Engineering Drawing</u> Advanced study of threads, gears and standard fasteners; geometric dimensioning and tolerancing (GD&T); schematic, production and assembly drawings; and introduction to solids modeling. Builds on view orientation, projection systems and basic CAD. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 241.

ITEC 364: 3 s.h. <u>Digital Electronics</u> Practical applications of digital logic for processing electronically encoded information. Covers numbering systems, logic design, basic gates, sequential and combination logic, and digital troubleshooting. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 262 or permission of instructor.

ITEC 425: 3 s.h. Industrial Robotic Systems The course provides a study of industrial robotics in modern automated work cells. Topics include the evaluation, justification, programming and integration of industrial robotic devices in order to improve an industrial process. A research and development component required. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 325.

ITEC 427: 3 s.h. Programmable Logic Controllers Focus on the integration and application of the programmable logic controller (PLC). Students design, construct and troubleshoot a variety of industrial control systems utilizing programmable logic controllers, networks, human-machine interfaces, variable frequency drives, control loops and sensors. A research and development component required. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 425 and MATH 151 or 161, or permission of instructor.

ITEC 466: 3 s.h. Wireless Communication Systems This course utilizes both theory and applications related to wireless communications systems. Topics include amplitude modulation (AM) and frequency modulation (FM) as well as the principles of television broadcasting and reception systems. Transmission lines, antennas and wave propagation are also described. New applications include microwave, wireless telephony, satellite communications and Wireless Fidelity (WiFi™). A research and development activity is required. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 262 or permission of instructor.

ITEC 467: 3 s.h. Mobile Robotic Systems Study of the development of mobile robotic solutions. Emphasis is placed on the programming and interfacing of microcontrollers to control autonomous mobile robots in known environments. A research and development activity is required. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 262 or permission of instructor.

CSCI 140: 4 s.h. Discrete Structures Discrete mathematical structures and their application to computer science, including formal mathematical notation and proofs, algorithms, computer-related arithmetic, propositional logic, predicate logic, set theory, graphics, relations and databases, functions, matrices and combinatorics. Prereq: placement in MATH 160 or higher.

CSCI 161: 4 s.h. Introduction to Programming I (G2) Introduction to computer programming for the student intending to major in computer science or related fields. Emphasis on developing ability to apply problem-solving strategies to design and implement algorithms in a modern programming language. Prereq: placement in MATH 160 or higher.

CSCI 162: 4 s.h. Introduction to Programming II (G2) Continuation of CSCI 161 covering advanced computer programming techniques. Emphasis on object-oriented programming, specification, design, elementary data structures, and proper use of programming language and development tools. Abstract data types, classes and objects, recursion, linked lists, queues, stacks and binary trees. Prereq: C or higher in CSCI 161.

CSCI 362: 4 s.h. Data Structures Abstract data types, objects, algorithm design and analysis, trees, graphs, sorting and searching. Emphasis on ADT-based and object-oriented design, incremental development and testing, and comparison of data structure implementations. Offered in fall, spring. Prereq: C- or higher in CSCI 140 and CSCI 162.

CSCI 450: 4 s.h. Artificial Intelligence (W) Introduction to artificial intelligence, including problem solving, search, heuristic methods, machine learning, knowledge representation, natural language processing, computer vision, expert systems, theorem proving and current applications. Concepts illustrated through programs developed in LISP or Prolog. Offered periodically. Prereq: C- or higher in 362; ENGL 110.

CSCI 456: 4 s.h. Robotics and Computer Vision Intelligent robotic systems that deal with the physical world through visual, acoustic or tactile sensing. Fundamentals of robot vision, including image acquisition and camera geometry, pattern recognition, representation and analysis of shape, pixel neighborhoods, connectivity, distance measures, arithmetic operations on pixels and images, computations of area, centroid, moments, axis of least inertia, correlation techniques, histogram computation, manipulation of robot end effectors, robot task coordination and simple Cartesian robot manipulation. Offered periodically. C- or higher in CSCI 362.

MATH 161: 4 s.h. Calculus I (G2) Introduces concepts and techniques of calculus, beginning with limits. Major emphasis is on the theory and applications of limits, continuity, derivatives, antiderivatives and the definite integral. Includes introductory calculus of trigonometric, inverse trigonometric, exponential and logarithmic functions. Prereq: C- or higher in MATH 160 or math placement testing/evaluation before registration. Credit will not be granted for both MATH 151 and MATH 161.

MATH 211: 4 s.h. Calculus II (G2) Continuation of MATH 161. Techniques of integration, applications of the definite integral, improper integrals, parametric equations, polar coordinates, sequences and infinite series. Prereq: C- or higher in MATH 161 or 163.

PHYS 231: 5 s.h. Physics I with Calculus (G2, L) An introductory course in classical physics dealing with mechanics, fluids, waves and thermodynamics. 3 hrs. lec., 1 hr. recitation, one 3-hr. lab. Offered in fall, spring, summer. Prereq: C- or higher in MATH 161.

PHYS 232: 5 s.h. Physics II with Calculus (G2, L) Continuation of PHYS 231. An introductory course in classical physics dealing with electricity, magnetism and optics. 3 hrs. lec., 1 hr. recitation, one 3-hr. lab. Offered in fall, spring, summer. Prereq: C- or higher in PHYS 231. Coreq: MATH 211.