Curriculum Guide

for the

Bachelor of Science in Electronics Technology
North Carolina A&T State University

Bachelor of Science in Electronics Technology
North Carolina A&T State University

Concentrations in:

Information Technology
and
Computational Technology

Purpose

This handbook will provide specific departmental information for students of the Electronics, Computer and Information Technology Department. It is meant to be supplemental to the University's Bulletin, and the University's Student Handbook. Thus, students of the department should obtain copies of both handbooks as well as the University Bulletin. The student should also remain informed of changes in policies and procedures that may take place after the handbooks and University's Bulletin have been updated. Your student advisor or department chair is a good source of updated departmental information.

The Electronics, Computer, and Information Technology Department is focused on providing students with an opportunity to acquire a high degree of proficiency in the field of technology, supported by competence in mathematics, the basic sciences, and technological principles that will be needed to function effectively as an Electronic Technologist.

Currently there are three undergraduate concentrations:

- Information Technology
- Computational Technology
- General
- And a Certificate Program in Radio Frequency & Microwave Wireless Communication Systems

The Bachelor of Science in Electronics Technology (general) program is designed to prepare individuals to become technologist who design, build, install, test, troubleshoot, repair, and modify developmental and production electronic components, equipment, and systems such as industrial/computer controls, manufacturing systems, communication systems, and power electronic systems.
A broad-based core of courses, including basic electricity, solid-state fundamentals, digital concepts, and microprocessors, ensures that the student will develop the skills necessary to perform entry-level tasks. Emphasis is placed on developing the student's ability to analyze and troubleshoot electronic systems. Graduates should qualify for employment as engineering assistants or electronic technologist with job titles such as electronics engineering technologist, field service technologist, maintenance technologist, electronic tester, electronic systems integrator, bench technologist, and production control technologist.

The Bachelor of Science in Electronics Technology with a concentration in Computational Technology is a program that embraces all of the possible inferences drawn from its name: its scope will include the science and technology of performing, analyzing, and archiving large-scale computations over wide-area networks, and

its goal will be to employ large-scale computer and network resources in pursuit of scientific and technological educational and research goals.

The Bachelor of Science in Electronics Technology with a concentration in Information Technology is a program that aims to meet existing and emerging needs of the information technology industry by educating new IT workers in current principles and practices in information technology and their applications. The IT applications may include Information Systems, Telecommunications, Network Administration, Web Development, Computer Graphics, and Information Security. Courses are designed to not only give you a solid knowledge of the field but also to prepare you to take industry-standard certification exams such as the CompTIA's A+, i-Net+, Network+, Server+, Linux+ and IT Project+; the Certified Wireless Network Professional (CWNP)'s Certified Wireless Network Administrator (CWNA), Certified Wireless Security Professional (CWSP), Certified Wireless Analysis Professional (CWAP), Certified Wireless Networking Expert (CWNE) and more.

What is a Technologist?

The rapid growth of technology in our society has been sustained by the efforts of a technological team of professionals. The technologist is a key member of that team who is responsible for applying the research, analysis and design of his colleagues the scientist and the engineer. Technologists also supervise technicians who are involved in fabricating, operating, testing, troubleshooting and maintaining equipment and systems.

A possible scenario could be described as follows: A scientist conducts basic research to explore and develop fundamental theories, an engineer uses these theories to design and develop products and systems. The design concept is then given to a technologist who has the responsibility for transforming the concept into a prototype or product. The device is then passed to a technician who is responsible for testing it to confirm the specifications or operation as originally designed. In actual practice, the interaction among members may vary considerably.

Typically, a technologist will have completed a bachelor's level degree in a field of technology, such as Electronics Technology. Employment opportunities include design operations, sales, technical management and project management. Graduates of Bachelor of Science degree programs in Technology are called technologists to distinguish them from graduates of Bachelor of Science degree programs in Engineering. However, the National Bureau of Labor Statistics does not presently have a category called "Technologist", consequently, many industrial job titles show little distinction between technologists and engineers. Graduates of technology and engineering programs complement each other in their skills and interests. Together with scientists and

technicians, they form a technological team, which has been able to produce an ever-increasing rate of technological advancement.

Your hard work as a technology student will prepare you for a wide range of exciting opportunities throughout the nation and world. We encourage you to take full advantage of all the resources available to you to help you to become all that you can be.

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

Department of Electronics, Computer, and Information Technology
Bachelor of Science in Electronics Technology
With a concentration in Information Technology (Major Code: 0290)

Freshman Year

First Semester	Credit	Second Semester	Credit
ECT 103 (Colloquium I)	0	ECT 104 (Colloquium II)	0
ENGL 100 (Ideas & Express I)	3	ENGL 101 (Ideas & Express II)	3
MATH 131 (Calculus I)(7)	4	GCS 234 or GCS 333(2)	3
MFG 191 (Intro to MFG)	3	CHEM 106, 116 (Gen Chem/Lab)(3)	4
ECT 101 (Microcomputer App.)	3	ECT 120 (Quan. Fund. of Electronics)	3
HPED 200 (Personal Hygiene)	2	MATH 132 (Calculus II)	4
	15		17

Sophomore Year

First Semester	Credit	Second Semester	Credit
ECT 203 (Colloquium III)	0	ECT 204 (Colloquium IV)	0
ECT 201 (Intro. to Comp. Prog.)	3	ECT 212 (Electric Circuits II)	3
MATH 123 (Discrete Math I)	3	PHYS 226, 236	4
PHYS 225, 235	4	SPCH 250 (Speech Fund.)	3
ECT 211 (Electric Circuits I)	3	ECT 213 (Digital Circuits)	3
GCS 292 or ENGL 331 or BUED 360	3	BUAD 220	3
	17		16

Junior Year

First Semester	Credit	Second Semester	Credit
ECT 312 (Active Circuits I)	3	ECT 314 (Active Circuits II)	3
ACCT 203	3	Computer Tech(8) or Telecom Tech(8)	3
Liberal Arts (Elective)(1)	3	Computer Tech(8) or Telecom Tech(8)	3
ECT 313 (Elect Microcomputer Sys I)	3	Liberal Arts (Elective)(1)	3
Computer Tech(8) or Telecom Tech(8)	3	Liberal Arts (Elective)(1)	3
	15		15

Senior Year

First Semester	Credit	Second Semester	Credit
PSYC 445 or PSYC 320	3	OSH 393 or OSH 201	3
CM 592 (Project Mgmt.)	3	Computer Tech(8) or Telecom Tech(8)	3
ECT 598 or ECT 497	3	Free Elective(6)	3
Liberal Arts (Elective)(1)	3	MATH 224	
Computer Tech(8) or Telecom Tech(8)	3	or SOCI 203 or ECON 305	3
Computer Tech(8) or Telecom Tech(8)	3	Free Elective	3
	18		15

Total Credit Hours = 127

Note(s):
(1) Must be an approved elective. See departmental approved liberal arts list.
(2) A prerequisite of GCS 133 is recommended for students who have not taken prior drafting course.
(3) A prerequisite of CHEM 099 is recommended for students lacking high school Chemistry.
(4) See an advisor for a list of approved technical specialization courses.
(5) Military or Air Science may be used as free electives.
(6) Select six credit hours of any courses offered by the university.
(7) A prerequisite of MATH 110 is recommended for students lacking high school Advanced Algebra and Trigonometry.
(8) See an advisor for a list of approved Computer Technology or Telecommunication Technology technical specialization courses.

Bachelor of Science in Electronics Technology
With a concentration in Information Technology (Major Code: 0290)
Select 18 credit hours from one of the specializations listed below

Computer Technology Specialization

Software Systems

BUAD 341 Introduction to Management Information Systems
BUAD 440 Business Information Systems
BUAD 448 Systems Analysis
BUED 342 Business Programming
BUED 624 E-Commerce
INEN 380 Information Technology for Industrial Engineers
ITT 420 Introduction to Unix/Linux
ITT 431 Advanced Programming Techniques with an OOP Language

Networking

ITT 301 Hardware and Software Installation and Maintenance
ITT 413 Electronic Microcomputer Systems II
ITT 629 Computer Networking I
ITT 630 Computer Networking II
BUED 444 Data Communication and Networks

Security

COMP 620 Information, Privacy and Security
COMP 627 Wireless Network Security

Animation/Graphics

GCS 418 Web Design for Graphic Communications
GCS 632 Graphic Animation
ITT 601 Wireless Application Protocols
TECH 382 Computer Applications for *Technological* Studies

Telecommunications Technology Specialization

Digital

ITT 610 Digital Communications I
ITT 611 Digital Communications II

Wireless

ITT 601 Wireless Application Protocols
ITT 650 Wireless Communication Systems
ITT 655 Optical Communication Systems
ITT 660 Satellite and Personal Communication Systems
ITT 665 Wireless Geo-location Systems

Management

ITT 620 Telecommunications Management

Systems

ECT 350 Communication Systems
ITT 670 Communication Circuit Development Laboratory I
ITT 675 Video Communication Systems
ITT 680 Radio Wave and Optical Signal Propagation

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY
Department of Electronics, Computer, and Information Technology
Bachelor of Science in Electronics Technology
With a concentration in Computational Technology (Major Code: 0289)

Freshman Year

First Semester	Credit	Second Semester	Credit
ECT 103 (Colloquium I)	0	ECT 104 (Colloquium II)	0
ENGL 100 (Ideas & Express I)	3	ENGL 101 (Ideas & Express II)	3
MATH 131 (Calculus I)	4	GCS 234 or GCS 333[2]	3
ECT 120 (Quan. Fund. of Electronics)	3	ECT 201 (Intro. to Comp. Prog.)	3
ECT 101 (Microcomputer App.)	3	ECT 211 (Electrical Circuits I)	3
HPED 200 (Personal Hygiene)	2	MATH 132 (Calculus II)	4
	15		16

Sophomore Year

First Semester	Credit	Second Semester	Credit
ECT 203 (Colloquium III)	0	ECT 204 (Colloquium IV)	0
ECT 212 (Electric Circuits II)	3	ECT 313 (Elect Microcomputer Sys I)	3
MATH 224 or MATH 231	3	PHYS 242, 252	4
PHYS 241, 251	4	SPCH 250 (Speech Fund.)	3
ECT 213 (Digital Circuits)	3	MFG 191 (Intro to MFG)	3
GCS 292 or ENGL 331 or BUED 360	3	Liberal Arts (Elective)[1]	3
	16		16

Junior Year

First Semester	Credit	Second Semester	Credit
ECT 312 (Active Circuits I)	3	ECT 314 (Active Circuits II)	3
ACCT 203	3	Computational Tech Elective[4]	3
Liberal Arts (Elective)[1]	3	Computational Tech Elective[4]	3
CHEM 106, 116 (Gen Chem/Lab)[3]	4	Liberal Arts (Elective)[1]	3
ECT 350 or ECT 355 or ECT 360	3	Liberal Arts (Elective)[1]	3
	16		15

Senior Year

First Semester	Credit	Second Semester	Credit
PSYC 445 or PSYC 320	3	OSH 393 or OSH 201	3
CM 592 (Project Mgmt.)	3	Computational Tech Elective[4]	3
ECT 598 or ECT 497	3	Computational Tech Elective[4]	3
BUAD 220 or BUAD 422	3	Free Elective[6]	3
Computational Tech Elective[4]	3	Free Elective[6]	3
Computational Tech Elective[4]	3		15
	18		

Total Credit Hours = 127

Note(s):
(1) Must be an approved elective. See departmental approved liberal arts list.
(2) A prerequisite of GCS 133 is recommended for students who have not taken prior drafting course.
(3) A prerequisite of CHEM 099 is recommended for students lacking high school Chemistry.
(4) See an advisor for a list of approved Computational Technology technical specialization courses.
(5) Military or Air Science may be used as free electives.
(6) Select six credit hours of any courses offered by the university.

Bachelor of Science in Electronics Technology
With a concentration in Computational Technology (Major Code: 0289)
Select 18 credit hours from courses listed below

ECT 600 Electromechanical Systems Analysis
ITT 634 Electronic Instrumentation for Remote Sensing Applications
ECT 635 Analysis and Design of Mechatronic Systems

ITT 431 Advanced Programming Techniques with an OOP Language
ITT 650 Wireless Communication Systems
ITT 665 Wireless Geo-location Systems
ITT 670 Communication Circuit Development Laboratory
ITT 680 Radio Wave and Optical Signal Propagation

MATH 240 Introduction to Computational Tools
MATH 431 Introduction to Differential Equations
MATH 432 Introduction to Applied Mathematics
MATH 440 Numerical Methods
MATH 450 Linear Algebra and Matrix Theory
MATH 465 Introduction to Scientific Computing
MATH 480 Introduction to Mathematical Modeling
MATH 608 Methods of Applied Statistics
MATH 623 Probability Theory and Applications

PHYS 405 Mathematical Physics
PHYS 445 Introduction to Computations in Physics
PHYS 530 Computational Techniques in Physics

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY
Department of Electronics, Computer, and Information Technology
Bachelor of Science in Electronics Technology
Undesignated Concentration (Major Code: 0184)

Freshman Year

First Semester	Credit	Second Semester	Credit
ECT 103 (Colloquium I)	0	ECT 104 (Colloquium II)	0
ENGL 100 (Ideas & Express I)	3	ENGL 101 (Ideas & Express II)	3
Mathematics Elective[6]	4	ECT 201 (Intro. to Comp. Prog.)	3
ECT 101 (Microcomputer App.)	3	ECT 211 (Electric Circuits I)	3
ECT 120 (Quan. Fund. of Electronics)	3	MFG 191 (Intro to MFG)	3
HPED 200 (Personal Hygiene)	2	Mathematics Elective[6]	4
	15		16

Sophomore Year

First Semester	Credit	Second Semester	Credit
ECT 203 (Colloquium III)	0	ECT 204 (Colloquium IV)	0
GCS 234 or GCS 333[2]	3	ACCT 203	3
Mathematics Elective[6]	3	PHYS 225, 235	4
CHEM 106, 116 (Gen Chem/Lab)[3]	4	SPCH 250 (Speech Fund.)	3
ECT 212 (Electric Circuits II)	3	ECT 213 (Digital Circuits)	3
GCS 292 or ENGL 331 or BUED 360	3	Liberal Arts (Elective)[1]	3
	16		16

Junior Year

First Semester	Credit	Second Semester	Credit
ECT 312 (Active Circuits I)	3	ECT 314 (Active Circuits II)	3
PHYS 226, 236	4	ECT 350 (Communication Systems)	3
Liberal Arts (Elective)[1]	3	ECT 360 (Indus Meas. & Control I)	3
ECT 313 (Elect Microcomputer Sys I)	3	Liberal Arts (Elective)[1]	6
ECT 355 (Elec. Power & Machinery)	3		15
	16		

Senior Year

First Semester	Credit	Second Semester	Credit
PSYC 445 or PSYC 320	3	OSH 393 or OSH 201	3
CM 592 (Project Mgmt.)	3	ECT Technical Elective	3
ECT 598 or ECT 497	3	Free Elective[7]	6
BUAD 220 or BUAD 422	3	MFG 495 or MATH 224 or SOCI 203 or ECON 305	3
ECT Technical Elective(s)	6		15
	18		

Total Credit Hours = 127

Note(s):
(1) Must be an approved elective. See departmental approved liberal arts list.
(2) A prerequisite of GCS 133 is recommended for students who have not taken prior drafting course.
(3) A prerequisite of CHEM 099 is recommended for students lacking high school Chemistry.
(4) See an advisor for a list of approved technical specialization courses.
(5) Military or Air Science may be used as free electives.
(6) Students must select at least 11 credit hours of mathematics from: MATH 110, MATH 131, MATH 132, and MATH 431.
(7) Select six credit hours of any courses offered by the university.

ECIT Required Courses (student must take all of the following courses)

ECT 101 Microcomputer Applications
ECT 120 Quantitative Fundamentals of Electronics and Computer Technology
ECT 201 Introduction to Computer Programming
ECT 211 Electric Circuits I
ECT 212 Electric Circuits II
ECT 213 Digital Circuits
ECT 312 Active Circuits I
ECT 313 Electronic Microcomputer Systems I
ECT 314 Active Circuits II
ECT 350 Communications Systems
ECT 355 Electrical Power and Machinery
ECT 360 Industrial Measurements and Control I

ECIT Senior Electives (student must select 3 credit hours from the following courses)

ECT 497 Cooperative Training in Industry I
ECT 598 Senior Project

ECIT Technical Electives (student must select 9 credit hours from any of the following specializations)

General Specialization

ECT 121 Electronic Circuit Fabrication Techniques
ECT 498 Cooperative Training in Industry II
ECT 599 Independent Study
ECT 690 Special Problems in Electronics and Computer Technology
ECT 685 Energy, Power and the Environment
ECT 695 Alternate Energy Systems

Computer Technology Specialization

ITT 301 Technical Computers III
ITT 413 Electronic Microcomputer Systems II
ITT 420 Introduction to Unix/Linux
ITT 431 Advanced Programming Techniques with an OOP Language
ITT 629 Computer Networking I
ITT 630 Computer Networking II
COMP 620 Information, Privacy and Security
COMP 627 Wireless Network Security

Telecommunications Technology Specialization

ITT 601 Wireless Application Protocols
ITT 610 Digital Communications I
ITT 611 Digital Communications II
ITT 620 Telecommunications Management
ITT 650 Wireless Communication Systems
ITT 655 Optical Communication Systems
ITT 660 Satellite and Personal Communication Systems
ITT 665 Wireless Geo-location Systems
ITT 670 Communication Circuit Development Laboratory
ITT 675 Video Communication Systems
ITT 680 Radio Wave and Optical Signal Propagation

Microelectronics and Materials Technology Specialization

ECT 414 Introduction to Semiconductor Device Physics and Fabrication
ECT 614 Microelectronic Fabrication Technology
ECT 615 Introduction to Semiconductor Manufacturing Equipment Technology
ECT 616 Applied Materials, Semiconductor, and Superconductivity
ECT 617 Advanced Solid State Devices

Control and Systems Technology Specialization

ECT 330 Industrial Electronics and Control I
ECT 334 Electronic Instrumentation
ECT 430 Industrial Electronics and Control II
ECT 455 Power Electronic Applications
ECT 460 Industrial Measurement & Controls II
ECT 600 Electromechanical Systems Analysis
ECT 634 Electronic Instrumentation for Telemetry Applications
ECT 635 Analysis and Design of Mechatronic Systems
ECT 640 Electronic Automated Testing Systems

Department of Electronics, Computer, and Information Technology
North Carolina A&T State University
Distance Learning Degree Program

Welcome to the Electronics Technology Distance Learning Program

The BS in Electronics Technology degree program enables individuals employed in business, industry and state related occupations to pursue a four-year degree through part-time on-line study. Instructional delivery will be completely on-line. The intent of the degree program is to provide an appropriate educational experience to qualify graduates for career advancement.

General Information

1. Applicants for the BS in Electronics Technology on-line degree program (major code: 0184) must have a two-year college degree, preferably in a technical discipline.

2. All students must have access to a modern computer preferable using roadrunner or DSL for connectivity to the Internet. Assignments may include accessing Internet resources, and the home page of the instructor. Email and FAX may also be modes of communication.

3. The BS in Electronics Technology on-line degree program is typically completed in 3 to four years of part-time study beyond the two year degree.

4. There are two primary points of contact at NCA&TSU:

Dr. Derrek Dunn, Chairperson, oversees the academic requirements of the degree program and provides advising services. He can be reached at (336) 334-7718 ext. 2286 or dbdunn@ncat.edu .

Ms. Pat White, Student Support Services Coordinator of the Center for Distance Learning. She has responsibility for administrative services, such as registration fees, etc. Her contact is (336) 256-0355 or whitep@ncat.edu.

You may also access information regarding on-line resources for the distance learner at http://fac.ncat.edu/dist/default.htm. As with students who are campus-based, students at a distance are also expected to be knowledgeable about NCA&TSU academic regulations and policies.

Requirements for the Bachelor of Science in Electronics Technology (Major code: 0184) degree program for Distance Learning students

1. Complete the General Education component at a NC community college. This component is contained in the AA and AS college transfer degree programs. Once completed and transferred to NCA&TSU, it should waive the Liberal Studies component of the Electronics Technology degree program at NCA&TSU.

2. The Bachelor of Science in Electronics Technology (Major code: 0184) degree requires a maximum of 128 semester hours. In most cases, between the required NCA&TSU courses, the General Education component and the courses in a two year college degree, this requirement is met. However, there may be instances where a student may have to take elective credits beyond required course work to reach the 128 hours.

ECT Departmental Advisor List

Advisor	BSET (general) Undergraduate and Transfer Students	Information Technology Undergraduate and Transfer Students	Graduate Students	NCA&TSU University Honor Program Students[1]
Mr. Ronnie Rollins	A-B	A-M	A-Z (MSIT-IT)	
Dr. DeWayne Brown	B-D		A-Z (MSIT-ECT)	
Dr. M. Haj-Mohamadi	E-G			
Dr. Felix Edgal	H-J			
Dr. David Eromon	K-L			
Dr. Fereshteh Fatehi	M-N			
Dr. Walter Gilmore	N-R			
Dr. Claude Hargove	S-T			
Ms. Angela Lemons	T-W	N-Z		A-Z
Mr. Thomas Avery	W-Z			

Department of Electronics, Computer, and Information Technology Academic Policies

Part I: Academic Policy for student earning a B.S. in Electronics Technology with a concentration in Information Technology, i.e. 0290 major code:

1. Electronics, Computer and Information Technology students earning a Bachelor of Science in Electronics Technology with a concentration in Information Technology entering Fall 2004 or after must earn a grade of "C" or better in all courses in the major and in all mathematics and science (chemistry, physics) courses required for graduation.
2. Electronics, Computer and Information Technology students earning a Bachelor of Science in Electronics Technology with a concentration in Information Technology will receive the same grade in the lecture and laboratory sections of ECT and ITT courses.
3. A 2.5 overall GPA will be required for current NCA&TSU students to transfer to the B.S. in ET-IT concentration.

Part II: Academic Policy for student earning a B.S. in Electronics Technology with a concentration in Computational Technology, i.e. 0289 major code:

1. Electronics, Computer and Information Technology students earning a Bachelor of Science in Electronics Technology with a concentration in Computational Technology entering Fall 2004 and after must earn a grade of "C" or better in all courses in the major and in all mathematics and science (chemistry, physics) courses required for graduation.
2. Electronics, Computer and Information Technology students earning a Bachelor of Science in Electronics Technology with a concentration in Computational Technology will receive the same grade in the lecture and laboratory sections of ECT and ITT courses.
3. A 2.0 overall GPA will be required for current NCA&TSU students to transfer to the Bachelor of Science in Electronics Technology with a concentration in Computational Technology.

Part III: Proposed Academic Policy for student earning a B.S. in Electronics Technology (undesignated concentration), i.e. 0184 major code:

1. Electronics, Computer and Information Technology students earning a Bachelor of Science in Electronics Technology with an undesignated concentration must earn a grade of "C" or better in all courses in the major.
2. Electronics, Computer and Information Technology students earning a Bachelor of Science in Electronics Technology with an undesignated concentration will receive the same grade in the lecture and laboratory sections of ECT and ITT courses.
3. A 2.0 overall GPA will be required for current NCA&TSU students to transfer to the Bachelor of Science in Electronics Technology with an undesignated concentration.

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY
OFFICE OF CAREER SERVICES
COOPERATIVE EDUCATION PROGRAM
OVERVIEW

What is Cooperative Education?

Cooperative Education is a carefully organized and supervised program of *experiential learning* in which the participating student enriches his/her education by alternating periods of study with periods of meaningful work. It has been defined by the National Commission for Cooperative Education as follows:

*It is that educational plan which integrates classroom experience and practical work experience in industrial, business, government, or service-type work situations. The work experience constitutes a regular and essential element in the educative process and some minimum amount of work experience (at least two different periods of work totaling at least 16 weeks) and minimum standards of performance are included in the requirements of the institution for a degree. In addition, there must be liaison between the administration of the institution and the employing firm. The essential criteria are that the work experience be considered an integral part of the education process, and that the institution takes a definite responsibility for this integrati*on. (Wilson, J.W. and Lyons, E.H., Work-Study College Program, New York: Harper Brothers Publishers, 1961, p. 19)

The term cooperative education suggests a dependency upon the cooperation of outside employers and educational centers in combining their resources to produce a more effective total educational experience for the student.

In summary, Cooperative Education is supervised employment in an occupational field that enhances learning, vocational adaptations, and enables the student to become better acquainted with both theory and practice as he/she makes the transition from campus life to "real" life in the world of work.

Regulations and Responsibilities

The success of a cooperative education program depends on a strong three-way relationship between the student, the University, and the employer. The reputation of the University rests heavily upon the performance standards set by the co-op student. The establishment and maintenance of this relationship are the responsibility of the Office of Career Services (OCS). This relationship is accomplished by personal contract with the student and with the employer, and by adherence to certain basic procedures. All Co-op work experiences must be arranged through the Office of Career Services.

Registered co-op students are considered to be full-time students in good standing with the University, while on campus and off campus on work assignments. Although no formal work agreement is signed by the student or the employer with the University, co-op students are expected to be on the job regularly and punctually. Students are paid employees and, therefore, have only those privileges that are allowed other employees. A co-op student may be terminated by the employer if his/her performance does not prove to be satisfactory. The student should notify the Assistant Director of Experiential Learning if his/her employment status change.

How to Apply for A Co-op Assignment

The Co-op Program is non-compulsory. Students interested in participating in the Program must establish and maintain at least a 2.0 overall grade point average. Freshmen must complete the freshman year prior to the first

work assignment and transfer students must complete one semester.

Selections are made by the employer. Academic standing, interests, work experience and community involvement are important in making the decision. If extended an offer, students have the option to accept or decline. Students who opt to participate should know that they are expected to work two to three times before they graduate and at least one of those times should be scheduled other than a summer period. Students should not accept co-op positions if they do not intend to follow a previously arranged work schedule.

REGISTRATION—To be considered for a co-op, registration with the Office of Career Services is required. Registration instructions and materials are located in Room 101 Murphy Hall and on-line.

INTERVIEWING—Students should interview the semester before they actually plan to begin work. Criteria established by the employer will be published in the OCS Recruitment Bulletin and on-line. Only students who meet the criteria will be allowed to interview. Positions are highly competitive and students are encouraged to interview with all companies seeking for their major.

PLANT VISITS—Students who do well in the on-campus interview are often invited for second interviews at the plant location. Arrangements will be confirmed prior to departure. This is usually the "make it, break it" interview.

REPORTING TO WORK—After accepting a co-op assignment, students must complete the Report to Work Form (available in OCS).

FEES—An administrative fee of $30.00 will be assessed a $30 by the University, which is due and payable during the semester of work. In addition, students desiring academic credit for assignments must register through their academic department and pay the required tuition.

How to Apply for Academic Credit

Students who have completed cooperative education work experiences and wish to get academic credit should follow these steps:

1. Register with the Office of Career Services, (Room 101 Murphy Hall) prior to reporting to your assignment. The OCS is your official link to the University while you are on work assignment. Therefore, you must register with the OCS.
2. Discuss your plans to co-op and get academic credit with your department chairperson and/or school dean. If your school/department requires that you enroll in a course and pay tuition while on work assignment, be sure to complete the registration process.
3. Provide the following documents to the OCS (Assistant Director of Experiential Learning) prior to the week of final exams:
    - An official copy of your position/job description
    - Unofficial copy of transcript
    - A copy of your student evaluation form (will be mailed while on co-op)
    - A copy of the employer evaluation form (will be mailed while on co-op)
    - A typewritten narrative - at least five hundred (500) words.

4. Following receipt and review of these documents, the Assistant Director of Experiential Learning will forward a formal recommendation package to the department chairperson and/or designated person.
5. Follow-up with the department chairperson to determine the status of the recommendation from the OCS.

The (typewritten) narrative should be technical and cover the following:

- Identify initial work assignment dates and instructions given.
- Type of work/projects performed
- Equipment/tools/materials used in completing work
- Relatedness to course(s) in current curriculum
- Level of success in project(s)
- What was learned
- How results will be used at company/agency
- Type of company/agency
- Level of interaction with co-workers
- Level of responsibility (show ability to work independently)
- Awards/Recognition received

Department of Electronics, Computer, and Information Technology
Departmental Regulations

SUPPLIES
University policy requires that students supply textbooks and supplies for courses as required. The University bookstore is one place to obtain these materials. Students are expected to purchase textbooks and supplies immediately after the first class meeting. Students in Electronics are expected to obtain a graphic scientific calculator. A set of hand tools (such as wire cutters, soldering iron, etc.) may be required for some courses.

TOWN MEETING
The department sponsors at least one Town Meeting each academic year to apprise students of changes in the department, to promote student feed-back and to acquaint students with departmental personnel. Watch the departmental bulletin board for date, time and location.

WEB PAGE
The latest information about the Department can be obtained from our website:
http://www.ncat.edu/~sot/ect/index.html.

E-MAIL ACCOUNTS
All students are encouraged to obtain e-mail accounts for the purpose of communicating with faculty and other students. Accounts are available free from the Computer Center.

STUDENT CLUBS
- Electronics Club

Pick up a membership application from Dr. Brown.

- The Instrumentation, Systems, and Automation Society

Contact Dr. Edgal for more information.

- National Association of Radio and Telecommunication Engineers

Contact Ms. Lemons or Mr. Avery for more information.

DEPARTMENTAL NEWSLETTER
A departmental newsletter is published at least once a semester. Students are responsible for this publication.

NATIONAL ASSOCIATIONS
Students are encouraged to join local chapters of NARTE, ISA and IEEE.

LABORATORY FACILITIES

Nearly every course in Electronic, Computer, and Information Technology Department is enhanced with hands on experimentation. It is important that students understand the importance of lab work.

The following are brief descriptions of Electronic, Computer, and Information Technology laboratories.

1. Basic Electricity Lab (202 Price Hall): This lab is equipped with basic analog and digital instruments and trainers to be used in introductory analog and digital courses. Instruments include analog and digital VOM, dual channel scopes, and analog, digital trainer. In addition a small workstation including a digital scope, spectrum analyzer, and satellite tracking station are available for students projects.

2. AT&T Computer Lab (201-B Price Hall): This lab is equipped with 20 PC stations. All PC's are loaded with modern software and simulation programs and computer-aided design that are used for circuit analysis and design. This lab provides students access to the internet.

3. Basic Electronics Lab (4008 Smith Hall): This lab is a general-purpose laboratory and can be used for many ECT Courses. The stations include prefabricated circuits, signal generators, power sources, scopes, DVM's, etc. Students use prefabricated circuit modules to build circuits, analyze and troubleshoot.

4. Digital/Microprocessor Lab (205 Price Hall): This lab equipped with digital and microprocessor hardware with 6800/68000 Trainers. This lab provides for interfacing microprocessors and microcontrollers to the analog world.

7. Industrial Controls Lab (4001 Smith Hall): This lab is equipped for industrial controls, rotating machinery and industrial instrumentation laboratory activities.

8. Advanced Computer Networking Lab (4016 Smith Hall): This lab is equipped with 20 networked workstations loaded with software to enable activities in artificial intelligence, networking and data communication.

9. Wireless Geo-location Systems Research Lab (207 Price Hall): This laboratory is located at the university in Smith/Price Hall Complex and supports funded research in navigation and navigation education. The laboratory is capable of conducting a variety of Global Positioning Systems related research including: low signal navigation technology research, GPS jamming research, and Improved techniques for high precision GPS point positioning and GPS precise ephemeris generation.

10. Electronic Communication Lab (4007 Smith Hall): This laboratory supports the study of various communication circuits and systems.

Department of Electronics, Computer, and Information Technology Courses

LEVEL 100 COURSES
ECT 101 Microcomputer Applications
ECT 120 Quantitative Fundamentals of Electronics and Computer Technology
ECT 121 Electronic Circuit Fabrication Techniques

LEVEL 200 COURSES
ECT 201 Introduction to Computer Programming
ECT 211 Electric Circuits I
ECT 212 Electric Circuits II
ECT 213 Digital Circuits
ECT 299 Survey of Electronics and Computer Technology

LEVEL 300 COURSES
ITT 301 Hardware and Software Installation and Maintenance
ECT 312 Active Circuits I
ECT 313 Electronic Microcomputer Systems I
ECT 314 Active Circuits II
ECT 330 Industrial Electronics & Control I
ECT 334 Electronic Instrumentation
ECT 350 Communication Systems
ECT 355 Electrical Power & Machinery
ECT 360 Industrial Measurements & Control I

LEVEL 400 COURSES
ITT 413 Electronic Microcomputer Systems II
ITT 420 Introduction to Unix/Linx
ECT 430 Industrial Electronics
ITT 431 Advance Programming Techniques with an OOP Language
ECT 455 Power Electronic Applications
ECT 460 Industrial Measurement & Controls II
ECT 497 Cooperative Training in Industry I
ECT 498 Cooperative Training in Industry II

LEVEL 500 COURSES
ECT 598 Senior Project
ECT 599 Independent Study

LEVEL 600 COURSES
ECT 600 Electromechanical Systems Analysis
ITT 601 Wireless Application Protocols
ITT 610 Digital Communications I
ITT 611 Digital Communications II
ECT 614 Microelectronic Fabrication Technology
ECT 615 Introduction to Semiconductor Manufacturing Equipment Technology
ECT 616 Applied Materials, Semiconductors, and Superconductivity
ECT 617 Advanced Solid State Devices
ITT 620 Telecommunications Management
ITT 629 Computer Networking I
ITT 630 Computer Networking II
ITT 634 Electronic Instrumentation for Telemetry Applications
ECT 635 Analysis and Design of Mechatronic Systems
ECT 640 Electronic Automated Testing Systems
ITT 650 Wireless Communication Systems I

ITT 655 Optical Communication Systems I
ITT 660 Satellite and Personal Communication Systems
ITT 665 Wireless Geo-location Systems I
ITT 670 Communication Circuit Development Laboratory
ITT 675 Video Communication Systems
ITT 680 Radio Wave and Optical Signal Propagation
ECT 685 Energy Power and the Environment
ECT 695 Alternate Energy Systems
ECT 690 Special Problems in Electronics and Computer Technology
ECT 699 Independent Study in Electronics & Computer Technology

LEVEL 700 COURSES
ECT 714 Advanced VLSI, Film, and IC process Technology
ECT 725 Wide Area Networks
ECT 730 Systems Integration for Telecommunications Managers
ECT 735 Telecommunication Management Issues
ITT 740 Regulatory and Policy Issues for Communication Systems
ECT 745 Network Services for the Enterprise
ECT 750 Telecommunications Co-op
ECT 755 Optical Communication Systems II
ECT 759 Special Topics in Electronics and Computer Technology
ECT 760 Wireless Communication Systems II
ECT 765 Wireless Geo-location Systems II
ECT 770 Communication Circuit Development Laboratory II
ECT 785 Electric Energy and Environmental Management

LEVEL 100 COURSES

ECT 101 Microcomputer Applications 3(2-2)
This course is designed to provide the student with basic computer skills as required in a typical business environment. Emphasis is on various business software packages including: Spreadsheets, database management, word processing, etc., as run on UNIX, DOS, and Windows platforms. Basic language programming is also covered. Prerequisites: None

ECT 120 Quantitative Fundamentals of Electronics and Computer Technology 3(3-0)
This course provides a survey of the field of electronics and computer technology and a grounding in basic problem-solving techniques. This course also provides the mathematical background needed in the field of electronics and computer technology. Topics include a review of arithmetic review, algebra, basic trigonometry, complex algebra, binary algebra and fundamental units. Prerequisites: None

ECT 121 Electronic Circuit Fabrication Techniques 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. Prerequisites: None

LEVEL 200 COURSES

ECT-201. Introduction to Computer Programming 3(2-2)
This course will focus on the "C" programming language and its applications in Electronics Technology. Topics include data types, I/O statements, control structures, functions, arrays, and strings. A brief introduction to C++ is also provided. Prerequisites: ECT 101.

ECT-211. Electric Circuits I 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, MATH 110 or MATH 111.

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

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.

ECT-299. Survey of Electronics and Computer Technology
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.

LEVEL 300 COURSES

ECT 301 Technical Computers III Credit 3(2-2)
This course will introduce the student to the practical hardware and software aspects of personal computers. Topics include operating systems, installation of hardware and software, configuration, troubleshooting, I/O and basic networking. Prerequisite: ECT 201

ECT 312 Active Circuits I Credit 3(2-2)
This course is an introduction to active electronic circuitry. Topics include: Power supplies, small and large signal amplifiers and linear integrated circuits. Prerequisite: ECT 212.

ECT 313 Electronic Microcomputer Systems I 3(2-2)
This course addresses the programming and interfacing of 8-bit microcomputer based systems. Prerequisite ECT 213.

ECT 314 Active Circuits II 3(2-2)
This course is a continuation of Active Circuits I. Topics include: Oscillators, phase locked amplifiers, logarithmic amplifiers, transconductance amplifiers, voltage regulators and specialized communication circuits. Prerequisite: ECT 312.

ECT 330 Industrial Electronics & Control I 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, relays, transducers, fundamentals of open and closed loop control systems, process control and programmable logic controllers. Prerequisite: ECT 312, ECT 313

ECT 334 Electronic Instrumentation 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: 312.

ECT 350 Communications Systems 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.

ECT 355 Electrical Power & Machinery 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

ECT 360 Industrial Measurements & Control 3(2-2)
This course deals with the basic principles of electronic industrial measurements and control. Topics include: Transducers, final correcting devices, open and closed loop controllers, stability and damping. The student will be required to analyze complex industrial measurement and control systems. Prerequisites: ECT 312, 313.

LEVEL 400 COURSES

ITT 413 Electronic Microcomputer Systems II 3(2-2)
Advanced microprocessor and microcomputer structures involving DSP-based systems and/or other powerful processors (eg. the Intel StrongArm). Advanced techniques of pipelining, parallel processing etc. are illustrated. Programming and design of hardware interfaces. The emphasis of the course is on student projects. Prerequisites: ECT 313.

ECT 414 Introduction to Semiconductor Device Physics and Fabrication 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

ITT 420 Introduction to Unix/Linx 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. Prerequisites: ECT 201

ECT 430 Industrial Electronics Credit 3(2-2)
A study of components and circuits in control systems to include: thyratons, thermocouple, thermistors, photo conductive cells, photo voltaic cells, waveshaping, and IC circuits. Prerequisite: 312.

ITT 431 Advanced Programming Techniques with an OOP Language 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

ECT 455 Power Electronic Applications 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, 355.

ECT 460 Industrial Measurement & Controls II 3(2-2**)**
This course is a continuation of ECT 360. Emphasis is on the analysis of complex industrial control systems. Prerequisite: ECT 360.

ECT 497 Cooperative Training in Industry I 3(3-0)
Students must be in industry full-time for one semester in the major field of work and complete any University Coop requirements. The student will be evaluated on reports from industry and the University Coop Coordinator. The hours earned will be credited toward required technical electives in the Electronics & Computer Technology Curriculum. Four semester hours credit is the maximum to be earned under this arrangement any one semester. Eight semester hours is the maximum to be earned in the Coop arrangement in the Electronics and Computer Technology Department.

ECT 498. Cooperative Training in Industry II 3(3-0)
The description of this course is the same as ECT 497 and is normally the second Coop experience of the student.

LEVEL 500 COURSES

ECT 598 Senior Project 3(0-6)
Under the direction and guidance of departmental faculty, the student independently design, build and test an approved project. Progress reports, a formal written report, and a formal presentation will be required. Prerequisite: Senior standing.

ECT 599 Independent Study 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.

LEVEL 600 COURSES

ECT 600 Electromechanical Systems Analysis 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. Prerequisites: DEPARTMENTAL APPROVAL

ITT 601 Wireless Application Protocols 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

ITT 610 Digital Communications I 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. Prerequisites: ECT 350

ITT 611 Digital Communications II 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. Prerequisites: ECT 610 or departmental approval

ECT 614 Microelectronic Fabrication Technology 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. Prerequisites: ECT 314 or ECT 414.

ECT 615 Introduction to Semiconductor Manufacturing Equipment Technology 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, ECT 414

ECT 616 Applied Materials, Semiconductors, and Superconductivity 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, 236

ECT 617 Advanced Solid State Devices 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. Prerequisites: ECT 414

ECT 620 Telecommunications Management 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. Prerequisites: ECT 350.

ITT 629 Computer Networking I 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. Prerequisite: ECT 212 and ECT 213 or ECT 299

ITT 630. Computer Networking II 3(1-4)
The 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. Prerequisites: ITT 629.

ITT 634 Electronic Instrumentation for Remote Sensing Applications 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. Prerequisites: ECT 350 or departmental approval

ECT 635 Analysis and Design of Mechatronic Systems 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, ECT 312, ECT 313.

ECT 640 Electronic Automated Testing Systems 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. Prerequisites: ECT 360.

ITT 650 Wireless Communication Systems I 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. Prerequisites: ECT 350

ITT 655 Optical Communication Systems I 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. Prerequisites: ECT 350

ITT 660 Satellite and Personal Communication Systems 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. Prerequisites: ECT 350

ITT 665 Wireless Geo-location Systems I 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. Prerequisites: ECT 350 or departmental approval

ITT 670 Communication Circuit Development Laboratory I 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.

ITT 675 Video Communication Systems 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.

ITT 680 Radio Wave and Optical Signal Propagation 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.

ECT 685 Energy Power and the Environment 3(3-0)
This course will cover the basic 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

ECT 695 Alternate Energy Systems 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

ECT 690 Special Problems in Electronics and Computer Technology 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. Prerequisite: Departmental Approval.

ECT 699 Independent Study in Electronics & 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.

LEVEL 700 COURSES

ECT 714 Advanced VLSI, Film, and IC process Technology 3(3-0)
This course introduces computer aided design tools for VLSI; Mask design styles, layout editors, placement/routing, design rule checking, etc.; thick films, advanced PVD/CVD systems; advanced lithographic and IC process techniques. The course also presents application to low frequency, Rf, and optical frequency micro- and nano- electronic devices. Prerequisite: ECT 614 or 615

ECT 725 Wide Area Networks 3(3-0)
This course will examine Wide Area Networks (WANs) and associated media devices and protocols. Also in this course the design, simulation, and implementation of extranet and internet WAN systems will be developed and tested. Prerequisite: Departmental Approval

ECT 730 Systems Integration for Telecommunications Managers 3(2-2)
This course delineates methods by which telecommunications systems can be put together to serve the needs of an organization. Students trace how the project manager should operate under constraints of time, cost, performance, competition, and regulation. The course involves extended case studies and group project. Prerequisites: ECT 620

ECT 735 Telecommunication Management Issues 3(2-2)
This course assesses the impact of current and future trends on telecommunication landscape. Topics include technological changes, strategic planning, financial analysis, and the roles of organizational entities such as research and development, production, human resources, and operations. Prerequisite: ECT 620

ITT 740 Regulatory and Policy Issues for Communication Systems 3(2-2)
This course examines current codes and procedures in sampling, engineering standards, testing procedures and guidelines. Data analysis using computer modeling and statistical analysis will be presented. Prerequisite: Departmental Approval

ECT 745 Network Services for the Enterprise 3(3-0)
The principles of current wired and wireless services in the telecommunication industry are analyzed for systems and effectiveness. Projected trends and patterns of systems applicable to the industrial communication network will be researched. Prerequisite: Departmental Approval

ECT 750 Telecommunications Co-op 3(3-0)
The co-op experience is designed to provide students with an intern experience of working full-time in a technical environment related to electronics and computer technology or telecommunications. For 3 hours of credit, the student must be employed full-time for one semester. Evaluation of student will be based on reports from student's work supervisor and co-op coordinator. Prerequisite: 15 hours of graduate credit.

ECT 755 Optical Communication Systems II 3(2-2)
This course is a continuation of ECT 655. The course will focus primarily on optical signal processing technologies as they are applied to high-speed communication systems. Prerequisites: ECT 655

ECT 759 Special Topics in Electronics & Computer Technology 3(3-0)
This course involves the study of a topic not addressed by an existing course in the department. Typically, a topic is selected from within a new or evolving area in the field. Prerequisite: Departmental Approval.

ECT 760 Wireless Communication Systems II 3(2-2)
The course will discuss the transmission of data over mobile links and digital packet data systems. The course will also address security and privacy issues in wireless communication systems. These topics will be introduced via in-depth case studies of wireless standards such as IS-41, GSM, PCS and third generation standards and technologies. Prerequisites: ECT 650 or ECT 660

ECT 765 Wireless Geo-location Systems II 3(2-2)
This course will provide integrated practical examples, in-depth case studies and guidelines for building GPS systems. The course will review in-depth implementation techniques for position location systems. Prerequisites: ECT 665

ECT 770 Communication Circuit Development Laboratory II 3(1-4)
This course is a continuation of ECT 670. The course will study practical methods of building a complete high frequency or ultra high frequency communication system at the discrete component level. Prerequisites: ECT 670

ECT 785 Electric Energy and Environmental Management 3(3-0)
This course will discuss the role of electricity from fossil and nuclear fuels, and renewable resources. It will investigate the impact of high voltage transmission lines as well as the health effects of electricity generation. The course will do an assessment of cogeneration cycles and demand side management. In addition, emission control in the US electric utility industry and an evaluation of uncertainties in quantifying emissions impacts will be studied. Prerequisites: ECT 685 or Departmental Approval

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