COMMITTEE: University Curriculum Committee

MEETING DATE: April 14, 2011

PERSON PRESIDING: Jonathan Reid

REGULAR MEMBERS IN ATTENDANCE: Kanchan Das, Ron Graziani, Donna Kain, Janice Neil, Jonathan Reid, and Paul Schwager

EX-OFFICIO MEMBERS IN ATTENDANCE: Kenneth Blair Jr., Linner Griffin, and Gregory Lapicki

EXCUSED: Derek Alderman, Ralph Scott and Carolyn Willis

ABSENT: None

SUPPORT: Kimberly Nicholson

OTHERS IN ATTENDANCE:
   College of Technology and Computer Science: Karl Abrahamson, Paul Kauffmann, Merwan Mehta, Leslie Pagliari, and Jason Yao
   Thomas Harriot College of Arts and Sciences: Scott Curtis, and Rosana Ferreira

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ACTIONS OF MEETING

Agenda Item: II. Old Business

(1.) The 03-24-11 minutes were approved electronically and forwarded to the Faculty Senate.

Discussion: At the 03-31-11 meeting minutes, the following description of MUSC 3677 included in marked catalog copy appended to the minutes was approved:

MUSC 3677. Music in Therapy (3)
For students in allied health, special education, or arts degree programs. Introduction to influence of music on human behavior, the scientific bases for music as therapy, and current music therapy techniques as practiced in health care, education, and community settings. Not open to Music Therapy Majors.

After the meeting and subsequent review and discussion of the catalog copy with appropriate faculty, it was agreed that the catalog copy should read as follows:

MUSC 3677. Music in Therapy (3)
Not open to Music Therapy Majors. Introduction to influence of music on human behavior, the scientific bases for music as therapy, and current music therapy techniques as practiced in health care, education, and community settings.
Donna Kain moved to approve the change in the marked catalog copy portion. Linner Griffin seconded. Motion carried.

**Action Taken:** Paul Schwager moved to approve the 03-31-11 minutes as amended. Linner Griffin seconded. Motion carried and the minutes were forwarded to the Faculty Senate.

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**Agenda Item:** III. Thomas Harriot College of Arts and Sciences, Department of Geography

(1.) Proposal of New Course: GEOG 2350

**Discussion:** This course on global climate change is being proposed to introduce students to issues that have a significant and global impact on society. The course would carry foundations credit. On the course proposal form:

- Item 3. Check that it is an elective
- Item 4. Check “on campus” under Expected Future Delivery
- Item 6. Change the course description to read: “Explores societal aspects of climate change science, relevant social science debates, human adaptation, mitigation strategies, and international policy.”
- Item 10. Check “Social Science (SO)” under foundations credit.
- Item 18. In the syllabus, fix spelling of “attendance”. Grading lists 4 quizzes, schedule three. Remove one of the quizzes from the grading matrix. Take out the dates in the syllabus.
- Make sure to change the course description in the catalog copy. Remove the fall semester designation from instances in the catalog.
- Jonathan asked about notifications to other departments that might be interested in the course.

**Action Taken:** Paul Schwager moved to approve with changes. Janice Neal seconded. The motion passed.

(2.) Revision of Existing Degrees: BA in Geography, BS in Applied Geography, BS in Geographical Information Science and Technology

**Discussion:** Changes include the addition of the proposed new course (above) to areas in geography. Janice also encouraged them to delete banked courses.

**Action Taken:** Paul Schwager moved to approve. Janice Neal seconded. The motion passed.
Agenda Item: IV. College of Technology and Computer Science, Department of Technology Systems

(1.) Proposal of New Courses: IENG 4024, 4025

Discussion: The faculty proposes this new course to meet updated knowledge in the field. IENG 4024 is a lecture and 4025 a lab portion. Greg Lapicki asked about whether to include robotics in the course title. Mehta said they have a robotics course and so don’t want to focus on that area in this course. In the course proposal:

- Item 3. Check required.
- Linner Griffin indicated that the syllabus is vague on the assignments and asked whether there were any details about the assignments that could be provided (30% of the course). Chair Reid said that for the future to add more about the assignments because the descriptions of the assignments show how the assignments are set up to meet the course objectives. Chair Reid also requested some indication of which of the course outline items would be attached to which assignments. They will provide more information about assignments.

Action Taken: Janice Neal moved to approve with changes. Linner Griffin seconded. Motion passed.

(2.) Revision of Existing Courses: IENG 4020; ITEC 4300

Discussion: Paul Schwager asked if the department has notified the College of Business about these revisions, particularly the Department of Marketing and Supply Change Management, through Dr. Anselmi. Dr. Pagliari indicated that the CoB had not been notified. Paul requested that notification be sent to the CoB and that the UCC be informed about the notification.

The proposal for IENG 4020 is a revision of the course. Title and prerequisites are proposed to change. In the course proposal:

- Item 5. Include that the faculty was involved in the revision of the course. Move wording about faculty involvement from Item 7 to Item 5. Item 5 should reflect the reasons for the requested change.
- Item 18. Course objective (j) change “Implementation of” to “implement.”
- In the course assignments and grading plan, clarify the number of quizzes and tests.

The proposal for ITEC 4300 is also a revision of an existing course. In the course proposal:

- Item 5. Include that the faculty was involved in the revision of the course. Move wording about faculty involvement from Item 7 to Item 5. Item 5 should reflect the reasons for the requested change.
- In the course assignments and grading plan, clarify the number of quizzes and tests.
Action Taken: Janice Neal moved to approve with changes and pending notifications of other units within one week. Linner Griffin seconded. Motion passed.

(3.) Banking of Existing Course: IENG 4092

Discussion: There was discussion about whether the course should be banked or deleted. The faculty indicated that this course would be banked for now.

Action Taken: Janice Neal moved to approve. Linner Griffin seconded. Motion passed.

(4.) Revision of Existing Degree: BS in Industrial Engineering Technology

Discussion: The changes requested will align the program with the accreditation requirements of the Association for Technology. The revisions involved changes to the core requirements, cognates, and pre- and co-requisites and the addition of new courses proposed above.

- Ensure that the changes are reflected consistently in the catalog copy.

Action Taken: Janice Neal moved to approve. Linner Griffin seconded. Motion passed.

(5.) Prerequisite and/or Corequisite Revision of Existing Courses: IENG 2020, 2021; 3300; 3600; 4200; ITEC 2054, 2055; 3200; 3800

Discussion: These changes are part of the effort to align program requirements with accreditation requirements.

Action Taken: Janice Neal moved to approve. Linner Griffin seconded. Motion passed.

(6.) Deletion of Existing Courses Previously Deleted from Graduate Catalog: IENG 5504

Discussion: This course is no longer available.

Action Taken: Janice Neal moved to approve. Linner Griffin seconded. Motion passed.

(7.) Deletion of Existing Banked Courses: IENG 2066, 2067; 2072, 2073; 3072; 4060, 4061

Discussion: None.

Action Taken: Janice Neal moved to approve. Linner Griffin seconded. Motion passed.
(8.) Deletion of Existing Banked Courses Previously Deleted from Graduate Catalog: IENG 5060; 5090, 5091.

Discussion: None.

Action Taken: Janice Neal moved to approve. Linner Griffin seconded. Motion passed.

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Agenda Item: V. College of Technology and Computer Science, Department of Computer Science

(1.) Proposal of New Course: CSCI 3040.

Discussion: This course would be cross listed with the new course EENG 3040 and is appropriate for advanced computer science majors. In the course proposal:
- Item 3. Identify as “elective.”
- Item 5. Add that the CSCI faculty participated in the decision about adding the course.
- Item 6. The description should match the EENG 3040 description.
- Item 18. Change the grading scale to eliminate “…or better” (e.g., “80% or better” should be “80% -- 89%”). Send a grading matrix with more specific information about details of student assignments as they relate to course objectives.

Action Taken: Janice Neal moved to approve with changes. Linner Griffin seconded. Motion passed.

(2.) Renumbering and Revision of Existing Course: CSCI 3526 (to 2410)

Discussion: Renumbering and revising the course will allow it to be cross listed with EENG 2410. The revision will align this course with EENG 2410. In the course proposal:
- Item 6. Change course description to match EENG 2410.
- Item 18. Change the grading scale.

Action Taken: Janice Neal moved to approve with changes. Linner Griffin seconded. Motion passed.

(3.) Prerequisite Revision of Existing Courses: CSCI 3601, 4520, 4627

Discussion: Courses that required CSCI 3526 as a prerequisite will be changed to reflect that the course is no longer required.
- Ensure that the changes are consistent throughout catalog copy.
Action Taken: Janice Neal moved to approve. Linner Griffin seconded. Motion passed.

Agenda Item: VI. College of Technology and Computer Science, Department of Engineering

Overview. Chair Jonathan Reid asked about the budgetary memo. Linner brought up budget issues again with respect to the new concentration. Paul Kaufmann suggested that he would provide a revised budget memo with additional details. Dr. Kaufmann will also provide additional information in the Memorandum of Request about the outcomes assessments relative to the program for all the courses.

(1.) Proposal of New Courses: EENG 2410, 3020, 3040, 3530, 3750, 4510 are being added in support of the new Electrical Engineering Concentration. ENGR 1016, 2000, 2514, 3000, 3420 are proposed to focus on professional skills, the engineering design process, and project management.

Discussion: New course proposals were discussed.

EENG 2410, in the course proposal:
- Item 3. Indicate whether the course is required.
- Item 6. Take out the wording about the three lecture hours per week.
- Item 19. Change the grading scale.

EENG 3020
- Item 3. Indicate whether the course is required.
- Item 5. Add wording about the faculty being involved in the course development. Add (EENG) after the first sentence.
- Item 6. Take out the wording about the three lecture hours.
- Item 19. Review and possibly reduce the number of objectives. Change the grading scale.

EENG 3040
- Item 3. Indicate whether the course is required.
- Item 19. Change the grading scale.

EENG 3530
- Item 3. Indicate whether the course is required.
- Item 5. Add wording about the faculty being involved in the course development. Add (EENG) after the first sentence.
- Item 6. Take out the wording about the three lecture hours. Spell out MOS the first time it is used.
- Item 17: Add “simulation.”
- Item 19: Delete the heading “Lecture Hour” from the Course Topics table. Change the grading scale.
EENG 3750
- Item 3. Indicate whether the course is required.
- Item 4: Check expected future delivery methods.
- Item 5. Add wording about the faculty being involved in the course development. Add (EENG) after the first sentence.
- Item 6. Take out the wording about the three lecture hours.
- Item 19: Delete the number of classes after each item under Course Topics. Change the grading scale.

EENG 4510
- Item 3. Indicate whether the course is required.
- Item 4: Check expected future delivery methods.
- Item 5. Add wording about the faculty being involved in the course development. Change “(EE)” to “(EENG).”
- Item 6. Take out the wording about the three lecture hours.
- Item 19: Delete the number of classes after each item under Course Topics. Change the grading scale.

ENGR 1016
- Item 5. Add wording to indicate that ABET is the accrediting agency.
- Item 18: Change the course content outline to be consistent in form with ENGR 2000.

ENGR 2000
- Item 5. Add wording to indicate that ABET is the accrediting agency.

ENGR 2514
- Item 3. Indicate whether the course is required.
- Item 5: Revise the justification to indicate the coverage in the new course and that faculty were involved in the planning.
- Item 19: Delete the chapter numbers after each item under Course Topics. Change the grading scale.

ENGR 3000
- Item 3. Indicate whether the course is required.
- Item 4: Check expected future delivery methods.
- Item 5. Add wording to indicate that ABET is the accrediting agency.
- Item 18: Delete the number of classes after each item under Course Topics. Change the grading scale. Add descriptions of the writing projects (this will be a writing intensive course).

ENGR 3420. Paul Schwager asked if other departments, particularly economics and business, had been notified about this course. Paul Kaufmann indicated that he would provide additional notifications.
Item 3. Indicate whether the course is required.
Item 4: Check expected future delivery methods.
Item 6. Take out the wording about the three lecture hours.
Item 18: Spell out IRR and MARR.

**Action Taken:** Paul Schwager moved to approve as amended; Kanchan Das seconded. Motion passed.

(2.) Revision of Existing Courses: ENGR 1000, 2070

**Discussion:** Proposed revisions were discussed.

ENGR 1000. This course will now be a required course.
- Item 3. Indicate whether the course is required.
- Item 5. Add wording to indicate that ABET is the accrediting agency.
- Item 18: Adjust objectives to ensure measurable outcomes. Remove the word “hour” under Course Topics.

ENGR 2070. This course will change to a lecture and lab.
- Item 3. Indicate whether the course is required.
- Item 4: Check expected future delivery methods.
- Item 5. Add wording to indicate that ABET is the accrediting agency.
- Item 18: Remove the word “hour” under Course Topics. Add descriptions of the writing projects (this will be a writing intensive course).

**Action Taken:** Paul Schwager moved to approve as amended; Kanchan Das seconded. Motion passed.

(3.) Revision of Existing Degree: BS in Engineering

**Discussion:** Additional emphasis on design and project management are needed to better prepare students. Changes to course, additions of courses and WI credit proposed will better prepare students for capstone courses in the senior year.

**Action Taken:** Paul Schwager moved to approve; Kanchan Das seconded. Motion passed.

(4.) Proposal of New Concentration: Electrical Engineering

**Discussion:** The six proposed new courses described (above) constitute a concentration in Electrical Engineering. The addition of this concentration is part of the program’s current strategic plan.
Action Taken: Paul Schwager moved to approve; Kanchan Das seconded. Motion passed.

(5.) Prerequisite Revision of Existing Courses: ENGR 3050, 4010

Discussion: ENGR 2514 is added as a pre-req for ENGL 3050. ENGR 3000 is added as a pre-req for ENGR 4010.

Action Taken: Paul Schwager moved to approve; Kanchan Das seconded. Motion passed.

(6.) Editorial Revision of Existing Courses: ENGR 3012, 3024

Discussion: None.

Action Taken: Paul Schwager moved to approve as amended; Kanchan Das seconded. Motion passed.

(7.) Deletion of Existing Courses: 1010, 1020, 2010, 2020, 3010, 3020

Discussion: These courses had been approved for deletion previously and were retained in the catalog. They need to be deleted.

Action Taken: Paul Schwager moved to approve as amended; Kanchan Das seconded. Motion passed.

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Agenda Item: VII. Thomas Harriot College of Arts and Sciences, Department of Chemistry

(1.) Revision of BA and BS program description in the Undergraduate Course Catalog

Discussion: The committee stands informed.

Action Taken: Chair Jonathan Reid approved this item by memo.

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Agenda Item: VIII. Undergraduate Curriculum and Program Development Manual
(1.) **Undergraduate Curricular Action Table**

**Discussion:** The committee should consider how this GCC document can be used as model for meeting the needs of the UCC.

**Action Taken:** Donna Kain volunteers to do that over the break.

(2.) **Undergraduate University Curriculum Committee Course Proposal Form for Courses Numbered 0001 - 4999**

**Discussion:** Editorial changes on the form are needed to clarify that indication of “required” or “elective” are required for all requested actions. Also, the names of several university committees have been changed and those changes need to be reflected in affected UCC documents.

**Action Taken:** Drafts with changes have been prepared.

(3.) **Signature Form for Curricular Changes**

**Discussion:** The names of several university committees have been changed and those changes need to be reflected in affected UCC documents.

**Action Taken:** Drafts with changes have been prepared.

(4.) **Undergraduate Curriculum and Program Development Manual**

**Discussion:** The names of several university committees have been changed and those changes need to be reflected in affected UCC documents.

**Action Taken:** Drafts with changes have been prepared.

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**Agenda Item:** VIII. New Business

(1.) **UCC Liaisons – Improving the System**

**Discussion:** None.
Action Taken: Tabled.

Chair Reid moved to thank Paul Schwager and Janice Neal for six year of significant service to the committee. Much of the good work and improvements to the committee’s process is as a result of their efforts. Approved by acclamation.

NEXT MEETING: April 28.

ITEMS TO BE DISCUSSED: End of year matters.
Marked Catalog Copy:

Agenda Item II

Old Business

Revision of catalog text from 03-24-11 UCC meeting, College of Fine Arts and Communication, School of Music

http://www.ecu.edu/cs-acad/ugcat/CoursesM.cfm#musc

MUSC: Courses for Non-Music Majors

3048. Music for Exceptional Children (2) (F,S,SS) (FC:FA)  
May count toward MUSC major electives. Emphasis on materials, procedures, and activities. Applied music group fee is $35 per semester hour credit.

3677. Music in Therapy (3)  
For students in allied health, special education, or arts degree programs. Introduction to influence of music on human behavior, the scientific bases for music as therapy, and current music therapy techniques as practiced in health care, education, and community settings. Not open to Music Therapy Majors.

3058. Music for the Preschool Child (2)  
May count toward MUSC major electives. P: MUSC 3018 or consent of instructor. Materials and methods for teaching music to children from birth to 6 years of age.

3677. Music in Therapy (3)  
Not open to Music Therapy Majors. Introduction to influence of music on human behavior, the scientific bases for music as therapy, and current music therapy techniques as practiced in health care, education, and community settings.

4228. Arts Marketing (3)  
May count toward MUSC major electives. Key concepts, background, public relations strategies, and arts-specific marketing solutions for teachers, sacred musicians, and community-sponsored arts program directors to promote music, theatre, and arts programs effectively.

4277. Music for Group Activities (2) (F) Same as MUSC 4277 (Music Therapy)  
Open to recreation and leisure studies and allied health majors. C: MUSC 4287. Organization and development of social and recreational music activities. Emphasis on therapeutic function.

Agenda Item III

Thomas Harriot College of Arts and Sciences
GEOG: Geography

1000. People, Places, and Environments (3) (F,S,SS) (FC:SO)
Basic course to field of geography. Major physical and cultural elements of environment and their influence on human activity.

1200. Introduction to Physical Geography (3) (F)
May not count toward foundations curriculum social sciences requirement. Fundamental processes that influence weather and climate, land form development, soil formation, water resources, and vegetative regimes with the purpose of better understanding their spatial interrelationships within human physical environment.

1250. The Water Planet (3) (F,S) (FC:SO)
Importance of water in natural world. Cultural, economic, and legal issues associated with human uses of water.

1300. Weather and Climate (4) (F,S,SS) (FC:SC)
Introductory survey of meteorology including weather and climate principles, processes, and patterns, at a variety of scales from local to global.

2003. Geography in the Global Economy (3) (F,S) (FC:SO)
Development of and contemporary issues in global economy from geographical perspective.

2019. Geography of Recreation (3) (F) (FC:SO)
Spatial distribution and interaction of selected recreational phenomena. Basic ideas which have emerged over last decade explored for contributions to recreational decision making.

2100. World Geography: Developed Regions (3) (F,S,SS) (FC:SO)
Introductory survey of the regions of the US and Canada, Europe, the former Soviet Union, Australia, and Japan. Emphasis on geographic aspects of physical environment, population, economy, resources, and current issues in each region.

2110. World Geography: Less Developed Regions (3) (F,S,SS) (FC:SO)
Introductory survey of regions of Latin America, Sub-Saharan Africa, North Africa and the Middle East, South Asia, Southeast Asia, and China. Emphasis on geographic aspects of physical environment, population, economy, resources, and current issues in each region.

2250. Earth Surface Systems (3) (F)
May not count toward foundations curriculum social sciences requirement. Basic understanding of natural systems operating on earth’s surface that shape the natural environment. Focuses on global distribution of land forms and vegetation. Strong emphasis on hands-on learning.

2300. Geography of Environmental Resources (3) (F)
May not count toward foundations curriculum social sciences requirement. Location and development of environmental resources at world and national levels.
2350. Climate Change: Science and Society (3) (FC:SO) Explores societal aspects of climate change science, relevant social science debates, human adaptation, mitigation strategies, and international policy.

2400. Spatial Data Analysis (3) (F,S)  
May not count toward foundations curriculum social sciences requirement. Foundation for data management and analysis in geographic information science. Introduces quantitative expressions common to geographic information science and descriptive and inferential spatial statistics.

2410. Fundamentals of GIS (3) (F,S) Formerly GEOG 3410.  
May not count toward foundations curriculum social sciences requirement. Foundations for understanding and using geographical information systems. Emphasis on creation, visualization, and analysis of geographically referenced data.

2500. Map and Aerial Photo Interpretation (3) (F,S,SS)  
4 lecture hours per week. May not count toward foundations curriculum social sciences requirement. Principles of map reading and aerial photo interpretation as information sources on natural and manmade environment.

3001. Historical Geography of the United States (3)  
Growth and development of US through analysis of geographic conditions.

3003. Political Geography (3) (WI) (S) (FC:SO)  
Geographic factors in current national and world problems. Internal and external power, frontiers and boundaries, colonialism and neonationalism, and impact of technology.

3004. Urban Geography (3) (F)  
Origin and growth of urban areas. Relationship with one another as well as size, function, and tributary territory.

3006. United States and Canada (3) (F) (FC:SO)  
Intensive study of US and Canada based on analysis and comparison of regions.

3047. Western Europe (3) (S) (FC:SO)  
Brief geographic survey of Europe and detailed regional study of nations located in western Europe.

3049. Latin America (3) (WI*) (FC:SO)  
Geographical analysis of political, social, economic and cultural transformations in contemporary Latin America.

3050. Africa (3) (WI) (S) (FC:SO)  
Physical and human background of Africa. Emphasis on political and economic role of sub-Saharan portion of continent in contemporary world.

3051. Asia (3) (S) (FC:SO)  
Geographic patterns, economy, population, and role of China, Korea, Japan, India, Pakistan, and Southeast Asia in world affairs.

3055. North Carolina (3) (F) (FC:SO)  
Physical and cultural survey of NC. Detailed study of geographic regions.

3056. Middle America (3) (FC:SO)  
Lands and people of Caribbean, Mexico, and Central America.

3220. Soil Properties, Surveys, and Applications (3) (F)  
Saturday field trip may be required. P: GEOG 2250. Physical and chemical properties of soil, soil-water relationships, soil-forming factors, county soil reports, and soil applications that involve land management decisions.
3230. Global Climates (3) (S)
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300; MATH 1065; or consent of instructor. Variation in global climates as related to atmospheric circulation patterns and processes.

3250. Environmental Hazards (3) (F)
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300 or 2250. Various ways people and governments respond to natural and human-induced extreme events, human behavior in threatening or actual hazards, and public policies and programs designed to control or alleviate hazards.

3420. Remote Sensing of the Environment I (3) (F)
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300 or equivalent. Basic understanding of digital image data and tools required to process, analyze, and interpret digital images.

3430. Geographic Information Systems I (3) (F, S)

3450. Introduction to the Global Positioning System (3) (S)
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300 or equivalent. Techniques for spatial referencing via a satellite-based navigation system.

3460. GIS Applications Programming (3) (F)
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300; ASIP 2212 or CSCI 1610 or MIS 2223 or consent of instructor. Introduces GIS applications design, development, and deployment. Focuses on custom mapping user interfaces; programmable solutions for spatial data display, analysis and manipulation; and custom GIS applications development.

3510. Physical Meteorology (3) (F)
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300; MATH 1065; or consent of instructor. Basic principles of atmospheric hydrostatics, thermodynamics, cloud and precipitation processes, and radiative transfer.

3520. Dynamic Meteorology (3) (S)
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300; MATH 2172, PHYS 2360; or consent of instructor. 3 lecture hours per week. Basic concepts and techniques of mathematics, thermodynamics, mechanics and fluid dynamics in the study of atmospheric motions and weather systems.

3550. Principles of Synoptic Meteorology (3) (F)
P: GEOG 3520; or consent of instructor. Basic concepts of synoptic scale atmospheric phenomena, including upper level waves and mid-latitude weather systems.

4140. Research Methods in Human Geography (3) (S)
May not count toward foundations curriculum social sciences requirement. P: GEOG 2300; 15 s.h. in GEOG; or dept consent. Methods and techniques of field research in human geography.

4150. Advanced Spatial Analysis (3) (F)
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Formerly GEOG 3400. P: GEOG 2400, 2410; or consent of instructor. Multivariate statistical methods applied to spatially referenced data with explicit concern for spatial autocorrelation and heterogeneity.

4191, 4192, 4193. Supervised Study in Regional Geography (1,2,3) (F,S,SS)
May be repeated for maximum of 6 s.h. May not count toward foundations curriculum social sciences requirement. P: Consent of instructor. Individualized study of selected aspect of regional geography under direct supervision of faculty member.

4210. Fluvial and Hydrological Processes (3) (S)
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300, 2250; or consent of instructor. Comprehensive examination of principles of surface water hydrology and fluvial geomorphology. Application of principles to environmental problems.

4220. Coastal Geography (3) (WI) (S) Formerly GEOG 3002
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300, 2250; or consent of instructor. Comprehensive examination of coastal systems, including beaches, dunes, and estuaries. Focuses on processes that form and maintain systems, how landforms respond to those processes, and how human activities affect the system.

4230. Earth Surface Processes (3) (WI) (F)
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300, 2250; or consent of instructor. Detailed examination of dominant geomorphic processes and sediment dynamics involved in the creation of landforms. Emphasis on laboratory experimentation.

4270. Water Resources Management and Planning (3) Same as PLAN 4270
P: GEOG 1000 or 1250; or PLAN 1900. Spatial and temporal characteristics of water. Consideration of hydrologic, engineering, economic, and institutional aspects of water management.

4291, 4292, 4293. Supervised Study in Physical Geography (1,2,3) (F,S,SS)
May be repeated for maximum of 6 s.h. P: Consent of instructor. Individualized study of selected aspect of physical geography under direct supervision of faculty member.

4310. Geography of Transportation and Trade (3) (S)
P: GEOG 2003. Forces leading to interaction of people and commodities between places, distribution and characteristics of transport networks, and effects of transportation flows on regions and nations.

4315. Geographic Images (3) (F) (FC:SO) Formerly GEOG 3300
Social and cultural images of space, place, and environment as produced and consumed through various media at a variety of scales.

4320. Gender, Economy, and Development (3) (S)
May not count toward foundations curriculum social sciences requirement. P: Consent of instructor. Role of gender in economic and development processes from geographical perspective.

4325. Resources, Population, and Development (3) (WI) (FC:SO) Formerly GEOG 3000
P: GEOG 2003 or consent of instructor. Demographic issues and population policies in relation to resource use and economic development from a geographical perspective.

4330. Agricultural Geography (3) (WI*) (FC:SO)
Contemporary trends in global restructuring of agro food systems in both industrialized and developing nations.

4335. Geography of Tourism (3) (FC:SO)
Traditional and emerging forms of tourism development as they transform economic, social, cultural, and environmental landscapes inside and outside the US.

4340. Introduction to Medical Geography (3) (S)
May not count toward foundations curriculum social sciences requirement. P: GEOG 2410 or consent of instructor. Topics range from geographic patterns and processes of disease to locational aspects of health care delivery systems. GIS used to describe and analyze problems in medical geography.

4345. Human Migration and Global Restructuring (3) (F)
Human migration processes associated with political and economic restructuring in different regions of the globe.

4391, 4392, 4393. Supervised Study in Human Geography (1,2,3) (F,S,SS)
May be repeated for maximum of 6 s.h. May not count toward foundations curriculum social sciences requirement. P: Consent of instructor. Individualized study of selected aspect of human geography under direct supervision of faculty member.

4410. Advanced Cartographic Design and Production (3) (F,S)
May not count toward foundations curriculum social sciences requirement. P: GEOG 2410 or equivalent experience. Continuation of GEOG 2410 at advanced level. Advanced mapping techniques such as animation. Internet mapping and production of publication-quality maps.

4420. Remote Sensing II (3) (S)
May not count toward foundations curriculum social sciences requirement. P: GEOG 3420 or consent of instructor. Interpretation of environmental phenomena remotely sensed data by sensors on board aircraft and satellites. Emphasis on learning digital image processing from remote sensing perspective.

4430. Geographic Information Systems II (3) (S)
P: GEOG 3430 or consent of instructor. Advanced topics. Emphasis on development of GIS projects.

4440. Coastal Applications of GIS (3) (F,S)
May not count toward foundations curriculum social sciences requirement. P: GEOG 2250, 2410; or consent of instructor. Application of geographic information science to coastal resource management.

4450. GIScience, Society and Technology (3) (S)
P: GEOG 2410, 3420, 3430; or consent of instructor. 3 lecture hours per week. Critical perspectives on the roles and impacts of geospatial technologies in contemporary society.

4460. Digital Terrain Analysis (3) (F)
3 lecture hours per week. P: GEOG 2250, GEOG 2410; or consent of instructor. Overview of digital topographic analyses that focuses on topographic data acquisition, development of digital elevation models, topographic analyses, and terrain visualization.

4491, 4492, 4493. Supervised Study in Geographic Techniques (1,2,3) (F,S,SS)
May be repeated for maximum of 6 s.h. May not count toward foundations curriculum social sciences requirement. P: Consent of instructor. Individualized study of selected geographic technique under direct supervision of faculty member.

4510. Meteorological Instruments and Observations (3) (F)
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300; MATH 1065; or consent of instructor. 2 lecture and 3 lab hours per week. Basic principles of meteorological instruments and measurement techniques; introduction of data logging, processing, and sources of measurement error; hands-on experience in labs and group field projects.

4520. Boundary Layer Meteorology (3) (S)
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300; or consent of instructor. Structure of atmospheric boundary layers and turbulence, principles of turbulent transport and diffusion processes, their measurements and modeling.

4525. Dynamic Meteorology II (3) (F)
P: GEOG 3520; MATH 4331; or consent of instructor. Applications of the governing equations of the atmosphere for the study of atmospheric waves, extratropical cyclones, and basic concepts in numerical weather prediction.

4530. Micrometeorology (3) (F)
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300; or consent of instructor. Atmospheric processes at micro and local scales, including exchange processes of momentum, mass and energy, radiation budget and energy balance near the surface, soil temperature and heat transfer, turbulent transport, biosphere-atmosphere interactions, micrometeorological measurement and modeling techniques.

4540. Coastal Storms (3) (F)
May not count toward foundations curriculum social sciences requirement. P: GEOG 1300; or consent of instructor. Basic dynamics, analysis, and forecasting of extratropical and tropical storms; history of storms in the Carolinas and current mitigation plans.

4550. Applied Synoptic Meteorology: Analyses and Forecasting (3) (S)
P: GEOG 3550; or consent of instructor. Current techniques in mid-latitude weather analyses and forecasting, including chart analyses, introduction to computer meteorological analyses and visualization, numerical weather prediction, and forecast discussion, development, and evaluation.

4560. Urban Climatology (3) (F)
P: GEOG 1300; or consent of instructor. Impact of urbanization upon atmospheric processes, including energetic balance, precipitation, atmospheric circulation, and pollution.

4570. Hydrometeorology (3) (S)
May not count toward foundations curriculum social science requirement. P: GEOG 1300; or consent of instructor. Theory and observation of atmospheric processes as they relate to surface hydrology. Emphasis on measurement, prediction, and Climatology of precipitation, evapotranspiration and associated hydrologic events, such as flooding.

4580. Radar and Satellite Meteorology (3) (S)
P: GEOG 1300, 3420; or consent of instructor. History, theory and applications of radar and satellite meteorology, with a focus on techniques of satellite image interpretation and radar data processing applied to severe weather forecasting and climate analysis.

4590. Tropical Meteorology (3) (F)
P: GEOG 1300; or consent of instructor. Tropical atmosphere as a key component of global weather and climate and climate prediction. Examination of the El Niño –
Southern Oscillation, the Madden Julian Oscillation, tropical cyclones and monsoons and their associated climate predictability.

4801, 4802, 4803. Geographic Internship (1,2,3) (F,S,SS)
60 hours of work responsibility for 1 s.h. credit. May be repeated for maximum of 6 s.h. May not count toward foundations curriculum social sciences requirement. P: Consent of director of geography internships; consent should be obtained during the semester prior to internship. Application of geographic principles in industrial, governmental, or business setting.

4900. Honors Research (3) (F,S)
P: Admission to GEOG honors program. Supervised reading and research in area of geography that leads to preparation of senior honors thesis proposal.

4901. Senior Honors Thesis (3) (F,S)
P: GEOG 4900 with a grade of B or higher. Extensive program of supervised research in area of geography that leads to writing of senior honors thesis.

4999. Geography Professional Seminar (1) (F,S)
P: Consent of instructor. Design and completion of professional portfolio. Examines transition from undergraduate student status to professional life or continued education.

5220. Physical Geography Field Experience (3)
10 classroom hours of orientation and organization over a 2-week period followed by 3 weeks (15 working days) in a field location. Undergraduates May not count toward foundations curriculum social sciences requirement. P: GEOG 1300, 2250; or consent of instructor. Field-based introduction to basic aspects of physical geography research. Development of research questions, field techniques, use of modern instrumentation, and geographic analysis of field data.

5281, 5282, 5283. Selected Topics in Physical Geography (1,2,3)
May be repeated for up to 6 s.h. Undergraduates May not count toward foundations curriculum social sciences requirement. P: Consent of instructor. Seminar on selected topic.

5393. Seminar in Human Geography (3)
May be repeated for up to 6 s.h. Undergraduates May not count toward foundations curriculum social sciences requirement. P: Consent of instructor. Seminar on selected topic in economic-human geography.

GEOG Banked Courses
1100. World Regional Geography (3)
1201. Introduction to Physical Geography Laboratory (1)
2009. Human Geography (3)
2201. Weather and Climate Laboratory (1)
3008. Evolution of Cartography (3)
3048. Eastern Europe (2)
3201. Land Form Analysis Laboratory (1)
3221, 3222, 3223. Natural Regions of the United States Field Studies (1,2,3)
4072. Intermediate Cartography (3)
5009. Geography of Public and Private Parkland Use (2)
5020. Spatial Efficiency Analysis (3)
5022. Theories of Industrial Location (3)
5024. Regional Development (3)
http://www.ecu.edu/cs-acad/ugcat/geography.cfm

Thomas Harriot College of Arts and Sciences

Department of Geography

Burrell Montz, Chairperson, A-227 Brewster Building

BA in Geography

Students must complete a minimum of 21 s.h. in geography above 2999. Minimum degree requirement is 126 s.h. of credit as follows:

1. Foundations curriculum (For information about courses that carry foundations curriculum credit see Liberal Arts Foundations Curriculum.) - 42 s.h.
2. Foreign language through level 1004 - 12 s.h.
3. Common core - 13 s.h.

   GEOG 2400. Spatial Data Analysis (3) (F, S)
   GEOG 4999. Geography Professional Seminar (1) (P: Consent of instructor)
   Choose 9 s.h. electives from:
   GEOG 3410. Fundamentals of GIS (3) (F, S)
   GEOG 3420. Remote Sensing of the Environment I (3) (F) (P: GEOG 3410 or equivalent)
   GEOG 3430. Geographic Information Systems I (3) (F,S) (P: GEOG 3410 or equivalent)
   GEOG 3450. Introduction to the Global Positioning System (3) (S) (P: GEOG 3410 or equivalent)
   GEOG 3460. GIS Applications Programming (3) (F) (P: GEOG 3410; CSCI 1610 or MIS 2223 or BITE 2212 or consent of instructor)
   GEOG 4150. Advanced Spatial Analysis (3) (F) (P: GEOG 2400, 2410; or consent of instructor)
   GEOG 4410. Advanced Cartographic Design and Production (3) (F,S) (P: GEOG 3410 or equivalent experience)
   GEOG 4420. Remote Sensing II (3) (P: GEOG 3420 or consent of instructor)
GEOG 4430. Geographic Information Systems II (3) (P: GEOG 3430 or consent of instructor)
GEOG 4440. Coastal Applications of GIS (3) (F,S) (P: GEOG 2250, GEOG 2410; or consent of instructor)
GEOG 4450. GIScience, Society, and Technology (3) (S) (P: GEOG 2410, 3420, 3430; or consent of instructor)
GEOG 4460. Digital Terrain Analysis (3) (F) (P: GEOG 2250, GEOG 2410; or consent of instructor)
GEOG 4491, 4492, 4493. Supervised Study in Geographic Techniques (1,2,3) (F,S,SS)
GEOG 4801, 4802, 4803. Geographic Internship (1,2,3) (F,S,SS) (P: Consent of GEOG internship director the semester prior to the internship.)
GEOG 4901. Senior Honors Thesis (3) (F,S) (P: GEOG 4900 with a grade of B or higher)
GEOG 5491, 5492, 5493. Seminar in Geographic Techniques (1,2,3) (P: Consent of instructor)
May choose any GEOG course listed below that is not being counted toward the degree.

4. Concentration area
(Choose 15 s.h. in one area, 6 s.h. in the other area.) - 21 s.h.

Human:
GEOG 2003. Geography of the Global Economy (3) (F,S) (FC:SO)
GEOG 2019. Geography of Recreation (3) (FC:SO)
GEOG 2100. World Geography: Developed Regions (3) (F, S, SS) (FC:SO)
GEOG 2110. World Geography: Less Developed Regions (3) (F, S, SS) (FC:SO)
**GEOG 2350. Climate Change: Science and Society (3) (FC:SO)**
GEOG 3001. Historical Geography of the United States (3)
GEOG 3003. Political Geography (3) (WI) (S) (FC:SO)
GEOG 3004. Urban Geography (3) (F)
GEOG 3049. Latin America (3) (WI) (FC:SO)
GEOG 3050. Africa (3) (WI) (S) (FC:SO)
GEOG 3051. Asia (3) (S) (FC:SO)
GEOG 3055. North Carolina (3) (F) (FC:SO)
GEOG 3056. Middle America (3) (FC:SO)
GEOG 4140. Research Methods in Human Geography (3) (S)
GEOG 4270. Water Resources Management and Planning (3) (P: GEOG 1000 or 1250; or PLAN 1900)
GEOG 4310. Geography of Transportation and Trade (3) (S) (P: GEOG 2003)
GEOG 4315. Geographic Images (3) (F) (FC:SO)
GEOG 4320. Gender, Economy, and Development (3) (S)
GEOG 4325. Resources, Population, and Development (3) (WI) (FC:SO) (P: GEOG 2003 or consent of instructor)
GEOG 4330. Agricultural Geography (3) (F) (FC:SO)
GEOG 4335. Geography of Tourism (3) (S) (FC:SO)
GEOG 4340. Introduction to Medical Geography (3) (S) (P: GEOG 2410 or consent of Instructor)*
GEOG 4345. Human Migration and Global Restructuring (3) (F) (FC:SO)
GEOG 4391, 4392, 4393. Supervised Study in Human Geography (1,2,3) (F,S,SS) (P: Consent of instructor)
GEOG 4900. Honors Research (3) (F,S) (P: Admission to GEOG honors program)
GEOG 5391, 5392, 5393. Seminar in Human Geography (1,2,3) (P: Consent of instructor)
Environmental: (In concentration area, a minimum of 3 s.h. must be above 3999.)
GEOG 1300. Weather and Climate (4) (F,S,SS) (FC:SC)
GEOG 2250. Earth Surface Systems (3) (F)
GEOG 3220. Soil Properties, Surveys, and Applications (3) (F) (P: GEOG 2250)
GEOG 3230. Global Climates (3) (S) (P: GEOG 1300; MATH 1065; or consent of instructor)
GEOG 3250. Environmental Hazards (3) (F) (P: GEOG 1300 or 2250)
GEOG 3510. Physical Meteorology (3) (F) (P: GEOG 1300; MATH 1065; or consent of instructor)
GEOG 3520. Dynamic Meteorology (3) (S) (P: GEOG 1300; MATH 2172, PHYS 2360; or consent of instructor)
GEOG 3550. Principles of Synoptic Meteorology (3) (F) (P: GEOG 1300 or consent of instructor)
GEOG 4210. Fluvial and Hydrological Processes (3) (S) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 4220. Coastal Geography (3) (WI) (S) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 4230. Earth Surface Processes (3) (WI) (F) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 4291, 4292, 4293. Supervised Study in Physical Geography (1,2,3) (F,S,SS) (P: Consent of instructor)
GEOG 4510. Meteorological Instruments and Observation (3) (F) (P: GEOG 1300; MATH 1065; or consent of instructor)
GEOG 4520. Boundary Layer Meteorology (3) (S) (P: GEOG 1300; or consent of instructor)
GEOG 4525. Dynamic Meteorology II (3) (F) (P: GEOG 3520; MATH 4331; or consent of instructor)
GEOG 4530. Micrometeorology (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4540. Coastal Storms (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4550. Applied Synoptic Meteorology: Analyses and Forecasting (3) (S) (P: GEOG 3550; or consent of instructor)
GEOG 4560. Urban Climatology (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4570. Hydrometeorology (3) (S) (P: GEOG 1300; or consent of instructor)
GEOG 4580. Radar and Satellite Meteorology (3) (S) (P: GEOG 1300, 3420; or consent of instructor)
GEOG 4590. Tropical Meteorology (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4900. Honors Research (3) (F,S) (P: Admission to GEOG honors program)
GEOG 5220. Physical Geography Field Experience (3) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 5281, 5282, 5283. Selected Topic in Physical Geography (1,2,3) (P: Consent of instructor)
5. Minor and general electives to complete requirements for graduation.

**BS in Applied Geography**

Minimum degree requirement is **126 s.h.** of credit as follows:

1. Foundations curriculum (For information about courses that carry foundations curriculum credit see *Liberal Arts Foundations Curriculum.*) - 42 s.h.

   COMM 2410. Public Speaking (3) (F,S,SS) (FC:FA) or COMM 2420. Business and Professional Communication (3) (F,S,SS) (FC:FA)
   MATH 1065. College Algebra (3) (F,S,SS) (FC:MA) (P: Appropriate score on mathematics placement test)

2. Core (Choose a minimum of 27 s.h. in geography above 2999, including a maximum of 3 s.h. of supervised study in each of the categories below.) - 43 s.h.

   ENGL 3820. Scientific Writing (3) (WI) (F,S) (P: ENGL 1200) or ENGL 3860. Introduction to Nonfiction Writing (3) (F,S) (P: ENGL 1200) or ENGL 3880. Writing for Business and Industry (3) (WI) (F,S,SS) (P: ENGL 1200) or ITEC 3290. Technical Writing (3) (WI) (F,S,SS) (P: ENGL 1200)
   GEOG 2400. Spatial Data Analysis (3) (F,S)
   GEOG 2410. Fundamentals of GIS (3) (F,S)
   GEOG 4801, 4802, 4803. Geography Internship (1,2,3) (F,S,SS) (P: Consent of GEOG internship director semester prior to internship)
   GEOG 4999. Geography Professional Seminar (1) (P: Consent of instructor)
   Geographic Information Science (Choose 9 s.h. from the following.):
   GEOG 3420. Remote Sensing of the Environment I (3) (F) (P: GEOG 2410 or equivalent)
   GEOG 3430. Geographic Information Systems I (3) (F,S) (P: GEOG 2410 or equivalent)
   GEOG 3450. Introduction to the Global Positioning System (3) (S) (P: GEOG 2410 or equivalent)
   GEOG 3460. GIS Applications Programming (3) (F) (P: GEOG 2410; BITE 2212 or CSCI 1610 or MIS 2223 or consent of instructor)
   GEOG 4150. Advanced Spatial Analysis (3) (F) (P: GEOG 2400, 2410; or consent of instructor)
   GEOG 4410. Advanced Cartographic Design and Production (3) (F,S) (P: GEOG 2410 or equivalent experience)
   GEOG 4420. Remote Sensing II (3) (S) (P: GEOG 3420 or consent of instructor)
   GEOG 4430. Geographic Information Systems II (3) (P: GEOG 3430 or consent of instructor)
   GEOG 4440. Coastal Applications of GIS (3) (F,S) (P: GEOG 2250, 2410; or consent of instructor)
   GEOG 4450. GIScience, Society, and Technology (3) (S) (P: GEOG 2410, 3420, 3430; or consent of instructor)
GEOG 4460. Digital Terrain Analysis (3) (F) (P: GEOG 2250, GEOG 2410; or consent of instructor)
GEOG 4491, 4492, 4493. Supervised Study in Geographic Techniques (1,2,3) (F,S,SS)
GEOG 4900. Honors Research (3) (F,S) (P: Admission to GEOG honors program)
Human (Choose 9 s.h. from the following.):
GEOG 2003. Geography of the Global Economy (3) (F,S) (FC:SO)
GEOG 2019. Geography of Recreation (3) (F) (FC:SO)
GEOG 2100. World Geography: Developed Regions (3) (F,S,SS) (FC:SO)
GEOG 2110. World Geography: Less Developed Regions (3) (F,S,SS) (FC:SO)
GEOG 2350. Climate Change: Science and Society (3) (FC:SO)
GEOG 3001. Historical Geography of the United States (3) (F)
GEOG 3003. Political Geography (3) (WI) (S) (FC:SO)
GEOG 3004. Urban Geography (3) (S)
GEOG 3049. Latin America (3) (WI) (FC:SO)
GEOG 3050. Africa (3) (WI) (S) (FC:SO)
GEOG 3051. Asia (3) (S) (FC:SO)
GEOG 3055. North Carolina (3) (F) (FC:SO)
GEOG 3056. Middle America (3) (FC:SO)
GEOG 4050. Human Migration and Global Restructuring (3) (F) (FC:SO)
GEOG 4140. Research Methods in Human Geography (3) (S)
GEOG 4270. Water Resources Management and Planning (3) (P: GEOG 1000 or 1250; or PLAN 1900)
GEOG 4310. Geography of Transportation and Trade (3) (S) (P: GEOG 2003)
GEOG 4315. Geographic Images (3) (F) (FC:SO)
GEOG 4320. Gender, Economy, and Development (3) (S)
GEOG 4325. Resources, Population, and Development (3) (WI) (FC:SO) (P: GEOG 2003 or consent of instructor)
GEOG 4330. Agricultural Geography (3) (F) (FC:SO)
GEOG 4335. Geography of Tourism (3) (S) (FC:SO)
GEOG 4340. Introduction to Medical Geography (3) (S) (P: GEOG 2410 or Consent of Instructor)
GEOG 4391, 4392, 4393. Supervised Study in Human Geography (1,2,3) (F,S,SS) (P: Consent of instructor)
GEOG 4900. Honors Research (3) (F,S) (P: Admission to GEOG honors program)
GEOG 5391, 5392, 5393. Seminar in Human Geography (1,2,3) (P: Consent of instructor)
Environmental (Choose 9 s.h. from the following.):
GEOG 1300. Weather and Climate (4) (F,S,SS) (FC:SC)
GEOG 2250. Earth Surface Systems (3) (F)
GEOG 3220. Soil Properties, Surveys, and Applications (3) (F) (P: GEOG 2250)
GEOG 3230. Global Climates (3) (S) (P: GEOG 1300; MATH 1065; or consent of instructor)
GEOG 3250. Environmental Hazards (3) (F) (P: GEOG 1300 or 2250)
GEOG 3510. Physical Meteorology (3) (F) (P: GEOG 1300; MATH 1065; or consent of instructor)
GEOG 3520. Dynamic Meteorology (3) (S) (P: GEOG 1300; MATH 2172; PHYS 2360; or consent of instructor)
GEOG 3550. Principles of Synoptic Meteorology (3) (F) (P: GEOG 3520; or consent of instructor)
GEOG 4210. Fluvial and Hydrological Processes (3) (S) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 4220. Coastal Geography (3) (WI) (S) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 4230. Earth Surface Processes (3) (WI) (F) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 4291, 4292, 4293. Supervised Study in Physical Geography (1,2,3) (F,S,SS) (P: Consent of instructor)
GEOG 4510. Meteorological Instruments and Observation (3) (F) (P: GEOG 1300; MATH 1065; or consent of instructor)
GEOG 4520. Boundary Layer Meteorology (3) (S) (P: GEOG 1300; or consent of instructor)
GEOG 4525. Dynamic Meteorology II (3) (F) (P: GEOG 3520; MATH 4431; or consent of instructor)
GEOG 4530. Micrometeorology (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4540. Coastal Storms (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4550. Applied Synoptic Meteorology: Analyses and Forecasting (3) (S) (P: GEOG 3550; or consent of instructor)
GEOG 4560. Urban Climatology (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4570. Hydrometeorology (3) (S) (P: GEOG 1300; or consent of instructor)
GEOG 4580. Radar and Satellite Meteorology (3) (S) (P: GEOG 1300, 3420; or consent of instructor)
GEOG 4590. Tropical Meteorology (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4900. Honors Research (3) (F,S) (P: Admission to GEOG honors program)
GEOG 5220. Physical Geography Field Experience (3) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 5281, 5282, 5283. Selected Topic in Physical Geography (1,2,3) (P: Consent of instructor)
Electives (Choose 3 s.h. from the following.):
GEOG 1000. People, Places, and Environments (3) (F,S,SS) (FC:SO)
GEOG 1250. The Water Planet (3) (F,S) (FC:SO)
GEOG 4901. Senior Honors Thesis (3) (F,S) (P: GEOG 4900 with a grade of B or higher)
May choose any GEOG course listed that is not being counted toward the degree.

3. Concentration Area (Choose an additional 6 s.h. in either human or environmental geography, as listed above. If concentration area is environmental geography, a minimum of 3 s.h. must be above 3999) - 6 s.h.
4. Minor - 24 s.h.
   Selected from aerospace, biology, business administration, computer science, economics, geology, industrial technology, information processing, leisure systems studies, military science, planning, public administration, statistics, or any other appropriate minor with consent of the dept chair.
5. Electives to complete requirements for graduation.

**BS in Applied Atmospheric Science**

Minimum degree requirement is 126 s.h. of credit as follows:

1. Foundations curriculum (For information about courses that carry foundations curriculum credit see *Liberal Arts Foundations Curriculum.*) - 42 s.h.

   MATH 1065. College Algebra (3) (F,S,SS) (FC:MA) (P: Appropriate score on mathematics placement test)
   PHYS 1251, 1261. General Physics Laboratory (1,1) (F,S,SS) (FC:SC) (C for 1251: PHYS 1250 or 2350; C for 1261: 1260 or 2360)
   PHYS 2350, 2360. University Physics (4,4) (F,S,SS) (FC:SC) (P: MATH 2121 or 2171; P for PHYS 2360: PHYS 2350)

2. Core - 38 s.h.

   GEOG 1300. Weather and Climate (4) (F, S)
   GEOG 2250. Earth Surface Systems (3) (F)
   GEOG 2400. Spatial Data Analysis (3) (F,S)
   GEOG 2410. Fundamentals of GIS (3) (F,S) (Formerly GEOG 3410)
   GEOG 3230. Global Climates (3) (S) (P: GEOG 1300, MATH 1065; or consent of instructor)
   GEOG 3420. Remote Sensing of the Environment I (3) (F) (P: GEOG 2410)
   GEOG 3510. Physical Meteorology (3) (F) (P: GEOG 1300, MATH 1065; or consent of instructor)
   GEOG 3520. Dynamic Meteorology (3) (S) (P: GEOG 1300, MATH 2172; PHYS 2360; or consent of instructor)
   GEOG 3550. Principles of Synoptic Meteorology (3) (F) (P: GEOG 3520; or consent of instructor)
   GEOG 4510. Meteorological Instruments and Observations (3) (F) (P: GEOG 1300, MATH 1065; or consent of instructor)
   GEOG 4525. Dynamic Meteorology II (3) (F) (P: GEOG 3520, MATH 4331; or consent of instructor)
   GEOG 4550. Applied Synoptic Meteorology: Analyses and Forecasting (3) (S) (P: GEOG 3550; or consent of instructor)
   GEOG 4999. Geography Professional Seminar (1) (P: Consent of instructor)

3. Math Cognates - 18-20 s.h.

   MATH 1083. Introduction to Functions (3) (F,S,SS) (FC:MA) (May not be taken by students who have successfully completed MATH 1074 or MATH 1085) (P: MATH 1065 with a minimum grade of C) or MATH 1085. Pre-Calculus Mathematics (5) (F,S,SS) (FC: MA) (May not be taken by students who have successfully completed MATH 1074) (P: MATH 1065 with a minimum grade of C)
MATH 2171. Calculus I (4) (F,S,SS) (FC:MA) (P: Minimum grade of C in any of MATH 1083, 1085, or 2122)
MATH 2172. Calculus II (4) (F,S,SS) (FC:MA) (P: MATH 2171)
MATH 2173. Calculus III (4) (F,S,SS) (FC:MA) (P: MATH 2172)
MATH 4331. Introduction to Ordinary Differential Equations (3) (F,S) (P: MATH 2173)

4. Geospatial Technologies Electives: (Choose from the following) - 6 s.h.

GEOG 3430. Geographic Information Systems I (3) (S) (P: GEOG 2410 or equivalent)
GEOG 3450. Introduction to the Global Positioning System (3) (F,S) (P: GEOG 2410 or equivalent)
GEOG 3460. GIS Applications Programming (3) (F) (P: GEOG 2410; ASIP 2212 or CSCI 1610 or MIS 2223 or consent of instructor)
GEOG 4150. Advanced Spatial Analysis (3) (F) (Formerly GEOG 3400) (P: GEOG 2400, 2410; or consent of instructor)
GEOG 4410. Advanced Cartographic Design and Production (3) (F,S) (P: GEOG 2410 or equivalent experience)
GEOG 4420. Remote Sensing II (3) (S) (P: GEOG 3420 or consent of instructor)
GEOG 4430. Geographic Information Systems II (3) (S) (P: GEOG 3430 or consent of instructor)
GEOG 4440. Coastal Applications of GIS (3) (F,S) (P: GEOG 2250, 2410; or consent of instructor)
GEOG 4450. GIScience, Society, and Technology (3) (S) (P: GEOG 2410, 3420, 3430; or consent of instructor)

5. Atmospheric Science Electives (Choose from the following) - 6 s.h.

CHEM 1150,1151. General Chemistry and Laboratory I (3,1) (F,S,SS) (FC:SC)
(P: Chemistry placement test or passing grade in CHEM 0150; P/C: MATH 1065; C for 1150; CHEM 1151; C for 1151: CHEM 1150)
GEOG 4520. Boundary Layer Meteorology (3) (S) (P: GEOG 1300; or consent of instructor)
GEOG 4530. Micrometeorology (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4540. Coastal Storms (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4560. Urban Climatology (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4570. Hydrometeorology (3) (S) (P: GEOG 1300; or consent of instructor)
GEOG 4580. Radar and Satellite Meteorology (3) (S) (P: GEOG 1300, GEOG 3420; or consent of instructor)
GEOG 4590. Tropical Meteorology (3) (F) (P: GEOG 1300; or consent of instructor)

6. Geography Electives (Choose from the following) - 6 s.h.

GEOG 3220. Soil Properties, Surveys, and Applications (3) (F) (P: GEOG 2250)
GEOG 3250. Environmental Hazards (3) (F) (P: GEOG 1300 or 2250)
GEOG 4210. Fluvial and Hydrological Processes (3) (S) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 4220. Coastal Geography (3) (WI) (S) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 4230. Earth Surface Processes (3) (WI) (F) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 4801, 4802, 4803. Geography Internship (1,2,3) (F,S,SS) (P: Consent of director of geography internships; consent should be obtained during the semester prior to internship)

7. General electives to complete requirements for graduation.

BS in Geographic Information Science and Technology

Minimum degree requirement is 126 s.h. of credit as follows:

1. Foundations curriculum (See Section 4, Foundations Curriculum Requirements for All Baccalaureate Degree Programs), including those listed below - 42 s.h.

   COMM 2410. Public Speaking (3) (F,S,SS) (FC:FA) or COMM 2420. Business and Professional Communication (3) (F,S,SS) (FC:FA)
   MATH 1065. College Algebra (3) (F,S,SS) (FC:MA) (P: Appropriate score on mathematics placement test)

2. Common Core - 31 s.h.

   GEOG 2400. Spatial Data Analysis (3) (F,S)
   GEOG 2410. Fundamentals of GIS (3) (F,S) (Formerly GEOG 3410) or PLAN 3051. Introduction to GIS in Planning (3) (F)
   GEOG 3420. Remote Sensing of the Environment I (3) (F) (P: GEOG 2410 or equivalent)
   GEOG 3430. Geographic Information Systems I (3) (F,S) (P: GEOG 2410)
   GEOG 3450. Introduction to the Global Positioning System (3) (S) (P: GEOG 2410 or equivalent)
   GEOG 3460. GIS Applications Programming (3) (F) (P: GEOG 2410; ASIP 2212 or CSCI 1610 or ITEC 2000 or MIS 2223 or consent of instructor)
   GEOG 4410. Advanced Cartographic Design and Production (3) (F,S) (P: GEOG 2410 or equivalent)
   GEOG 4420. Remote Sensing II (3) (S) (P: GEOG 3420 or consent of instructor)
   GEOG 4430. Geographic Information Systems II (3) (S) (P: GEOG 3430 or consent of instructor)
   GEOG 4450. GIScience, Society, and Technology (3) (S) (P: GEOG 2410, 3420, 3430; or consent of instructor)
   GEOG 4999. Geography Professional Seminar (1) (F, S) (P: Consent of instructor)

3. GIS electives (Choose from the following) - 6 s.h.
GEOG 4150. Advanced Spatial Analysis (3) (F) (Formerly GEOG 3400) (P: GEOG 2400, 2410; or consent of instructor)
GEOG 4440. Coastal Applications of GIS (3) (F,S) (P: GEOG 2250, 2410; or consent of instructor)
GEOG 4460. Digital Terrain Analysis (3) (F) (P: GEOG 2250, 2410; or consent of instructor)
GEOG 4540. Coastal Storms (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4580. Radar and Satellite Meteorology (3) (P: GEOG 1300, 3420; or consent of instructor)
GEOG 4491,4492,4493. Supervised Study in Geographic Techniques (1,2,3) (F,S,SS) (P: Consent of instructor)
GEOG 4801, 4802, 4803. Geography Internship (1,2,3) (F,S,SS) (P: Consent of director of geography internships; consent should be obtained during the semester prior to the internship) A maximum of 3 s.h. can be used to meet the degree requirement.
PLAN 4021. Advanced GIS Applications in Planning (3) (S) (P: PLAN 3051 or GEOG 2410 or consent of instructor)

4. Environmental and Human Geography (Choose from the following) - 15 s.h.

GEOG 1300. Weather and Climate (4) (F,S,SS) (FC:SC)
GEOG 2003. Geography of the Global Economy (3) (F,S) (FC:SO)
GEOG 2019. Geography of Recreation (3) (F) (FC:SO)
GEOG 2250. Earth Surface Systems (3) (F)
GEOG 2350. Climate Change: Science and Society (3) (FC:SO)
GEOG 3001. Historical Geography of the United States (3)
GEOG 3003. Political Geography (3) (WI) (S) (FC:SO)
GEOG 3004. Urban Geography (3) (F)
GEOG 3049. Latin America (3) (WI*) (FC:SO)
GEOG 3050. Africa (3) (WI) (S) (FC:SO)
GEOG 3051. Asia (3) (S) (FC:SO)
GEOG 3220. Soil Properties, Surveys, and Applications (3) (F) (P: GEOG 2250)
GEOG 3230. Global Climates (3) (S) (P: GEOG 1300, MATH 1065; or consent of instructor)
GEOG 3250. Environmental Hazards (3) (F) (P: GEOG 1300 or 2250)
GEOG 3510. Physical Meteorology (3) (F) (P: GEOG 1300, MATH 1065; or consent of instructor)
GEOG 4210. Fluvial and Hydrological Processes (3) (S) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 4220. Coastal Geography (3) (WI) (S) (Formerly GEOG 3002) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 4230. Earth Surface Processes (3) (WI) (F) (P: GEOG 1300, 2250; or consent of instructor)
GEOG 4270. Water Resources Management and Planning (3) Same as PLAN 4270 (P: GEOG 1000 or 1250; or PLAN 1900)
GEOG 4310. Geography of Transportation and Trade (3) (S) (P: GEOG 2003)
GEOG 4315. Geographic Images (3) (F) (FC:SO) (Formerly GEOG 3300)
GEOG 4320. Gender, Economy, and Development (3) (S) (P: Consent of instructor)
GEOG 4325. Resources, Population, and Development (3) (WI) (FC:SO) (Formerly GEOG 3000) (P: GEOG 2003 or consent of instructor)
GEOG 4330. Agricultural Geography (3) (WI*) (F) (FC:SO)
GEOG 4335. Geography of Tourism (3) (FC:SO)
GEOG 4345. Human Migration and Global Restructuring (3) (F)
GEOG 4510. Meteorological Instruments and Observation (3) (F) (P: GEOG 1300, MATH 1065; or consent of instructor)
GEOG 4530. Micrometeorology (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4560. Urban Climatology (3) (F) (P: GEOG 1300; or consent of instructor)
GEOG 4570. Hydrometeorology (3) (S) (P: GEOG 1300; or consent of instructor)

5. Cognates (Choose from the following) - 21 s.h.

CSCI 1001. Introduction to Computer Science (3) (F,S)
CSCI 2310, 2311. Algorithmic Problem Solving and Programming Laboratory (4,0) (F,S) (P: MATH 1065; C for 2310: CSCI 2311; C for 2311: CSCI 2310) CSCI/MATH 2427.
Discrete Mathematical Structures (3) (F,S) (P: MATH 1065 or 1066)
CSCI 2600. Introduction to Digital Computation (3) (S) (P: MATH 1065 or 1066)
CSCI 3200. Data Structures and Their Applications (4) (F) (P: CSCI 2310, 2311)
CSCI 3700. Database Management Systems (3) (F,S) (P: CSCI 3200 or 3310)
ICTN 1500, 1501. PC Hardware (3,0) (F,S) (P: MATH 1065 or higher)
ICTN 2000. Introduction to Telecommunications (3) (F)
ICTN 2154, 2155. Digital Communication Systems (3,0) (F,S) (P: ICTN 1500)
ICTN 2158, 2159. Computer Networking Technology (3,0) (F,S) (P: ICTN 2154)
ICTN 2510, 2511. Network Environment I (3,0) (F) (P: ICTN 1500)
ICTN 2530, 2531 Network Environment II (3,0) (F,S) (Formerly ICTN 3530, 3531) (P: ICTN 1500)
ICTN 2900, 2901. Introduction to Network Security (3,0) (F) (P: ICTN 2154)
ICTN 3540, 3541. Network Environment III (3,0) (F) (P: ICTN 2510, 3530)
MATH 1066. Applied Mathematics for Decision Making (3) (F,S,SS) (FC:MA) (P: Appropriate score on math placement test or approval of the dept chair)
MATH 1083. Introduction to Functions (3) (F,S,SS) (FC:MA) (P: MATH 1065 with a minimum grade of C)
MATH 2119. Elements of Calculus (3) (F,S,SS) (FC:MA) (P: MATH 1065 with a minimum grade of C)
MATH 2127. Basic Concepts of Mathematics (3) (F,S,SS) (FC:MA) (P: Appropriate score on math placement test)

6. Electives to complete requirements for graduation - 11 s.h.

Agenda Item IV

College of Technology and Computer Science
College of Technology and Computer Science

Department of Technology Systems

*Tijjani (TJ) Mohammed, Interim Chair, Suite 202 Science and Technology Building*

Admission

Upon admission to the university, students may declare a major in one of the following degree programs: design, industrial distribution and logistics, industrial engineering technology, or information and computer technology. The technology systems degree programs are accredited by the Association of Technology, Management, and Applied Engineering. The minimum degree requirement is 126 s.h. of credit.

Students who have an associate degree from an approved technical program can be admitted directly into the department’s programs but must either transfer or take courses that meet the core technical content in the programs. Although any department degree can be entered by transfer students, the BS in industrial technology is designed specifically to meet a broad range of needs of transfer students from community colleges. Students transferring credits without an associate’s degree will have their previous courses individually evaluated for program credit.

Those ECU students intending to transfer to a technology systems degree program from other campus programs must have at least a 2.0 GPA.

**BS in Design**

*Robert A. Chin, Coordinator, 207 Science and Technology Building*

The design program is accredited by the Association of Technology, Management, and Applied Engineering. Minimum degree requirement is **126 s.h.** credit as follows:

1. Foundations curriculum requirements (For information about courses that carry foundations curriculum credit see *Liberal Arts Foundations Curriculum*) including those listed below - 42 s.h.

   All concentrations:
   COMM 2410. Public Speaking (3) (F,S,SS) (FC:FA) or COMM 2420. Business and Professional Communication (3) (F,S,SS) (FC:FA)
   ECON 2113. Principles of Microeconomics (3) (F,S,SS) (FC:SO)
   MATH 1065. College Algebra (3) (F,S,SS) (FC:MA) (P: Appropriate score on mathematics placement test)
PHIL 2274. Business Ethics (3) (WI*) (F,S,SS) (FC:HU) or PHIL 2275. Professional Ethics (3) (WI*) (F,S,SS) (FC:HU)
PHYS 1250. General Physics (3) (F,S,SS) (FC:SC) (P for 1250: MATH 1065 or 1066)
PHYS 1251. General Physics Laboratory (1) (F,S,SS) (FC:SC) (C: PHYS 1250 or 2350)
PSYC 1000. Introductory Psychology (3) (F,S,SS) (FC:SO)
PSYC 3241. Personnel and Industrial Psychology (3) (F,S,SS) (FC:SO) (P: PSYC 1000 or 1060)

Architectural Technology:
GEOL 1700. Environmental Geology (4) (F,S) (FC:SC)

Mechanical Technology:
PHYS 1260. General Physics (3) (F,S,SS) (FC:SC) (P PHYS 1250)
PHYS 1261. General Physics Laboratory (1) (F,S,SS) (FC:SC) (C PHYS 1260 or 2260)

2. Core - 53 s.h.

DESN 2034, 2035. Engineering Graphics I (3,0) (F,S) (P: ITEC 2000 or MIS 2223)
DESN 2036, 2037. Computer-Aided Design and Drafting (3,0) (F,S) (P: DESN 2034)
DESN 3032, 3033. Engineering Graphics II (3,0) (F,S) (P: DESN 2036; ITEC 2080; PHYS 1250; C: ITEC 2090; or program coordinator approval)
DESN 4030, 4031. Descriptive Geometry (3,0) (S) (P: DESN 3032; MATH 1074)
FINA 2244. Legal Environment of Business (3) (F,S,SS)
IENG 2020, 2021. Materials and Processes Technology (3,0) (WI*) (F,S) (P/ C: ITEC 2000 or MIS 2223)
ITEC 2000. Industrial Technology Applications of Computer Systems (3) (F,S) or MIS 2223 Introduction to Computers (3) (F,S,SS)
ITEC 2054, 2055. Electricity/Electronic Fundamentals (3,0) (F,S) (P/C: MATH 1065 or 1066 or 1085 or 2119; MATH 1074 or 1083 or 1085)
ITEC 2080, 2081. Thermal and Fluid Systems (3,0) (F,S) (P: IENG 2020)
ITEC 2090, 2091. Electromechanical Systems (3,0) (F,S) (P: ITEC 2054)
ITEC 3200. Introduction to Statistical Process Control (3) (F,S) (P: MATH 1065 or 1066 or equivalent; ITEC 2000 or 3000 or MIS 2223) or MATH 2283. Statistics for Business (3) (F,S,SS) (FC:MA)
ITEC 3290. Technical Writing (3) (WI) (F,S,SS) (P: ENGL 1200)
ITEC 3292. Industrial Safety (3) (F,S) (P: Junior standing)
ITEC 3300. Technology Project Management (3) (F,S) (WI) (P: ENGL 1200; ITEC 2000 or MIS 2223)
ITEC 3800. Cost and Capital Project Analysis (3) (F,S) (P: MATH 1065 or ITEC 2000 or 3000 or MIS 2223) or FINA 3004. Survey of Financial Management (3) (F,S)
ITEC 4293. Industrial Supervision (3) (WI) (F,S) (P: Senior standing or consent of instructor) or MGMT 3202. Fundamentals of Management (3) (F,S,SS)
ITEC 4300. Quality Assurance Concepts (3) (F,S) (P: ITEC 3200 or MATH 2283)
MATH 1074. Applied Trigonometry (2) (F,S,SS) (P: MATH 1065)

3. Concentration area (Choose one) - 23 s.h.
Architectural Technology:
BIOL 1060. Environmental Biology (4) (F,S,SS) (FC:SC)
BIOL 1061. Environmental Biology Laboratory (1) (F,S) (FC:SC)
DESN 3030, 3031. Architectural Drafting (3,0) (F,S) (P: DESN 2036 or IDSN 2281; ITEC 2080; or program coordinator approval)
DESN 3036, 3037. Architectural Design and Drafting (3,0) (F) (P: DESN 3030, 3032; or program coordinator approval)
DESN 3038, 3039. Sustainable Design (3,0) (S) (P: BIOL 1060, 1061; DESN 3030; GEOL 1700; ITEC 2090, 3300; PSYC 3241; or program coordinator approval)
PLAN 3021. Introduction to Planning Techniques (3) (F)
PLAN 3051. Introduction to GIS in Planning (3) (F)
PLAN 4003. Urban Form and Design (3) (S)

Mechanical Technology:
CHEM 1020. General Descriptive Chemistry (4) (F,S) (FC:SC)
CHEM 1021. General Descriptive Chemistry Laboratory (1) (F,S) (FC:SC)
DESN 3230, 3231. Rapid Prototyping (3,0) (S) (P: DESN 3032; IENG 2076)
DESN 3234, 3235. Jig and Fixture Design (3,0) (F) (P: DESN 3032; ITEC 2090; IENG 2076)
DESN 3236, 3237. Geometric Dimensioning and Tolerancing (3,0) (F) (P: DESN 3032; MATH 1074; ITEC 3200 or MATH 2283)
IENG 2076, 2077. Introduction to Computer Numerical Control (CNC) (3,0) (F,S) (P: DESN 2034)
IENG 3020, 3021. Robotics in Computer Integrated Manufacturing (3,0) (S) (P: IENG 2076; ITEC 2090)
IENG 3300. Plant Layout and Materials Handling (3) (F) (P/C: ITEC 3290; P: IENG 2020)

4. Approved electives to complete requirements for graduation. - 8 s.h.

BS in Industrial Distribution and Logistics

Leslie R. Pagliari, Coordinator, 402 Science and Technology Building

The industrial distribution and logistics program is accredited by the Association of Technology, Management, and Applied Engineering.

Minimum degree requirement is 126 s.h. of credit as follows:

1. Foundations curriculum requirements (For information about courses that carry foundations curriculum credit see Liberal Arts Foundations Curriculum) including those listed below. 42 s.h.
COMM 2410. Public Speaking (3) (F,S,SS) (FC:FA) or COMM 2420. Business and Professional Communication (3) (F,S,SS) (FC:FA)
ECON 2113. Principles of Microeconomics (3) (F,S,SS) (FC:SO)
MATH 1065. College Algebra (3) (F,S,SS) (FC:MA) (P: Appropriate score on mathematics placement test)
PSYC 1000. Introductory Psychology (3) (F,S,SS) (FC:SO)
PSYC 3241. Personnel and Industrial Psychology (3) (F,S,SS) (FC:SO) (P: PSYC 1000 or 1060)

2. Core - 57 s.h.

IDIS 2771. Introduction to Distribution and Logistics (3) (F,S)
IDIS 3780, 3781. Warehousing and Materials Handling (3,0) (S) (P: IDIS 2771)
IDIS 3785. Global Logistics (3) (F) (P: IDIS 2771, 3815)
IDIS 3790. Technical Presentations for Industry (3) (F,S) (P: ITEC 2000 or MIS 2223)
IDIS 3795, 3796. Distributor Sales and Branch Management (3,0) (F) (P: IDIS 2771)
IDIS 3800. Transportation Logistics (3) (S) (P: IDIS 2771)
IDIS 3805. Purchasing Logistics (3) (S) (P: IDIS 2771)
IDIS 3815. Supply Chain Logistics (3) (S) (P: IDIS 2771)
IDIS 3825. Strategic Pricing for Distributors (3) (F) (P: IDIS 2771, ACCT 2101)
IDIS 3830. ERP Systems for Distributors (3) (F,S) (P: IDIS 3780, 3781, 3815)
IDIS 3835. Security and Risk Analysis for Distributors (3) (F) (P: IDIS 3815)
IDIS 4800. Distribution and Logistics Capstone (3) (F,S) (P: Junior standing; IDIS 3790, ITEC 3290, 3300; IDIS major)
IDIS 4802. Distribution Research (3) (F,S) (P: IDIS 4800; senior standing)
ITEC 3290. Technical Writing (3) (WI) (F,S,SS) (P: ENGL 1200)
ITEC 3292. Industrial Safety (3) (F,S) (P: Junior status)
ITEC 3300. Technology Project Management (3) (WI) (F,S) (P: ENGL 1200; ITEC 2000 or MIS 2223)
ITEC 3800. Cost and Capital Project Analysis (3) (F,S) (P: MATH 1065; ITEC 2000 or 3000 or MIS 2223)
ITEC 4293. Industrial Supervision (3) (WI) (F,S) (P: Senior status; or consent of instructor)
ITEC 4300. Quality Assurance Concepts (3) (F,S) (P: ITEC 3200 or MATH 2283)

3. Cognates - 12 s.h.

ACCT 2101. Survey of Financial and Management Accounting (3) (F,S) (P: MATH 1065)
FINA 2244. Legal Environment of Business (3) (F,S,SS)
MATH 2283. Statistics for Business (3) (F,S,SS) (P: MATH 1065 or 1066 or equivalent) or ITEC 3200. Introduction to Statistical Process Control (3) (F,S) (P: MATH 1065 or 1066 or equivalent; ITEC 2000 or 3000 or MIS 2223)
ITEC 2000. Industrial Technology Applications of Computer Systems (3) (F,S) or MIS 2223. Introduction to Computers (3) (F,S,SS)
4. Electives to complete requirements for graduation. - 15 s.h.

BS in Industrial Engineering Technology

Merwan B. Mehta, Coordinator, 244 Slay Building

Minimum degree requirement is 126 s.h. of credit as follows:

1. Foundations curriculum requirements (For information about courses that carry foundations curriculum credit see Liberal Arts Foundations Curriculum) including those listed below. 42 s.h.

COMM 2410. Public Speaking (3) (F,S,SS) (FC:FA) or COMM 2420. Business and Professional Communication (3) (F,S,SS) (FC:FA)
ECON 2113. Principles of Microeconomics (3) (F,S,SS) (FC:SO)
MATH 1065. College Algebra (3) (F,S,SS) (FC:MA) (P: Appropriate score on mathematics placement test) or MATH 1066. Applied Mathematics for Decision Making (3) (F,S,SS) (FC:MA) (P: Appropriate score on mathematics placement test or approval of dept chair)
PHYS 1250, 1260. General Physics (3,3) (F,S,SS) (FC:SC) (P for 1250: MATH 1065 or 1066; P for 1260: PHYS 1250)
PHYS 1251, 1261. General Physics Laboratory (1,1) (F,S,SS) (FC:SC) (C for 1251: PHYS 1250 or 2350; C for 1261: PHYS 1260 or 2260)
PSYC 1000. Introductory Psychology (3) (F,S,SS) (FC:SO)
PSYC 3241. Personnel and Industrial Psychology (3) (F,S,SS) (FC:SO) (P: PSYC 1000 or 1060)

2. Core - 669 s.h.

DESN 2034, 2035. Engineering Graphics I (3,0) (F,S) (P: ITEC 2000 or MIS 2223)
DESN 2036, 2037. Computer-Aided Design and Drafting (3,0) (F,S) (P: DESN 2034)
IENG 2020, 2021. Materials and Processes Technology (3,0) (WI*) (F,S) (P:ITEC 2000 or MIS 2223)
IENG 2076, 2077. Introduction to Computer Numerical Control (CNC) (3,0) (F,S) (P: DESN 2034)
IENG 3020, 3021. Robotics in Computer Integrated Manufacturing (3,0) (S) (P: IENG 2076; ITEC 2090)
IENG 3300. Plant Layout and Materials Handling (3) (F) (P/C: ITEC 3290; P: IENG 2020)
IENG 3600. Statics and Strength of Materials (3) (S) (P: IENG 2020; MATH 1074
MATH 2119)
IENG 4020. Manufacturing System Planning (3) (F) (P: ITEC 3200, MATH 2119)
IENG 4023. Advanced Manufacturing Systems (3) (S) (P: IENG 3300)
IENG 4092. Operation Research (3) (S) (P: IENG 3300; MATH 2119)
IENG 4024, 4025. Electromechanical Systems Integration (3,0) (F) (P: DESN 2036; IENG 3020)
IENG 4200. Work Methods and Ergonomics Analysis (3) (S) (P: IENG 4020 or MATH 2283)
IENG 4900. Capstone (3) (S) (P: Senior Standing)
ITEC 2000. Industrial Technology Applications of Computer Systems (3) (F,S)
ITEC 2054, 2055. Electricity/Electronic Fundamentals (3,0) (F,S) (P/C: MATH 1065 or 1066 or 1085 or 2119, MATH 1074 or 1083 or 1085)
ITEC 2080, 2081. Thermal and Fluid Systems (3,0) (F,S) (P: IENG 2020)
ITEC 2090, 2091. Electromechanical Systems (3,0) (F,S) (P: ITEC 2054)
ITEC 3200. Introduction to Statistical Process Control (3) (F,S) (P: MATH 1065 or 1066; ITEC 2000 or 3000 or MIS 2223)
ITEC 3290. Technical Writing (3) (WI) (F,S,SS) (P: ENGL 1200)
ITEC 3292. Industrial Safety (3) (F,S) (P: Junior standing)
ITEC 3300. Technology Project Management (3) (F,S) (WI) (P: ENGL 1200; ITEC 2000 or MIS 2223)
ITEC 3800. Cost and Capital Project Analysis (3) (F,S) (P: MATH 1065 or ITEC 2000 or 3000 or MIS 2223)
ITEC 4293. Industrial Supervision (3) (WI) (F,S) (P: Senior standing or approval of instructor)
ITEC 4300. Quality Assurance Concepts (3) (F,S) (P: ITEC 3200 or MATH 2283)

3. Cognates - 42 s.h.
   CHEM 1020 General Descriptive Chemistry (4) (F,S)
   ITEC 3200. Introduction to Statistical Process Control (3) (F,S) (P: MATH 1065 or 1066 or equivalent)
   MATH 1074. Applied Trigonometry (2) (F,S,SS) (P: MATH 1065)
   MATH 2119: Elements of Calculus (3) (F,S,SS) (P: MATH 1065 with minimum grade of C+)

4. Electives to complete requirements for graduation - 9 s.h.

BS in Industrial Technology

David L. Batts, Coordinator, 230 Slay Building

The industrial technology program is accredited by the Association of Technology, Management, and Applied Engineering.

Student must have an associate degree from an approved technical program. Minimum degree requirement is **126 s.h.** of credit as follows. Students must complete at ECU a minimum of 42 s.h. credit of upper division core and concentration courses. Industrial technology courses completed at ECU and transfer courses must total at least 66 s.h. All students pursuing a bachelor of science in industrial technology through distance education (online) are required to complete ITEC 3000 in their initial semester of enrollment at East Carolina University. For distance
education (online) students only, ITEC 3000 will fulfill 3 s.h. of the required 27 s.h. in their
chosen concentration area. ITEC 3100, 4100 or any course that does not meet as a class may not
be used as upper division core or concentration courses.

1. Foundations curriculum requirements (For information about courses that carry
foundations curriculum credit see Liberal Arts Foundations Curriculum) including those
listed below. 42 s.h.

   COMM 2410. Public Speaking (3) (F,S,SS) (FC:FA) or COMM 2420. Business and
   Professional Communication (3) (F,S,SS) (FC:FA)
   ECON 2113. Principles of Microeconomics (3) (F,S,SS) (FC:SO)
   MATH 1065. College Algebra (3) (F,S,SS) (FC:MA) (P: Appropriate score on
   mathematics placement test) or MATH 1066. Applied Mathematics for Decision Making
   (3) (F,S,SS) (FC:MA) (P: Appropriate score on mathematics placement test or approval
   of dept chair)
   PSYC 1000. Introductory Psychology (3) (F,S,SS) (FC:SO)
   PSYC 3241. Personnel and Industrial Psychology (3) (F,S,SS) (FC:SO) (P: PSYC 1000
   or 1060)

2. Lower Division Core. 24 s.h.

   Transfer technical courses up to 24 s.h. or approved technical courses.

3. Upper Division Core. 15 s.h.

   ITEC 3200. Introduction to Statistical Process Control (3) (F,S) (P: MATH 1065 or 1066
   or equivalent, ; ITEC 2000 or 3000 or MIS 2223)
   ITEC 3290. Technical Writing (3) (WI) (F,S,SS) (P: ENGL 1200)
   ITEC 3300. Technology Project Management (3) (WI) (F,S) (P: ENGL 1200; ITEC 2000
   or MIS 2223)
   ITEC 3800. Cost and Capital Project Analysis (3) (F,S) (P: MATH 1065 or
   ITEC 2000 or 3000 or MIS 2223)
   ITEC 4293. Industrial Supervision (3) (WI) (F,S) (P: Senior standing or approval of
   instructor)

4. Concentrations (choose one). 27 s.h.

   Architectural Technology
   DESN 3030, 3031. Architectural Drafting (3,0) (F,S) (P: DESN 2036 or IDSN 2281;
   ITEC 2080; or program coordinator approval)
   DESN 3032, 3033. Engineering Graphics II (3,0) (F,S) (P: DESN 2036; ITEC 2080;
   PHYS 1250; C: ITEC 2090; or program coordinator approval)
   DESN 3036, 3037. Architectural Design and Drafting (3,0) (F) (P: DESN 3030, 3032; or
   program coordinator approval)
   DESN 3038, 3039. Sustainable Design (3,0) (S) (P: BIOL 1060, 1061; DESN 3030;
   GEOL 1700; ITEC 2090, 3300; PSYC 3241; or program coordinator approval)
PLAN 3021. Introduction to Planning Techniques (3) (F)
PLAN 3051. Introduction to GIS in Planning (3) (F)
PLAN 4003. Urban Form and Design (3) (S)
Approved technical electives (6 s.h.)

Bioprocess Manufacturing
ITEC 3292. Industrial Safety (3) (F,S) (P: Junior standing)
ITEC 4150. Microbiology for Industrial Processing (3) (S EY) (P: Admitted to bioprocess manufacturing concentration within BS industrial technology degree)
ITEC 4250. Engineering for Food Safety and Sanitation (3) (F OY) (P: Admitted to bioprocess manufacturing concentration within BS industrial technology degree)
ITEC 4300. Quality Assurance Concepts (3) (F,S) (P: ITEC 3200 or MATH 2283)
ITEC 4350. Separation Techniques for Industrial Processing (3) (S OY) (P: Admitted to bioprocess manufacturing concentration within BS industrial technology degree)
ITEC 4450. Waste Treatment Techniques for Industrial Processing (3) (S OY) (P: Admitted to bioprocess manufacturing concentration within BS industrial technology degree)
ITEC 4550. Quality in Regulatory Environments (3) (F, EY) (P: Admitted to bioprocess manufacturing concentration within BS industrial technology degree)
Approved technical electives (6 s.h.)

Distribution and Logistics
IDIS 2771. Introduction to Distribution and Logistics (3) (F,S)
IDIS 3785. Global Logistics (3) (F) (P: IDIS 2771)
IDIS 3790. Technical Presentations for Industry (3) (F,S) (P: ITEC 2000 or MIS 2223)
IDIS 3800. Transportation Logistics (3) (F,S) (P: IDIS 2771)
IDIS 3805. Purchasing Logistics (3) (S) (P: IDIS 2771)
IDIS 3815. Supply Chain Logistics (3) (S) (P: IDIS 2771)
IDIS 3825. Strategic Pricing for Distributors (3) (F) (P: ACCT 2101; IDIS 2771)
IDIS 3835. Security and Risk Analysis for Distributors (3) (F) (P: IDIS 3815)
Approved technical electives (3 s.h.)

Industrial Supervision
IDIS 2771. Introduction to Distribution and Logistics (3) (F,S)
IDIS 3790. Technical Presentations for Industry (3) (F,S) (P: ITEC 2000 or MIS 2223)
IDIS 3815. Supply Chain Logistics (3) (F,S) (P: IDIS 2771)
ITEC 3292. Industrial Safety (3) (S) (P: Junior standing)
ITEC 4300. Quality Assurance Concepts (3) (F,S) (P: ITEC 3200 or MATH 2283)
IENG 3300. Plant Layout and Materials Handling (3) (F) (P/C: ITEC 3290; P: IENG 2020)
IENG 4200. Work Methods and Ergonomics Analysis (3) (S) (P: IENG 4020 or ITEC 3200 or MATH 2283)
Approved technical electives (6 s.h.)

Information and Computer Technology
Choose nine courses from below (27 s.h.):
ICTN 2000. Introduction to Telecommunications (3) (F)
ICTN 2530, 2531 Network Environment II (3,0) (F,S) (P: ICTN 1500)
ICTN 2900, 2901. Introduction to Network Security (3,0) (F) (P: ICTN 2154)
ICTN 3250, 3251. Internetwork Routing Technology (3,0) (F) (P: Current CCNA certification)
ICTN 3530, 3531 Network Environment II (3,0) (S) (P: ICTN 1500)
ICTN 3540, 3541. Network Environment III (3,0) (F) (P: ICTN 2510, 2530)
ICTN 3900, 3901. Web Services Management (3,0) (F) (P: ICTN 2510, 2530)
ICTN 4010, 4011. User Application Management and Emerging Technologies (3,0) (F) (P: ICTN 2510, 2530)
ICTN 4040. Communication Security (3) (S) (P: Senior standing and ICTN 2154)
ICTN 4064. Regulations and Policies (3) (S) (P/C: FINA 2244; P: ICTN 2000)
ICTN 4150, 4151. Switching Network Technology (3,0) (F) (P: Current CCNA certification)
ICTN 4200, 4201. Intrusion Detection Technologies (3,0) (F) (P: ICTN 2530, 2900)
ICTN 4250, 4251. Enterprise Network Technology (3,0) (S) (P: Current CCNA certification)
ICTN 4592, 4593. Optimizing Converged Networks (3,0) (S) (P: Current CCNA certification)
ICTN 4600, 4601. Enterprise Information Technology Management (3,0) (S) (P: ICTN 2154, 2530)
ICTN 4800, 4801. Information Assurance Technologies (3,0) (F) (P: ICTN 2530, 2900)
ITEC 3000. Internet Tools Technology (3) (F,S) (P: MIS 2223 or ITEC 2000; distance education (online) student)

Manufacturing Systems
IENG 3300. Plant Layout and Materials Handling (3) (F) (P/C: ITEC 3290; P: IENG 2020)
IENG 4020. Manufacturing System Planning (3) (F) (P: ITEC 3200, MATH 2119)
IENG 4023. Advanced Manufacturing Systems (3) (S) (P: IENG 3300)
IENG 4200. Work Methods and Ergonomics Analysis (3) (S) (P: IENG 4020, ITEC 3200 or MATH 2283)
ITEC 3292. Industrial Safety (3) (F,S) (P: Junior standing)
ITEC 4300. Quality Assurance Concepts (3) (F,S) (P: ITEC 3200 or MATH 2283)
Approved technical electives (9 s.h.)

Mechanical Technology
DESN 3032, 3033. Engineering Graphics II (3,0) (F,S) (P: DESN 2036; ITEC 2080; PHYS 1250; C: ITEC 2090; or program coordinator approval)
DESN 3230, 3231. Rapid Prototyping (3,0) (S) (P: DESN 3032; IENG 2076)
DESN 3234, 3235. Jig and Fixture Design (3,0) (F) (P: DESN 3032; ITEC 2090; IENG 2076)
DESN 3236, 3237. Geometric Dimensioning and Tolerancing (3,0) (F) (P: DESN 3032; MATH 1074; ITEC 3200 or MATH 2283)
IENG 2076, 2077. Introduction to Computer Numerical Control (CNC) (3,0) (F) (P: DESN 2034)
IENG 3020, 3021. Robotics in Computer Integrated Manufacturing (3,0) (S) (P: IENG 2076; ITEC 2090)
IENG 3300. Plant Layout and Materials Handling (3) (F) (P/C: ITEC 3290; P: IENG 2020)
Approved technical electives (6 s.h.)

5. Cognates - 5 s.h.
   FINA 2244. Legal Environment of Business (3) (F,S,SS)
   MATH 1074. Applied Trigonometry (2) (F,S,SS) (P: MATH 1065)

6. Approved electives to complete requirements for graduation.

BS in Information and Computer Technology

Philip J. Lunsford, Coordinator, C123 Science and Technology Building

The information and computer technology program is accredited by the Association of Technology, Management, and Applied Engineering. Credit toward an information and computer technology major will not be given for any ICTN course with a grade less than C. Minimum degree requirement is 126 s.h. credit as follows:

1. Foundations curriculum requirements (For information about courses that carry foundations curriculum credit see Liberal Arts Foundations Curriculum) including those listed below. 42 s.h.

   COMM 2410. Public Speaking (3) (F,S,SS) (FC:FA) or COMM 2420. Business and Professional Communication (3) (F,S,SS) (FC:FA)
   ECON 2113. Principles of Microeconomics (3) (F,S,SS) (FC:SO)
   MATH 1065. College Algebra (3) (F,S,SS) (FC:MA) (P: Appropriate score on mathematics placement test) or MATH 1066. Applied Mathematics for Decision Making (3) (F,S,SS) (FC:MA) (P: Appropriate score on mathematics placement test or approval of dept chair)
   PHYS 1250, 1260. General Physics (3,3) (F,S,SS) (FC:SC) (P for 1250: MATH 1065 or 1066; P for 1260: PHYS 1250)
   PHYS 1251, 1261. General Physics Laboratory (1,1) (F,S,SS) (FC:SC) (C for 1251: PHYS 1250 or 2350; C for 1261: PHYS 1260 or 2260)
   PSYC 1000. Introductory Psychology (3) (F,S,SS) (FC:SO)
   PSYC 3241. Personnel and Industrial Psychology (3) (F,S,SS) (FC:SO) (P: PSYC 1000 or 1060)

2. Lower Division Core - 24 s.h.

   ICTN 1500, 1501. PC Hardware (3,0) (F,S)
ICTN 2000. Introduction to Telecommunications (3) (F)
ICTN 2154, 2155. Digital Communication Systems (3,0) (F,S) (P: ICTN 1500; RP/C: ICTN 2000)
ICTN 2158, 2159. Computer Network Technology (3,0) (F,S) (P: ICTN 2154)
ICTN 2510, 2511. Network Environment I (3,0) (F) (P: ICTN 1500)
ICTN 2530, 2531. Network Environment II (3,0) (S) (P: ICTN 1500)
ICTN 2732. Scripting for Information Technology (3) (S) (P: ITEC 2000; P/C: ICTN 2530)
ITEC 2000. Industrial Technology Applications of Computer Systems (3) (F,S) or ITEC 3000. Internet Tools Technology (3) (F,S) (P: MIS 2223 or ITEC 2000 or equivalent experience) or equivalent.

3. Upper Division Core - 27 s.h.

ICTN 2900, 2901. Introduction to Network Security (3,0) (F) (P: ICTN 2154)
ICTN 3540, 3541. Network Environment III (3,0) (F) (P: ICTN 2510, 2530)
ICTN 4000. Network Internship (3) (F,S,SS) (P: Junior standing and ICTN major)
ICTN 4020. Senior Information and Computer Technology Capstone Design Project I (1) (WI) (F) (P: Senior standing, IDIS 3790, ITEC 3290, 3300 and ICTN major)
ICTN 4022. Senior Information and Computer Technology Capstone Design Project II (2) (WI) (S) (P: ICTN 4020)
ICTN 4040. Communication Security (3) (S) (P: Senior standing and ICTN 2154, 2530)
IDIS 3790. Technical Presentations for Industry (3) (F,S) (P: ITEC 2000 or MIS 2223)
ITEC 3290. Technical Writing (3) (WI) (F,S,SS) (P: ENGL 1200)
ITEC 3300. Technology Project Management (3) (WI) (F,S) (P: ENGL 1200; ITEC 2000 or MIS 2223)

4. Concentration area (Choose one). 12 s.h.

Computer Networking:
ICTN 3250, 3251. Internetwork Routing Technology (3,0) (F) (P: Current CCNA certification)
ICTN 4150, 4151. Switching Network Technology (3,0) (F) (P: Current CCNA certification)
ICTN 4250, 4251. Enterprise Network Technology (3,0) (S) (P: Current CCNA certification)
ICTN 4592, 4593. Optimizing Converged Networks (3,0) (S) (P: Current CCNA certification)

Information Security:
ICTN 4064. Regulations and Policies (3) (S) (P/C: FINA 2244; P: ICTN 2000, 2530)
ICTN 4200, 4201. Intrusion Detection Technologies (3,0) (F) (P: ICTN 2530, 2900)
ICTN 4600, 4601. Enterprise Information Technology Management (3,0) (S) (P: ICTN 2154, 2530)
ICTN 4800, 4801. Information Assurance Technologies (3,0) (F) (P: ICTN 2530, 2900)
Information Technology:
ICTN 3900, 3901. Web Services Management (3,0) (F) (P: ICTN 2510, 2530)
ICTN 4010, 4011. User Application Management and Emerging Technologies (3,0) (F) (P: ICTN 2510, 2530)
ICTN 4064. Regulations and Policies (3) (S) (P/C: FINA 2244; P: ICTN 2000, 2530)
ICTN 4600, 4601. Enterprise Information Technology Management (3,0) (S) (P: ICTN 2154, 2530)

5. Cognates - 12 s.h.
FINA 2244. Legal Environment of Business (3) (F,S,SS)
ITEC 3200. Introduction to Statistical Process Control (3) (F,S) (P: MATH 1065 or 1066 or equivalent; ITEC 2000 or 3000 or MIS 2223) or MATH 2283. Statistics for Business (3) (F,S,SS) (P: MATH 1065 or 1066 or equivalent)
ITEC 3800. Cost and Capital Project Analysis (3) (F,S) (P: MATH 1065; ITEC 2000 or 3000 or MIS 2223) or ACCT 2101 Survey of Financial and Managerial Accounting (3) (F,S) (P: MATH 1065 or 1066) or ACCT 2401. Financial Accounting (3) (F,S,SS) (P: MATH 1065 or 1066 or 2119 or 2121 or 2171)
ITEC 4293. Industrial Supervision (3) (WI) (F,S) (P: Senior standing or approval of instructor) or MGMT 3202. Fundamentals of Management (3) (F,S,SS) (P: ECON 1000 or 2113)

6. Approved electives to complete requirements for graduation.

Architectural Design Technology Minor

The architectural design technology design minor requires a minimum of 30 s.h. of credit:
DESN 2034, 2035. Engineering Graphics I (3,0) (F,S) (P: ITEC 2000 or MIS 2223)
DESN 2036, 2037. Computer-Aided Design and Drafting (3,0) (F,S) (P: DESN 2034)
DESN 3030, 3031. Architectural Drafting (3,0) (F,S) (P: DESN 2036 or IDSN 2281; ITEC 2080; or program coordinator approval)
DESN 3032, 3033. Engineering Graphics II (3,0) (F,S) (P: DESN 2036; ITEC 2080; PHYS 1250; C: ITEC 2090; or program coordinator approval)
DESN 3036, 3037. Architectural Design and Drafting (3,0) (F) (P: DESN 3030, 3032; or program coordinator approval)
DESN 3038, 3039. Sustainable Design (3,0) (S) (P: BIOL 1060, 1061; DESN 3030; GEOL 1700; ITEC 2090, 3300; PSYC 3241; or program coordinator approval)
ITEC 2000. Industrial Technology Applications of Computer Systems (3) (F,S) or MIS 2223. Introduction to Computers (3) (F,S,SS)

And 9 s.h. from the following:
PLAN 1900. Planning for the Human Environment (3) (F,S,SS)
PLAN 3021. Introduction to Planning Techniques (3) (F)
PLAN 3051. Introduction to GIS in Planning (3) (F) (P: PLAN 3410 or consent of instructor)
PLAN 4003. Urban Form and Design (3) (S)
PLAN 4021. Advanced GIS Applications in Planning (3) (S) (P: PLAN 3051 or GEOG 2410 or consent of instructor)
PLAN 4046. Planning and Design Studio (3) (F,S)
PLAN 5985. Historic Preservation Planning (3)

**Industrial Technology Management Minor**

The industrial technology management minor requires **24 s.h.** of credit as follows:
- FINA 2244. Legal Environment of Business (3) (F,S,SS)
- IDIS 2771. Introduction to Distribution and Logistics (3) (F,S)
- ITEC 3200. Introduction to Statistical Process Control (3) (F,S) (P: MATH 1065 or 1066 or equivalent; ITEC 2000 or 3000 or MIS 2223)
- ITEC 3290. Technical Writing (3) (WI) (F,S,SS) (P: ENGL 1200)
- ITEC 3292. Industrial Safety (3) (F,S) (P: Junior standing)
- ITEC 3300. Technology Project Management (3) (WI) (F,S) (P: ENGL 1200; ITEC 2000 or MIS 2223)
- ITEC 3800. Cost and Capital Project Analysis (3) (F,S) (P: MATH 1065; ITEC 2000 or 3000 or MIS 2223)
- ITEC 4293. Industrial Supervision (3) (WI) (F,S) (P: Senior standing or approval of instructor)

**Information and Computer Technology Minor**

The information and computer technology minor requires **24 s.h.** of credit.
- ICTN 1500, 1501. PC Hardware (3,0) (F,S)
- ICTN 2000. Introduction to Telecommunications (3) (F)
- ICTN 2154, 2155. Digital Communication Systems (3,0) (F,S) (P: ICTN 1500; RP/C: ICTN 2000)
- ICTN 2158, 2159. Computer Networking Technology (3,0) (F,S) (P: ICTN 2154)
- ICTN 2510, 2511. Network Environment I (3,0) (F) (P: ICTN 1500)
- ICTN 2530, 2531. Network Environment II (3,0) (S) (P: ICTN 1500)
- ICTN 2900, 2901. Introduction to Network Security (3,0) (F) (P: ICTN 2154)
- ICTN 4040. Communication Security (3) (S) (P: Senior standing; ICTN 2154, 2530)

**Mechanical Design Technology Minor**

The mechanical design technology minor requires **30 s.h.** of credit:
- DESN 2034, 2035. Engineering Graphics I (3,0) (F,S) (P: ITEC 2000 or MIS 2223)
- DESN 2036, 2037. Computer-Aided Design and Drafting (3,0) (F,S) (P: DESN 2034)
- DESN 3032, 3033. Engineering Graphics II (3,0) (F,S) (P: DESN 2036; ITEC 2080; PHYS 1250; C: ITEC 2090; or program coordinator approval)
- DESN 3230, 3231. Rapid Prototyping (3,0) (S) (P: DESN 3032; IENG 2076)
- DESN 3234, 3235. Jig and Fixture Design (3,0) (F) (P: DESN 3032; ITEC 2090; IENG 2076)
- IENG 2076, 2077. Introduction to Computer Numerical Control (CNC) (3,0) (F) (P: DESN 2034)
ITEC 2000. Industrial Technology Applications of Computer Systems (3) (F,S) or MIS 2223. Introduction to Computers (3) (F,S,SS)
ITEC 2054, 2055. Electricity/Electronic Fundamentals (3,0) (F,S) (P/C: MATH 1065 or 1066 or 1085 or 2119, MATH 1074 or 1083 or 1085)
ITEC 2090, 2091. Electromechanical Systems (3,0) (F,S) (P: ITEC 2054)
MATH 1065. College Algebra (3) (F,S,SS) (FC:MA) (P: Appropriate score on mathematics placement test)

Occupational Safety and Health Minor

Minimum requirement for environmental health minor is **24 s.h.** of credit as follows:
- EHST 3700. Industrial Hygiene (3) (S) (P: 8 s.h. of general science lab courses or consent of dept chair)
- EHST 3701. Industrial Hygiene Lab (1) (S) (P: Consent of instructor; C: EHST 3700)
- EHST 3910. General Industry Safety (3) (F)
- EHST 3926. Construction Safety (3) (F,S)
- EHST 4200. Environmental Health Management and Law (3) (F)
- ITEC 3292. Industrial Safety (3) (F,S) (P: Junior standing)

Choose 8 s.h. of general science lab courses

http://www.ecu.edu/cs-acad/ugcat/CoursesI.cfm#ieng

**IENG: Industrial Engineering Technology**

2020, 2021. Materials and Processes Technology (3,0) (WI*) (F,S) P/C: ITEC 2000 or MIS 2223. Factors which influence the production and modification of materials into useful forms. Various manufacturing processes and machinery used to convert raw materials into finished products. Hands on experience with materials and processes used in industry.

2076, 2077. Introduction to Computer Numerical Control (CNC) (3,0) (F) 2 hours lecture and 2 hours lab per week. P: DESN 2034. Review of fundamental manual programming for numerical control machines. Topics include CNC machine types, controls, safety, and coordinate measuring systems; CNC speed and feed calculations, tooling and fixturing; and programming CNC mills and lathes; computer controlled laser cutting and engraving. Self-paced. Hands-on experience with CNC machines and simulations in virtual reality.

3020, 3021. Robotics in Computer Integrated Manufacturing (3,0) (S) 2 lecture and 2 lab hours per week. P: IENG 2076, ITEC 2090. Students will learn how to build, program, and integrate robots into computer integrated manufacturing (CIM) processes in an hands-on manner.

3600. Statics and Strength of Materials (3) (S) P: IENG 2020; MATH 1074, MATH 2119. Statics including vectors, moments, equilibrium of structures, centroids and moments of inertia. Strength of materials including basic stresses and deformations; beam diagrams, flexure and shear.

4020. Manufacturing System Planning (3) (F) P: ITEC 3200, MATH 2119. Introduction to manufacturing planning including system concepts such as strategy, product design, learning curves, forecasting, aggregate planning, stochastic inventory control, reliability models, linear programming, and scheduling.


4024, 4025. Electromechanical Systems Integration (3,0) (F) 2 lecture and 2 lab hours per week. P: DESN 2036; IENG 3020. Electromechanical systems integration including electronics, pneumatics, hydraulics, computer control and instrumentation.

4092. Operations Research (3) (S) P: MATH 2119. Application of operations research models to industrial engineering problems. Linear programming, sensitivity analysis, transportation models, network models, queuing models, dynamic programming, game theory and simulation.

4200. Work Methods and Ergonomics Analysis (3) (S) P: IENG 4020, ITEC 3200 or MATH 2283. Work methods and study of work measurement systems. Principles of motion study, work simplification, and work measurement by direct and predetermined motion-time systems.

4401, 4402, 4403. Independent Study: Industrial Engineering Technology (1,2,3) P: Consent of instructor. Special topics in selected areas of Industrial Engineering Technology. Exploration and research in personal areas of interest.

4502. Laboratory Problems: Production (3) 6 lab hours per week. Independent study of industrial manufacturing systems, processes, and concepts.

4507. Laboratory Problems: Metals (3) 6 lab hours per week. P: IENG 2076. In-depth and independent study of concepts and/or processes of metals, tools, and materials. Emphasis on lab work.

4900. Capstone (3) (S) P: Senior standing. Hands-on industrial project. Teams of students will work directly with individual clients or organizations to improve their processes through the implementation of industrial engineering technology principles and tools.
5504. Independent Study: Manufacturing (3) May be repeated for credit with consent of chair. P: Consent of instructor. Research-oriented problem solving with tools, materials, and processes of manufacturing industries.

IENG Banked Courses

2066, 2067. Polymeric Materials (3,0)
2072, 2073. Metals Technology I (3,0)
3072. Metals Technology (3)
4060, 4061. Woods Products Manufacturing (3,0)
4092. Operations Research (3)
4094, 4095. Industrial Maintenance (3,0)
4501. Laboratory Problems: Maintenance (3)
5060. Organic Matrix Composite Materials (3)
5090, 5091. Fluid Power Circuits (3,0)
ITEC: Industrial Technology

2000. Industrial Technology Applications of Computer Systems (3) (F,S) Technical and managerial aspects of computer applications and information technology in industry and engineering areas.

2010. Introduction to Industry and Technology (3) (F,S) Foundation for advanced study in various technology specialization areas. Emphasis on basic technical and technical managerial concepts of manufacturing, construction, and service industries. Evolution of industry and career opportunities in broad fields of industry and industrial education.

2054, 2055. Electricity/Electronic Fundamentals (3,0) (F,S) 2 classroom and 2 lab hours per week. P/C: MATH 1065 or 1066 or 1085 or 2119, MATH 1074 or 1083 or 1085. Electronic components and circuits. Study communications and industrial control systems.

2080, 2081. Thermal and Fluid Systems (3,0) (F,S) P: IENG 2020. Basic elements of design and analysis of thermal and power systems including boilers, air conditioning, refrigeration, pumps, compressions, heat exchanges, and piping systems.

2090, 2091. Electromechanical Systems (3,0) (F,S) P: ITEC 2054. Design and analysis of electromechanical control systems. Includes the fundamentals of programmable controllers as well as practical applications of interfacing mechanical, electrical, pneumatic, and hydraulic systems and components.

3000. Internet Tools Technology (3) (F,S) P: MIS 2223 or ITEC 2000 or equivalent experience. Experience based introduction to Internet applications, communications, and collaboration methods for industry and other technical environments.

3100. Internship in Industrial Technology (3) (F,S,SS) Minimum of 240 hours of supervised, full- or part-time industrial or technical work experience. P: Consent of instructor and at least one semester as a full-time ECU student First experience in technical and managerial problems of industry. Participation in weekly seminar or completion of eight concept papers.

3200. Introduction to Statistical Process Control (3) (F,S) P: MATH 1065 or 1066 or equivalent, ITEC 2000 or 3000 or MIS 2223. Examination of statistical measures, tools and methods employed to analyze and control variation in industrial processes. Course covers measures of central tendency and variation, frequency distributions and use of variable and attribute control charts.

3290. Technical Writing (3) (WI) (F,S,SS) P: ENGL 1200. Practice in writing about technical problems of significance to student.

3300. Technology Project Management (3) (F,S) (WI) 3 lecture hours per week. P: ENGL 1200; ITEC 2000 or MIS 2223. Systems needs analysis identification, functional requirements analysis, IT project timelines, and system development progress metrics.

3800. Cost and Capital Project Analysis (3) (F,S) P: MATH 1065, ITEC 2000 or 3000 or MIS 2223. Economic analysis of technology alternatives. Valuation techniques, time value of money, cash flow analysis, cost estimation, taxes and depreciation, operations planning and control, and project evaluation, accounting and budgeting tools.

4100. Internship in Industrial Technology (3) (F,S,SS) Supervised internship for student with industrial or technical experience. Minimum of 240 hours of supervised work experience. May be taken concurrently with ITEC 3100. P: ITEC 3100 or consent of instructor. Work experience and participation in weekly seminar. For students not within commuting distance of ECU, participation in the seminar may be waived in lieu of concept papers.

4150. Microbiology for Industrial Processing (3) (S EY) P: Admitted to bioprocess manufacturing concentration within BS industrial technology degree. Microbiological and cell growth techniques utilized by the bioprocessing, chemical, food, or other industries.

4250. Engineering for Food Safety and Sanitation (3) (F OY) P: Admitted to bioprocess manufacturing concentration within BS industrial technology degree. Techniques for the sanitary design of food plants and food plant equipment.

4293. Industrial Supervision (3) (WI) (F,S) P: Senior standing or approval of instructor. Fundamental and special techniques for supervising people in industrial or business work situation. Duties and responsibilities of supervisor. Emphasis on successful supervisory practices.

4300. Quality Assurance Concepts (3) (F,S) P: ITEC 3200 or MATH 2283. Managerial, statistical, motivational, and technological aspects of quality control as practiced in manufacturing, construction, processing, and service industries.

4350. Separation Techniques for Industrial Processing (3) (S OY) P: Admitted to bioprocess manufacturing concentration within BS industrial technology degree. Numerous separation techniques utilized by the bioprocessing industry.

4450. Waste Treatment Techniques for Industrial Processing (3) (S OY) P: Admitted to bioprocess manufacturing concentration within BS industrial technology degree. Waste treatment processes utilized by the bioprocessing, chemical, food, or other industries.
4550. Quality in Regulatory Environment (3) (F EY) P: Admitted to bioprocess manufacturing concentration within BS industrial technology degree. Quality processes in a regulatory environment utilized by the bioprocessing, chemical, food, or other industries.

5100. Internship in Industrial Technology (3) Supervised internship. P: Consent of graduate director. Placement in industrial or technical firm. Requires journal of related activities and final report.

ITEC Banked Courses

2001. Industrial Technology Applications of Computer Systems (0)
3030, 3091. Supervised Work Experience (2)
3291. Technical Writing (0)
3294. Principles of Industrial Training (3)
4290. Job Analysis: Procedures and Applications (3)

Agenda Item V

College of Technology and Computer Science

Department of Computer Science

http://www.ecu.edu/cs-acad/ugcat/CompScience.cfm

COLLEGE OF TECHNOLOGY AND COMPUTER SCIENCE

David White, Dean, Suite 100, Science and Technology Building
Leslie R. Pagliari, Associate Dean for Academic Affairs, Suite 100, Science and Technology Building
Evelyn C. Brown, Associate Dean for Research and Graduate Studies, Suite 100, Science and Technology Building

The College of Technology and Computer Science is comprised of the Departments of Computer Science, Construction Management, Engineering, and Technology Systems.

DEPARTMENT OF Computer Science

Karl R. Abrahamson, Interim Chairperson, Suite C-124 Science and Technology Building

BA in Computer Science

Credit toward a computer science major will not be given for any CSCI course with a grade less than C being used to satisfy the requirements specified in the core. Minimum degree requirement is 126 s.h. of credit as follows:

1. Foundations curriculum (See Section 4, Foundations Curriculum Requirements for all Baccalaureate Degree Programs)..................................................................................................................42 s.h.

PHIL 2275. Professional Ethics (3) (WI*) (F,S,SS) (FC:HU)
2. Foreign language through level 1004.................................................................12 s.h.
3. Core.................................................................33 s.h.
   CSCI 2310, 2311. Algorithmic Problem Solving and Programming Laboratory (4,0) (F,S) (P: MATH 1065; C for 2310: CSCI 2311; C for 2311: CSCI 2310)
   CSCI/EENG 2410. Digital Electronics (3) (F,S) (P: CSCI 2310, 2311; or ENGR 1014 or 1016 and 2050)
   CSCI 3200. Data Structures and Their Applications (4) (F,S) (P: CSCI 2310, 2311)
   CSCI 3526. Switching Theory and Computer Organization (3) (F,S) (P: CSCI 2310, 2427)
   CSCI 3700. Database Management Systems (3) (F) (P: CSCI 3200 or 3310)
   CSCI 4000. Ethical and Professional Issues in Computer Science (1) (F,S)
   CSCI 4200. Software Engineering I (3) (WI) (F,S) (P: CSCI 3200 or 3310; CSCI major)
   CSCI 4300. Systems Programming (3) (F) (P: CSCI 3200 or 3310)
   CSCI 4530. Computer Networks and the Internet (3) (S) (P: CSCI 3200 or 3300 or consent of instructor)
   CSCI 4710. Introduction to Developing e-Business Systems (3) (WI) (SEY) (P: CSCI 3200 or 3310)
Choose 6 s.h. CSCI courses above 2999, excluding CSCI 3584 and 5774
4. Cognates..................................................... 6 s.h.
   CSCI/MATH 2427. Discrete Mathematical Structures (3) (P: MATH 1065 or 1066)
   MATH 2228. Elementary Statistical Methods I (3) (F,S,SS) (FC:MA) (P: MATH 1065 or 1066) or MATH 2283.
Statistics for Business (3) (F,S,SS) (P: MATH 1065 or 1066 or equivalent)
5. Minor and electives to complete requirements for graduation.
BS in Computer Science
Credit toward a computer science major will not be given for any CSCI course with a grade less than C being used to satisfy
the requirements specified in the common core and CSCI electives. Minimum degree requirement is 126 s.h. of credit as
follows:
1. Foundations curriculum (See Section 4, Foundations Curriculum Requirements for all
   Baccalaureate Degree Programs), including those listed below.........................................42 s.h.
   See cognates below for courses that fulfill science requirements.
   COMM 2410. Public Speaking (3) (F,S,SS) (FC:FA) or COMM 2420. Business and Professional Communication
   (3) (F,S,SS) (FC:FA)
   PHIL 2275. Professional Ethics (3) (WI) (F,S,SS) (FC:HU)
2. Common core.........................................................30 s.h.
   CSCI 2310, 2311. Algorithmic Problem Solving and Programming Laboratory (4,0) (F,S) (P: MATH 1065; C for 2310: CSCI 2311; C for 2311: CSCI 2310)
   CSCI/EENG 2410. Digital Electronics (3) (F,S) (P: CSCI 2310, 2311; or ENGR 1014 or 1016 and 2050)
   CSCI 3300. Introduction to Algorithms and Data Structures (4) (F,S) (P: CSCI 2310; C: CSCI 2427)
   CSCI 3310. Advanced Data Structures and Data Abstraction (3) (F,S) (P: CSCI 2427, 3300)
   CSCI 3526. Switching Theory and Computer Organization (3) (F,S) (P: CSCI 2310 or 2427)
   CSCI 3675. Organization of Programming Language (3) (F) (P: CSCI 3200 or 3310)
   CSID 4000. Ethical and Professional Issues in Computer Science (1) (F,S)
   CSCI 4200. Software Engineering I (3) (WI) (F,S) (P: CSCI 3200 or 3310 and CSCI major)
   CSCI 4230. Software Engineering II (3) (F,S) (P: CSCI 4200 or consent of instructor)
   CSCI 4602. Theory of Automata and Linguistics (3) (F) (P: CSCI major; CSCI 2427)
   CSCI 4630. Operating Systems I (3) (F,S) (P: CSCI 3200 or 3300; CSCI major)
3. Cognates...............................................................25-27 s.h.
   CSCI/MATH 2427. Discrete Mathematical Structures (3) (F,S) (P: MATH 1065 or 1066)
   CSCI/MATH 3584. Computational Linear Algebra (3) (F,S) (P: Calculus course)
   ENGL 3880. Writing for Business and Industry (3) (WI) (F,S,SS) (P: ENGL 1200) or ITEC 3290. Technical Writing
   (3) (F,S,SS) (P: ENGL 1200)
   MATH 2171. Calculus I (4) (F,S,SS) (FC:MA) (P: MATH 1083 or 1085 or 2122 with a minimum grade of C) or
   MATH 2121. Calculus for the Life Sciences I (3) (F,S,SS) (FC:MA) (May not receive credit for MATH 2121 after
   taking MATH 2171) (P: MATH 1065 or 1077 with minimum grade of C)
   MATH 2172. Calculus II (4) (F,S,SS) (FC:MA) (P: MATH 2171 with a minimum grade of C or MATH 2122 with
consent of instructor) or MATH 2122. Calculus for the Life Sciences II (3) (F,S,SS) (May not receive credit for MATH 2122 after taking MATH 2172) (P: MATH 2121)
MATH 2228. Elementary Statistical Methods I (3) (F,S,SS) (FC:MA) (P: MATH 1065 or equivalent) or MATH 2283.
Statistics for Business (3) (F,S,SS) (FC:MA) (P: MATH 1065 or 1066 or equivalent) or MATH 3307. Mathematical Statistics I (3) (F,S) (P: MATH 2172)
MATH 3229. Elementary Statistical Methods II (3) (P: MATH 2228 or equivalent) or MATH 3308. Mathematical Statistics II (3) (F) (P: MATH 3307) or CSCI 5774. Programming for Research (3) (P: General course in statistics or consent of instructor)
12 s.h. of science. (Note that 8 of these 12 units count toward foundation curriculum requirements.)
One of the following options must be selected.

*Option 1 - Physics:
PHYS 1251, 1261. General Physics Laboratory (1,1) (F,S,SS) (FC:SC) (C for 1251: PHYS 1250 or 2350; C for 1261: 1260 or 2360)
PHYS 2350, 2360. University Physics (4,4) (F,S,SS) (FC:SC) (P for 2350: MATH 2121, 2151, or 2171; P for PHYS 2360: PHYS 2350)
2 s.h. of science that satisfy ECU foundation requirements.

*Option 2 – Chemistry:
CHEM 1150, 1151. General Chemistry and Laboratory I (3,1) (F,S,SS) (FC:SC) (P/C: MATH 1065; C for 1150: CHEM 1151; C for 1151: CHEM 1150)
CHEM 1160, 1161. General Chemistry and Laboratory II (3,1) (F,S,SS) (FC:SC) (P: CHEM 1150, 1151; C for 1160: CHEM 1161; C for 1161: CHEM 1160; RC: MATH 1083 or 1085)
4 s.h. of science that satisfy ECU foundation requirements.

*Option 3 - Biology
BIOL 1100, 1101. Principles of Biology and Laboratory I (3,1) (F,S,SS) (FC:SC) (P/C: for 1101: BIOL 1100)
BIOL 1200, 1201. Principles of Biology and Laboratory II (3,1) (F,S,SS) (FC:SC) (P/C: for 1201: BIOL 1200)
4 s.h. of science that satisfy ECU foundations curriculum requirements.

4. CSCI electives above 2999 (excluding CSCI 3200 and 5774).................................................12 s.h.

5. Electives to complete requirements for graduation.
*Requirements for 5., above, may be met by satisfying the requirements for a minor.

http://www.ecu.edu/cs-acad/ugcat/CoursesC.cfm#csci

CSCI: Computer Science

1001. Introduction to Computer Science (3) (F,S) May not count towards a BA or BS degree in computer science, or towards foundations curriculum credit. Elementary treatment of some basic ideas in computer science, such as how computers store and process data, binary and hexadecimal numbers, arithmetic/logic instructions, social issues, data structures, web pages, and the Internet. Targeted towards novice computer users.

1002. Web Page Programming (3) (F,S) May not count toward CSCI major or minor. Introduction to the enhancement of web pages using programming techniques. Provides supervised practical experience in the use of an embedded programming language. A portable computer is required.

1200. Introduction to Visual Programming (3) (F,S) May not count toward CSCI major or minor. P: MATH 1065. Introduces programming using a visual design tool such as Visual Basic.

2300. Computer Science Survey (3) (F,S) Elementary architecture, operating systems, file systems, network, algorithmic, and software development concepts.
2310, 2311. Algorithmic Problem Solving and Programming Laboratory (4,0) (F,S) P: MATH 1065; C for 2310: CSCI 2311; C for 2311: CSCI 2310. Design of algorithms and their implementation as programs in high-level language such as Java.

2410. Digital Electronics (3) Formerly CSCI 3526 Same as EENG 2410 P: ENGR 1014 or 1016 and 2050; or CSCI 2310, 2311. Introduction to digital logic and digital electronics, including Boolean algebra, number systems, logic gates, data structures, and both combinational and sequential logical design and optimization.

2427. Discrete Mathematical Structures (3) (F,S) Same as MATH 2427 May not count toward MATH major or minor. May receive credit for only one of CSCI 2427; MATE or MATH 2775, 3237, or MATH 2427. P: MATH 1065 or 1066. Study of discrete mathematical structures. Special emphasis on structures most important in computer science. Practical applications of subject emphasized.

2600. Introduction to Digital Computation (3) (S) May not count toward CSCI major or minor. P: MATH 1065 or 1066. Emphasis on algorithmic approach to problem solving. Algorithms programmed and run on computer by all students.

2618. COBOL (3) (F) P: CSCI 2310 or 2610. Basic and advanced elements of COBOL.

3040. Microprocessors (4) Same as EENG 3040 3 lecture and 2 lab hours per week. P: ENGR 2514, EENG 2410 or CSCI 2410; or consent of instructor. Microprocessor architecture and programming, register level logic, input and output, system logic, timing, embedded systems applications, and hardware interfacing.

3200. Data Structures and Their Applications (4) (F,S) P: CSCI 2310, 2311. Common data structures and how to use them in advanced problem solving.

3300. Introduction to Algorithms and Data Structures (4) (F,S) P: CSCI 2310; C: CSCI 2427. Advanced data representations such as lists and trees, including associated algorithms and use of both static and dynamic memory.

3310. Advanced Data Structures and Data Abstraction (3) (F,S) P: CSCI 2427, 3300. Data abstractions such as stacks, queues, graphs, tables, and sets, and implementations in object-oriented style, including principles of class design.


3550. Introduction to Computer Game Development (3) (S) P: CSCI 3200 or 3300. A broad view of computer game development from an applied computer science point of view. Content creation and the concepts behind the development of story, character, environment, level design, user interface, and sound.

3573. Introduction to Numerical Analysis (3) (S) Same as MATH 3573 P: CSCI 2310 or consent of instructor; MATH 2119 or 2172 or equivalent. Algorithms suitable for digital computation in areas of linear algebra, linear programming, slope finding, area finding, and nonlinear equation solution.

3584. Computational Linear Algebra (3) (F,S) Same as MATH 3584 May not count toward MATH major or minor. P: Calculus course. Introduces vectors, matrices, and determinants. Special emphasis on application of linear algebra to solution of practical problems.

3601. Computer Organization and Programming (3) (F,S) P: CSCI 3200, 3300, or 3526 2410. Assembly language used to illustrate general machine architecture that executes assembly language command structure.
3650. Analysis of Algorithms (3) (S) P: CSCI 3200 or 3300; CSCI 2427. Decision trees, mathematical induction, and adversary arguments used to analyze correctness, complexity, and optimality of algorithms. Emphasis on searching and sorting algorithms.

3675. Organization of Programming Language (3) (F) P: CSCI 3200 or 3310. Applied course in programming language constructs. Emphasis on run-time behavior of programs. Provides appropriate background for advanced-level courses involving formal and theoretical aspects of programming languages and compilation process.


3800. Introduction to Computer Graphics (3) (F) P: CSCI 3200 or 3310; MATH 3256 or 3584. Computer graphics systems, hardware, interactive methods; line and curve drawing; two- and three-dimensional transformations; and perspective transformation.

4000. Ethical and Professional Issues in Computer Science (1) (F,S) To be taken by CSCI seniors in final semester. Departmental assessment and professional, ethical, legal, security, and social issues and responsibilities related to the practice of computer science.

4200. Software Engineering I (3) (WI) (F,S) P: CSCI major and CSCI 3200 or 3310. Formal approach to state-of-the-art techniques in software design and development and application of the techniques.

4230. Software Engineering II (3) (F,S) P: CSCI 4200 or consent of the instructor. Conceptual and practical knowledge in relation to large-scale software development using established software engineering principles. Requires completion of major project using tools and methodologies provided.

4300. Systems Programming (3) (F) P: CSCI 3200 or 3310. Programming issues related to the functionality and general structure of operating systems, networking, security, and the general architecture of information systems are covered.

4510. Object-Oriented Computing and Graphical User Interfaces (3) (F,S) P: CSCI 3200 or 3310. Object oriented program design and development and data abstraction. Object-oriented programming languages. Applications to graphical user interfaces and event-driven computing.

4520. Introduction to Computer Architecture (3) (S) P: CSCI major; CSCI 3526 CSCI 2410. Organization of basic elements of computer system, including processor, memory, control unit, and I/O units.

4530. Computer Networks and the Internet (3) (S) P: CSCI 3200 or 3300 or consent of instructor. Theory and case studies of modern networking protocols and telecommunication methods. Local area and long-haul networks.

4540. Introduction to Mobile Communications and Wireless Security (3) P: CSCI 4530 or consent of instructor. Signals, access protocols, application requirements and security issues. Focus is on digital data transfer.

4550. Computer Game Development (3) (F) P: CSCI 3550. Animation development, multi-layer technologies, haptic displays, spatial issues in gaming and 3D immersion technology, terrain and special effects.

4602. Theory of Automata and Linguistics (3) (F) P: CSCI major; CSCI 2427. Basic concepts of automata theory and mathematical linguistics and their close interrelationship.

4627. Procedural Languages and Compilers (3) (S) P: CSCI major; CSCI 3526 2410. 3675. State of the art techniques for compiling procedural languages.
4630. Operating Systems I (3) (F,S) P: CSCI major and CSCI 3200 or 3300. Job control and operating systems. System organization, resource and storage allocation, interrupt handling, addressing techniques, file structures, and batch/time sharing systems.

4710. Introduction to Developing e-Business Systems (3) (WI) P: CSCI 3200 or 3310 or consent of instructor. Introduces use of concepts, technologies, and building blocks from computer science, practical software engineering, and business development in building e-Commerce systems. Describes systematic life-cycle approach to developing successful e-Commerce systems and presents knowledge essential to wide range of organization and software developers. Requires completion of major term projects using state-of-the-art tools and methodologies.

4905. Selected Topics in Computer Science (3) May be repeated for maximum of 6 s.h. with change of topic. P: CSCI major and CSCI 3200 or 3310. Consideration of new or advanced topics in computer science.

5002. Logic for Mathematics and Computer Science (3) Same as MATH 5002 P: CSCI 3200 or 3310 or MATE 3223 or 2775 or MATH 2427 or 2775 or 3223 or 3256 or PHIL 3580 or equivalent. Methods of mathematical logic important in mathematics and computer science applications.


5501, 5502, 5503. Independent Study (1,2,3) Minimum of 3-6 hours per week depending on the nature of the work assigned. P: CSCI 3200 or 3310 or equivalent or consent of instructor. Advanced computer science students study topics that supplement regular curriculum.

5774. Programming for Research (3) Same as MATH 5774 For graduate student who wishes to use computer science to meet required research skills in his or her dept. May not count toward MATH major or minor. P: General statistics course or consent of instructor. Emphasis on minimum-level programming skill and use of statistical packages.

5800. Artificial Intelligence (3) P: CSCI 3200 or 3310 or consent of instructor. Fundamental problems and techniques of artificial intelligence. Heuristic search. Concepts of expert systems.

Agenda Item VI

College of Technology and Computer Science

Department of Engineering

http://www.ecu.edu/cs-acad/ugcat/engineering.cfm

College of Technology and Computer Science

Department of Engineering
The Department of Engineering offers a BS in engineering with four concentration areas: electrical engineering, mechanical engineering, industrial and systems engineering, biomedical engineering, and bioprocess engineering. The BS in engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: 410-347-7700.

The mission of the department is to provide a theory-based, application-oriented general engineering education that serves as a basis for career success and lifelong learning. Our graduates demonstrate the engineering and scientific knowledge to analyze, design, improve and evaluate integrated technology-based systems. Our program welcomes a diverse student body and provides the support to foster its success.

Graduates of the BS in engineering program will:

1. Use their education to be successful in a technical career or graduate studies, demonstrating competence in applying classical methods and modern engineering tools;
2. Analyze technical, environmental, and societal issues related to engineering designs and technology systems;
3. Be productive team members and leaders, using skills in human relations and communication;
4. Practice a lifelong commitment to learning and professional development; and
5. Demonstrate commitment to the professional and ethical standards of engineering and recognize the importance of community and professional service.

Graduates of the BS program have: (a) an ability to apply knowledge of math, science and engineering; (b) an ability to design and conduct experiments/analyze and interpret data; (c) an ability to design a system, component, or process; (d) an ability to function on multi-disciplinary teams; (e) an ability to identify, formulate, and solve engineering problems; (f) an understanding of professional and ethical responsibility; (g) an ability to communicate effectively; (h) an ability to evaluate the impact of technology in a global/societal context; (i) an appreciation for lifelong learning; (j) knowledge of contemporary issues; (k) an ability to use the techniques, skills, and modern tools for engineering practice; and (l) an ability to apply engineering concepts to an area of concentrated study, chosen from biomedical engineering, bioprocess engineering, electrical engineering, industrial and systems engineering, or mechanical engineering.

The BS program is distinctive from many other engineering programs in that it: 1) focuses on hands-on project applications of engineering, beginning with the freshman year and continuing throughout the program; 2) promotes a team-based learning approach where students work closely with each other and the faculty; and 3) integrates science, math and engineering content to assure a coordinated presentation of concepts that flow from theory to advanced practice and application.

Engineering students are encouraged to pursue registration as a Professional Engineer (PE). The first step in this process is completion of the Fundamentals of Engineering (FE) Exam. Students
are required to take the FE exam during their senior year. Subsequent to graduation, professional licensure requires at least four years of progressive engineering experience and successful completion of the PE Examination.

Admission

Admission to the university or college does not guarantee admission to the engineering program. Students with an interest in engineering should indicate engineering as the desired major when they apply to the university and complete a separate application to the engineering program. The engineering application can be found on the Department of Engineering Web site at www.tecs.ecu.edu/engineering. Once students have been accepted into the university, the engineering admissions committee evaluates program applicants based on a number of success indicators including SAT/ACT scores, performance in math and science courses, high school GPA, and rank in class. The average SAT for freshmen admitted to the engineering program at ECU is typically over 1100 on mathematics and critical reading. Prior to enrolling in classes, engineering students also take an engineering mathematics placement test focused on calculus readiness. Information on this test is included in the engineering acceptance letter.

Transfer admission: Students transferring to the engineering program must first meet university transfer requirements. Once transfer students have been admitted to the university, they may apply to the engineering program and will be evaluated by the department admissions committee on the potential to succeed with particular emphasis on performance in math and science classes. Students who have completed an associate degree from an approved pre-engineering program will be directly admitted to the BS program.

Special Department Programs

Internships. All engineering students are encouraged to complete internships, service learning projects, and professional practice activities prior to graduation. The department maintains a number of internship relationships at local and regional employers. Full-time students who have completed 24 credit hours and have a 2.5 minimum cumulative GPA are eligible for these ECU internships. Transfer students must complete 12 credit hours at ECU before applying for the internship program.

Engineering Learning Community. Incoming freshmen are encouraged to live in the engineering learning community dormitory on campus. This program builds teamwork and collaboration skills and facilitates the transition to university life.

Undergraduate Research. Students are strongly encouraged to pursue undergraduate research with a faculty member. Up to 3 s.h. of undergraduate research may be applied toward degree requirements as a technical elective. Information regarding undergraduate research may be obtained from the concentration coordinator.

BS in Engineering

Minimum degree requirement for the engineering program is 128 s.h. credit as follows:
1. Foundations curriculum requirements (For information about courses that carry foundations curriculum credit see *Liberal Arts Foundations Curriculum*) including those listed below - 42 s.h.

- BIOL 1050. General Biology (3) (F,S,SS) (FC:SC) and BIOL 1051. General Biology Laboratory (1) (F,S,SS) (FC:SC) (C: BIOL 1030 or 1050) or BIOL 1100, 1101. Principles of Biology and Laboratory I (3,1) (F,S,SS) (FC:SC) (P/C for 1101: BIOL 1100)
- ECON 2113. Principles of Microeconomics (3) (F,S,SS) (FC:SO)
- MATH 2151. Engineering Calculus I (3) (S) (FC:MA) (May not receive credit for MATH 2151 after receiving credit for MATH 2171) (P: MATH 1083 or 1085 or placement test criteria; or consent of instructor)
- PHIL 2275. Professional Ethics (3) (WI*) (F,S,SS) (FC:HU) or PHIL 2274. Business Ethics (3) (WI*) (F,S,SS) (FC:HU)
- PHYS 2350. University Physics (4) (F,S,SS) (FC:SC) (P for 2350: MATH 2121, 2151, or 2171)

2. Engineering Foundation - 39 s.h.

- **ENGR 1000. Introduction to Engineering (1) (P: Engineering major)**
- **ENGR 1012. Engineering Graphics (2) (C: MATH 1083 or higher)**
- **ENGR 1014. Introduction to Engineering (3) (P: ENGR 1012)**
- **ENGR 1016. Introduction to Engineering Design (2) (P: ENGR 1000, 1012)**
- **ENGR 2000. Engineering Design and Project Management I (1) (P: ENGR 1016 or consent of instructor)**
- **ENGR 2022. Statics (3) (P: MATH 2152; C: PHYS 2350)**
- **ENGR 2050. Computer Applications in Engineering (3) (P: MATH 1083 or higher)**
- **ENGR 2070. Materials and Processes (3) (F) (WI) (P: CHEM 1150)**
- **ENGR 2450. Dynamics (3) (Formerly ENGR 3004) (P: ENGR 2022 with minimum grade of C; MATH 2152)**
- **ENGR 2514. Circuit Analysis (4) (P/C: MATH 2154; PHYS 2360)**
- **ENGR 3000. Engineering Design and Project Management II (2) (WI) (P/C: ENGR 3420; P: ENGR 2000)**
- **ENGR 3014. Circuit Analysis (3) (P: MATH 2153; PHYS 2360)**
- **ENGR 3024. Mechanics of Materials (3) (WI) (P: ENGR 2022 with minimum grade of C; ENGR 2070)**
- **ENGR 3500. Sensors, Measurements, and Controls (3) (S) (P: ENGR 2514 or 3014; MATH 2154)**
- **ENGR 3420. Engineering Economics (2) (P: MATH 2152)**
- **ENGR 3400. Engineering Economics (3) (WI) (P: MATH 2152)**
- **ENGR 3500. Introduction to Engineering Project Management (3) (WI) (Formerly ENGR 3300) (P: ENGR 3400; MATH 3307)**
- **ENGR 3800. Quality Control for Engineers (3) (Formerly ENGR 4000) (P: MATH 3307)**
- **ENGR 4010. Senior Capstone Design Project I (2) (WI) (P: ENGR 3000, consent of instructor)**
- **ENGR 4020. Senior Capstone Design Project II (2) (WI) (P: ENGR 4010)**
3. Cognates - 21 s.h.

CHEM 1150, 1151. General Chemistry and Laboratory I (3,1) (F,S,SS) (P/C: MATH 1065; C for 1150: CHEM 1151; C for 1151: CHEM 1150)
MATH 2152. Engineering Calculus II (3) (S) (FC:MA) (May not receive credit for MATH 2152 after receiving credit for MATH 2172) (P: MATH 2151 or 2171; or consent of instructor)
MATH 2153. Engineering Calculus III (3) (F) (FC:MA) (May not receive credit for MATH 2153 after receiving credit for MATH 2173) (P: MATH 2152 or 2172; or consent of instructor)
MATH 2154. Engineering Linear Algebra and Differential Equations I (4) (S) (P: ENGR 2050; MATH 2153)
MATH 3307. Mathematical Statistics I (3) (F,S) (P: MATH 2172)
PHYS 2360. University Physics (4) (F,S,SS) (FC:SC) (P: PHYS 2350)

4. Concentrations (Choose one)

Biomedical Engineering - 26 s.h.
BIME 3000. Foundations of Biomedical Engineering (3) (P: Consent of instructor)
BIME 4030. Biomechanics and Materials (4) (P: CHEM 2750, 2753; ENGR 2450 with minimum grade of C, ENGR 3024)
BIME 4200. Biomedical Instrumentation (4) (P: BIME 3000; ENGR 3050)
CHEM 1160, 1161. General Chemistry and Laboratory II (3,1) (F,S,SS) (FC:SC) (P: CHEM 1150, 1151; C for 1160: CHEM 1161; C for 1161: CHEM 1160; RC: MATH 1083 or 1085)
CHEM 2750. Organic Chemistry I (3) (F,S,SS) (P: CHEM 1160, 1161; C: CHEM 2753)
CHEM 2753. Organic Chemistry Laboratory I (1) (F,S,SS) (C: CHEM 2750)
ENGR 3012. Thermal and Fluid Systems (4) (P: ENGR 2450 with minimum grade of C; MATH 2153)

Bioprocess Engineering - 26 s.h.
BIOE 3016 Engineering Applications in Microbial Systems (2) (P: ENGR 2450 with minimum C; MATH 2154; C: CHEM 2650, 2651)
BIOE 3250. Bioprocess Engineering Systems (3) (Formerly BIOE 3000) (P: CHEM 2650, 2651; BIOE 3016)
BIOE 4006. Bioprocess Validation and Quality (2 ) (P: MATH 3307; consent of instructor)
BIOE 4010. Bioprocess Separation Engineering (3) (P: BIOE 3250; ENGR 3012)
BIOE 4020. Bioprocess Plant Design, Simulation and Analysis (3) (P: BIOE 4010; MATH 3307)
BIOL 2110, 2111. Fundamentals of Microbiology and Laboratory (3,1) (F,S) (FC:SC) P for 2110: CHEM 1120, 1130 or CHEM 1150, 1160; RP for 2110; BIOL 1050, 1051 or 1100, 1101; P/C for 2111: BIOL 2110)
CHEM 1160, 1161. General Chemistry and Laboratory II (3,1) (F,S,SS) (FC:SC) (P: CHEM 1150, 1151; C for 1160: CHEM 1161; C for 1161: CHEM 1160; RC: MATH 1083 or 1085)
CHEM 2650. Organic Chemistry for the Life Sciences (4) (F,S) (P: CHEM 1160, 1161)
CHEM 2651. Organic Chemistry Lab for the Life Sciences (1) (F,S) (C: CHEM 2650)
ENGR 3012. Thermal and Fluid Systems (4) (P: ENGR 2450 with minimum grade of C; MATH 2153)

Electrical Engineering 26 s.h.
EENG 2410. Digital Electronics (3) (Same as CSCI 2410) (P: ENGR 1014 or 1016 and 2050; or CSCI 2310, 2311)
EENG 3020. Signals and Systems (3) (P: ENGR 2514; MATH 2154)
EENG 3040. Microprocessors (4) (Same as CSCI 3040) (P: ENGR 2514; CSCI 2410 or EENG 2410; or consent of instructor)
EENG 3530. Electronics (3) (P: ENGR 2514)
EENG 3750. Electric Power Systems (3) (P: ENGR 2514)
EENG 4510. Advanced Controls (3) (P: EENG 3020; ENGR 3050)
ENGR 3012. Thermal and Fluid Systems (4) (S) (P: ENGR 2450 with minimum grade of C; MATH 2153)

Technical electives, 3 s.h. as approved by the academic advisor.

Industrial and Systems Engineering - 26 s.h.
ISYS 3010. Principles and Methods of Industrial and Systems Engineering (3) (P: Junior standing in engineering)
ISYS 3060. Systems Optimization (3) (P: MATH 2154, 3307)
ISYS 4010. Work Measurement and Human Factors (3) (P: MATH 3307)
ISYS 4020. Analysis of Production Systems and Facility Design (3) (P: MATH 3307)
ISYS 4065. Discrete System Modeling (3) (P: ENGR 3800)
ENGR 3012. Thermal and Fluid Systems (4) (P: ENGR 2450 with minimum grade of C; MATH 2153)

Technical electives, 7 s.h. as approved by the academic advisor.

Mechanical Engineering - 26 s.h.
MENG 3624. Solid Mechanics (3) (P: ENGR 3024)
MENG 3070. Thermodynamics I (3) (P: MATH 2154; ENGR 2450 with minimum grade of C)
MENG 4018. Thermodynamics II (3)(P: MENG 3070)
MENG 4150. Fluid Mechanics (4) (P: ENGR 2450 with minimum grade of C; MATH 2154)
MENG 4260. Heat and Mass Transfer (3) (P: MENG 3070)
MENG 4650. Machine Design (3) (P: MENG 3624)

Technical electives, 7 s.h. as approved by the academic advisor.

http://www.ecu.edu/cs-acad/ugcat/CoursesE.cfm

EENG: Electrical Engineering

2410. Digital Electronics (3) Same as CSCI 2410
   P: ENGR 1014 or 1016 and 2050; or CSCI 2310, 2311. Introduction to digital logic and digital electronics, including Boolean algebra, number systems, logic gates, data structures, and both combinational and sequential logical design and optimization.
3020. **Signals and Systems (3)**  
P: ENGR 2514; MATH 2154. Singularity functions, properties of LTI systems, and differential and difference equation representation of physical systems. Convolution, Fourier series, Fourier Transforms, Laplace transforms, and z-transforms. Applications in sampling, modulation, filtering, and digital signal processing, with relevant examples in electrical, mechanical, and biomedical engineering.

3040. **Microprocessors (4) Same as CSCI 3040**  
3 lecture and 2 lab hours per week. P: ENGR 2514, EENG 2410 or CSCI 2410; or consent of instructor. Microprocessor architecture and programming, register level logic, input and output, system logic, timing, embedded systems applications, and hardware interfacing.

3530. **Electronics (3)**  
P: ENGR 2514. Fundamentals of operational amplifiers and common topologies; PN junctions, semiconductor physics, the ideal diode, and real diodes; bipolar junction transistors (BJTs) and metal oxidized silicon field-effect transistors (MOSFETs): physical structures, signal models, common configurations, and second-order effects.

3750. **Electric Power Systems (3)**  
P: ENGR 2514. Alternating current (AC) systems, single-phase and three-phase systems, transformers, electric machinery, electric power generation, transmission lines, and power system faults.

4510. **Advanced Controls (3)**  
P: EENG 3020; ENGR 3050. Difference equations and Z-transforms; sampling of continuous-time systems; transfer functions in Z-domain and discrete-time system models; control system performance and stability analysis in Z-domain; digital-controller design and implementation.

http://www.ecu.edu/cs-acad/ugcat/CoursesE.cfm#engr

**ENGR: Engineering Core**

1000. **Engineering Freshman Seminar (1)**  
1 lecture hour per week. P: Enrolled in first or second semester in engineering. Focus on collaborative learning, use of resources, development of engineering study skills, and strategies for student success.

1000. **Introduction to Engineering (1)**  
2 lecture hours per week. P: Engineering major. Introduction to the engineering profession, engineering design, and problem solving. Focus on communications, collaborative learning, use of resources, development of engineering study skills, and strategies for student success.

1002. **Fundamentals of Engineering Practice (3)**  
3 lecture hours per week. P: Consent of instructor. Introduction to the engineering profession. Topics include mathematical modeling, functions and graphs, trigonometry, vector geometry, systems of equations and analytical geometry.

1010. **Integrated Collaborative Engineering I (6)**
4 lecture and 4 lab hours per week. C: MATH 1083. Introduces engineering profession and basic tools and concepts of engineering. Team taught, providing immersive and hands-on experience in engineering practice areas, including graphics, professional practice, environmental issues, systems thinking, and basic concepts in machinery, controls, digital circuits, and data analysis.

1012. Engineering Graphics (2)
1 lecture and 2 lab hours per week. C: MATH 1083 or higher. Engineering graphics in a professional engineering context, including sketching and working drawings, multiple views, sections, solid modeling software, drawing standards, tolerancing, and dimensioning.

1014. Introduction to Engineering (3) (S)
1 lecture and 4 lab hours per week. P: ENGR 1012. Engineering profession and basic tools and concepts of engineering, providing immersive and hands-on experience in engineering practice areas, including professional practice, systems thinking, and basics concepts in machinery, controls, digital circuits, and data analysis.

1016. Introduction to Engineering Design (2)
2 two-hour labs per week. P: ENGR 1000, 1012. Engineering design process including developing design requirements and constraints, determining feasible solutions, evaluating alternative solutions and testing implementing the best dilution. Utilizes case studies and hands-on micro-processor and robotic based design problems in a team environment.

1020. Integrated Collaborative Engineering II (6) (S)
4 lecture and 4 lab hours per week. P: ENGR 1010; C: MATH 2151. Basic engineering concepts of project analysis and business planning for engineering entrepreneurship. Tools of design analysis involving static forces, stress, shear, torsion and moments. Lab covers use of spreadsheets to evaluate engineering alternatives and mathematical analytical software plus analysis of engineering materials, including tests of stress, fastening methods, and fabrication.

2010. Integrated Collaborative Engineering III (4)
3 lecture and 2 lab hours per week. P: ENGR 1020; C: MATH 2151; PHYS 2350. Covers advanced topics in engineering fundamentals in particle and rigid body dynamics. Lab covers applications of engineering software to analyze engineering problems.

2020. Integrated Collaborative Engineering IV (4) (S)
3 lecture and 2 lab hours per week. P: ENGR 2010; C: PHYS 2360. Covers advanced engineering fundamentals, analysis, and design of electrical circuits including amplification, resonance, and three phase power distribution. Lab covers design of electrical circuits, including use of electrical instrumentation.

2000. Engineering Design and Project Management I (1)
2 lecture hours per week. P: ENGR 1016 or consent of instructor. Continuation of ENGR 1016. Historical engineering achievements, focusing on the design process and project management issues; engineering failures, emphasizing the impacts on the engineering profession and society; and contemporary issues facing society, focusing on the role of engineering solutions.

2022. Statics (3) (S)
3 lecture hours per week. P: MATH 2152; C: PHYS 2350. Analysis of equilibrium of particles, addition and resolution of forces, equivalent system of forces, equilibrium of
rigid bodies, centroid and moment of inertia, structural analysis, internal forces, friction, and virtual work.

2050. Computer Applications in Engineering (3) (S)
2 lecture and 2 lab hours per week. C: Math 1083 or higher. Application of modern programming tools and languages to solve engineering problems.

2070. Materials and Processes (3) (WI)
2 lecture and 2 lab hours per week. P: CHEM 1150. Study of the materials used in engineering and related manufacturing processes. Materials topics include the atomic structure of materials, alloys, phase diagrams, and heat treatment. Manufacturing processes include casting, forming, machining, and joining processes.

2450. Dynamics (3) (S) Formerly ENGR 3004
3 lecture hours per week. P: ENGR 2022 with minimum grade of C; MATH 2152. Fundamental topics in particle and rigid body dynamics. Planar kinematics of a particle. Planar kinetics of a particle: force and acceleration, work and energy, and impulse and momentum. Planar kinematics of a rigid body.

2514. Circuit Analysis (4)
3 lecture and 2 lab hours per week. P/C: MATH 2154; PHYS 2360. Fundamental electric circuit concepts and theory. Electronic elements and electric power, DC and AC circuits, and circuit analysis methods in time and frequency domains.

3000. Engineering Design and Project Management II (2) (WI)
1 lecture and 2 lab hours per week. P/C: ENGR 3420; P: ENGR 2000. Integration of engineering design and project management. Employs example project to demonstrate the steps of engineering design, develop a project plan, project presentation, and design report with supporting documents.

3010. Engineering Systems and Problem Solutions (3)
P: ENGR 2022; MATH 2153. Explores systems approach to design, analysis, and engineering of thermal and fluid systems using mathematical and software tools.

3012. Thermal and Fluid Systems (4) (S)
3 lecture and 2 lab hours per week. P: ENGR 2450 with minimum grade of C; MATH 2153. Explores systems approach to design, analysis, and engineering of thermal and fluid systems using mathematical and software tools.

3014. Circuit Analysis (3)
2 lecture and 2 lab hours per week. P: MATH 2153; PHYS 2360. Electrical and electronic engineering concepts, theory, and methods. Includes electric circuit analysis, electro mechanics, and electrical instrumentation systems.

3020. Information Systems Engineering (3) (S)
P: ENGR 3010. Fundamental knowledge of information systems, including formal systems and models. Use of data, information, and knowledge in organizations, information lifecycle; collection, storage, processing, retrieval, delivery; and overview of the various components of an information infrastructure. Includes computing platforms, software architectures, and telecommunications networks. Introduces integration and acquisition of information for decision-making using information technology.

3024. Mechanics of Materials (3) (WI)
2 lecture and 2 lab hours per week. P: ENGR 2022 with minimum grade of C. ENGR 2070. Behavior of deformable bodies subjected to axial loading, torsion, and bending.
Includes stress-strain relations, elastic deflections of beams, effects of combined loading, buckling of slender columns, and failure criteria for ductile and brittle materials.

3050. Sensors, Measurement, and Controls (3) (S)
2 lecture and 2 lab hours per week. P: ENGR 2514 or 3014; MATH 2154. Fundamental concepts of measurement and instrumentation at the system level. Measurement systems cover non-electrical parameters measurement, data acquisition, and signal conditioning. Controls systems cover application of mathematical and analytical tools to model, analyze, and design automated feedback control systems for dynamic processes.

3060. System Optimization (3)
P: MATH 3100, 3307. Introduces mathematical tools applied to system optimization, including problem formulation, identification of decision variables, use of graphical methods, linear programming, concepts of duality, and sensitivity analysis. Applications include transportation, network analysis, project management and other engineering areas.

3100. Internship in Engineering (1) (WI) (F, S, SS)
P: Consent of instructor. Minimum of 150 hours of supervised work or project experience in engineering. May include industry or service learning activities and be repeated for credit as a technical elective.

3400. Engineering Economics (3) (WI) (F)
3 lecture hours per week. P: MATH 2152. Analysis of cash flows including cost, revenue, and benefits that occur at different times. Evaluation of engineering projects using equivalent worth, benefit-cost, and rate of return including impact of depreciation, taxes, and statistical risk.

3420. Engineering Economics (2)
P: MATH 2152. Analysis of cash flows including cost, revenue, and benefits that occur at different times. Evaluation of engineering projects using equivalent worth, benefit-cost, and rate of return including impact of depreciation, and taxes.

3500. Introduction to Engineering Project Management (3) (WI) (S) Formerly ENGR 3300
3 lecture hours per week. P: ENGR 3400; MATH 3307. System needs and analysis identification, functional requirements analysis, project timelines, network analysis, and system development progress metrics.

3800. Quality Control for Engineers (3) (S) Formerly ENGR 4000
3 lecture hours per week. P: MATH 3307. Analytical procedures associated with Statistical Quality and Process Control. Includes design of experiments, and system approaches to maintenance and improvement of process quality.

3901, 3902, 3903. Undergraduate Research in Engineering (1,2,3)
P: Consent of instructor and chair. Study of an experimental or theoretical area involving engineering analysis and design. Demonstrates depth of analysis and study beyond scope of existing courses. Up to 3 s.h. of undergraduate research may be applied toward degree.

4010. Senior Capstone Design Project I (2) (WI)
1 lecture and 2 lab hours per week. P: ENGR 3000; consent of instructor. Senior capstone course involves open-ended design project, exposing students to practice of engineering design and problem solving. Emphasis on real problems and working with real clients. Students required to visit facilities, interact with client employees, determine on-site data measurement strategies, and perform any necessary literature search. Develop proposal for project to be performed in ENGR 4020.
4020. Senior Capstone Design Project II (2) (WI) (S)
  1 lecture and 2 lab hours per week. P: ENGR 4010. Open-ended design project, exposing
  students to practice of engineering design and problem solving. Requires facility visits,
  interaction with clients, onsite data measurement and literature search. Preparation and
  completion of Fundamentals of Engineering professions examination.
4501, 4502, 4503. Special Topics in Engineering (1,2,3)
  P: Consent of instructor. May be repeated for credit as a technical elective. Course builds
  upon knowledge gained from the core engineering or specialization curriculum. Topics
  typically focus on advanced or emerging area, which will equip graduates with
  specialized knowledge to improve performance in analysis, synthesis, and design.
4510. Practice of Professional Engineering I (1)
  2 lab hours per week. C: ENGR 4010, 4020, or consent of instructor. Problem analysis
  and review of topics related to the fundamentals of engineering exam and professional
  practice. Covers topics such as statics and dynamics.

**ISYS: Industrial and Systems Engineering**

3010. Principles and Methods of Industrial and Systems Engineering (3)
  3 lecture hours per week. P: Junior standing in engineering. Systems engineering
  methodologies, and processes; conceptual system design; testing; design review; multiple
  criteria design decisions; and design for reliability. Introduces engineering management and
  organization principles, team building, leadership, motivation, and quantitative decision
  making.
3060. Systems Optimization (3)
  2 lecture and 2 lab hours per week. P: MATH 2154, 3307. Mathematical tools applied to
  system optimization: problem formulations, identification of decision variables, use of
  graphical methods, linear programming, duality, and sensitivity analysis. Applications
  include transportation analysis, network analysis, project management, decision analysis, and
  production planning.
4010. Work Measurement and Human Factors (3)

**Agenda Item VII**

**Thomas Harriot College of Arts and Sciences**

**Department of Chemistry**

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BA in Chemistry

The BA program provides a flexible major designed to provide the student with a broad education in chemistry appropriate for further study in a wide range of fields, such as business, medicine, pharmacy, and law as well as careers dependent on a basic knowledge in chemistry. The BA in chemistry, in conjunction with two semesters of laboratory-based biology courses, satisfies the course requirements for application to most US medical schools. It is different than the BS degree in the required chemistry, math, and physics courses. Any of the required major courses or cognates, however, may be replaced by courses that cover the same topics at a more advanced level. For example, CHEM 3950, 3960 may be taken instead of CHEM 3850. It is the student’s responsibility to ensure that the prerequisites for such courses have been met. If a student successfully completes a higher-level cognate course after bypassing the lower-level prerequisite course(s), he/she may use free electives to substitute for the prerequisite hours. All students are required to take a departmentally administered assessment examination before graduation. Scores from this examination will not be included in the calculation of GPA for academic standing. The performance on this exam will be noted on the student’s transcript. Minimum degree requirement is 126 s.h. of credit as follows:

BS in Chemistry

The BS degree in chemistry is the appropriate program for students considering advanced degree programs in chemistry, biochemistry, and other related fields or a professional career in chemistry. Graduates of this program meet certification requirements of the American Chemical Society. Students are strongly encouraged to pursue undergraduate research with a faculty member. Up to 6 s.h. of undergraduate research may be applied toward degree requirements. Information regarding undergraduate research may be obtained from the director of undergraduate studies. Students completing the BS degree are encouraged to consider some of the following courses as electives: COMM 2410 or COMM 2420; ITEC 3290 or ENGL 3820; MATH 2228, 3256, 4331; CHEM 4515, 4516, 4517; advanced 5000-level courses in chemistry; and BIOL 5800 or 5810. If a student successfully completes a higher-level cognate course after bypassing the lower-level prerequisite course(s), he/she may use free electives to substitute for the prerequisite hours. All students are required to take a departmentally administered assessment examination before graduation. Scores from this examination will not be included in the calculation of GPA for academic standing. The performance on this exam will be noted on the student’s transcript. Minimum degree requirement is 126 s.h. of credit as follows:
Thomas Harriot College of Arts and Sciences

Interdisciplinary Programs

Neuroscience Studies

Tuan Tran, Director, 209 Rawl Building

Multidisciplinary Studies Major
A multidisciplinary studies major with a focus in neuroscience is available. Interested students should contact the director of neuroscience studies.

Students pursuing a BS multidisciplinary major in neuroscience who are also participating in the MD/7 program must meet all the specified requirements for their major. In addition, the student will need to fulfill the pre-health concentration by taking BIOL 1100, 1101, 1200, 1201; PHYS 1250, 1251, 1260, 1261. If the student is accepted for admission to the Brody School of Medicine under the MD/7 program, the first year of medical studies will count toward fulfilling the remaining hours of electives as required for graduation.

Minor
The neuroscience minor is designed to provide students with an introduction to the study of neuroscience at the various structural and functional levels of analysis, including molecular, cellular, integrative, and behavioral. (Students interested in a neuroscience major should see multidisciplinary studies, described above, and contact the neuroscience program director.) The minor requires completion of core courses (20 s.h.), a laboratory course (2 or 3 s.h.), and an elective course (2-5 s.h.). In the event that courses required for the minor are also required for the student’s major, neuroscience elective courses should be taken so that a minimum of 24 s.h. of unique neuroscience courses are completed for the minor. The major advisor should send a potential minor to the director for advising. The minimum requirements for the minor are 24 s.h. as follows:

1. Core - 20 s.h.
   
   BIOL 1100, 1101. Principles of Biology I (4,0) (F,S,SS) (FC:SC)
   CHEM 1160, 1161. General Chemistry and Laboratory I (3,1) (F,S,SS) (FC:SC) (P: CHEM 1150, 1151; C for 1160:
   CHEM 1161; C for 1161: CHEM 1160; RC: MATH 1083 or 1085)
NEUR 4900. Cellular and Molecular Neuroscience (3) (F) (P: Senior standing; consent of instructor)
NEUR 4901. Behavioral and Integrative Neuroscience (3) (S) (P: Senior standing; consent of instructor)
PSYC 1000. Introductory Psychology (3) (F,S,SS) (FC:SO) or PSYC 1060. Honors Introductory Psychology (3) (F,S) (FC:SO)
PSYC 3310. Introduction to Neuroscience (3) (F,S,SS) (FC:SO)

2. Neuroscience Laboratory Course (Choose one.) - 2-3 s.h.

NEUR 4201. Laboratory Methods in Cellular and Molecular Neuroscience (2) (S)
PSYC 4312. Laboratory Methods in Behavioral Neuroscience (3) (P: PSYC 3310, 3311; or consent of instructor)
PSYC 4315. Neuroscience: Literature and Laboratory Experience (3) (P: PSYC 2210; 3310 or 3311; or consent of instructor)

3. Electives - 2-5 s.h.

BIOL 2130. Survey of Human Physiology and Anatomy (4) (F,S,SS) (FC:SC) (P: BIOL 1050, 1051; or 1100, 1101)
BIOL 2131. Survey of Human Physiology and Anatomy Laboratory (1) (F,S,SS) (FC:SC) (P/C: BIOL 2130)
BIOL 2300. Principles of Genetics (3) (F,S,SS) (FC:SC) (P: BIOL 1100, 1200)
BIOL 3310, 3311. Cellular Physiology (4,0) (F,S,SS) (P: CHEM 2650 or 2750 or 2770)
BIOL 3320. Principles of Animal Physiology (3) (F,S,SS) (P: CHEM 2650 or 2750 or 2770)
BIOL 5510, 5511. Transmission Electron Microscopy (4,0) (P for undergraduate students: Senior standing as a BIOL major or consent of instructor)
BIOL 5520, 5521. Scanning Electron Microscopy and X-Ray Analysis (2,0) (P for undergraduate students: Senior standing as a BIOL major or consent of instructor)
CHEM 2750. Organic Chemistry I (3) (F,S,SS) (P: CHEM 1160, 1161; C: CHEM 2753)
CHEM 2753. Organic Chemistry Laboratory I (1) (F,S,SS) (C: CHEM 2750)
CHEM 2760. Organic Chemistry II (3) (F,S,SS) (P: CHEM 2750; C: CHEM 2763)
CHEM 2763. Organic Chemistry Laboratory II (1) (F,S,SS) (P: CHEM 2750, 2753; C: CHEM 2760)
CHEM 2770. Biological Chemistry (3) (S) (FC:SC) (P: CHEM 2650 or 2760)
CHEM 2771. Biological Chemistry Laboratory (1) (S) (FC:SC) (C: CHEM 2770)
ITEC 2054, 2055. Electricity/Electronics Fundamentals (3,0) (F,S,SS) (P/C: MATH 1065 or 1066 or 1085 or 2119 MATH 1074 or 1083 or 1085)
MATH 2121. Calculus for the Life Sciences I (3) (F,S,SS) (FC:MA)
MATH 2122. Calculus for the Life Sciences II (3) (F,S,SS) (P: MATH 2121)
NEUR 4200. Literature in Neuroscience (1) (F)
PHIL 1262. Introduction to Philosophical Issues in Biology (3) (F,S) (FC:HU)
PHIL 2261. Introduction to Philosophy of Science (3) (FC:HU)
PSYC 2210. Research Methods in Psychology (4) (WI) (F,S) (FC:SO) (P: MATH 1065 or MATH 1066; PSYC 2101)
PSYC 3225. Psychology of Learning (3) (F,S,SS) (FC:SO)
PSYC 3226. Cognitive Psychology (3) (F,S,SS) (FC:SO) (P: PSYC 1000 or 1060)
PSYC 3311. Neuropsychology (3) (F,S) (FC:SO)
PSYC 4340. Behavioral Pharmacology Seminar (3) (P: PSYC 3310, 3311; or consent of instructor)
Any course listed under 2., above, not used to meet lab requirement may be chosen as an elective.

http://www.ecu.edu/cs-acad/ugcat/Security.cfm

Thomas Harriot College of Arts and Sciences

Interdisciplinary Programs

Security Studies

Jalil Roshandel, Director, A-116 Brewster Building

The security studies minor is designed to provide an interdisciplinary overview of security-related issues, policies, and infrastructure that has developed in response to security challenges. The program is designed to accommodate students from a broad spectrum of degree programs within the university who have a desire to apply their majors to the growing security community, whether it be at local, state, and federal governments, or in the private or non-profit sectors.

The minor program, coordinated through the Thomas Harriot College of Arts and Science, requires 24 s.h. credit.

1. Core - 15 s.h.

   SECS 1000. Introduction to Security Studies (3) (F) (FC:SO)
   SECS 4000. Senior Seminar in Security Studies (3) (S) (P: SECS 1000 and consent of the instructor)
   Choose three of the following:
   POLS 3155. National Security Policy (3) (F,S)
   POLS 4382. Politics of Terrorism (3) (F,S)
   EHST 2110. Introduction to Environmental Health Science (3) (F,S)
   PLAN 4015. Emergency Planning Management (3) (F,SS)

2. Electives - 9 s.h.
   Choose 3 of the following. POLS majors may not choose POLS electives. Courses used for the core may not be used for electives. Other appropriate courses may be considered for inclusion as electives change or review by the director.
EHST 2110. Introduction to Environmental Health Science (3) (F,S)
GEOG 3003. Political Geography (3) (WI) (S) (FC:SO)
GEOG 2410. Fundamentals of GIS (3) (F,S)
HIST 3260. U.S. and the Middle East, 1783 to the Present (3)
ICTN 2900, 2901. Fundamental Network Security (3,0) (P: ICTN 2150)
JUST 1000. Criminal Justice Systems (3) (F,S,SS)
ITEC 3800. Cost and Capital Project Analysis (3) (S) (P: MATH 1065; ITEC 2000 or 3000 or MIS 2223)
PLAN 1900. Planning for the Human Environment (3) (F,S,SS)
PLAN 3051. Introduction to GIS in Planning (3) (F,S) (P: GEOG 2410 or consent of Instructor)
PLAN 4015. Emergency Planning Management (3) (F,SS)
POLS 3144. American Foreign Policy (3) (S) (RP: POLS 2020)
POLS 3155. National Security Policy (3) (F,S)
POLS 3290. Conflict and Peace in the Post Cold War Age (3) (S)
POLS 3293. International Organizations (3)
POLS 4380. Topics in International Politics (3) (P: POLS 2020 or Consent of Instructor)
POLS 4382. Politics of Terrorism (3) (S)
POLS 4383. War in the Modern Age (3)

V. College of Technology and Computer Science, Department of Computer Science, Affected Units

http://www.ecu.edu/cs-acad/ugcat/math.cfm

Thomas Harriot College of Arts and Sciences

Department of Mathematics

Johannes H. Hattingh, Chair, 124 Austin Building

BS in Mathematics

Credit toward a mathematics major will not be given in any MATH course with a grade less than C. Minimum degree requirement is 126 s.h. of credit as follows:

1. Foundations curriculum (For information about courses that carry foundations curriculum credit see Liberal Arts Foundations Curriculum.) - 42 s.h.
2. Common mathematics core - 37 s.h.
MATH 2171, 2172, 2173. Calculus I, II, III (4,4,4) (F,S,SS) (FC:MA) (P for 2171: MATH 1083, 1085, 2122 with minimum grade of C; P for 2172: MATH 2171 or 2122 with consent of instructor; P for 2173: MATH 2172)
MATH 2300. Transition to Advanced Mathematics (3) (P: MATH 2171)
MATH 3256. Linear Algebra (3) (F,S,SS) (P: MATH 2172)
MATH 3263. Introduction to Modern Algebra (3) (WI) (F,S) (P: MATH 2300, 3256)
MATH 3307. Mathematical Statistics I (3) (F,S) (P: MATH 2172)
MATH 3308. Mathematical Statistics II (3) (F) (P: MATH 3307)
MATH 4101. Advanced Calculus I (3) (P: MATH 2173, 2300, or consent of instructor)
MATH 4331. Introduction to Ordinary Differential Equations (3) (F,S) (P: MATH 2173)
CSCI 2310, 2311. Algorithmic Problem Solving and Programming Laboratory (4,0) (P: MATH 1065; C for 2310: CSCI 2311; C for 2311: CSCI 2310)

3. Concentration area (Choose one area.) - 13-33 s.h.

Mathematics (27-33 s.h.):
MATH 4110. Elementary Complex Variables (3) (S) (P: MATH 2173)
Minor (24-30 s.h.)
Science (27-28 s.h.)
CHEM 1150, 1151. General Chemistry and Laboratory I (3,1) (F,S,SS) (FC:SC) (P/C: MATH 1065; C for 1150: CHEM 1151; C for 1151: CHEM 1150)
CHEM 1160, 1161. General Chemistry and Laboratory II (3,1) (F,S,SS) (FC:SC) (P: CHEM 1150, 1151; C for 1160, CHEM 1161; C for 1161: CHEM 1160; R/C: MATH 1083 or 1085)
MATH 4110. Elementary Complex Variables (3) (S) (P: MATH 2173)
PHYS 2350, 2360. University Physics (4,4) (F,S,SS) (FC:SC) (P for 2350: MATH 2121, 2151, 2171; P for PHYS 2360: PHYS 2350)
Choose one of the following:
BIOL 1100, 1101. Principles of Biology I (4,0) (F,S,SS) (FC:SC) and BIOL 1200, 1201. Principles of Biology II (4,0) (F,S,SS) (FC:SC)
A combination of any 3 courses numbered above 1999 in Chemistry or numbered above 3999 in Physics.
Statistics (21 s.h.)
ENGL 3880. Writing for Business and Industry (3) (WI) (F,S,SS) (P: ENGL 1200)
MATH 4031. Applied Statistical Analysis (3) (WI) (P: MATH 2228 or 2283 or 3308; MATH 3256 or MATH/CSCI 3584; or equivalent; or consent of instructor)
MATH 4201. Introduction to Stochastic Processes (3) (P: MATH 3307 or equivalent or consent of instructor) or MATH 5000. Introduction to Sampling Design (3) (F) (P: MATH 3308 or 3229 or consent of instructor)
MATH 4774. Programming for Research (3) (P: MATH 2228 or MATH 2283 or equivalent)
MATH 4801. Probability Theory (3) (P: MATH 2173 or 3307)
MATH 4999. Capstone and Statistical Consulting (3) (P: MATH 4031)
PHIL 2274. Business Ethics (3) (F,S,SS) (FC:HU)
Computer Science (13 s.h.)
CSCI/EENG 2410. Digital Electronics (3) (Same as EENG 2410) (P: ENGR 1014 or 1016, and 2050; or CSCI 2310, 2311 or CSCI 3675) Organization of Programming Language (3) (P: CSCI 3200 or 3310) or MATH 4110. Elementary Complex Variables (S) (P: MATH 2173)

CSCI 3300. Introduction to Algorithms and Data Structures (4) (P: CSCI 2300, 2310, 2427)

CSCI 3310. Advanced Data Structures and Data Abstraction (3) (P: CSCI 3300)

CSCI 3650. Analysis of Algorithms (3) (P: CSCI 3200 or 3300; CSCI 2427)

CSCI 3526. Switching Theory and Computer Organization (3) (P: CSCI 2310 or CSCI 2610; CSCI 2427) or CSCI 3675. Organization of Programming Language (3) (P: CSCI 3200 or 3310) or MATH 4110. Elementary Complex Variables (3) (S) (P: MATH 2173)

4. Specified electives

Mathematics (9 s.h.):
Choose 9 additional s.h. in consultation with advisor from MATH 3174, 3233, 3273, 3301, 3573, 4201, 4264, 4801, 5000, 5002, 5021, 5102, 5121, 5122, 5131, 5132, 5311, 5322, or 5551.

Science (3 s.h.)
Choose 3 additional s.h. in consultation with advisor from MATH 3174, 3233, 3273, 3301, 3573, 4201, 4264, 4801, 5000, 5002, 5021, 5102, 5121, 5122, 5131, 5132, 5311, 5322, or 5551.

Statistics (9 s.h.)
Choose 3 additional s.h. from MATH 4201, 5000, 5132; OMGT 4493; ECON 3343, 4430.

Choose 6 additional s.h. from MATH 3174, 3233, 3273, 3301, 3573, 4110, 4264, 5002, 5021, 5102, 5121, 5122, 5131, 5132, 5311, 5322 or 5551.

Computer Science (15 s.h.)
Choose 3 s.h. from MATH 3174, 3233, 3273, 3301, 3573, 4201, 4264, 4801, 5000, 5002, 5021, 5102, 5121, 5122, 5131, 5132, 5311, 5322 or 5551.

Choose 12 s.h. of CSCI electives numbered above 1999, 2310/2311, 2610, 2611, 3300, 3310, 3510, 3584, 3601, 3650.

5. Electives to complete requirements for graduation.