UNIVERSITY FACULTY SENATE FORMS

Academic Program Approval

This form is a routing document for the approval of new and revised academic programs. Proposing department should complete this form. For more information, call the Faculty Senate Office at 831-2921.

Submitted by: William Ritter phone number 302-831-2468

Department: Bioresources Engineering email address writter@udel.edu

Actions: Revise Major and add New Concentration

Effective term 10F
(use format 04F, 05W)

Current degree BS
(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

Proposed change leads to the degree of: BS
(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

Proposed name: Engineering Technology

Revising:
Undergraduate major/Concentrations: Engineering Technology/Natural Resources Engineering Technology

List new courses required for the new or revised curriculum. How do they support the overall program objectives of the major/minor/concentrations)?

Revisions of the ET program include the addition of a seminar series that progresses through all four years and focuses on professional development and documentation of program outcomes through compilation of a required student e-portfolio. The revised program also incorporates a new concentration, *Natural Resources Engineering Technology, in* the *Engineering Technology* program. Few additional courses will be required. The prefix will be changed from EGTE to BREG for all courses to be consistent with the prefix used for our graduate level courses that support the Department's Master of Science in Bioresources Engineering degree program.

New courses required for the revised major include the aforementioned seminar series consisting of one zero-credit course and four 1-credit seminars. Other new courses required for this major are BREG 424, Water Supply and Water Treatment Systems, and BREG 468, Undergraduate Research. Tables 2 through 4 show revised undergraduate catalog listings of program requirements with side-by-side comparisons to existing requirements, where applicable. Tables 5 and 6 list new and revised courses, respectively. A 400-level version of BREG 621, Nonpoint Source Pollution, will be added as shown in Table 7.

Because the existing concentration in Applied Electronics and Controls has never attracted many students, it will be discontinued. Courses associated with the Applied Electronics and Controls concentration along with other courses that are not needed for the revised ET program are listed as courses to be dropped in Table 8. Table 9 shows a suggested course sequence for the major with the option of no concentration specified.

Explain, when appropriate, how this revised curriculum supports the 10 goals of undergraduate education.

The engineering technology program is a TAC-ABET accredited engineering technology program. As such, the following outcomes must be demonstrated for all graduates (ABET, Inc. 2008):

a. an appropriate mastery of the knowledge, techniques, skills, and modern tools of their disciplines
b. an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology
c. an ability to conduct, analyze and interpret experiments, and apply experimental results to improve processes
d. an ability to apply creativity in the design of systems, components, or processes appropriate to program educational objectives
e. an ability to function effectively on teams
f. an ability to identify, analyze and solve technical problems
g. an ability to communicate effectively
h. a recognition of the need for, and an ability to engage in lifelong learning
i. an ability to understand professional, ethical and social responsibilities
j. a respect for diversity and a knowledge of contemporary professional, societal and global issues
k. a commitment to quality, timeliness, and continuous improvement

Inspection of these program outcomes shows a close alignment with the University of Delaware's 10 goals of undergraduate education. Table 1 shows how the TAC-ABET program outcomes map to the University of Delaware's 10 goals of undergraduate education:

Table 1. UD Goals of Undergraduate Education vs. TAC-ABET Program Outcomes

UD Goals of Undergraduate Education		Related TAC-ABET Outcomes
1	Attain effective skills in oral and written communication, quantitative reasoning, and the use of information technology	a, b, c, e, f, g
2	Learn to think critically to solve problems.	a, b, c, e
3	Be able to work and learn both independently and collaboratively.	a, b, c, d, e, h
4	Engage questions of ethics and recognize responsibilities to self, community, and society at large.	h, i, j, k
5	Understand the diverse ways of thinking that underlie the search for knowledge in the arts, humanities, sciences and social sciences.	h, i, j
6	Develop the intellectual curiosity, confidence, and engagement that will lead to lifelong learning.	h
7	Develop the ability to integrate academic knowledge with experiences that extend the boundaries of the classroom.	h, i, j
8	Expand understanding and appreciation of human creativity and diverse forms of aesthetic and intellectual expression.	h, i, j
9	Understand the foundations of United States society including the significance of its cultural diversity.	i, j
10	Develop an international perspective in order to live and work effectively in an increasingly global society.	i, j

In addition, other aspects of the program will address several of the UD goals. For example, goal 7 is fulfilled by the university's Discovery Learning Experience, which in this program must be satisfied by either a technical practicum in industry or an undergraduate research effort. The university multicultural course requirement potentially addresses several of the UD goals: 5, 8, 9 and 10. This revised program, as does the current one, requires two courses in economics, ECON 151 Microeconomics and ECON 152 Macroeconomics that are related to goal 9.

Identify other units affected by the proposed changes:
The proposed new concentration should have minimal impact on other programs. This concentration will not be in conflict with any engineering majors because engineering technology draws from a different pool of students then engineering. The program will continue to fill a need at the university. We intend that this program will remain attractive to Delaware Technical & Community College transfer students; articulation agreements currently in place will be unaffected and can be expanded. By making courses available, on a rotating basis, during late afternoon and evening hours, the program has attracted and will continue to attract part time non-traditional students who may be employed full time.

Describe the rationale for the proposed program change(s):

The current engineering technology program has a concentration in construction technology and technical management in which the great majority of current students is either enrolled or taking courses. It is anticipated that with a concentration in natural resources engineering technology more students would be attracted to the engineering technology major. Courses for the natural resources engineering technology concentration can be supported by the expertise of the current faculty and with upcoming retirements and the necessity of new faculty hires supporting the research mission of the College of Agriculture and Natural Resources, it is likely we will be able to recruit new faculty who can continue to support the new concentration.

The new concentration is designed to be flexible and to allow students to complete a minor in civil engineering or environmental engineering. This adaptability to student interests directly addresses the action step calling for a more flexible curriculum in the university's Path to Prominence Strategic Milestone I, subsection: Enhance Curriculum Flexibility, Intellectual Exploration, and Discovery Learning. The availability of the natural resources engineering technology concentration is consistent with the university's objective of becoming a green university in the Pathway to Prominence, Strategic Milestones, Part IV: The Initiative for the Planet (University of Delaware, Strategic Planning Committee 2008).

The new seminar series is designed to improve the professional development of our students and to assist with documentation of program outcomes. Students will be required to develop e-portfolios through which they will demonstrate their competencies by providing a compendium of artifacts linked to reflective commentary. The e-portfolios will be used as evidence for TAC of ABET accreditation purposes. In addition, we are using the revision as an opportunity to improve the mathematical skills of the students in the program. The current engineering technology program has MATH 241/242 as the preferred calculus option, but allows students to choose MATH 221/222 with the permission of their advisors. In the revised program, students will be required to take MATH 241, but will have the option of taking either MATH 242 or MATH 222 with advisor approval. This revision, although slight, will provide students with a better mathematical background and will allow students to take higher level courses in physics or the College of Engineering and improve opportunities for graduate school.

References Cited:
ABET, Inc. *CRITERIA FOR ACCREDITING ENGINEERING TECHNOLOGY PROGRAMS.* 2008. http://www.abet.org/forms.shtml (accessed October 21, 2009).
University of Delaware, Strategic Planning Committee. *Path to Prominence, Strategic Plan for the University of Delaware.* Newark, DE: University of Delaware, 2008.

Table 2. Undergraduate Catalog Listing of Program Requirements for BS in Engineering Technology, No Concentration. Comparison with current ET major, no concentration.

Current Program	Revised Program
DEGREE: BACHELOR OF SCIENCE **MAJOR: ENGINEERING TECHNOLOGY** CURRICULUM CREDITS **UNIVERSITY REQUIREMENTS** ENGL 110 Critical Reading and Writing . . . . . 3 First Year Experience (see page 68). . . . . 0-4 Discovery Learning Experience (see page 68) . . . . . 3 Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 69-71). . . . . 3 **MAJOR REQUIREMENTS** BREG 165 Freshman Seminar . . . . . 0 **Communications** A second writing course selected from: . . . . . 3 ENGL 301 Expository Writing ENGL 302 Advanced Composition ENGL 307 News Writing and Editing ENGL 312 Written Communications in Business ENGL 410 Technical Writing An oral communications course selected from: . . . . . 3 AGRI 212 Oral Communications in Agriculture and Natural Resources COMM 212 Oral Communication in Business COMM 255 Fundamentals of Communication COMM 350 Public Speaking **Social Sciences and Humanities** ECON 151 Introduction to Microeconomics. . . . . 3 ECON 152 Introduction to Macroeconomics . . . . . 3 Six additional credits to be selected from . . . . . 6 Anthropology, Art, Art History, Black American Studies, Criminal Justice, Economics, Education, English, Foreign Language, Geography, History, Music, Philosophy, Political Science, Psychology, Sociology, Theatre, Women's Studies, or courses cross-listed in these departments. **Basic Sciences and Mathematics** Biology/Life Science course . . . . . 3 or 4 CHEM 103/104 General Chemistry . . . . . 8 PHYS 201/202 Introductory Physics I and II or PHYS 207/208 Fundamentals of Physics I and II (recommended). . . . . 8 MATH 117 Precalculus for Scientists and Engineers . . . . . 4 MATH 221/222 Calculus I and II (with permission of advisor) or MATH 241/242 Calculus A and B . . . . . 6 or 8 Additional MATH course to bring total MATH credits at 201 level and above to 12 credits. . . . . 4 or 6 **Technical Skills** BREG 115 Introduction to Computer Based Problem Solving. . . . . 4 BREG 209 Technical and Computer Aided Drafting. . . . . 3 Technical Skills elective . . . . . 3 **Technical Sciences** BREG 215 Applied Fluid Mechanics . . . . . 4 BREG 231 Fundamentals of Statics and Strength of Materials . . . . . 4 BREG 244 Electricity for Engineering Technology . . . . . 4 BREG 311 Fundamentals of Thermodynamics . . . . . 3 **Technical Specialization** 25 to 31 credits of BREG or engineering courses at the 300 or 400 level from a departmental approved list, including a 3 credit capstone experience selected from BREG 450, BREG 451, BREG 466 or UNIV 401/402. At least 15 credits must be BREG courses. A minor in a technical or business subject area is strongly encouraged. With a minor, the requirements for a technical specialization are a minimum of 25 credits . . . . . 31 to 25 **Technical Support** 9 to 15 credits of course work selected to support the student's career objectives. Subject to approval of the faculty. . . . . 9 to 15 **CREDITS TO TOTAL A MINIMUM OF . . . . . 124** Students must earn at least a C- in all prerequisite courses to qualify for admission to the next course. Enrollment in BREG 300 and 400 level courses is limited to majors with Junior or Senior standing, or by permission of the instructor. To graduate with a major in engineering technology, a student must attain at least a 2.0 average in ETGE courses. This requirement is in addition to the University requirement of an overall 2.0 grade point average. A student must complete a minimum of 48 semester hours in technical sciences, technical skills and technical specialization.	**DEGREE: BACHELOR OF SCIENCE** **MAJOR: ENGINEERING TECHNOLOGY** CURRICULUM CREDITS **UNIVERSITY REQUIREMENTS** ENGL 110 Critical Reading and Writing . . . . . 3 First Year Experience credits counted under Professional Development. . . . (1) Discovery Learning Experience credits counted under Tech. Spec. . . . . (3) Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content. Credits counted under Social Science and Humanities. . . . . (3) **MAJOR REQUIREMENTS** **Professional Development** BREG 165 Engineering Technology Freshman Seminar I . . . . . 0 BREG 175 Engineering Technology Freshman Seminar II. . . . . 1 BREG 265 Engineering Technology Sophomore Seminar . . . . . 1 BREG 365 Engineering Technology Junior Seminar . . . . . 1 BREG 465 Engineering Technology Senior Seminar & Capstone Experience .1 **Communications** A second writing course selected from: . . . . . 3 ENGL 301 Expository Writing ENGL 302 Advanced Composition ENGL 307 News Writing and Editing ENGL 312 Written Communications in Business ENGL 410 Technical Writing An oral communications course selected from: . . . . . 3 COMM 212 Oral Communication in Business COMM 350 Public Speaking **Social Sciences and Humanities** ECON 151 Introduction to Microeconomics. . . . . 3 ECON 152 Introduction to Macroeconomics . . . . . 3 Six additional credits to be selected from . . . . . 6 Anthropology, Art, Art History, Black American Studies, Criminal Justice, Economics, Education, English, Foreign Language, Geography, History, Music, Philosophy, Political Science, Psychology, Sociology, Theatre, Women's Studies, or courses cross-listed in these departments. Include multicultural course. **Basic Sciences and Mathematics** Biology/Life Science course . . . . . 3 or 4 CHEM 103 General Chemistry. . . . . 4 PHYS 207/208 Fundamentals of Physics I and II (recommended) or PHYS 201/202 Introductory Physics I and II . . . . . 8 MATH 117 Precalculus for Scientists and Engineers. . . . . 4 MATH 241 Calculus A . . . . . 4 MATH 242 Calculus B . . . . . 4 or MATH 222 Calculus II (with permission of advisor) . . . . . 3 Additional MATH course to bring total MATH credits at 201 level and above to 12 credits . . . . . .4 or 5 **Technical Skills** BREG 209 Technical and Computer Aided Drafting. . . . . 3 CISC 106 General Computer Science for Engineers. . . . . 3 Technical Skills electives. . . . . 6 **Technical Sciences** BREG 215 Fluid Mechanics. . . . . 4 BREG 231 Fundamentals of Statics and Strength of Materials . . . . . 4 BREG 232 Dynamics. . . . . 3 BREG 244 Electricity for Engineering Technology. . . . . .4 BREG 311 Thermodynamics . . . . . 3 **Technical Specialization** BREG 450 Technical Practicum in Industry or BREG 468 Undergraduate Research . . . (DLE) . . . . . .3 Technical Specialization Electives - 24 to 30 credits of BREG or engineering courses at the 300-level or above from a department approved list. May include maximum of one course from BREG 306, 416, 417, and 420. A maximum of 6 credits from BREG 450 and BREG 468 may be counted in technical specialization. With a science, technical, or business minor or an ET Associate's degree, the requirements for Technical Specialization electives are reduced from 30 credits to a minimum of 24 . . . . . .30 to 24 **Technical Support** 9 to 15 credits of course work selected to support the student's career objectives. Increase to 15 credits if Technical Specialization elective credits are reduced to 24 by virtue of a science, technical, or business minor or an ET Associate's degree. Subject to approval of the faculty. . . . . 9 to 15 **CREDITS TO TOTAL A MINIMUM OF . . . . . 128** Students must earn at least a C- in all prerequisite courses to qualify for admission to the next course. Enrollment in BREG 300 and 400 level courses is limited to majors with Junior or Senior standing, or by permission of the instructor. To graduate with a major in engineering technology, a student must attain at least a 2.0 average in BREG courses. This requirement is in addition to the University requirement of an overall 2.0 grade point average.

Table 3. Undergraduate Catalog Listing of Program Requirements for BS in Engineering Technology, Construction Technology and Technical Management Concentration. Comparison with current ET major.

Current Program	Revised Program
DEGREE: BACHELOR OF SCIENCE **MAJOR: ENGINEERING TECHNOLOGY** **CONCENTRATION: CONSTRUCTION TECHNOLOGY AND TECHNICAL MANAGEMENT** CURRICULUM CREDITS **UNIVERSITY REQUIREMENTS** ENGL 110 Critical Reading and Writing . . . . . 3 First Year Experience . . . . . 0-4 Discovery Learning Experience . . . . . 3 Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 69-71). . . . . .3 **MAJOR REQUIREMENTS** BREG 165 Freshman Seminar . . . . . 0 **Communications** A second writing course selected from: . . . . . 3 ENGL 301 Expository Writing ENGL 302 Advanced Composition ENGL 307 News Writing and Editing ENGL 312 Written Communications in Business ENGL 410 Technical Writing An oral communications course selected from: . . . . . 3 AGRI 212 Oral Communications in Agriculture and Natural Resources COMM 212 Oral Communication in Business COMM 255 Fundamentals of Communication COMM 350 Public Speaking **Social Sciences and Humanities** ECON 151 Introduction to Microeconomics. . . . . 3 ECON 152 Introduction to Macroeconomics . . . . . 3 Six additional credits to be selected from . . . . . 6 Anthropology, Art, Art History, Black American Studies, Criminal Justice, Economics, Education, English, Foreign Language, Geography, History, Music, Philosophy, Political Science, Psychology, Sociology, Theatre, Women's Studies, or courses cross-listed in these departments. **Basic Sciences and Mathematics** Biology/Life Science course . . . . . 3 or 4 CHEM 103/104 General Chemistry . . . . . 8 PHYS 201/202 Introductory Physics I and II or PHYS 207/208 Fundamentals of Physics I and II (recommended). . . . . 8 MATH 117 Precalculus for Scientists and Engineers . . . . . 4 MATH 221/222 Calculus I and II (with permission of advisor) or MATH 241/242 Calculus A and B . . . . . 6 or 8 Additional MATH course to bring total MATH credits at 201 level and above to 12 credits. . . . . 4 or 6 **Technical Skills** BREG 113 Introduction to Surveying . . . . . 2 BREG 115 Introduction to Computer Based Problem Solving. . . 4 BREG 209 Technical and Computer Aided Drafting. . . . . 3 BREG 223 Surveying . . . . . 3 **Technical Sciences** BREG 215 Applied Fluid Mechanics . . . . . 4 BREG 231 Fundamentals of Statics and Strength of Materials . 4 BREG 244 Electricity for Engineering Technology. . . . . 4 BREG 311 Fundamentals of Thermodynamics . . . . . .3 **Technical Specialization** BREG 312 Fundamentals of Soil Mechanics . . . . . 3 BREG 321 Storm Water Management. . . . . 4 BREG 416 Project Economic Analysis. . . . . .3 BREG 417 Project Management. . . . . .3 BREG 454 Wood and Steel Structures. . . . . .3 BREG 455 Concrete and Masonry Structures. . . . . .3 Approved Technical Specialization electives. . . . . .12 Technical Specialization electives will include a 3 credit capstone experience selected from BREG 450, BREG 451, BREG 466 or UNIV 401/UNIV 402. **Technical Support** ACCT 207 or FREC 201 . . . . . 3 5 credits of course work selected to support the student's career objectives. Subject to approval of the faculty. . . . . 5 **CREDITS TO TOTAL A MINIMUM OF . . . . . 124** Students must earn at least a C- in all prerequisite courses to qualify for admission to the next course. Enrollment in BREG 300 and 400 level courses is limited to majors with Junior or Senior standing, or by permission of the instructor. To graduate with a major in engineering technology, a student must attain at least a 2.0 average in ETGE courses. This requirement is in addition to the University requirement of an overall 2.0 grade point average. A student must complete a minimum of 48 semester hours in technical sciences, technical skills and technical specialization.	**DEGREE: BACHELOR OF SCIENCE** **MAJOR: ENGINEERING TECHNOLOGY** **CONCENTRATION: CONSTRUCTION TECHNOLOGY AND TECHNICAL MANAGEMENT (CTTM)** CURRICULUM CREDITS **UNIVERSITY REQUIREMENTS** ENGL 110 Critical Reading and Writing . . . . . 3 First Year Experience credits counted under Professional Development. . . . . .(1) Discovery Learning Experience credits counted under Tech. Spec. . . . . .(3) Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content. Credits counted under Social Science and Humanities. . . .(3) **MAJOR REQUIREMENTS** **Professional Development** BREG 165 Engineering Technology Freshman Seminar I . . . . . .0 BREG 175 Engineering Technology Freshman Seminar II. . . . . .1 BREG 265 Engineering Technology Sophomore Seminar . . . . . .1 BREG 365 Engineering Technology Junior Seminar . . . . . .1 BREG 465 Engineering Technology Senior Seminar & Capstone Experience . . . . . 1 **Communications** A second writing course selected from: . . . . . 3 ENGL 301 Expository Writing ENGL 302 Advanced Composition ENGL 307 News Writing and Editing ENGL 312 Written Communications in Business ENGL 410 Technical Writing An oral communications course selected from: . . . . . 3 COMM 212 Oral Communication in Business COMM 350 Public Speaking **Social Sciences and Humanities** ECON 151 Introduction to Microeconomics. . . . . 3 ECON 152 Introduction to Macroeconomics . . . . . 3 Six additional credits to be selected from . . . . . 6 Anthropology, Art, Art History, Black American Studies, Criminal Justice, Economics, Education, English, Foreign Language, Geography, History, Music, Philosophy, Political Science, Psychology, Sociology, Theatre, Women's Studies, or courses cross-listed in these departments. **Basic Sciences and Mathematics** Biology/Life Science course . . . . . 3 or 4 CHEM 103 General Chemistry. . . . . 4 PHYS 207/208 Fundamentals of Physics I and II (recommended) or PHYS 201/202 Introductory Physics I and II . . . . . 8 MATH 117 Precalculus for Scientists and Engineers. . . . . 4 MATH 241 Calculus A . . . . . 4 MATH 242 Calculus B . . . . . 4 or MATH 222 Calculus II (with permission of advisor) . . . . . 3 Additional MATH course to bring total MATH credits at 201 level and above to 12 credits . . . . . .4 or 5 **Technical Skills** BREG 113 Introduction to Surveying. . . . . 3 BREG 209 Technical and Computer Aided Drafting. . . . . 3 BREG 223 Surveying. . . . . .3 CISC 106 General Computer Science for Engineers. . . . . 3 **Technical Sciences** BREG 215 Fluid Mechanics. . . . . 4 BREG 231 Fundamentals of Statics and Strength of Materials . . . . . 4 BREG 232 Dynamics. . . . . 3 BREG 244 Electricity for Engineering Technology. . . . . .4 BREG 311 Thermodynamics . . . . . 3 **Technical Specialization** BREG 312 Fundamentals of Soil Mechanics . . . . . 3 BREG 321 Storm Water Management. . . . . 4 BREG 416 Project Economic Analysis. . . . . .3 BREG 454 Wood and Steel Structures. . . . . .3 BREG 455 Concrete and Masonry Structures. . . . . .3 BREG 450 Technical Practicum in Industry or BREG 468 Undergraduate Research . . . (DLE) . . . . . .3 Technical Specialization Electives - 8 to 14 credits of BREG or engineering courses at the 300-level or above from a department approved list. May include maximum of one course from BREG 306, 416, 417, and 420. A maximum of 6 credits from BREG 450 and BREG/UNIV 468 may be counted in Technical Specialization. With a science, technical, or business minor or an ET Associate's degree, the requirements for technical specialization electives are reduced from 14 credits to a minimum of 8 . . . . . .14 to 8 **Technical Support** BREG 306 Cost Estimating. . . . . .3 BREG 417 Project Management. . . . . .3 Technical Support Electives – 3 to 9 credits selected to support the student's career interest. Requirement is 9 credits if Technical Specialization elective credits are reduced to 8 by virtue of a science, technical, or business minor or an ET Associate's degree. Subject to approval of the faculty. . . . . 9 to 3 **CREDITS TO TOTAL A MINIMUM OF . . . . . 128** Students must earn at least a C- in all prerequisite courses to qualify for admission to the next course. Enrollment in BREG 300 and 400 level courses is limited to majors with Junior or Senior standing, or by permission of the instructor. To graduate with a major in engineering technology, a student must attain at least a 2.0 average in BREG courses. This requirement is in addition to the University requirement of an overall 2.0 grade point average.

Table 4. Undergraduate Catalog Listing of Program Requirements for BS in Engineering Technology, Natural Resources Engineering Technology Concentration.

DEGREE: BACHELOR OF SCIENCE
MAJOR: ENGINEERING TECHNOLOGY
CONCENTRATION: NATURAL RESOURES ENGINEERING TECHNOLOGY (NRET)
CURRICULUM CREDITS
UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing 3
First Year Experience credits counted under Professional Development. . . . .(1)
Discovery Learning Experience credits counted under Tech. Spec. . . . . .(3)
Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content. Credits counted under Social Science and Humanities. . . . . .(3)
MAJOR REQUIREMENTS
Professional Development
BREG 165 Engineering Technology Freshman Seminar I 0
BREG 175 Engineering Technology Freshman Seminar II. 1
BREG 265 Engineering Technology Sophomore Seminar 1
BREG 365 Engineering Technology Junior Seminar 1
BREG 465 Engineering Technology Senior Seminar & Capstone Experience .1
Communications
A second writing course selected from: 3
ENGL 301 Expository Writing
ENGL 302 Advanced Composition
ENGL 307 News Writing and Editing
ENGL 312 Written Communications in Business
ENGL 410 Technical Writing
An oral communications course selected from: 3
COMM 212 Oral Communication in Business
COMM 350 Public Speaking
Social Sciences and Humanities
ECON 151 Introduction to Microeconomics. 3
ECON 152 Introduction to Macroeconomics 3
Six additional credits to be selected from 6
Anthropology, Art, Art History, Black American Studies, Criminal Justice, Economics, Education, English, Foreign Language, Geography, History, Music, Philosophy, Political Science, Psychology, Sociology, Theatre, Women's Studies, or courses cross-listed in these departments.
Basic Sciences and Mathematics
Biology/Life Science course . . . . . 3 or 4
CHEM 103 General Chemistry. 4
PHYS 207/208 Fundamentals of Physics I and II (recommended)
or
PHYS 201/202 Introductory Physics I and II 8
MATH 117 Precalculus for Scientists and Engineers. 4
MATH 241 Calculus A 4
MATH 242 Calculus B 4
or
MATH 222 Calculus II (with permission of advisor) 3
Additional MATH course to bring total MATH credits
at 201 level and above to 12 credits . . . . . .4 or 5
Technical Skills
BREG 113 Introduction to Surveying. 3
BREG 209 Technical and Computer Aided Drafting. 3
BREG 223 Surveying. 3
CISC 106 General Computer Science for Engineers. 3
Technical Sciences
BREG 215 Fluid Mechanics. 4
BREG 231 Fundamentals of Statics and Strength of Materials 4
BREG 232 Dynamics. 3
BREG 244 Electricity for Engineering Technology. 4
BREG 311 Thermodynamics 3
Technical Specialization
BREG 321 Storm Water Management. 4
BREG 328 Wastewater Treatment Systems. 3
BREG 421 Nonpoint Source Pollution. 3
BREG 423 Advanced Stormwater Management 3
BREG 424 Water Supply and Water Treatment Systems 3
BREG 450 Technical Practicum in Industry
or
BREG 468 Undergraduate Research . . . (DLE) 3
Technical Specialization Electives - 8 to 14 credits of BREG or engineering courses at the 300-level or above from a department approved list. May include maximum of one course from BREG 306, 416, 417, and 420. A maximum of 6 credits from BREG 450 and BREG/UNIV 468 may be counted in technical specialization. With a science, technical, or business minor or an ET Associate's degree, the requirements for Technical Specialization electives are reduced from 14 credits to a minimum of 8 . . . . . .14 to 8
Technical Support
Technical Support Electives – 9 to 15 credits selected to support the student's career interest. Requirement is 9 credits if Technical Specialization elective credits are reduced to 8 by virtue of a science, technical, or business minor or an ET Associate's degree. Subject to approval of the faculty. . . . . 15 to 9
CREDITS TO TOTAL A MINIMUM OF 128
Students must earn at least a C- in all prerequisite courses to qualify for admission to the next course. Enrollment in BREG 300 and 400 level courses is limited to majors with Junior or Senior standing, or by permission of the instructor. To graduate with a major in engineering technology, a student must attain at least a 2.0 average in BREG courses. This requirement is in addition to the University requirement of an overall 2.0 grade point average.

Table 5. New Courses for Revised ET Program

New Courses and Catalog Descriptions	Credits
BREG 175 Engineering Technology Freshman Seminar II Continuation of BREG 165. ePortfolio and resume development, orientation to the ET major. RESTRICTIONS: Freshman status	1
BREG 232 Dynamics Intermediate-level development of kinematics and dynamics of particle systems and rigid bodies. Solution of engineering problems by force, momentum and energy methods with applications to mechanisms, machines, vehicles and single degree-of- freedom vibration Computer-based solutions. PREREQ: BREG 231, MATH 222 or 242	3
BREG 265 Engineering Technology Sophomore Seminar Accreditation, ePortfolio development, resume updates, entrepreneurship, ethics, and professional practice issues. RESTRICTIONS: Sophomore status	1
BREG 365 Engineering Technology Junior Seminar Accreditation, ePortfolio development, professional certifications and licensure, leadership and ethics, case studies, entrepreneurship, resume updates, preparation for internship experience. RESTRICTIONS: Junior status	1
BREG 424/ 624 Water Supply and Water Treatment Systems Water supply sources, hydraulics of water distribution systems, water softening, sedimentation, chemical precipitation, filtration, and disinfection PREREQ: BREG 215, CHEM 103	3
BREG 465 Engineering Technology Senior Seminar and Capstone Experience Accreditation, professional practice issues, leadership and ethics, ePortfolio submittal for evaluation, report writing, oral presentations. RESTRICTIONS: Senior status	1
BREG 468 Undergraduate Research Undergraduate research conducted on or off campus, out of class, and under the supervision of a BREG faculty member. RESTRICTIONS: Requires permission of instructor.	0-6

Table 6. Revised Courses for Revised ET Program

Current Course	Revised Course
EGTE 165 Freshman Seminar 0 Focuses on academic services, career exploration and preparation, campus resources, and practical skills helpful in mastering the freshman year. RESTRICTIONS: Limited to freshmen in College of Agriculture and Natural Resources.	BREG 165Freshman Seminar I 0 Focuses on academic services, career exploration and preparation, campus resources, and practical skills helpful in mastering freshman year. Orientation to the ET major. Accreditation issues and introduction to ePortfolios. RESTRICTIONS: Freshman status
EGTE 450 TECHNICAL PRACTICUM IN INDUSTRY 1-3 Structured experience in industry. Minimum of 40 hours of technical activities per credit hour. Upon completion, students present results to department faculty and industrial sponsor through written reports and oral presentations. Proposals approved in advance by the department faculty, and a designated faculty advisor is required. RESTRICTIONS: Junior standing. May be repeated twice for credit.	BREG 450 TECHNICAL PRACTICUM IN INDUSTRY 1-3 Structured experience in industry. Minimum of 40 hours of technical activities per credit hour. Upon completion, students present results to department faculty and industrial sponsor through written reports and oral presentations. Proposals must be approved in advance by the department faculty, and a designated faculty advisor is required. RESTRICTIONS: Junior standing. May be repeated for a maximum of 6 credits total.

Table 7. Existing graduate courses adding an undergraduate 400-level course listing.

BREG 421/621 Nonpoint Source Pollution

Table 8. Courses to Be Dropped

BREG 245 Analog Electronics
BREG 418 Manufacturing
BREG 435 Machine Design
BREG 440 Plant Layout and Materials Handling
BREG 451 Senior Design

Table 9. Suggested Course Sequence for Revised ET Major, No Concentration

Fall 1	class	credits		Spring 1	class	credits
	CISC 106 General Computer Science for Engineers	3			Technical Skills Elective	3
	CHEM 103 - General Chemistry I	4			BISC 103	3
	MATH 117 Precalculus for Scientists and Engineers	4			BREG 209 - Technical and Computer Aided Drafting	3
	Multicultural Elective	3			ENGL 110 - Critical Reading & Writing	3
	BREG 165 ET Freshman Seminar I	0			MATH 241 - Calculus A	4
					BREG 175 ET Freshman Seminar II	1
	semester total =	14			semester total =	17
Fall 2	class	credits		Spring 2	class	credits
	MATH 242 - Calculus B	4			MATH 243 - Calculus C	4
	PHYS 207 - Physics I	4			PHYS 208 - Physics II	4
	Technical Skills Elective	3			BREG 215 - Applied Fluid Mechanics	4
	BREG 231 - Fund. of Statics & Str. Mat.	4			BREG 232 - Dynamics	3
					BREG 265 ET Sophomore Seminar	1
	semester total =	15			semester total =	16
Fall 3	class	credits		Spring 3	class	credits
	BREG 244 - Electricity for ET	4			Technical Support Elective	3
	BREG 311 - Fundamentals of Thermo.	3			Oral Communications Course	3
	ECON 151 - Intro to Micro Economics	3			Technical Specialization Electives	7
	Technical Specialization Elective	3			BREG 365 ET Junior Seminar	1
	Written Communication Course	3			ECON 152 Intro to Macro Economics	3
	semester total =	16			semester total =	17
Fall 4	class	credits		Spring 4	class	credits
	Social Sciences and Humanities Elective	3			Technical Specialization Electives	12
	Technical Specialization Electives	8			Technical Support Elective	3
	BREG 450 or 468	3			BREG 465 Senior Seminar & Capstone Experience	1
	Technical Support Elective	3				
	semester total =	17			semester total =	16
	Total Credit Hours =	128				

ROUTING AND AUTHORIZATION: (Please do not remove supporting documentation.)

Department Chairperson _____ Date 11/16/09

Dean of College Robin W. Morgan Date 11/16/2009

Chairperson, College Curriculum Committee David Frey Date 11/16/09

Chairperson, Senate Com. on UG or GR Studies _____ Date _____

Chairperson, Senate Coordinating Com. _____ Date _____

Secretary, Faculty Senate _____ Date _____

Date of Senate Resolution _____ Date to be Effective _____

Registrar _____ Program Code _____ Date _____

Vice Provost for Academic Affairs & International Programs _____ Date _____

Provost _____ Date _____

Board of Trustee Notification _____ Date _____

Revised 10/23/2007 /khs

Scarborough, James

From: David Saunders [saunders@UDel.Edu]
Sent: Monday, November 02, 2009 12:37 PM
To: writter@UDel.Edu
Subject: Re: Fwd: Revision Of Engineering Technology

Hi, Bill,

This looks like a good idea (to have CISC106 in the Engineering Technology Major). I have a question and a remark.

1. Are you guestimating 15 majors overall (per class), or 15 in addition to those already taking CISC 106 as freshmen?

2. If possible, we would like to see additional CISC 106 students take the course in spring, because the fall demand of the Engineering common first semester strains our resources for staffing the course and the computer labs.

Best,

-dave

B. David Saunders, Professor and Chair
Department of Computer and Information Sciences University of Delaware
302-831-6238

William Ritter wrote:
> Dr Saunders
> I was wondering if you got my earlier e-mail.
> Bill Ritter
> William F. Ritter
> Bioresources Engineering Department
> University of Delaware
> Newark, DE. 19716
> TEL:302-831-2468
> FAX:302-831-2469
> E-Mail:writter@udel.edu
>
>
> ---
> --
>
> Subject:
> Revision Of Engineering Technology
> From:
> William Ritter <writter@udel.edu>
> Date:
> Mon, 26 Oct 2009 11:26:56 -0400 (EDT)
> To:
> saunders@cis.udel.edu
>
> To:
> saunders@cis.udel.edu

> CC:
> jns@udel.edu
>
>
> Dr Saunders
> We are in the process of revising our Engineering Technology major.We would like to add CISC 106 General Computer Science for Engineers as a required course under Technical Skills for the major.It would involve approximately 15 students a year counting freshmen and transfer students (who have not had CISC 106)in our program.We get some student transfers from Engineering,but they will already have taken CISC 106 by the time they enter the ET major. Attached is the complete proposal for the major revisions.
> Bill Ritter
> William F. Ritter
> Bioresources Engineering Department
> University of Delaware
> Newark, DE. 19716
> TEL:302-831-2468
> FAX:302-831-2469
> E-Mail:writter@udel.edu

Revision of Minor in Engineering Technology

Revision of Minor in Engineering Technology

Old Minor	Revised Minor
MINOR IN ENGINEERING TECHNOLOGY A minor in engineering technology may be earned by a student in any University bachelor degree program through successful completion of a minimum of 20 credits in engineering technology courses in accordance with the requirements listed here. Before taking each engineering technology course, the student must satisfy required prerequisites for the course. A grade point average of at least 2.0 is required in the 20 credits of engineering technology courses for the minor. The required engineering technology courses are: EGTE 115 Introduction to Computer Based Problem Solving . . . . . .4 One course from the following list: EGTE 215 Applied Fluid Mechanics .. . . . . 4 EGTE 231 Fundamentals of Statics and Strength of Materials . .. . 4 EGTE 244 Electricity for Engineering Technology . . . . . 4 Furthermore, additional courses must be completed so that EGTE credits total 20, of which at least 6 credits must be at the 300-level or above. All engineering technology courses shall be selected with the approval of an advisor in the Department of Bioresources Engineering to meet each student's objectives. For students interested in environmental issues, courses could include: EGTE 103, 113, 215, and 328; for those interested in electronics: EGTE 244, 245, 443, 444, and 449. For students interested in construction technology, courses could include: EGTE 113, 223, 312, 416, 454, 455 and 456. Courses can also be chosen to give the student's minor an emphasis in other areas such as manufacturing or management.	**MINOR IN ENGINEERING TECHNOLOGY** A minor in engineering technology may be earned by a student in any University bachelor degree program through successful completion of a minimum of 20 credits in BREG courses in accordance with the requirements listed here. Before taking each BREG course, the student must satisfy required prerequisites for the course. A grade point average of at least 2.0 is required in the 20 credits of BREG courses for the minor. The required BREG courses are: BREG 209 Technical and Computer Aided Drafting . . . . . .3 One course from the following list: BREG 215 Applied Fluid Mechanics . . . . . 4 BREG 231 Fundamentals of Statics and Strength of Materials. . . . . 4 EGTE 244 Electricity for Engineering Technology. . . . . 4 Furthermore, additional courses must be completed so that BREG credits total 20, of which at least 6 credits must be at the 300-level or above. All BREG courses shall be selected with the approval of an advisor in the Department of Bioresources Engineering to meet each student's objectives. For students interested in natural resources and environmental issues, courses could include: BREG 103, 113, 215, 223, 321, 328, 421, and 423; for those interested in electronics: BREG 244, 443, 444, and 449. For students interested in construction technology and project management, courses could include: BREG 113, 223, 215, 231, 312, 321, 416, 417, 420, 454, 455, and 456.