University Curriculum Committee (UCC)
Meeting Minutes
Thursday February 18, 2016
2:00 pm
Greenville Center 1511

Regular Members Present:
Michael Dingfelder
Gail Ratcliff
Jean-Luc Scemama
David Batts
Mark Johnson
Mark Richardson
Karen Vail-Smith
Lori Flint, Chair

Regular Members Excused:

Ex-Officio Members Present:
Josie Bowman
Rita Reaves
Patrick Rider
Christine Zoller

Ex-Officio Members Excused:
Chase Crawford, SGA representative
Nancy Winterbauer

IPAR Office of Academic Program Planning and Development (OAPPD):
Karen Traynor
Patricia Gregory

Office of the Registrar:
Diane Coltraine

I. Call to Order

II. College of Nursing (Continued from the February 11, 2016 meeting)
(Josie Bowman, Susan Kidd, Annette Peery)

1. Revision of Existing Degree: Second Degree Accelerated BSN option
2. Proposal of New Courses: NURS 3610, 3611, 3612, 3613, 3614, 4610, 4613, 4614, 4940, 4941, 4942, 4943
3. Deletion of Existing Courses: NURS 3910, 3911, 3920, 3921, 4910, 4920, 4921, 4930
Discussion: General discussion and edits suggested related to proposals and catalog pages.

Action: Approved as amended.

III. College of Engineering and Technology  
Department of Technology Systems  
(leslie Pagliari and David Batts)

1. Proposal of New Courses: IDIS 3840, IDIS 4600  
2. Revision of Existing Courses: Prerequisites: IDIS 3796, 3815, 3835, 3850, 3851, 4785, 4790, Prerequisites, title, and course description.: IDIS 4800, 4802  
3. Deletion of Existing Courses: IDIS 3820, IDIS 4502  
4. Revision of an Existing Degree: Industrial Distribution and Logistics, BS  
   ○ Reduce the number of free electives from 15 s.h. to 12 s.h.  
   ○ Catalog editorial changes  
5. Revision of Existing Concentrations: Industrial Technology, BS (IDIS)  
   ○ #4 catalog editorial change “Choose one concentration from below:”  

Distribution and Logistics Concentration  
○ Catalog editorial change add “Choose 24 s.h. of advisor approved IDIS courses from below:”  
○ Add: IDIS 3790, 3795, 3796, 3840, 3850, 3851, 4600, 4802  
○ Delete: IDIS 3820

Discussion: Memo reviewed with some editorial suggestions made related to clarity. Suggested edits to course proposals and catalog pages.

Action: Approved as amended.

IV. College of Engineering and Technology  
Department of Engineering  
(leslie Pagliari, Ricky Castle, and William Howard)

1. Proposal of New Courses: BIOE 3013, EENG 3013 ENGR 3034, MENG 3073, 4013, 4153, 4263  
2. Revision of Existing Courses: Prerequisites: BIME 4040, BIOE 3250, 4006, ENGR 4010  
3. Renumber of Existing Courses EENG 3020 to EENG 3023  
4. Deletion of Existing Courses: ENGR 3012, MENG 3070, 4018, 4150, 4260, BIOE 3016  
5. Revision of Existing Degree: BS in Engineering  
   ○ Foundations  
   ○ Cognates  
   ○ Concentrations  

Discussion: Overview given for justification of change related to the curriculum. Suggested edits for memo. Each proposal reviewed and general suggestions made to each. Catalog pages reviewed and suggestions made. Stressed need to make sure edited course descriptions matched the catalog pages.

Action: Approved as amended.
V. College of Engineering and Technology
Department of Computer Science
(Venkat Gudivada and Leslie Pagliari)

1. Proposal of New Courses: CSCI 1000, 1003, 1010, 1011, 2400, 2405, 2530, 2540, 3000, 3010, 3030, 4110, 4120, 4130, 4140, 4150, 4160, 4170, 4180, 4231
2. Revision of Existing Courses: CSCI 3650, 4230, 4540, 4602, 4710
3. Deletion of Existing Courses: CSCI 1001, 1002, 1200, 2300, 2310, 2311, 2427, 2600, 2618, 3040, 3300, 3310, 3573, 3601, 4000, 4200, 4510, 4530,
4. Revision of Existing Degree: BS in Computer Science
   ○ Foundations
   ○ Core
   ○ Cognates
   ○ Electives

Discussion: Discussion of memo and suggested edits shared. Reviewed two courses and provided suggested edits. Committee members that reviewed the packets will share the feedback with Dr. Scemama who will share with Dr. Gudivada and Dr. Pagliari.

Action: Tabled till March 24, 2016 meeting.

VI. Old Business: None

VII: New Business: None

Adjournment: At 5:55pm

Next meeting at February 25, 2016

Minutes submitted by:
Josie Bowman for Dr. Gail Ratcliff
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<tr>
<th>Curricular Actions Reviewed</th>
<th>At this meeting:</th>
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NOTE: NURS 3910, NURS 3911, NURS 3920, NURS 3921, NURS 4910, NURS 4920, NURS 4921, and NURS 4930 are to be deleted in the spring of 2017.

NURS 3610 - Pathophysiology for ABSN

2

2 lecture hours per week. P: Admission to Accelerated Second Degree BSN option. Etiology, mechanism and clinical presentation of alterations in physiology.

NURS 3611 - Health Assessment for ABSN

3

2 lecture and 2 lab hours per week. P: Admission to Accelerated Second Degree BSN option; C: NURS 3610, NURS 3613, NURS 3614. Theoretical foundation necessary for performing a holistic health assessment.

NURS 3612 - Pharmacology for ABSN

2

2 lecture hours per week. P: Admission to Accelerated Second Degree BSN option. C: NURS 3610, NURS 3611. Nursing roles and pharmacotherapeutics and physiological effects.

NURS 3613 - Lifespan in Nursing Practice I

7

4 lecture and 9 clinical hours per week. P: Admission to Accelerated Second Degree BSN option; C: NURS 3610, NURS 3611, NURS 3612, NURS 3614. Theoretical foundations of wellness and illness across the lifespan.

NURS 3614 – Theoretical and Clinical Concepts for Nursing Practice

4

2 lecture and 2 lab hours per week. P: Admission to Accelerated Second Degree BSN option; C: NURS 3610, NURS 3611, NURS 3612. Theoretical concepts, evidence based and critical reasoning fundamental to basic, intermediate and advanced nursing skills.
NURS 3910 - Concept Integration for Professional Nursing I

4 SS

3 lecture, 2 lab hours per week. P: Admission to accelerated second degree BSN option; P/C: NURS 3020, NURS 3021, NURS 3911. Scope of nursing practice related to principles of pharmacological and nursing interventions.

NURS 3911—Concept Integration for Professional Nursing I Laboratory

0 SS

P: Admission to accelerated second degree BSN option; P/C: NURS 3020, NURS 3021, NURS 3910. Scope of nursing practice related to principles of pharmacological and nursing interventions laboratory.

NURS 3920 - Concept Integration for Professional Nursing II

7 F

P/C: NURS 3020, NURS 3021, NURS 3910, NURS 3911, NURS 3921, NURS 4140, NURS 4910. Theoretical foundations and clinical experiences for nursing care of individuals experiencing selected alterations in health throughout the life span.

NURS 3921—Concept Integration for Professional Nursing II Clinical

0 F

P/C: NURS 3020, NURS 3021, NURS 3910, NURS 3911, NURS 3920, 4140, NURS 4910. Theoretical foundations and clinical experiences for nursing care of individuals experiencing selected alterations in health throughout the life span.

NURS 4610 - Behavioral Health Nursing

3

2 lecture and 3 clinical hours per week. P: NURS 3610, NURS 3611, NURS 3612, NURS 3613, NURS 3614; C: NURS 4613. Theoretical foundations specific to behavioral health nursing throughout the lifespan.
NURS 4613 - Lifespan in Nursing Practice II

4 lecture and 9 clinical hours per week. P: NURS 3610, NURS 3611, NURS 3612, NURS 3613, NURS 3614; C: NURS 4610, NURS 4614. Theoretical foundations for clients across the lifespan experiencing complex alterations in health.

NURS 4614 - Research and Contemporary Issues

4 lecture hours per week. P: NURS 4610; C: NURS 4613. Trends, Issues, and evidence-based practice affecting professional nursing in global health.

NURS 4910—Nursing Leadership in the Health Care System

5 W I F

P/C: NURS 3020, NURS 3021, NURS 3910, NURS 3911, NURS 3920, NURS 3921. Introduction and examination of the leadership role of the nurse in the health care system.

NURS 4920—Nursing Care of Clients with Complex Health Needs

7 S

P/C: NURS 4210, NURS 4211, NURS 4910, NURS 4921. Applications of theory in nursing practice for individuals experiencing complex health alterations across the lifespan.

NURS 4921—Nursing Care of Clients with Complex Health Needs Clinical

0 S

P/C: NURS 4210, NURS 4211, NURS 4910, NURS 4920. Applications of theory in nursing practice for individuals experiencing complex health alterations across the lifespan-clinical component.

NURS 4930 - Transition to Professional Nursing Practice

2 SS

P/C: NURS 4511, NURS 4920, NURS 4921. Concepts needed to transition into practice and assure professional development.
NURS 4940 - Clinical Capstone for ABSN
3
18 clinical hours per week for a total of 126 clinical hours per semester. P: NURS 4614; C: NURS 4942, NURS 4943. Management, co-ordination, and delivery of nursing care.

NURS 4941 - Leadership and Community Nursing for ABSN
5
3 lecture and 6 clinical hours per week. P: NURS 4940; C: NURS 4942, NURS 4943. Nursing management and leadership for the health of populations and communities.

NURS 4942 - Transition to Practice for ABSN
2
4 lab hours per week. P: NURS 3610, NURS 3611, NURS 3612, NURS 3613, NURS 3614, NURS 4610, NURS 4611, NURS 4614; C: NURS 4940, NURS 4941, NURS 4943. Synthesis of skills applicable to nursing practice focusing on professional, legal and ethical standards.

NURS 4943 - Capstone Theory for ABSN
8
8 lecture hours per week. P: NURS 3610, NURS 3611, NURS 3612, NURS 3613, NURS 3614, NURS 4610, NURS 4613, NURS 4614; C: NURS 4940, NURS 4941, NURS 4942. Synthesis of nursing in professional practice for ABSN.

Programs

Bachelor’s

- Nursing, Bachelor of Science
- Nursing, Bachelor of Science (Accelerated Second Degree Option)

Courses

Nursing

- NURS 3005 - Academic Development for Nursing Education
• NURS 3010 - Foundations in Nursing Informatics
• NURS 3020 - Health Assessment
• NURS 3021 - Health Assessment Laboratory
• NURS 3025 - Health Assessment and Diagnostic Reasoning
• NURS 3030 - Management of Diabetes Mellitus Across the Life Span
• NURS 3081 - Topics in Nursing
• NURS 3082 - Topics in Nursing
• NURS 3083 - Topics in Nursing
• NURS 3200 - Introduction to Professional Nursing
• NURS 3210 - Nurse as Care Provider
• NURS 3211 - Nurse as Care Provider Clinical
• NURS 3260 - Legal Aspects of Health Care
• NURS 3270 - Clinical Nursing Foundations I
• NURS 3271 - Clinical Nursing Foundations I Laboratory
• NURS 3280 - Concepts of Pathophysiology for Nursing
• NURS 3330 - Nursing Care of Families During the Childbearing Phase
• NURS 3331 - Nursing Care of Families During the Childbearing Phase Clinical
• NURS 3340 - Nursing Care of Children
• NURS 3341 - Nursing Care of Children Clinical
• NURS 3370 - Clinical Nursing Foundations II
• NURS 3371 - Clinical Nursing Foundations II Laboratory
• NURS 3380 - Pharmacotherapeutics in Nursing
• NURS 3520 - Trends and Issues in Professional Nursing
• NURS 3550 - Health of the Older Adult
• NURS 3610 - Pathophysiology for ABSN
• NURS 3611 - Health Assessment for ABSN
• NURS 3612 - Pharmacology for ABSN
• NURS 3613 - Lifespan for Nursing Practice I
• NURS 3614 – Theoretical and Clinical Concepts for Nursing Practice
• NURS 3851 - Nurse Extern
• NURS 3910 – Concept Integration for Professional Nursing I
• NURS 3911 – Concept Integration for Professional Nursing I Laboratory
• NURS 3920 – Concept Integration for Professional Nursing II
• NURS 3921 – Concept Integration for Professional Nursing II Clinical
• NURS 4010 - Nursing Care of Clients with Alterations in Mental Health
• NURS 4011 - Nursing Care of Clients with Alterations in Mental Health Clinical
• NURS 4020 - Nursing Care of Adults
• NURS 4021 - Nursing Care of Adults Clinical
• NURS 4140 - Research in Nursing
• NURS 4150 - Nursing Leadership
• NURS 4210 - Nursing Care of Populations and Communities
• NURS 4211 - Nursing Care of Populations and Communities Clinical
• NURS 4220 - Perspectives in International Community Health Nursing
• NURS 4410 - Nursing Management of Complex Health Issues: Individuals and Families
• NURS 4420 - Nursing Management of Complex Health Issues: Populations and Systems
• NURS 4430 - Systems, Complex Health Issues and Nursing
• NURS 4440 - Nursing Leadership and Service Learning I
• NURS 4450 - Nursing Leadership and Service Learning II
• NURS 4460 - Nursing Leadership and Service Learning III
• NURS 4500 - Theory Capstone
• NURS 4511 - Clinical Capstone
• NURS 4610 - Behavioral Health Nursing
• NURS 4613 - Lifespan in Nursing Practice II
• NURS 4614 - Research and Contemporary Issues
• NURS 4901 - Nursing Research, Clinical Scholarship, and Evidence Based Practice
• NURS 4902 - Professional Communication in Nursing
• NURS 4903 - Critical Thinking to Facilitate Role Transition: RN to BSN
• NURS 4904 - Professionalism in Baccalaureate Nursing Practice
• NURS 4905 - Nursing in a Global Society
• NURS 4906 - Community Health Nursing
• NURS 4907 - Nursing Leadership and Finance
• NURS 4908 - RN to BSN Practice Experience Capstone
• NURS 4910 - Nursing Leadership in the Health Care System
• NURS 4920 - Nursing Care of Clients with Complex Health Needs
• NURS 4921 - Nursing Care of Clients with Complex Health Needs Clinical
• NURS 4930 - Transition to Professional Nursing Practice
• NURS 4940 - Clinical Capstone for ABSN
• NURS 4941 - Leadership and Community Nursing for ABSN
• NURS 4942 - Transition to Practice for ABSN
• NURS 4943 - Capstone Theory for ABSN

http://catalog.ecu.edu/preview_entity.php?catoid=8&ent_oid=717&returnto=523

College of Nursing

Sylvia T. Brown, Dean, 4205L Health Sciences Building
Lou Everett, Assistant to the Dean for the Undergraduate Program, 3185H Health Sciences Building
Frances R. Eason, Assistant to the Dean for Undergraduate Curriculum, 2135 Health Sciences Building
Annette Peery, Associate Dean for Undergraduate Nursing Science; Interim Chair, Department of Undergraduate Nursing Science, Senior Division and Interim Chair, Department of Undergraduate Nursing Science, Junior Division, 2175 3166F Health Sciences Building

Faculty

• College of Nursing Faculty
Curriculum

The baccalaureate program in nursing educates students for professional nursing practice and is characterized by a combination of foundations curriculum and nursing courses. The focus of the nursing courses is on nursing theory and scientific principles applied to the care of healthy persons as well as to acute and chronic health problems of individuals, families, and groups. Clinical experiences are provided in a variety of health care settings, such as hospitals, health departments, nursing homes, mental health centers, and other health-related community agencies. Graduates are prepared for beginning positions in nursing with the potential for positions of leadership and graduate study.

All students – high school graduates, transfer students, diploma or associate-degree graduates in nursing – earn the bachelor of science in nursing degree (BSN). The awarding of the BSN does not license one as a registered nurse. A separate examination (NCLEX-RN) is administered by the board of nursing in the state in which the applicant wishes to be registered. The College of Nursing will certify completion of degree requirements, but meeting other requirements for licensure is the responsibility of each candidate.

Registered nurses seeking to obtain a BSN are offered opportunities for educational accessibility, flexibility, and mobility. The curriculum track is 100 percent online. Service learning projects in student’s area of interest are completed in their local region. The curriculum track is designed to build on students’ past education and experience and expose registered nurses to innovative instructional methods for meeting course objectives. Registered nurse students meet course requirements by transfer, advanced placement, credit by exam, CLEP, and completion of courses by enrollment. Required sciences, foundations curriculum, and cognate courses must be completed prior to entry into the curriculum track. Students must hold a current unrestricted license and practice as a registered nurse in North Carolina or a NCBON recognized compact state. Students who were admitted to the RIBN option and remain in the option, will be directly admitted to the RN-BSN option at the prescribed point in the curriculum.

The accelerated second degree BSN option is designed for students who have earned a baccalaureate or higher degree and are interested in pursuing a BSN degree with eligibility to obtaining licensure as a Registered Nurse (RN). This 12-month program begins in spring semester the 2nd summer session annually.

All students are required to demonstrate computer competency, which can be met by placement or enrollment in BITE 2000.

The program is accredited by the Commission on Collegiate Nursing Education, One Dupont Circle, NW Suite 530, Washington, DC 20036; telephone 202-887-6791 and approved by the North Carolina Board of Nursing.

Admission Criteria for the Undergraduate BSN Option

Freshmen may declare an intent to enroll in nursing but are assigned to General College until officially admitted to the College of Nursing after filing an application for admission to the
major and meeting eligibility requirements prior to enrollment in the first nursing courses. Students should not apply to the College of Nursing until their last semester of pre-requisite courses. Eligibility is based upon a minimum cumulative 2.5 GPA, a standardized preadmission test (prelicensure students only) and completion of foundations curriculum requirements. A minimum grade of C (2.0) is required in biology, chemistry, and college algebra or equivalent. Admission to nursing courses is competitive and limited due to space availability and accrediting requirements. Students desiring readmission after an absence of one or more semesters must secure approval from the university admissions office and the College of Nursing Student Affairs Committee. Financial aid is available through scholarships and loans from government and private sources, work-study, and self-help programs. Information is available from the university director of financial aid or the College of Nursing director of student services.

**Admission Criteria for the Accelerated Second Degree BSN Option**

To be eligible to apply for this option the applicant must have a bachelor’s degree from an accredited college or university with a cumulative GPA of 3.0 or better and at least a B (3.0) in each of the specified mathematics, biology, and chemistry courses. A “C” (2.0) in the other prerequisite courses is also required. In addition, the applicant must have completed the National League for Nursing Pre-admission Examination (NLN PAX). Students achieving a composite score of 120 or higher and 50th percentile in each subtest area will be given preference a standardized pre-admission test.

**Requirements**

The College of Nursing requires a grade of C (2.0) as the minimum passing grade for all nursing courses. Opportunity to repeat a nursing course is limited by the College of Nursing Progression requirements as printed in the current student handbook. Students must earn a 2.0 (C) to pass a required nursing course. If a student earns less than a 2.0 (C) in more than one course, they are not eligible to continue in the CON.

All students are required to have CPR certification, a two-step PPD or Gold test, immunizations including Hepatitis B, and to have health and liability insurance prior to enrollment in clinical nursing courses. Verification of a two-step PPD or Gold test, CPR update, and payment of health and liability insurance is required each year. If applicable, waivers must be signed for immunizations and health insurance. Criminal background checks and drug screening are also required prior to enrolling in nursing courses.

Specific health requirements and performance standards are stated in the *College of Nursing Student Handbook* and can be found at [www.nursing.ecu.edu/download/UG_Handbook.pdf](http://www.nursing.ecu.edu/download/UG_Handbook.pdf).

The College of Nursing utilizes diagnostic tests for each of the 4 semesters a student is enrolled in the CON undergraduate curriculum. Tests may also be required prior to admission, during the semester, or near the completion of the semester. Results are used to assist students from entrance to graduation in determining nursing content that has been mastered. Various enhancement materials are used to assist with identified weaknesses.
Credit for courses in the College of Nursing is determined by the following formula: one classroom/lecture hour per week equals 1 s.h. credit; two lab hours per week equals 1 s.h. credit; and three practicum hours per week equals 1 s.h. credit.

http://catalog.ecu.edu/preview_program.php?catoid=8&poid=1936

Nursing, Bachelor of Science (Accelerated Second Degree Option)

The accelerated second degree BSN option is designed for students who have earned a baccalaureate or higher degree and are interested in pursuing a BSN degree with eligibility to obtaining licensure as a registered nurse (RN). This 12-month program begins in the spring semester 2nd summer session annually.

Admission Criteria

To be eligible to apply for this option the applicant must have:

- A bachelor’s degree from an accredited college or university with a graduating cumulative GPA of 3.0 or better
- At least a B (3.0) in each of the specified mathematics, biology, and chemistry courses
- A “C” (2.0) in the other prerequisite courses
- Completed the National League for Nursing Pre-admission Examination (NLN PAX). Students achieving a composite score of 120 or higher and 50th percentile in each subtest area will be given preference.
- Completion of a standardized pre-admission test.

Program of Study

The BSN degree requires at least 128 s.h. (40-50 s.h. in nursing, and 88-78 s.h. transferred from the previous baccalaureate degree including the designated prerequisites. Science course work cannot be more than five years old.

Designated Nursing Prerequisites - 88 78 s.h.

- BIOL 2110 - Fundamentals of Microbiology
- BIOL 2111 - Fundamentals of Microbiology Laboratory
- BIOL 2140 - Human Physiology and Anatomy I
- BIOL 2141 - Human Physiology and Anatomy I Laboratory
- BIOL 2150 - Human Physiology and Anatomy
• BIOL 2151 - Human Physiology and Anatomy II Laboratory
• CHEM 1120 - Introduction to Chemistry for the Allied Health Sciences
• CHEM 1130 - Organic and Biochemistry for the Allied Health Sciences
• MATH 1065 - College Algebra
• NUTR 2105 - Nutrition Science
• PHIL 1175 - Introduction to Ethics or
• PHIL 2275 - Professional Ethics

• PSYC 1000 - Introductory Psychology
• PSYC 3206 - Developmental Psychology
• SOCI 2110 - Introduction to Sociology
• Approved statistics course
• Other courses to equal 88-78 s.h.

Nursing Major – 450 s.h.

• NURS 3020 - Health Assessment
• NURS 3021 - Health Assessment Laboratory
• NURS 3910 - Concept Integration for Professional Nursing I
• NURS 3911 - Concept Integration for Professional Nursing I Laboratory
• NURS 3920 - Concept Integration for Professional Nursing II
• NURS 3921 - Concept Integration for Professional Nursing II Laboratory
• NURS 4140 - Research in Nursing
• NURS 4210 - Nursing Care of Populations and Communities
• NURS 4211 - Nursing Care of Populations and Communities Laboratory
• NURS 4511 - Clinical Capstone
• NURS 4910 - Nursing Leadership in the Health Care System
• NURS 4920 - Nursing Care of Clients with Complex Health Needs
• NURS 4921 - Nursing Care of Clients with Complex Health Needs Laboratory
• NURS 4930 - Transition to Professional Nursing Practice
• NURS 3610 - Pathophysiology for ABSN
• NURS 3611 - Health Assessment for ABSN
• NURS 3612 - Pharmacology for ABSN
• NURS 3613 - Lifespan in Nursing Practice I
• NURS 3614 - Theoretical and Clinical Concepts for Nursing Practice
• NURS 4610 - Behavioral Health Nursing
• NURS 4613 - Lifespan in Nursing Practice II
• NURS 4614 - Research and Contemporary Issues
• NURS 4940 - Clinical Capstone for ABSN
- NURS 4941 - Leadership and Community Nursing for ABSN
- NURS 4942 - Transition to Practice for ABSN
- NURS 4943 - Capstone Theory for ABSN
IDIS 3796 - Distributor Sales and Branch Management Laboratory

0

2 lab hours per week. P: IDIS 2771, IDIS 2830 C: IDIS 3795. Role of the industrial distributor salesperson in the supply chain. Branch management issues are also analyzed. The Kahle Way® Distributor Sales Level 1 Certification of Completion - Certification Test required.

IDIS 3815 - Supply Chain Logistics

3

P: IDIS 2771, IDIS 2830. Evaluates supply chain and its effects in logistics. Covers concepts and strategies used to design and manage supply chain, and explains relationship proper supply chain management has between industrial sales and logistics.

IDIS 3820 - Purchasing Logistics

3 Formerly IDIS 3805

P: IDIS 2830, IDIS 3815. Critical role of purchasing in supporting logistics strategy. Topics include supplier selection, product delivery, inventory management, application of technology, financial impact of purchasing, cost analysis, purchasing of transportation services, and negotiations.

IDIS 3835 - Security and Risk Analysis for Distributors

3

P: IDIS 3700 IDIS 2771. Logistical issues involving laws and regulations internationally and in the United States. Includes safety and security issues involved in logistics. Risk assessment techniques and issues are also explored.
IDIS 3840 - Procurement Logistics and Inventory Control
3
P: IDIS 3815. Introduction to the field of materials procurement and inventory control, including the purchasing cycle, information technology, forecasting, inventory management, replenishment methods, and sustainability issues in purchasing.

IDIS 3850 - Warehousing and Materials Handling
3 Formerly IDIS 3780, 3781
2 lecture hours per week. P: IDIS 2771; C: IDIS 3851, IDIS 2830; ITEC 2000 or MIS 2223. Warehousing operations and management, logistics, control, productivity, and analytical tools and techniques used to analyze and solve problems related to warehouse.

IDIS 3851 - Warehousing and Materials Handling Laboratory
0 Formerly IDIS 3780, 3781.
2 lab hours per week. P: IDIS 2771, IDIS 2830; ITEC 2000 or MIS 2223 C: IDIS 3850. Warehousing operations and management, logistics, control, productivity, and analytical tools and techniques used to analyze and solve problems related to warehouse.

IDIS 4600 – Strategic Global Sourcing for Distributors
3 GD
P: IDIS 2830; ITEC 2000 or MIS 2223. Examination of the role that the sourcing function plays in enhancing value in the industrial sector through the supplier selection process.

IDIS 4785 - Strategic Pricing for Distributors
3 Formerly IDIS 3825.
P: IDIS 3820 IDIS 2771. Examination of pricing in the distribution industry and pricing strategy as a competitive advantage. Topics include breakeven cost analysis, value-based pricing, life-cycle pricing, segmented pricing, dynamic pricing, and channel strategy.
IDIS 4790 - Global Logistics

Formerly: IDIS 3785.

P: IDIS 3700, IDIS 3815. Evaluation of the complexities of the international environment and logistical infrastructure on supply chain performance. Topics include inbound and outbound logistics including sourcing, inventory control, packaging, third party logistics (3PL), shipping, warehousing, distribution, Incoterms, documentation, customs, and global entry strategy.

IDIS 4800 - Distribution and Logistics Capstone Internship

Minimum of 240-180 hours of supervised, full-or-part-time work experience required. P: Junior standing; IDIS 3790, ITEC 3300; IDIS major or distribution and logistics concentration within BS industrial technology degree. Capstone course involving a design project exposing students to the practice of distribution and logistics. Experiential learning reinforced through structured research.

IDIS 4802 - Distribution and Logistics Research

P: IDIS 3815; IDIS major or distribution and logistics concentration within BS industrial technology degree; senior standing. Capstone course for all industrial distribution. Application of new and innovative technologies used in industrial technology, industrial distribution, and logistics fields. Research into current events and trends impacting supply chain efficiency, the wholesale distribution channel, and the transportation industry, with consideration of business processes and technology applications.
Industrial Distribution and Logistics

- IDIS 2771 - Introduction to Distribution and Logistics
- IDIS 2830 - ERP Systems for Distributors
- IDIS 3700 - Transportation Logistics
- IDIS 3790 - Technical Presentations
- IDIS 3795 - Distributor Sales and Branch Management
- IDIS 3796 - Distributor Sales and Branch Management Laboratory
- IDIS 3815 - Supply Chain Logistics
- IDIS 3820 - Purchasing Logistics
- IDIS 3835 - Security and Risk Analysis for Distributors
- IDIS 3840 – Procurement Logistics and Inventory Control
- IDIS 3850 - Warehousing and Materials Handling
- IDIS 3851 - Warehousing and Materials Handling Laboratory
- IDIS 4502 – Laboratory Problems: Industrial Distribution
- IDIS 4504 - Independent Study: Industrial Distribution
- IDIS 4600 - Strategic Global Sourcing for Distributors
- IDIS 4785 - Strategic Pricing for Distributors
- IDIS 4790 - Global Logistics
- IDIS 4800 - Distribution and Logistics Capstone Internship
- IDIS 4802 - Distribution and Logistics Research
Industrial Distribution and Logistics, BS

Richard W. Monroe, Coordinator, 402  Mark G. Angolia, Coordinator, 405 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 including those listed below - 42 s. h.**

   (For information about courses that carry foundations curriculum credit see Liberal Arts Foundations Curriculum)

   - ECON 2113 - Principles of Microeconomics
   - MATH 1065 - College Algebra
   - PSYC 1000 - Introductory Psychology
   - PSYC 3241 - Personnel and Industrial Psychology

2. **Core - 57 60 s.h.**

   - IDIS 2771 - Introduction to Distribution and Logistics
   - IDIS 2830 - ERP Systems for Distributors
   - IDIS 3700 - Transportation Logistics
   - IDIS 3790 - Technical Presentations
   - IDIS 3795 - Distributor Sales and Branch Management
   - IDIS 3796 - Distributor Sales and Branch Management Laboratory
   - IDIS 3815 - Supply Chain Logistics
   - IDIS 3820 - Purchasing Logistics
   - IDIS 3835 - Security and Risk Analysis for Distributors
   - IDIS 3840 - Procurement Logistics and Inventory Control
   - IDIS 3850 - Warehousing and Materials Handling
   - IDIS 3851 - Warehousing and Materials Handling Laboratory
   - IDIS 4600 - Strategic Global Sourcing for Distributors
   - IDIS 4785 - Strategic Pricing for Distributors
- IDIS 4790 - Global Logistics
- IDIS 4800 - Distribution and Logistics Capstone Internship
- IDIS 4802 - Distribution and Logistics Research
- ITEC 3290 - Technical Writing
- ITEC 3292 - Industrial Safety
- ITEC 3300 - Technology Project Management
- ITEC 3800 - Cost and Capital Project Analysis
- ITEC 4293 - Industrial Supervision
- ITEC 4300 - Quality Assurance Concepts

3. Cognates - 12 s. h.

- ACCT 2101 - Survey of Financial and Managerial Accounting
- FINA 2244 - Legal Environment of Business

- MATH 2283 - Statistics for Business or
- ITEC 3200 - Introduction to Statistical Process Control

- ITEC 2000 - Industrial Technology Applications of Computer Systems or
- MIS 2223 - Introduction to Computers

4. Electives to complete requirements for graduation - 15 12 s.h.
Industrial Technology, BS

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 of applied science degree from an approved technical program. 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, ITEC 4100 or any course that does not meet as a class may not be used as upper division core or concentration courses.

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

1. **Foundations curriculum requirements including those listed below - 42 s.h.**

   (For information about courses that carry foundations curriculum credit see Liberal Arts Foundations Curriculum.)

   - ECON 2113 - Principles of Microeconomics
   - MATH 1065 - College Algebra or
   - MATH 1066 - Applied Mathematics for Decision Making
   - PSYC 1000 - Introductory Psychology
   - PSYC 3241 - Personnel and Industrial Psychology

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
- ITEC 3290 - Technical Writing
- ITEC 3300 - Technology Project Management
- ITEC 3800 - Cost and Capital Project Analysis
- ITEC 4293 - Industrial Supervision

4. Concentrations - 27 s.h.

(choose one) Choose one concentration from below:

Architectural Technology

- DESN 3030 - Architectural Drafting
- DESN 3031 - Architectural Drafting Laboratory
- DESN 3032 - Engineering Graphics II
- DESN 3033 - Engineering Graphics II Laboratory
- DESN 3036 - Architectural Design and Drafting
- DESN 3037 - Architectural Design and Drafting Laboratory
- DESN 3038 - Sustainable Design
- DESN 3039 - Sustainable Design Laboratory
- PLAN 2410 - Fundamentals of GIS
- PLAN 3021 - Introduction to Planning Techniques
- PLAN 4003 - Urban Form and Design
- Approved technical electives (6 s.h.)

Bioprocess Manufacturing

- ITEC 3292 - Industrial Safety
- ITEC 4150 - Microbiology for Industrial Processing
- ITEC 4250 - Engineering for Food Safety and Sanitation
- ITEC 4300 - Quality Assurance Concepts
- ITEC 4350 - Separation Techniques for Industrial Processing
- ITEC 4450 - Waste Treatment Techniques for Industrial Processing
- ITEC 4550 - Quality in Regulatory Environment
- Approved technical electives (6 s.h.)
Distribution and Logistics

Approved technical electives (3 s.h.)

Choose 24 s.h. of advisor approved IDIS courses from below:

- IDIS 2771 - Introduction to Distribution and Logistics
- IDIS 2830 - ERP Systems for Distributors
- IDIS 3700 - Transportation Logistics
- IDIS 3790 - Technical Presentations
- IDIS 3795 - Distributor Sales and Branch Management
- IDIS 3796 - Distributor Sales and Branch Management Laboratory
- IDIS 3815 - Supply Chain Logistics
- IDIS 3820 - Purchasing Logistics
- IDIS 3835 - Security and Risk Analysis for Distributors
- IDIS 3840 – Procurement Logistics and Inventory Control
- IDIS 3850 - Warehousing and Materials Handling
- IDIS 3851 - Warehousing and Materials Handling Laboratory
- IDIS 4600 - Strategic Global Sourcing for Distributors
- IDIS 4785 - Strategic Pricing for Distributors
- IDIS 4790 - Global Logistics
- IDIS 4800 - Distribution and Logistics Internship
- IDIS 4802 - Distribution and Logistics Research

Approved technical electives (3 s.h.)

Health Information Technologies

- HIMA 3000 - Medical Terminology for Health Professionals
- HIMA 3120 - Health Care Delivery Systems
- HIMA 4030 - Quality Management in Health Care
- HSMA 2000 - Professional Roles and Environments in Health Care
- HSMA 3020 - Health Care Payment Systems
- HSMA 3025 - Professional Ethical Codes and Law in Health Care
- HSMA 3035 - Interpersonal Team Skills for Health Care Supervisors and Practitioners
- HSMA 4010 - Health Information Management
- Approved technical electives (3 s.h.)

Industrial Supervision

- IDIS 2771 - Introduction to Distribution and Logistics
- IDIS 3790 - Technical Presentations
- IDIS 3815 - Supply Chain Logistics
- IENG 3300 - Plant Layout and Materials Handling
- IENG 4023 - Advanced Manufacturing Systems
- ITEC 3292 - Industrial Safety
ITEC 4300 - Quality Assurance Concepts
Approved technical electives (6 s.h.)

Information and Computer Technology

Choose 27 hours s.h. from below:

- ICTN 2530 - Network Environment II
- ICTN 2531 - Network Environment II Laboratory
- ICTN 2900 - Fundamental Network Security
- ICTN 2901 - Fundamental Network Security Laboratory
- ICTN 3250 - Internetwork Routing Technology
- ICTN 3251 - Internetwork Routing Technology Laboratory
- ICTN 3540 - Network Environment III
- ICTN 3541 - Network Environment III Laboratory
- ICTN 3900 - Web Services Management
- ICTN 3901 - Web Services Management Laboratory
- ICTN 4040 - Enterprise Information Security
- ICTN 4064 - Regulations and Policies
- ICTN 4150 - Switching Network Technology
- ICTN 4151 - Switching Network Technology Laboratory
- ICTN 4200 - Intrusion Detection Technologies
- ICTN 4201 - Intrusion Detection Technologies Laboratory
- ICTN 4250 - Enterprise Network Security Technology
- ICTN 4251 - Enterprise Network Security Technology Laboratory
- ICTN 4310 - Digital Forensics
- ICTN 4402 - Special Topics
- ICTN 4404 - Special Topics
- ICTN 4406 - Special Topics
- ICTN 4408 - Special Topics
- ICTN 4501 - Laboratory Problems
- ICTN 4503 - Laboratory Problems
- ICTN 4505 - Laboratory Problems
- ICTN 4520 - Wireless Communication
- ICTN 4521 - Wireless Communication Laboratory
- ICTN 4590 - Network Maintenance and Troubleshooting
- ICTN 4591 - Network Maintenance and Troubleshooting Laboratory
- ICTN 4600 - Enterprise Information Technology Management
- ICTN 4601 - Enterprise Information Technology Management Laboratory
- ICTN 4700 - Virtualization Technologies
- ICTN 4701 - Virtualization Technologies Laboratory
- ICTN 4750 - Enterprise Data Storage Technologies
- ICTN 4800 - Information Assurance Technologies
- ICTN 4801 - Information Assurance Technologies Laboratory
Manufacturing Systems

- IENG 3300 - Plant Layout and Materials Handling
- IENG 4020 - Manufacturing System Planning
- IENG 4023 - Advanced Manufacturing Systems
- IENG 4200 - Work Methods and Ergonomics Analysis
- ITEC 3292 - Industrial Safety
- ITEC 4300 - Quality Assurance Concepts
- Approved technical electives (9 s.h.)

Mechanical Technology

- DESN 3032 - Engineering Graphics II
- DESN 3033 - Engineering Graphics II Laboratory
- DESN 3230 - Rapid Prototyping
- DESN 3231 - Rapid Prototyping Laboratory
- DESN 3234 - Jig and Fixture Design
- DESN 3235 - Jig and Fixture Design Laboratory
- DESN 3236 - Geometric Dimensioning and Tolerancing
- DESN 3237 - Geometric Dimensioning and Tolerancing Laboratory
- IENG 2076 - Introduction to Computer Numerical Control (CNC)
- IENG 2077 - Introduction to Computer Numerical Control (CNC) Laboratory
- IENG 3020 - Robotics in Computer Integrated Manufacturing
- IENG 3021 - Robotics in Computer Integrated Manufacturing Laboratory
- IENG 3300 - Plant Layout and Materials Handling
- Approved technical electives (6 s.h.)

5. Cognates - 5 s.h.

- FINA 2244 - Legal Environment of Business
- MATH 1074 - Applied Trigonometry

6. Free electives to complete requirements for graduation.
The Department of Engineering offers a BS in engineering with six concentration areas: biomedical engineering, bioprocess engineering, electrical engineering, environmental, industrial and systems engineering, and mechanical 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, environmental 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 encouraged 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 FE 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 website. 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 their potential to succeed with particular emphasis on performance in math and science classes. Students who have completed an associate’s degree from an approved pre-engineering program will be directly admitted to the BS program.

Special Department Programs

**Cooperative Education.** Students in the industrial and systems and mechanical engineering concentrations may request to participate in the cooperative education (co-op) program that alternates semesters of engineering work and academic enrollment. Co-op students earn money during their periods of employment and also learn how their coursework relates to engineering activities. Furthermore, they have an opportunity to experience different areas of engineering during their co-op work periods. To be eligible for the engineering co-op program, students must have declared a major in engineering, completed a minimum of 24 s.h. including ENGR 1000, ENGR 1012, ENGR 1014 or ENGR 1016, ENGR 2050, and MATH 2152, and have earned a minimum major and overall cumulative GPA of 2.5. Additional eligibility requirements and availability of co-op placements can be obtained from the academic advisor. Interested students should apply for a co-op through the Career Center.

**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.

**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.

**Transfer Program.** The engineering department evaluates transfer credits on a course-by-course basis. Transfer students who have received credit for courses equivalent to ENGR 1000 and ENGR 1012 may be placed in ENGR 1014 in lieu of taking the traditional pathway through ENGR 1016 and ENGR 2000. Students may not receive credit for both ENGR 1014 and either ENGR 1016 or ENGR 2000.
Programs
Bachelor’s
- Engineering, BS

Courses
Biomedical Engineering
- BIME 2080 - Foundations of Biomedical Engineering
- BIME 4030 - Biomechanics and Materials
- BIME 4040 - Physiological Systems and Modeling for Engineering I
- BIME 4050 - Physiological Systems and Modeling for Engineering II
- BIME 4200 - Biomedical Instrumentation

Bioprocess Engineering
- BIOE 3013 - Engineering Applications in Microbial Systems
- BIOE 3016 - Engineering Applications in Microbial Systems
- BIOE 3250 - Bioprocess Engineering Systems
- BIOE 4006 - Bioprocess Engineering Validation and Quality
- BIOE 4010 - Bioprocess Separation Engineering
- BIOE 4020 - Bioprocess Plant Design, Simulation and Analysis

Bioprocess Engineering Banked Courses
- BIOE 3016 - Engineering Applications in Microbial Systems

Electrical Engineering
- EENG 2410 - Digital Electronics
- EENG 3013 - AC Circuits
- EENG 3023 - Signals and Systems
- EENG 3040 - Microprocessors
- EENG 3530 - Electronics
- EENG 3750 - Electric Power Systems
- EENG 4510 - Control System Design

Engineering Core
- ENGR 1000 - Introduction to Engineering
- ENGR 1002 - Fundamentals of Engineering Practice
- ENGR 1012 - Engineering Graphics
- ENGR 1014 - Introduction to Engineering and Design
- ENGR 1016 - Introduction to Engineering Design
- ENGR 2000 - Engineering Design and Project Management I
- ENGR 2022 - Statics
- ENGR 2050 - Computer Applications in Engineering
- ENGR 2070 - Materials and Processes
- ENGR 2450 - Dynamics
- ENGR 2514 - Circuit Analysis
- ENGR 3000 - Engineering Design and Project Management II
  - ENGR 3012 - Thermal and Fluid Systems
- ENGR 3013 - Introduction to Engineering Management
- ENGR 3024 - Mechanics of Materials
- ENGR 3034 – Thermal and Fluid Systems
- ENGR 3050 - Sensors, Measurements, and Controls
- ENGR 3100 - Internship in Engineering
- ENGR 3400 - Engineering Economics
- ENGR 3420 - Engineering Economics
- ENGR 3500 - Introduction to Engineering Project Management
- ENGR 3500 - Introduction to Engineering Project Management
- ENGR 3800 - Quality Control for Engineers
- ENGR 3901 - Undergraduate Research in Engineering
- ENGR 3902 - Undergraduate Research in Engineering
- ENGR 4010 - Senior Capstone Design Project I
- ENGR 4020 - Senior Capstone Design Project II
- ENGR 4033 - Entrepreneurship and Intellectual Property
- ENGR 4501 - Special Topics in Engineering
- ENGR 4502 - Special Topics in Engineering
- ENGR 4503 - Special Topics in Engineering
- ENGR 4510 - Practice of Professional Engineering I

**Environmental Engineering**
- ENVE 3103 - Water Quality
- ENVE 3203 - Water and Wastewater Treatment
- ENVE 3303 - Air Quality Engineering
- ENVE 4103 - Engineering Surface Water Hydrology
- ENVE 4203 - Engineering Groundwater Hydrology

**Industrial and Systems Engineering**
- ISYS 3010 - Principles and Methods of Industrial and Systems Engineering
- ISYS 3060 - Systems Optimization
- ISYS 4010 - Work Measurement and Human Factors
- ISYS 4020 - Analysis of Production Systems and Facility Design
- ISYS 4065 - Discrete Systems Modeling
- ISYS 4203 - Integrated Systems Engineering
- ISYS 4303 - Engineering Logistics
- ISYS 4410 - Lean and Six-Sigma Quality Systems for Engineers

**Mechanical Engineering**
- MENG 3070 - Thermodynamics I
- MENG 3073- Engineering Thermodynamics
- MENG 3624 - Solid Mechanics
- MENG 4013 - Advanced Engineering Thermodynamics
- MENG 4018 - Thermodynamics II
- MENG 4150 - Fluid Mechanics
  - MENG 4153 - Engineering Fluid Mechanics
- MENG 4260 - Heat and Mass Transfer
  - MENG 4263 - Engineering Heat Transfer
  - MENG 4343 - Composite Materials
  - MENG 4350 - Electromechanical Systems Design
  - MENG 4650 - Machine Design

Return to: Academic Programs/Colleges, Schools and Departments
Courses

Biomedical Engineering

BIME 4030 - Biomechanics and Materials
4
3 lecture and 3 lab hours per week. P: ENGR 2450 with minimum grade of C (2.0); ENGR 3024; P/C: ENGR 3012 or MENG 4150. Concepts of statics, dynamics, mechanics of materials, and fluid mechanics applied to biological systems. Characterization of biological materials, including time-dependent properties.

BIME 4040 - Physiological Systems and Modeling for Engineering I
3 F
3 lecture hours per week. P: BIME 2080; ENGR 2022 with minimum grade of C (2.0) or consent of instructor. Quantitative approach to human physiology from the biomedical engineering perspective with emphasis on cellular, neural, endocrine and musculoskeletal systems. Introduction to numerical simulation of physiologic processes and simple control/feedback systems.

Bioprocess Engineering

BIOE 3013 - Engineering Applications in Microbial Systems
3 Formerly BIOE 3016
3 lecture hours per week. P: ENGR 2450 with minimum C (2.0); MATH 2154; P/C: CHEM 2750, CHEM 2753. Engineering applications and analytical models for microbiology, biochemistry, and genetic engineering. Applies engineering principles such as protein, lipid, carbohydrate and nucleic acid biochemistry to enzyme kinetics and regulation, metabolic pathways, and mass transfer to biological processes and how cellular formation is altered.

BIOE 3016 - Engineering Applications in Microbial Systems
2
2 lecture hours per week. P: ENGR 2450 with minimum C (2.0); MATH 2154; C: CHEM 2650, CHEM 2651. Engineering applications and analytical models for microbiology, biochemistry, environmental, and genetic engineering. Applies engineering principles such as enzyme kinetics, metabolic pathways, mass transfer to biological processes and how cellular formation is altered.

BIOE 3250 - Bioprocess Engineering Systems
3
2 lecture and 3 lab hours per week. P: BIOE 3016; CHEM 2650, CHEM 2651-BIOE 3013; CHEM 2750, CHEM 2753. Engineering concepts for biological conversion of raw materials to pharmaceuticals, biopharmaceuticals, fuels, biological products, and chemicals. Includes enzyme, bioreaction and cellular
growth kinetics, bioreactor stoichiometry, analytical characterization of biological products, and design, analysis, selection, scale up, and control of bioreactors and fermenters.

**BIOE 4006 - Bioprocess Engineering Validation and Quality**
2
2 lecture hours per week. P: BIOE 3250; MATH 3307; consent of instructor. Foundations of bioprocess validation and good manufacturing practices to ensure safe products, reduce the risk of adverse reactions, and avoid recalls. Emphasizes cost effectiveness and level of validation required for different phases of development, license application, and process improvements.

Electrical Engineering

**EENG 3013 - AC Circuits**
3
3 lecture hours per week. P: ENGR 2514. RLC circuits; AC impedance and AC power; three phase circuits; magnetically coupled circuits and transformers; frequency response, resonance and filters; and introduction to Fourier and Laplace transform and circuit analysis applications.

**EENG 3020 3023 - Signals and Systems**
3 formerly EENG 3020
3 lecture hours per week. 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.
2 lecture and 1 lab hour per week. P: EENG 3013. Applications of singularity functions; properties of Linear Time-Invariant (LTI) systems; representations of physical systems using differential and difference equations; convolution; Fourier series; Fourier transform, Laplace transform, and z-transform in sampling; modulation; filtering; and digital signal processing (DSP) with relevant examples in electrical, mechanical, and biomedical engineering.

Mechanical Engineering

**MENG 3070 - Thermodynamics I**
3
3 lecture hours per week. P: MATH 2154; ENGR 2450 with minimum grade of C (2.0). Thermodynamic properties and tables. First and second law analysis for open systems and control volumes. Ideal and real gases and mixtures of gases, availability, irreversibility, and exergy.
MENG 3073 - Engineering Thermodynamics
3
3 lecture hours per week. P: ENGR 3034 and ENGR 2450, both with minimum grade of C (2.0); MATH 2154. Thermodynamic properties and equations-of-state involving phase change and ideal gases; first and second law analysis for open and closed systems; and thermodynamic cycles.

MENG 4013 - Advanced Engineering Thermodynamics
3
3 lecture hours per week. P: MENG 3073. Thermodynamics of nonreacting and reacting flows; advanced thermodynamic cycle analysis; and availability and exergy.

MENG 4018 – Thermodynamics II
3
3 lecture hours per week. P: MENG 3070. Engineering applications involving ideal gas mixtures, psychrometrics, real gas mixtures, power cycles, refrigeration systems, pumps, heat exchangers, boilers, combustion, dissociation and chemical equilibrium.

MENG 4150 – Fluid Mechanics
4
3 lecture and 2 lab hours per week. P: MENG 3070. Fluid systems including fluid statics; conservation of mass, momentum, and energy; incompressible inviscid flow; similitude; internal and external incompressible viscous flow; and fluid machinery.

MENG 4153 - Engineering Fluid Mechanics
3
3 lecture hours per week. P: ENGR 2450 and ENGR 3034, both with minimum grade of C (2.0). Static fluid forces; conservation of mass, conservation of energy, and Newton’s second law for flowing fluids; internal and external flow; and flow systems and machinery.

MENG 4260 - Heat and Mass Transfer
3
3 lecture hours per week. P: ENGR 3012 or MENG 3070. Three fundamental modes of heat transfer: conduction, convection and radiation, and mass transfer.

MENG 4263 - Engineering Heat Transfer
3
3 lecture hours per week. P: ENGR 2450 and ENGR 3034, both with minimum grade of C (2.0). Multi-dimensional steady and transient heat conduction; forced and natural convection; radiation heat transfer; and heat exchangers.

Engineering Core

ENGR 3012 – Thermal and Fluid Systems
4
3 lecture and 2 lab hours per week. P/C: MATH 2154. Explores systems approach to design, analysis, and engineering of thermal and fluid systems using mathematical and software tools.
ENGR 3034 - Thermal and Fluid Systems
4 Formerly ENGR 3012
3 lecture and 2 lab hours per week. P/C: MATH 2154. Ideal gas law; conservation of mass and energy in steady-state incompressible fluids; friction losses in a pipe; one-dimensional steady-state conduction; and convective heat transfer for simple geometries. Design, conduct, analysis, and interpretation of laboratory studies.

ENGR 4010 - Senior Capstone Design Project I
2 WI
1 lecture and 2 lab hours per week. P: ENGR 3000, ENGR 3420; BIOE 3016, BIOE 3250 or BIME 2080, BIME 4040 or EENG 2410, EENG 3520 or ISYS 3010 or MENG 3070, MENG 3624; minimum GPA 2.0 in the major; minimum cumulative GPA 2.; 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.

1 lecture and 2 lab hours per week. P: Minimum 2.0 GPA in the major; minimum cumulative 2.0 GPA; consent of instructor; ENGR 3000, ENGR 3420; and concentration specific prerequisites. P for bioprocess engineering: BIOE 3013 or BIOE 3016; BIOE 3250. P for biomedical engineering: BIME 2080; BIME 4040. P for electrical engineering: EENG 2410; EENG 3013 or EENG 3530. P for environmental engineering: ENVE 3303; ENVE 3203. P for industrial and systems engineering: ISYS 3010. P for mechanical engineering: MENG 3070 or MENG 3073; MENG 3624. 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.
ENGINEERING, BS

Minimum degree requirement for the engineering program is 128 s.h. credit as follows:

1. Foundations curriculum requirements including those listed below – 42-43 s.h.

(For information about courses that carry foundations curriculum credit see Liberal Arts Foundations Curriculum)

- BIOL 1050 - General Biology
- BIOL 1051 - General Biology Laboratory
  or
- BIOL 1100 - Principles of Biology I
- BIOL 1101 - Principles of Biology Laboratory I

- ECON 2113 - Principles of Microeconomics
- ECON 2113 - Principles of Microeconomics

- MATH 2151 - Engineering Calculus I or
- MATH 2171 – Calculus I

- PHIL 2275 – Professional Ethics or
- PHIL 2274 – Business Ethics

- PHYS 2350 - University Physics

2. Engineering Foundation - 39-43 s.h.

- ENGR 1000 - Introduction to Engineering
- ENGR 1012 - Engineering Graphics
- ENGR 1016 - Introduction to Engineering Design
- ENGR 2000 - Engineering Design and Project Management I
- ENGR 2022 - Statics
- ENGR 2050 - Computer Applications in Engineering
- ENGR 2070 - Materials and Processes
- ENGR 2450 - Dynamics
- ENGR 2514 - Circuit Analysis
- ENGR 3000 - Engineering Design and Project Management II
- ENGR 3024 - Mechanics of Materials
• **ENGR 3034** – Thermal and Fluid Systems
• ENGR 3050 - Sensors, Measurements, and Controls
• ENGR 3420 - Engineering Economics
• ENGR 3800 - Quality Control for Engineers
• ENGR 4010 - Senior Capstone Design Project I
• ENGR 4020 - Senior Capstone Design Project II

3. Cognates – 21-23 s.h.

• CHEM 1150 - General Chemistry I
• CHEM 1151 - General Chemistry Laboratory I

• MATH 2152 - Engineering Calculus II or
  MATH 2172 - Calculus II

• MATH 2153 - Engineering Calculus III or
  MATH 2173 - Calculus III

• MATH 2154 - Engineering Linear Algebra and Differential Equations I
• MATH 3307 - Mathematical Statistics I
• PHYS 2360 - University Physics

4. Concentrations

(Choose one)

**Biomedical Engineering** - 26 22 s.h.

• BIME 2080 - Foundations of Biomedical Engineering
• BIME 4030 - Biomechanics and Materials
• BIME 4040 - Physiological Systems and Modeling for Engineering I
• BIME 4050 - Physiological Systems and Modeling for Engineering II
• BIME 4200 - Biomedical Instrumentation
  • **ENGR 3012** – Thermal and Fluid Systems
• Technical electives, 6 s.h. as approved by the academic advisor.

**Bioprocess Engineering** - 26 22 s.h.

• BIOE 3016 3013 - Engineering Applications in Microbial Systems
• BIOE 3250 - Bioprocess Engineering Systems
• BIOE 4006 - Bioprocess Engineering Validation and Quality
• BIOE 4010 - Bioprocess Separation Engineering
• BIOE 4020 - Bioprocess Plant Design, Simulation and Analysis
• CHEM 1160 - General Chemistry II
• CHEM 1161 - General Chemistry Laboratory II
  • CHEM 2650 - Organic Chemistry for the Life Sciences
  • CHEM 2651 - Organic Chemistry Lab for the Life Sciences
• CHEM 2750 - Organic Chemistry I
• CHEM 2753 - Organic Chemistry Laboratory I
• ENGR 3012 - Thermal and Fluid Systems

Electrical Engineering - 26 22 s.h.

• EENG 2410 - Digital Electronics
• EENG 3013 - AC Circuits
• EENG 3020 - Signals and Systems
• EENG 3040 - Microprocessors
  • EENG 3530 - Electronics
• EENG 3750 - Electric Power Systems
• EENG 4510 - Control System Design
  • ENGR 3012 - Thermal and Fluid Systems
• Technical electives, 3 s.h. as approved by the academic advisor.

Environmental Engineering - 26 22 s.h.

• CHEM 1160 - General Chemistry II
• CHEM 1161 - General Chemistry Laboratory II
  • ENGR 3012 - Thermal and Fluid Systems
• ENVE 3103 - Water Quality
• ENVE 3203 - Water and Wastewater Treatment
• ENVE 3303 - Air Quality Engineering
• ENVE 4103 - Engineering Surface Water Hydrology
• ENVE 4203 - Engineering Groundwater Hydrology
• Technical electives, 3 s.h. as approved by the academic advisor.

Industrial and Systems Engineering - 26 22 s.h.

• ISYS 3010 - Principles and Methods of Industrial and Systems Engineering
• ISYS 3060 - Systems Optimization
• ISYS 4010 - Work Measurement and Human Factors
• ISYS 4020 - Analysis of Production Systems and Facility Design
• ISYS 4065 - Discrete Systems Modeling
  • ENGR 3012 - Thermal and Fluid Systems
• Technical electives, 7 s.h. as approved by the academic advisor.

Mechanical Engineering - **26 22 s.h.**

• MENG 3073 - Engineering Thermodynamics
• MENG 3624 - Solid Mechanics
  • MENG 3070 - Thermodynamics I
  • MENG 4018 - Thermodynamics II
  • MENG 4150 - Fluid Mechanics
• MENG 4153 - Engineering Fluid Mechanics
  • MENG 4260 - Heat and Mass Transfer
• MENG 4263 - Engineering Heat Transfer
• MENG 4650 - Machine Design
• Technical electives, 7 s.h. as approved by the academic advisor.