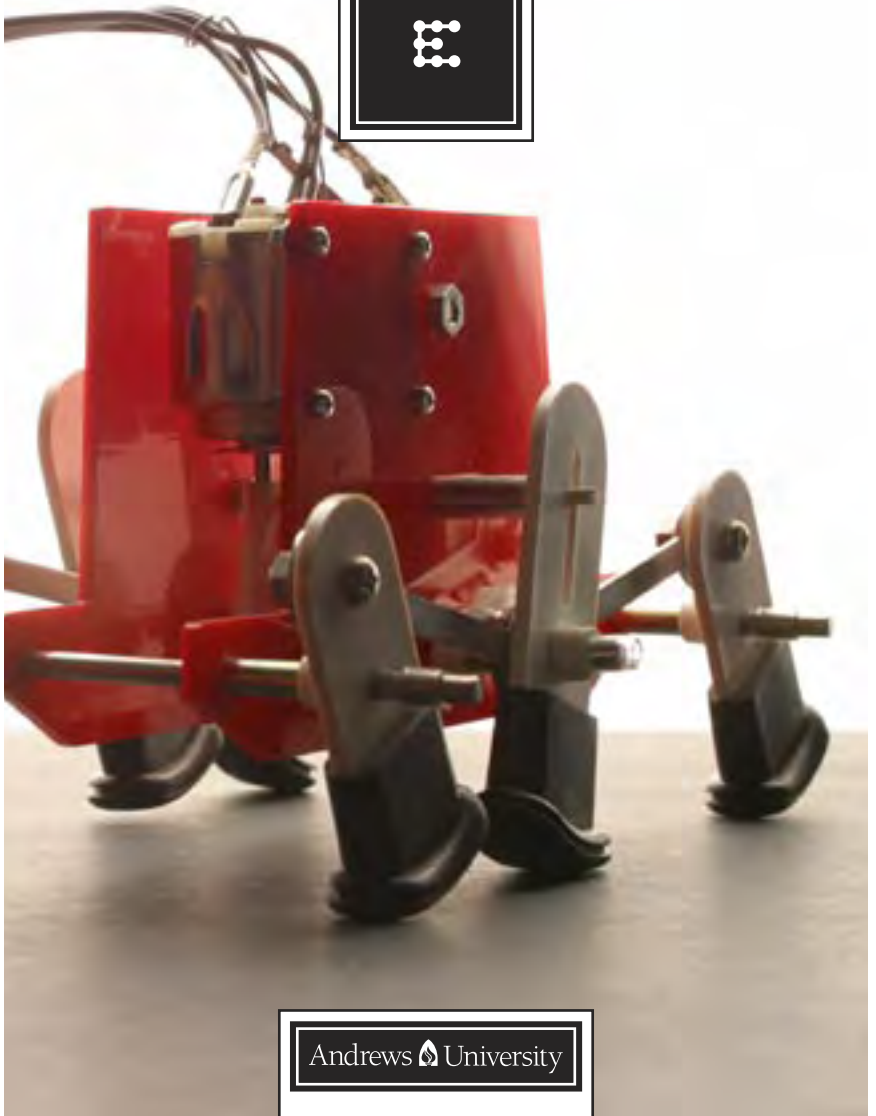


engineering



Andrews  University



ENGINEERING

Are you technically oriented, creative and innovative? Do you have exceptional math, science and computer skills? Do you dream of putting your technological interests and abilities to work for you? If you want to become a professional who works with computers, electronics and mechanical constructions for the benefit of humanity, consider a Bachelor of Science in Engineering (BSE) at Andrews University!

With a BSE degree, you will enter one of the most profitable and growing professions in the world. Engineers support the technological—and therefore, economical—advancement of society by finding cost-effective, efficient solutions to the practical problems of human needs. Engineers do this by inventing, maintaining and improving systems, equipment and instruments that meet our industrial, commercial and technological needs.

Before you can meet society's wants and needs you must have the know-how. That's where we can help, as a BSE degree is required for entry-level positions in the engineering profession. In the interest of connecting you with your professional dreams, we are proud to offer a quality BSE program, with emphases in electrical and

computer engineering or mechanical engineering. Math and science are at the core of our program. With a little planning, you can complete a complementary minor or second major and still graduate in four years. Or, you can pair a minor in engineering with another major. Whatever your educational path, at Andrews your learning takes place in modern facilities, where you receive the quality instruction and hands-on experience you need for success. And, as a small, Christian university, with a friendly, close-knit department, we connect you with the kind of personal attention and support you want and need in a learning experience. So, go ahead! Make your mark on the future by connecting with an engineering career that begins with Andrews University!

MISSION STATEMENT

The Department of Engineering and Computer Science aspires to be a place of choice for engineering and computer science education where dedicated students and faculty grow together to reach their God-given potential for service to society and the church.

Faculty and students in the Department of Engineering and Computer Science will:

SEEK KNOWLEDGE BY:

- Exploring current knowledge in engineering and computing from a Christian viewpoint, within the broader context of the liberal arts.
- Creating a nurturing environment for a committed lifetime of intellectual discovery, problem-solving and innovation.
- Enhancing learning through research and scholarship.
- Preparing students to join their chosen profession or attend graduate school.
- Engaging industry and professional stakeholders in the planning and assessing of our curriculum.

AFFIRM FAITH BY:

- Acknowledging the leadership of God in their lives.
- Acting with personal and moral integrity.
- Serving Humanity in a complex, technological, global society.

CHANGE THE WORLD BY:

- Applying knowledge and skills to the care of their God-given home.
- Solving contemporary societal problems.
- Providing selfless service to others.



**Bachelor of Science
in Engineering (BSE)**

The Andrews University Engineering program leads to a Bachelor of Science in Engineering with emphases in either Electrical and Computer Engineering or Mechanical Engineering. These two emphases build on a strong traditional mathematics, science and engineering core. The Electrical and Computer Engineering emphasis focuses on digital systems, communication systems computer-controlled instrumentation and computer simulation. The Mechanical Engineering emphasis focuses on mechanical design and the electromechanical elements of smart machines. The BSE consists of 35 credits of general education, 32 credits of mathematics and general sciences, an engineering core of 30 credits, and 36 credits in the emphasis area.

**Option for Second
Major or Minor in
Mathematics**

Because mathematics courses make up a large percentage of the BSE core, engineering students automatically earn a minor in mathematics when they complete the BSE requirements. Students have the option of earning a double major in Engineering and Mathematical Studies by taking two additional mathematics courses (consisting of 6–7 semester credits).

**Option for a
Complementary
Second Major or
Minor**

Because the BSE curriculum depends heavily on the disciplines of math and science, completing a second major or minor is easily attainable, and often seamlessly woven into the regular four-year span of undergraduate study.

**Minor in
Engineering**

The Department of Engineering & Computer Science also offers a minor in engineering. The minor consists of a minimum of 20 semester credits chosen from engineering courses, selected in consultation with an engineering faculty advisor. This is an advantageous minor for students taking the Bachelor of Science in Computing (Computer Science) program, also offered by the Department of Engineering and Computer Science.



CHOOSE ANDREWS

Choose Andrews Andrews University has a long-standing tradition and reputation for excellence in academics, with particular strength in math and the sciences. We strive to connect you with an education for the whole you—mind, body and spirit—that better prepares you for meaningful service to society. While studying with us, you'll connect with:

An Ideal Location for Engineering Study Until the 2003–2004 school year, the only Seventh-day Adventist (SDA) university offering a bachelor's level program in engineering was located in the western United States. As 75% of American engineering practice takes place in the Midwest and Eastern states, Andrews University's location is ideal for your instruction and placement in the engineering profession.

Easy Transfer Options into the BSE Program Perhaps you are already planning to go to another Adventist college or university to study pre-engineering, and finish your degree somewhere else. Well, good news! We have formed articulation agreements with other Adventist colleges and universities with pre-engineering programs so that you can transfer into our program after two years and still graduate when you're supposed to.

ENGINEERING PROGRAM EDUCATIONAL OBJECTIVES

- Globally, environmentally, and socially responsible engineering professionals and engineering scholars who are professionally equipped to solve diverse problems and change the world.
- Engineering professionals and scholars who are an integral part of the intellectual conversation of the Seventh-day Adventist Church and who actively contribute to its world-wide mission.



The Engineering program at Andrews University is accredited under the **ABET Engineering Accreditation Commission**. ABET* is the nationally recognized accrediting body for college and university programs in applied science, computing, engineering and technology.

WHAT IS ACCREDITATION?

ABET accreditation is assurance that a college or university program meets the quality standards established by the profession for which it prepares its students.

WHY IS ACCREDITATION IMPORTANT?

- Accreditation helps students and their parents choose quality college programs.
- Accreditation enables employers and graduate schools to recruit graduates they know are well-prepared.
- Accreditation is used by registration, licensure and certification boards to screen applicants.
- Accreditation gives colleges and universities a structure mechanism to assess, evaluate and improve the quality of their programs.

Source: www.abet.org

Accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: (410) 347-7700.

*Accrediting Board for Engineering and Technology (ABET)



Modern Facilities and Hands-on Training Our facilities are well equipped so you can receive the most up-to-date, hands-on instruction we can offer. Our department includes a materials testing lab, an electro-mechanical engineering lab, an electronics lab, a communications systems lab and a large computer lab for your use.

Quality, Christian Instruction in a Friendly Atmosphere Our students consistently tell us they appreciate the warm, friendly atmosphere in our department. With their demonstrated success after graduation, our students continue to show the effectiveness of our professors. Perhaps this is due to our service-based perspective on the profession of engineering.

Impressive Faculty Our faculty bring to the classroom years of industry experience, domestic and international exposure, and brilliant minds ready to challenge students. Our professors are well-researched and published and have made several contributions to the world of engineering where today their inventions help to serve humanity.

Senior Design Project The Senior Project is a major engineering design experience that builds upon the fundamental concepts of mathematics, basic sciences, the humanities and the social sciences, engineering topics and communication skills. This capstone project allows students to select a problem and design a solution for that problem, using the basic sciences, mathematics and engineering sciences. Among the fundamental elements of the design process are the establishment of objectives and criteria, analysis, synthesis, construction, testing and evaluation. There is an emphasis on design with the intention of drawing on the knowledge and skills acquired in earlier courses. Students are encouraged to approach any industries for these design projects.

EXAMPLES OF SENIOR DESIGN PROJECTS FOCUSED ON TOPICS OF TARGET MOTION SYSTEMS, RFID SYSTEMS AND WIRELESS NETWORKS. PHOTO FEATURES DESIGN OF A BENCH TOP WIND TUNNEL FOR MEASUREMENT OF DRAG AND LIFT COEFFICIENTS OF MODEL OBJECTS. (PROJECT BY—DAVID POLLEY & ABDIEL QUETZ).





CAREERS

"ENGINEERING IS THE PROFESSION IN WHICH A KNOWLEDGE OF THE MATHEMATICAL AND NATURAL SCIENCES, GAINED BY STUDY, EXPERIENCE AND PRACTICE, IS APPLIED WITH JUDGMENT TO DEVELOP WAYS TO UTILIZE, ECONOMICALLY, THE MATERIALS AND FORCES OF NATURE FOR THE BENEFIT OF MANKIND."
ACCREDITING BOARD FOR ENGINEERING AND TECHNOLOGY (ABET)

What does an Engineer do?

Engineers are involved at each step in the process of creating, developing and establishing products and services that aid or improve the lives of others. Depending on their specialty area, engineers plan, invent, design, manufacture, test, sell or repair products or perform a combination of these activities. Typically, an engineer works with customers, other engineers, computer-aided design software, laboratory equipment, representatives and reference materials from suppliers, production personnel and marketing professionals to turn an idea into a finished product.

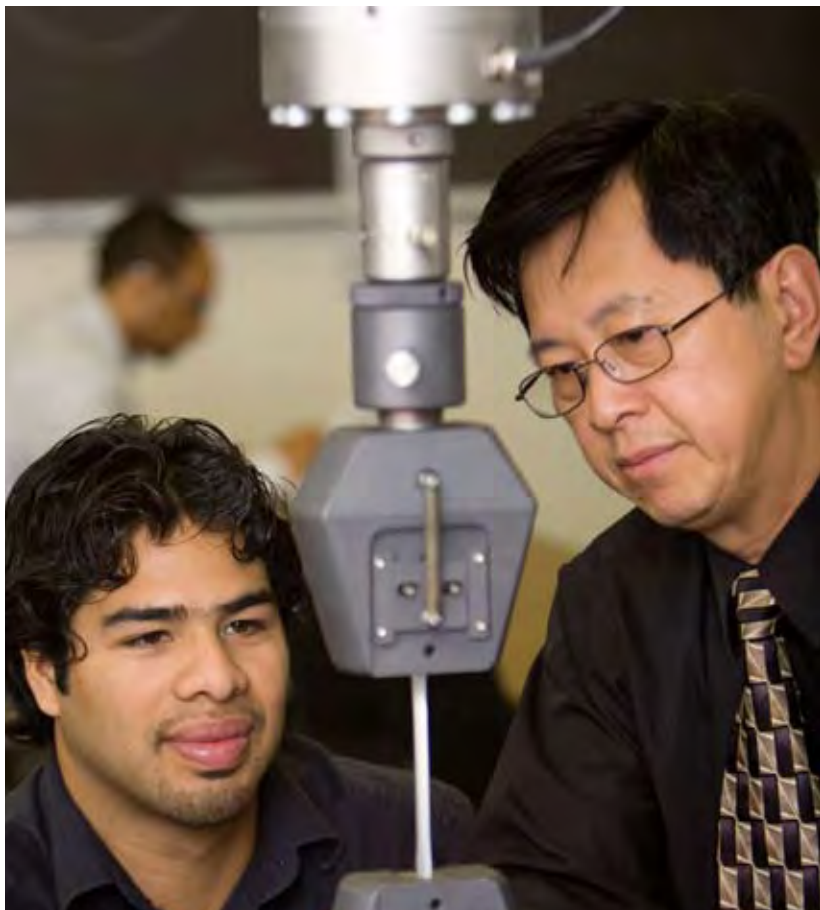


What kinds of jobs can I get with a BSE degree? With a BSE degree, you can become a Design Engineer, Product Engineer, Sales Engineer, Test Engineer, Software Engineer or Computer Engineer, just to name a few.

Where could I work? Our graduates have been hired at such companies as Ford Motors, Whirlpool Corporation, Adobe Systems Incorporated, Pilkington U.S., Clark Equipment Company, Allied Signal, U.S. Corp of Engineers, Magnavox, Hughes Aircraft and Electro-Voice.

What kind of salary should I expect? The starting salaries for engineers are significantly higher than in other fields. Entry-level positions for individuals with a BSE degree are averaging about \$50,000 annually. An individual with 10 years experience can expect \$60,000 to \$75,000 annually. An annual salary of \$80,000 to \$150,000 is common at the top of the profession.

Will I have a job when I graduate? Currently, Engineering is one of the largest professions in the United States. With approximately 1.5 million practicing engineers—three quarters of whom are located in the Midwest and eastern states—the engineering profession expects to see strong job growth in the next decade. According to the U.S. Department of Labor, there will be up to 35% more jobs available in the immediate future. This is because the U.S. economy is largely supported by engineers. As innovators of technology, engineers shape and control our advancement in the world. For this reason, the engineering profession sees much lower rates of unemployment. Even during economic recession, they have less than half the unemployment rate of the general workforce. This demonstrates a balance of supply and demand in the field of engineering, indicating that job prospects are currently excellent and expected to get even better.



"THE ENGINEERING DEPARTMENT AT ANDREWS UNIVERSITY PREPARED ME FOR THE OPPORTUNITY TO CONDUCT SUMMER RESEARCH AT THE PRESTIGIOUS OAK RIDGE NATIONAL LAB. THE INDIVIDUAL ATTENTION FROM PROFESSORS AND THE COLLABORATIVE LEARNING ENVIRONMENT AT ANDREWS, ALONG WITH MY COMMITMENT TO CHRIST, HELPED ME TO ACCOMPLISH MY RESEARCH GOAL."

WHILE INTERNING AT OAK RIDGE NATIONAL LAB ABDIEL DESIGNED THE HIGH FLUX ISOTOPE REACTOR SAFETY SYSTEM.

—ABDIEL QUETZ, CLASS OF 2009





MORE INFO

The Society of Automotive Engineers


The Society of Automotive Engineers (SAE) has been playing a vital role in the development of the mobility industry since 1905. Created by engineers in the automotive business, the SAE expands individuals' technical knowledge and provides a place where students can share their ideas freely. The student chapter of SAE at Andrews University was established in February 2006.

As part of the SAE activities, Andrews University Student Chapter members participated in their first-ever Mini Baja Competition in April 2007, in Florida. In this competition, students are tasked to design and build an off-road vehicle that will survive the severe punishment of rough terrain, mud and water. Students must function as a team to design, build, test, promote and race a vehicle within the limits of the rules. Other activities include attending lectures by other colleges and universities and industry tours.

For more information on the Society of Automotive Engineers visit www.sae.org.

REPRESENTATIVES OF THE ANDREWS SAE STUDENT CHAPTER AT 2007 MINI BAJA COMPETITION





PRIOR TO REJOINING THE FACULTY AT ANDREWS UNIVERSITY, DR. GUNNAR LOVHOIDEN WORKED AT LUMINETX TECHNOLOGIES CORPORATION WHERE HE COMMERCIALIZED HIS PHD PROJECT: THE DESIGN AND CONSTRUCTION OF A VEIN VIEWER™ PROTOTYPE THAT COULD PROJECT VEIN PATTERNS BACK ONTO THE SKIN WITH HIGH ACCURACY.



CONTACT

DEPARTMENT OF ENGINEERING & COMPUTER SCIENCE
HAUGHEY HALL, RM #312
4260 ADMINISTRATION DR
BERRIEN SPRINGS MI 49104-0370
PHONE: 269.471.3420 OR 888.467.6443
FAX: 269.471.3797
EMAIL: ENGR-INFO@ANDREWS.EDU
WEB: WWW.ANDREWS.EDU/COT/ECS

CURRICULUM GUIDES:

CLICK TO SEE GUIDE

- Bachelor of Science: Engineering
With an Electrical and Computer
Engineering Emphasis
- Bachelor of Science: Engineering
With a Mechanical Engineering
Concentration



**BACHELOR OF SCIENCE IN ENGINEERING:
ELECTRICAL & COMPUTER ENGINEERING EMPHASIS**

What classes will I take?

The Bachelor of Science in Engineering (BSE) is a four-year undergraduate degree program. The BSE program includes 32 credits in general education, 35 credits in math and natural science, 30 credits of core engineering courses, and 36 credits in the Electrical and Computer Engineering emphasis. The following is an example of a four-year degree plan for the BSE program. All classes are chosen in consultation with a faculty advisor.

Freshman Year - 1st Semester		Total Credits	17CR
ENGR120	INTRO TO ENGINEERING		2CR
ENGR125	ENGINEERING DRAWING		3CR
MATH141	CALCULUS I		4CR
CHEM131	GENERAL CHEMISTRY I		4CR
ENGL115	ENGLISH COMP I		3CR
HLED120	FIT & WELL		1CR

Freshman Year - 2nd Semester		Total Credits	17CR
ENGR180	MATERIAL SCIENCE		4CR
MATH142	CALCULUS II		4CR
ENGR185	ENGINEERING STATICS		3CR
RELT100	GOD & HUMAN LIFE		3CR
ENGL220	TECHNICAL WRITING		3CR

Sophomore Year - 1st Semester		Total Credits	17CR
ENGR225	CIRCUIT ANALYSIS		3CR
PHYS241 & 271	PHYSICS FOR SCIENTISTS & ENGINEERS I		5CR
MATH240	CALCULUS III		4CR
BHSC100	PHILOSOPHY OF SERVICE		2CR
GEN ED	RELIGION*		3CR

Sophomore Year - 2nd Semester		Total Credits	17CR
ENGR285	ENGINEERING DYNAMICS	3CR	
ENGR275	ELECTRONICS I	3CR	
PHYS242 & 272	PHYSICS FOR SCIENTISTS & ENGINEERS II	5CR	
MATH286	DIFFERENTIAL EQUATIONS	3CR	
COMM104	COMMUNICATION SKILLS	3CR	

Junior Year - 1st Semester		Total Credits	17CR
MATH215	LINEAR ALGEBRA	3CR	
CPTR151	COMPUTER SCIENCE I	4CR	
ENGR335	LOGIC CIRCUIT DESIGN	3CR	
ENGR325	ELECTRONICS II	4CR	
GEN ED	SOC STUDIES / ARTS & HUMANITIES COURSE**	3CR	

Junior Year - 2nd Semester		Total Credits	17CR
ENGR310	LINEAR SYSTEMS ANALYSIS	3CR	
STAT340	PROBABILITY AND STATISTICS	3CR	
CPTR152	COMPUTER SCIENCE II	3CR	
ENGR385	MICROPROCESSOR SYSTEMS	4CR	
GEN ED	RELIGION*	3CR	
PEAC	PHYSICAL ACTIVITY	1CR	

Senior Year - 1st Semester		Total Credits	15CR
ENGR491	SENIOR DESIGN PROJECT I	2CR	
ENGR450	ENGINEERING ECONOMY	2CR	
ENGR435	ELECTROMAGNETIC FIELDS	3CR	
ENGR415	VIRTUAL INSTRUMENTATION	3CR	
GEN ED	RELIGION*	3CR	
ENG/COMPSCI	ELECTIVE	2CR	

Senior Year - 2nd Semester		Total Credits	16CR
ENGR492	SENIOR DESIGN PROJECT II	2CR	
CPTR465	COMPUTER ARCHITECTURE	3CR	
ENGR455	COMMUNICATIONS SYSTEMS	4CR	
ENG/COMP SCI	ELECTIVE	3CR	
GEN ED	SOC STUDIES / ARTS & HUMANITIES COURSE**	3CR	
PEAC	PHYSICAL ACTIVITY	1CR	

Total Credits Needed for Graduation: 133

Suggested course outline: It may not be necessary to take these courses in the order shown. An academic advisor will consult with you in this regard.

- * RELT340 plus two of the following: RELB210, RELT250, RELT225 or RLP400
- ** Choose from HIST118 or IDSC211, plus one from the following: ANTH200, ECON225, GEOG110, PLSC104, PSYC101, SOCI119
- *** Additional requirements (not listed here) include 1 credit in Service. This usually earned by completing approved community service of the student's choice.

CONNECT

Details on courses for the Engineering major as well as general education requirements for the degrees are available on our website, www.andrews.edu/COT or in the Andrews University Bulletin. Apply online or download an application at connect.andrews.edu.

DEPARTMENT OF ENGINEERING, COMPUTER SCIENCE	ENROLLMENT MANAGEMENT
PHONE: 269.471.3420	PHONE: 800.253.2874
EMAIL: ENGR-INFO@ANDREWS.EDU	EMAIL: ENROLL@ANDREWS.EDU
WEB: ANDREWS.EDU/COT	WEB: CONNECT.ANDREWS.EDU



**BACHELOR OF SCIENCE IN ENGINEERING:
MECHANICAL ENGINEERING CONCENTRATION**

What classes will I take?

The Bachelor of Science in Engineering (BSE) is a four-year undergraduate degree program. The BSE program includes 35 credits in general education, 35 credits in math and natural science, 30 credits of core engineering courses, and 33 credits in the Electrical and Computer Engineering or Mechanical Engineering concentration areas. Following is an example of a four-year degree plan for the BSE program. All classes are chosen in consultation with a faculty advisor.

Freshman Year - 1st Semester		Total Credits	16CR
ENGR120	INTRO TO ENGINEERING		2CR
ENGR125	ENGINEERING DRAWING		2CR
MATH141	CALCULUS I		4CR
CHEM131	GENERAL CHEMISTRY I		4CR
ENGL115	ENGLISH COMP I		3CR
HLED120	FIT & WELL		1CR

Freshman Year - 2nd Semester		Total Credits	17CR
ENGR180	MATERIAL SCIENCE		4CR
MATH142	CALCULUS II		4CR
CPTR125	INTRO TO COMPUTER PROGRAMMING		3CR
RELT100	GOD & HUMAN LIFE		3CR
ENGL220	TECHNICAL WRITING		3CR

Sophomore Year - 1st Semester		Total Credits	17CR
ENGR225	CIRCUIT ANALYSIS		3CR
PHYS241 & 271	PHYSICS FOR SCIENTISTS & ENGINEERS I		5CR
MATH240	CALCULUS III		4CR
COMM104	COMMUNICATION SKILLS		2CR
GEN ED	RELIGION*		3CR

Sophomore Year - 2nd Semester		Total Credits	17CR
ENGR280	ENGINEERING MECHANICS		5CR
ENGR275	ELECTRONICS I		4CR
PHYS242 & 272	PHYSICS FOR SCIENTISTS & ENGINEERS II		5CR
BHSC100	PHILOSOPHY OF SERVICE***		2CR
PEAC	PHYSICAL ACTIVITY		1CR

Junior Year - 1st Semester		Total Credits	17CR
MATH215	LINEAR ALGEBRA		3CR
ENGR320	MANUFACTURING PROCESSES		3CR
ENGR330	THERMODYNAMICS		3CR
ENGR340	STRENGTH OF MATERIALS		3CR
GEN ED	SOC STUDIES / ARTS & HUMANITIES COURSE**		3CR
PEAC	PHYSICAL ACTIVITY		1CR

Junior Year - 2nd Semester		Total Credits	16CR
ENGR310	LINEAR SYSTEMS ANALYSIS		3CR
MATH286	DIFFERENTIAL EQUATIONS		3CR
ENGR350	SENSORS & ACTUATORS		3CR
ENGR360	FLUID DYNAMICS		3CR
ENGR390	MECHANICAL ENGINEERING LAB		2CR
GEN ED	RELIGION*		3CR

Senior Year - 1st Semester		Total Credits	17CR
ENGR491	SENIOR DESIGN PROJECT I		2CR
INDT450	INDUSTRIAL ECONOMY		3CR
ENGR410	FEEDBACK CONTROL SYSTEMS		4CR
ENGR420	MACHINE DESIGN		3CR
ENG/IND TECH	ELECTIVE		2CR
GEN ED	RELIGION*		3CR

Senior Year - 2nd Semester		Total Credits	16CR
ENGR492	SENIOR DESIGN PROJECT II		2CR
STAT340	PROBABILITY WITH STATISTICAL APPLICATION		3CR
ENGR440	HEAT TRANSFER		3CR
ENG/IND TECH	ELECTIVE		4CR
GEN ED	SOC STUDIES / ARTS & HUMANITIES COURSE**		3CR
PEAC	PHYSICAL ACTIVITY		1CR

Total Credits Needed for Graduation: 133

Suggested course outline: It may not be necessary to take these courses in the order shown. An academic advisor will consult with you in this regard.

- * Choose from RELB210, RELT250, RELT225 or RELP400
- ** Choose from HIST118 or IDSC211, plus one from the following: ANTH200, ECON225, GEOG110, PLSC104, PSYC101, SOCI119
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