

SCHOOL OF ENGINEERING

CHEMICAL AND BIOCHEMICAL ENGINEERING • CIVIL AND ENVIRONMENTAL ENGINEERING

- ELECTRICAL AND COMPUTER ENGINEERING • MECHANICAL ENGINEERING
- ENGINEERING MANAGEMENT

ADMINISTRATION

DR. ERIC B. WELCH, *Dean*

DR. JOHN VENTURA, *Chair, Electrical and Computer Engineering*

DR. YEU-SHENG SHIUE, *Chair, Mechanical Engineering Department*

DR. NEAL F. JACKSON, *Director of Engineering Management*

MR. R. EUGENE MCGINNIS, *Chair, Civil and Environmental Engineering Department*

DR. ALI POURHASHEMI, *Chair, Chemical and Biochemical Engineering Department*

FACULTY

CHEMICAL AND BIOCHEMICAL ENGINEERING

ALI POURHASHEMI, *Associate Professor*

B.S., M.S., Howard University; Ph.D., University of Maryland (College Park)

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B.S., University of Missouri (Columbia); M.S., University of Arkansas;
Ph.D., Lehigh University

ASIT K. RAY, *Professor*

B.S., Calcutta University; M.S., Ph.D., Lehigh University

CIVIL AND ENVIRONMENTAL ENGINEERING

L. YU LIN, *Professor¹*

B.S., Feng-Chia University; M.S., University of Cincinnati;
Ph.D., University of Central Florida; P.E.

K. MADHAVAN, *Professor*

B.E., Annamalai University (India); M.Tech., Indian Institute of Technology;
M.S., Memphis State University; Ph.D., University of Mississippi; P.E.

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B.E., Chulalongkorn University; M. Engr., Asian Institute of Technology (Thailand);
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ELECTRICAL AND COMPUTER ENGINEERING

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B.S., M.S., Tulane University; Ph.D., Mississippi State University; P.E.

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MECHANICAL ENGINEERING

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B.S.E., Princeton University; M.S., Stanford University; Ph.D., The University of Texas at Austin

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ENGINEERING MANAGEMENT

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PART-TIME FACULTY

CHADWICK BAKER, *Adjunct Professor*
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Ph.D., Université de Rennes (France)

YONGQUAN ZHOU, *Lecturer*
BE., M.E., Wuxi Institute of Light Industry (China);
M.S., Rochester Institute of Technology; CPP

PROFESSORS EMERITI

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FRED H. TERRY
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MISSION

CHRISTIAN BROTHERS UNIVERSITY offers engineering programs in four departments: Chemical and Biochemical, Civil and Environmental, Electrical and Computer, and Mechanical Engineering, accredited by the Engineering Accreditation Commission of the Accreditation Board

for Engineering and Technology (111 Market Place, Suite 1050; Baltimore, MD 21202-4012; telephone number 410-347-7700). Each curriculum is sufficiently flexible to permit a student to tailor a course of study for entry into the engineering profession immediately or for continued study in graduate school. While most graduates do remain in the engineering profession, a significant number use their engineering background as a foundation for professional careers in law, medicine, business, education, science and other fields.

The objective of our chemical, civil, electrical, and mechanical engineering programs at Christian Brothers University is twofold: (1) to continue the Lasallian tradition through excellence in teaching and focusing on the individual student, and (2) to prepare our graduates for professional careers and advanced study in engineering and for a life of moral responsibility and constructive community involvement.

Because the engineer applies scientific principles and practical judgment to the economic solution of many problems concerned with human welfare, the education must include, in addition to courses in engineering analysis and design, numerous courses in natural sciences, in mathematics, and in liberal studies. Thus, the total engineering program at Christian Brothers University provides each student with a liberal education, designed to permit the graduate to make important contributions not only toward the solution of specific technical problems, such as those found in automobile engine or computer circuit design, but also toward such compelling problems of society that are found in transportation, communications, urban redevelopment, energy production and conservation, and air and water quality.

Engineering design is the heart of the creative process of devising solutions to many of society's problems. In the design process, all of an engineer's knowledge of scientific principles and practical judgment is integrated toward the solution of specific problems. The student at Christian Brothers University begins practice in design during the first year, at the same time gaining knowledge and skills in science, mathematics, and communications. This practice in design is integrated through the four years of the program culminating in an independent design project during the senior year.

DEGREE REQUIREMENTS

The Engineering programs at Christian Brothers University are designed to graduate students who will be able to excel as engineering professionals as described above. This requires an integrated program of mathematics, basic sciences, humanities and social sciences, engineering sciences and engineering design. A balance is struck between breadth and depth, technical and non-technical content, and rigor and flexibility. Students must meet departmental requirements as listed in the paradigms that follow this section.

In the case of transfer students, at least one half of the upper division major courses (300-400 level courses in CHE, CE, ECE or ME and upper division Chemistry in the case of CHE) must be taken at Christian Brothers University. Normally, junior and senior level courses from non-ABET accredited programs will not be transferred.

In order to graduate, a student must attain a 2.0 overall grade point average and a 2.0 in the major (CHE, CE, ECE or ME courses and advanced chemistry in the case of Chemical Engineering) and program option.

DUAL DEGREE

The School of Engineering and the School of Sciences offer a dual degree program for students interested in electrical engineering and computer science. With careful coordination, this program allows students to earn both degrees in a normal undergraduate time frame. For specific degree requirements, see Page 93.

JOINT DEGREE

The School of Engineering and the School of Business jointly offer a Bachelor of Science in Engineering Management for students interested in pursuing management positions at engineering firms or other technologically based businesses. For specific degree requirements, see Pages 81, 82, 95, and 96.

SUMMARY OF COURSE REQUIREMENTS

Students must take the University defined General Education requirements (See Page 31).

Program Option (department approved 300/400 level courses in Mathematics, Science, Engineering or Business or advanced ROTC courses—3 hours maximum is allowed for ROTC courses) courses should be part of an integrated sequence of courses consistent with the overall aims and objectives of the School of Engineering. The integrated sequence must receive approval from the student's advisor.

The religion courses will include one course at the 200 level followed by one at the 300 level or above.

The three-course emphasis on religion and moral values provides depth consistent with the mission of Christian Brothers University and the needs of society and the engineering profession.

COURSE REQUIREMENTS FOR A B.S. IN CHEMICAL ENGINEERING

BIOCHEMICAL ENGINEERING CURRICULA

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
CH E 101 CH E Project	1	BIOL 112 Prin Biology II & Lab	4
CH E 111 Intro Chem Engineering I	1	CHEM 114 Prin of Chemistry II	3
CHEM 113 Prin of Chemistry I	3	CHEM 114L Chemistry II Lab	1
CHEM 113L Chemistry I Lab I	1	CH E 112 Intro to Chem Engineering II	1
ENG 111 English Composition I	3	ENG 112 English Composition II	3
MATH 131 Calculus I	3	MATH 132 Calculus II	3
BIOL 111 Prin Biology I & Lab	4	Liberal Studies	3
Liberal Studies	3		
Orientation	0		
Total	19	Total	18

SOPHOMORE YEAR Semester I	Credits	Semester II	Credits
CH E 201 CH E Project	1	CH E 232 Material & Energy Bal	4
CH E 231 Elem Thermodynamics	3	CHEM 212 Organic Chem II & Lab	4
CHEM 211 Organic Chem I & Lab	4	MATH 232 Calculus III	3
MATH 231 Differential Equations	3	PHYS 251 Physics II	3
PHYS 150 Physics I	3	PHYS 251L Physics Lab II	1
PHYS 150L Physics I Lab	1	Liberal Studies	3
Liberal Studies	3		
Total	18	Total	18

JUNIOR YEAR Semester I	Credits	Semester II	Credits
CH E 314 Engineering Economy	3	BIOL 321 Microbiology & Lab	4
CH E 323 Fluid Mechanics	3	CH E 324 Heat Transfer	3
CH E 325 Junior Lab I	1	CH E 326 Junior Lab II	1
CH E 327 Chem. Engr. Thermo	3	CHE 330 Mass Transfer & Separations	3
CHEM 351 Physical Chemistry I	3	ECE 221 Electrical Circuits I	3
CHEM 351L Physical Chem I Lab	1	Liberal Studies	3
Total	14	Total	17

SENIOR YEAR Semester I	Credits	Semester II	Credits
CH E 401 CH E Project	2	CH E 402 CH E Project	2
CH E 425 Process Design I	3	CH E 426 Process Design II	3
CH E 437 Modeling & Control	3	CH E 442 Senior Lab II	1
CH E 441 Senior Lab I	1	CH E 446 Biochemical Engineering	3
CH E 443 Reactor Design	3	Liberal Studies	3
CHEM 312/312L Biochemistry & Lab	4		
Total	16	Total	12

Total credits for graduation: 132.

COURSE REQUIREMENTS FOR A B.S. IN CHEMICAL ENGINEERING

CHEMICAL ENGINEERING CURRICULA

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
CH E 101 CH E Project.....	1	CH E 112 Intro to Chem Engineering II	1
CH E 111 Intro Chemical Engineering I	1	CHEM 114 Prin of Chemistry II.....	3
CHEM 113 Prin of Chemistry I	3	CHEM 114L Chemistry II Lab	1
CHEM 113L Chemistry I Lab	1	ENG 112 English Composition II	3
ENG 111 English Composition I.....	3	MATH 132 Calculus II.....	3
MATH 131 Calculus I	3	Liberal Studies	3
Liberal Studies	3	Liberal Studies	3
Liberal Studies	3		
Orientation.....	0		
Total	18	Total.....	17

SOPHOMORE YEAR Semester I	Credits	Semester II	Credits
CH E 201 CH E Project.....	1	CHEM 212 Organic Chem II & Lab	4
CH E 231 Elem Thermodynamics.....	3	CH E 232 Material & Energy Bal	4
CH E 245 Materials Science	3	MATH 232 Calculus III.....	3
CHEM 211 Organic Chem & Lab.....	4	PHYS 251 Physics II.....	3
MATH 231 Differential Equations	3	PHYS 251L Physics II Lab	1
PHYS 150 Physics I	3	CE/ME 200 Mechanics of Solids I	3
PHYS 150L Physics I Lab	1		
Total.....	18	Total.....	18

JUNIOR YEAR Semester I	Credits	Semester II	Credits
CH E 323 Fluid Mechanics.....	3	CH E 324 Heat Transfer	3
CH E 325 Junior Lab I.....	1	CH E 326 Junior Lab II	1
CH E 327 Chem. Engr. Thermo.....	3	CH E 330 Mass Transfer & Separations	3
CHEM 351 Physical Chemistry I.....	3	CHEM 352 Physical Chemistry II.....	3
CHEM 351L Physical Chem I Lab.....	1	CHEM 352L Physical Chem II Lab	1
CH E 314 Engineering Economics.....	3	ECE 221 Electric Circuits I.....	3
Liberal Studies	3	Liberal Studies	3
Total.....	18	Total.....	17

SENIOR YEAR Semester I	Credits	Semester II	Credits
CH E 401 CH E Project.....	2	CH E 402 CH E Project.....	2
CH E 425 Process Design I	3	CH E 426 Process Design II.....	3
CH E 437 Modeling & Control	3	CH E 442 Senior Lab II	1
CH E 441 Senior Lab I.....	1	CH E 444 Polymers	3
CH E 443 Reactor Design	3	Program Option	3
Program Option	3		
Total.....	15	Total.....	12

Total credits for graduation: 132.

COURSE REQUIREMENTS FOR A B.S. IN CIVIL ENGINEERING

FRESHMAN YEAR Semester I		Credits	Semester II		Credits
CE 100 Intro to Civil & Envir Engr		0	CE 112 Computers Appl. in C&EE		3
CE 105 Intro to Civil & Envir. Desig		2	ENG 112 English Composition II		3
CE 111 Engr. Design Graphics.....		3	MATH 132 Calculus II.....		3
ENG 111 English Composition I.....		3	PHYS 150 Physics I		3
MATH 131 Calculus I		3	PHYS 150L Physics I Lab		1
Liberal Studies		3	Liberal Studies		3
Liberal Studies		3			
Orientation		0			
Total.....		17	Total.....		16

SOPHOMORE YEAR Semester I		Credits	Semester II		Credits
CE 115 Field Measurements.....		3	CE 213 Mechanics of Solids II		3
CE 200 Mechanics of Solids I		3	ME 202 Dynamics		3
CHEM 115 General Chemistry.....		3	CE 299 Hydraulics		3
CHEM 115L General Chemistry Lab		1	CE 299L Hydraulics Lab.....		1
MATH 231 Differential Equations		3	MATH 232 Calculus III.....		3
PHYS 251 Physics II.....		3	Liberal Studies		3
PHYS 251L Physics II Lab		1			
Total.....		17	Total.....		16

JUNIOR YEAR Semester I		Credits	Semester II		Credits
CE 310 Anal/Design Steel Structures		3	CE 311 Analys/Design Concrete Structures		3
CE 313 Hydrology		3	CE 315 Junior Project.....		0
CE 322 Geotech Engr		3	CE 317 Intro to Environ Engineering.....		3
CE 322L Geotech Lab		1	CE 318 Highway Engineering.....		3
PHYS 252 Physics III.....		3	CE 340 Design of Foundations.....		3
CE Major Elective		3	MATH 308 Statistics		3
			Liberal Studies		3
Total.....		16	Total.....		18

SENIOR YEAR Semester I		Credits	Semester II		Credits
CE 400 The Compleat Engineer		3	CE 314 Engineering Economy		3
CE 417 Environmental Engr Lab.....		1	CE 432 Design Project II		2
CE 431 Design Project I.....		2	CE Major Elective.....		3
CE Major Elective		3	ME 305/ChE 231 Thermodynamics		3
ECE 221 Electric Circuits I		3	Program Options.....		3
MATH Elective ¹		3	Liberal Studies		3
Total.....		15	Total.....		17

Total credits for graduation: 132.

¹ Must be a 300/400 level Math course.

COURSE REQUIREMENTS FOR A B.S. IN ELECTRICAL ENGINEERING COMPUTER ENGINEERING CURRICULA

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
CHEM 115 General Chemistry.....	3	ECE 172 Intermed. Prog. & Lab	4
CHEM 115L Gen Chemistry Lab	1	ENG 112 English Comp II.....	3
ENG 111 English Comp I	3	MATH 132 Calculus II.....	3
MATH 131 Calculus I	3	PHYS 150 Physics I.....	3
ME 121 Solids Modeling.....	3	PHYS 150L Physics I Lab	1
Liberal Studies	3	ECE 250 Digital Design	3
Orientation	0		
Total.....	16	Total	17

SOPHOMORE YEAR Semester I	Credits	Semester II	Credits
ECE 221 Electric Circuits I	3	CE 200 Mechanics of Solids I	3
ECE 234 Data Structures/Program	3	ECE 201 Instrumentation	2
ECE 244 Data Structures Lab.....	1	ECE 222 Electric Circuits II.....	3
ECE 251 Microprocessors	3	ECE 360 Object Oriented Design.....	3
MATH 231 Differential Equations	3	Liberal Studies	3
PHYS 251 Physics II.....	3	MATH 232 Calculus III.....	3
PHYS 251L Physics II Lab	1		
Total.....	17	Total.....	17

JUNIOR YEAR Semester I	Credits	Semester II	Credits
ECE 331 Electronics I.....	3	ECE 370 Operating Sysytems.....	3
ECE 341 Junior Lab I	1	ECE 314 Engineering Economy	3
ECE 350 Computer Systems	3	ECE 332 Electronics II	3
ECE 406 Electromagnetic Fields.....	4	ECE 335 Systems, Signals, Noise	3
MATH 309 Probability	3	ECE 342 Junior Lab II.....	1
PHYS 252 Physics III.....	3	ECE 450 Computer Networks	3
		Liberal Studies	3
Total	17	Total.....	19

SENIOR YEAR Semester I	Credits	Semester II	Credits
ECE 409 ECE Project I	1	ECE 400 The Compleat Engineer	3
ECE Major Elective	3	ECE 410 ECE Project II.....	2
ME 202 Dynamics.....	3	ECE Major Elective.....	3
Liberal Studies	6	MATH 405 Discrete Math.....	3
Program Option	3	Liberal Studies	3
Total.....	16	Total.....	14

Total Credits for graduation: 133.

All major electives and at least one program option must include design experience and therefore be a course offered by the School of Engineering.

Intern Program in France: Students with Junior Standing in the Electrical and Computer Engineering Department can complete 12 hours abroad. For information contact the ECE Department.

COURSE REQUIREMENTS FOR A B.S. IN ELECTRICAL ENGINEERING

ELECTRICAL ENGINEERING CURRICULA

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
CHEM 115 Chemistry I and Lab.....	4	ENG 112 English Composition II	3
ECE 172 Int. Programming & Algorithms	3	MATH 132 Calculus II.....	3
ENG 111 English Composition I.....	3	ME 121 Solids Modeling	3
MATH 131 Calculus I	3	PHYS 150 Physics I.....	3
Liberal Studies	3	PHYS 150L Physics I Lab	1
Orientation	0	Liberal Studies	3
Total.....	16	Total.....	16

SOPHOMORE YEAR Semester I	Credits	Semester II	Credits
CE 200 Mechanics of Solids I.....	3	ECE 201 Instrumentation	2
ECE 221 Electric Circuits I	3	ECE 222 Electric Circuits II.....	3
ECE 250 Digital Design.....	3	ECE 251 Microprocessor Arch/Prog	3
MATH 231 Differential Equations	3	MATH 232 Calculus III.....	3
PHYS 251 Physics II.....	3	PHYS 252 Physics III.....	3
PHYS 251L Physics II Lab.....	1	ME 202 Dynamics.....	3
Total.....	16	Total.....	17

JUNIOR YEAR Semester I	Credits	Semester II	Credits
ECE 331 Electronics I.....	3	ECE 314 Engineering Economy.....	3
ECE 341 Junior Lab I	1	ECE 322 Linear Controls.....	3
ECE 406 Electromagnetic Field Theory	4	ECE 332 Electronics II	3
MATH 309 Probability	3	ECE 335 Systems, Signals, & Noise.....	3
PHYS 353 Solid State Physics.....	3	ECE 342 Junior Lab II.....	1
Liberal Studies	3	Liberal Studies	3
Total.....	17	Total.....	16

SENIOR YEAR Semester I	Credits	Semester II	Credits
ECE 401 Energy Conversion.....	3	ECE 400 The Compleat Engineer	3
ECE 403 Energy Conversion Lab.....	1	ECE 410 ECE Project II.....	2
ECE 409 ECE Project I	1	ECE Major Elective.....	3
ECE Major Elective	3	Liberal Studies	3
ME 305 Thermodynamics	3	Mathematics Elective	3
Liberal Studies	3	Program Option	3
Total.....	14	Total.....	17

Total credits for graduation: 129.

All major electives and at least one program option must include design experience and therefore be a course offered by the School of Engineering.

Intern Program in France: Students with Junior Standing in the Electrical and Computer Engineering Department can complete 12 hours abroad. For information contact the ECE Department.

COURSE REQUIREMENTS FOR B.S. IN ELECTRICAL ENGINEERING AND A B.S. IN COMPUTER SCIENCE

COMPUTER ENGINEERING CURRICULUM

FRESHMEN YEAR Semester I		Credits	Semester II		Credits
ENG 111 English Composition I.....	3		ENG 112 English Composition II.....	3	
CHEM 115 Gen Chemistry and Lab.....	4		ECE 172 Int. Prog. & Lab.....	4	
MATH 131 Calculus I.....	3		MATH 132-Calculus II.....	3	
ME 121 Solids Modeling.....	3		PHYS 150 Physics I and Lab.....	4	
Liberal Studies.....	3		Liberal Studies.....	3	
Orientation.....	0				
Total.....	16		Total.....	17	

SOPHOMORE YEAR Semester I		Credits	Semester II		Credits
ECE 234/244 Structured Prog and Lab.....	4		ECE 251 Microprocessors.....	3	
ECE 250 Digital Design.....	3		ECE 360 Object Oriented Systems Design.....	3	
MATH 231 Differential Equations.....	3		CE 200 Mechanics of Solids I.....	3	
PHYS 251 Physics II and Lab.....	4		ECE 201 Instrumentation.....	2	
ECE 221 Electric Circuits I.....	3		ECE 222 Electric Circuits II.....	3	
			MATH 232 Calculus III.....	3	
Total.....	17		Total.....	17	

JUNIOR YEAR Semester I		Credits	Semester II		Credits
ECE 331 Electronics I.....	3		ECE 314 Engineering Economy.....	3	
ECE 341 Junior Lab.....	1		ECE 342 Junior Lab II.....	1	
ECE 350 Computer Systems.....	3		ECE 332 Electronics II.....	3	
ECE 406 Electromagnetic Fields.....	4		ECE 335 Systems Signals & Noise.....	3	
MATH 309 Probability.....	3		ECE 450 Computer Networks.....	3	
PHYS 252 Physics III.....	3		ECE 370 Operating Systems.....	3	
			Liberal Studies.....	3	
Total.....	17		Total.....	19	

SENIOR YEAR Semester I		Credits	Semester II		Credits
ECE 409 ECE Project I.....	1		ECE 410 ECE Project II.....	2	
ECE Major Elective.....	3		CS 440 Algorithms.....	3	
ECE 471 Database Design.....	3		CS 460 Topics in Computer Science.....	3	
Liberal Studies.....	3		ECE 400 The Compleat Engineer.....	3	
Math Elective.....	3		Liberal Studies.....	3	
Liberal Studies.....	3		MATH 405 Discrete Math.....	3	
ME 202 Dynamics.....	3				
Total.....	19		Total.....	17	

Total credits for graduation: 139

COURSE REQUIREMENTS FOR B.S. IN MECHANICAL ENGINEERING

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
CHEM 115 General Chemistry.....	3	ME 112 Scientific Programming	3
CHEM 115L General Chem Lab.....	1	ENG 112 English Composition II	3
ENG 111 English Composition I.....	3	MATH 132 Calculus II.....	3
MATH 131 Calculus I.....	3	PHYS 150 Physics I.....	3
ME 121 Solids Modeling.....	3	PHYS 150L Physics I Lab	1
Liberal Studies.....	3	Liberal Studies	3
Orientation.....	0		
Total.....	16	Total.....	16

SOPHOMORE YEAR Semester I	Credits	Semester II	Credits
ME 200 Mechanics of Solids.....	3	ECE 221 Electric Circuits I.....	3
MATH 231 Differential Equations	3	MATH 232 Calculus III.....	3
ME 201 Manufacturing Processes.....	3	ME 202 Dynamics.....	3
PHYS 251 Physics II.....	3	ME 305 Thermodynamics I.....	3
PHYS 251L Physics II Lab.....	1	PHYS 252 Physics III.....	3
Liberal Studies.....	3	Liberal Studies	3
Total.....	16	Total.....	18

JUNIOR YEAR Semester I	Credits	Semester II	Credits
Liberal Studies.....	3	ME 302 Energy Systems Lab.....	2
MATH 329 Applied Analysis	3	ME 306 Heat Transfer	3
ME 301 Engr Instrumentation Lab.....	2	ME 318 Dynamics of Machines.....	3
ME 313 Fluid Mechanics	3	ME 422 Control Systems.....	3
ME 316 Engr Thermodynamics II.....	3	MATH Elective.....	3
ME 317 Kinematics	3	Liberal Studies	3
Total.....	17	Total.....	17

SENIOR YEAR Semester I	Credits	Semester II	Credits
ME 314 Engineering Economy.....	3	ME 400 The Compleat Engineer.....	3
ME 401 Mechanical Systems Lab.....	2	ME 408 ME Project II.....	3
ME 407 ME Project I.....	3	ME Major Elective.....	3
ME 420 Machine Design.....	3	Program Option	3
ME 421 Thermal Sys Analy & Dsgn.....	3	Program Option	3
ME Major Elective.....	3		
Total.....	17	Total.....	15

Total credits for graduation: 132.

BACHELOR OF SCIENCE IN ENGINEERING MANAGEMENT (INFORMATION SYSTEMS CONCENTRATION)

Offered Jointly by the School of Business and the School of Engineering

GENERAL EDUCATION REQUIREMENTS (See Page 31)	34 hours
Dimensions of Faith and Community (IDS 101)	3 hours
English Composition (ENG 111 and 112)	6 hours
Literature (ENG 211, 212, 221, or 222)	3 hours
Mathematics (MATH 131)	3 hours
Physics I and Lab (PHYS 150/150L)	4 hours
Physics II (or III) and Lab (PHYS 251/251L or 252/252L)	4 hours
Social Sciences/ History	6 hours
Religious Studies Electives	6 hours
Moral Values (PHIL 323, 220, or 234).....	3 hours
SCHOOL OF BUSINESS REQUIREMENTS	45 hours
Technology/Business (ITM 153)	3 hours
Speech Communications (SPCH 125)	3 hours
Business Writing (ENG 371).....	3 hours
Accounting (ACCT 260 & 270).....	6 hours
Business Law (BLAW 301 & 302, or CE 420 ¹)	6 hours
Economics (ECON 214 & 215).....	6 hours
Management (MGMT 337, 339, & 498).....	9 hours
Marketing and Logistics (MKTG 311 & 418).....	3 hours
Statistics (STAT 221 & 222 or MATH 308 ²)	6 hours
SCHOOL OF ENGINEERING REQUIREMENTS	52 hours
Mathematics (MATH 132 & 231)	6 hours
Physics II (or III) and Lab (PHYS 251/251L or 252/252L)	4 hours
Circuits I (ECE 221)	3 hours
Engineering Economics (ECE/ME/CE/CHE 314 ³).....	3 hours
Modeling (ME 121, CE 111)	3 hours
Mechanics (ME 200, CE 200).....	3 hours
Dynamics (ME 202).....	3 hours
Thermodynamics I (ME 305)	3 hours
Compleat Engineer (CE/ME/EE 400).....	3 hours
Computer Science Fund. (ITM 251/CS 109, ECE/ME/CE 112).....	3 hours
Computational Logic (ITM 252, CS 122).....	3 hours
Design & Analysis (ITM 351)	3 hours
Information Systems (ITM 455).....	3 hours
Decision Support (ITM 480).....	3 hours
Engineering Elective ⁴ (CHE 391)	3 hours
Engineering Elective ⁵ (ME 201, ME 429)	3 hours
TOTAL HOURS FOR GRADUATION	131 hours

¹ BLAW 302 or CE 420 Contracts and Specifications

² STAT 222 or MATH 308 Statistics

³ Engineering Economics (314) substitutes for Financial Management I (FIN 327) in the Business Core.

⁴ An upper division Engineering elective (200, 300, 400); recommended CHE 319 Packaging

⁵ An upper division Engineering elective (200, 300, 400); recommended ME 201 or ME 429

BACHELOR OF SCIENCE IN ENGINEERING MANAGEMENT (PACKAGING CONCENTRATION)

Offered Jointly by the School of Business and the School of Engineering

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
SPCH 125 Speech Communication	3	ENG 112 English Composition II	3
ENG 111 English Composition I	3	ME 121 Modeling	3
IDS 101 Faith & Community	3	ECON 214 Prin of Micro Econ	3
MATH 131 Calculus I	3	Social Science Elective	3
CHEM 113 or 115 Chemistry I	3	PHYS 150 Physics I	3
Orientation	0	PHYS 150L Physics I Lab	1
Total	15	Total	16

SOPHOMORE YEAR Semester I	Credits	Semester II	Credits
ACCT 260 Financial Accounting	3	ACCT 270 Managerial Accounting	3
STAT 221 Elementary Statistics	3	STAT 222 Intermediate Statistics	3
ITM 153 Microcomputer Applications	3	CE 213 Mechanics of Solids II	3
CHE 245 Materials Science	3	PHYS 251 Physics II	3
CE/ME 200 Mechanics of Solids I	3	PHYS 251L Physics II Lab	1
		English Literature	3
Total	15	Total	16

JUNIOR YEAR Semester I	Credits	Semester II	Credits
ME 201 Manufacturing Processes	3	Moral Values	3
CHE/ME 319 Prin of Packaging	3	CHE/ME 320 Dist/Med Dev Packaging	3
BLAW 301 Business Law I	3	CE420 Contracts/Specifications	3
ENG 371 Business Writing	3	MGMT 337 Prin of Org & Mgmt	3
MKTG 311 Prin of Marketing	3	Engineering Elective	3
Total	15	Total	15

SENIOR YEAR Semester I	Credits	Semester II	Credits
ECON 215 Prin of Macro Econ	3	MKTG 418 Phys Dist/Traffic Mgmt.....	3
MGMT 339 Prod & Ops Management	3	MGMT 498 Business Policy	3
CHE/CE/ECE/ME 314 Engrg Econ	3	ChE 490 Sp. Topics: Packaging Project.....	2
Engineering Elective	3	Social Science Elective	3
MKT 418 Supply Chain & Logistics	3	Engineering Elective	3
Religious Studies	3		
Total	18	Total	14

Total credits for graduation: 124.

MINOR IN THE SCHOOL OF ENGINEERING

Minor in Computer Engineering: A minor in Computer Engineering is open to students not part of the Electrical Engineering majors, and they must complete seven courses in the computer engineering curriculum according to the following criteria:

1. at most 5 courses from the following: ECE 112, 201, 221, 233, 234, 250, and 251.
2. at least 2 courses from the following: ECE 350, 450-459, 470-479.