



ARTS AND SCIENCE-ENGINEERING CURRICULA

- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Mechanical Engineering

This five-year program leads to the degree of Bachelor of Arts or Bachelor of Science and the degree of Bachelor of Chemical, Civil, Electrical, or Mechanical Engineering.

The Arts-Engineering Program serves to both broaden the engineer's knowledge of the liberal arts and provide him or her with additional professional expertise. Many employers recognize the utility of hiring engineers who have extra proficiency in the language arts, the social sciences, and the humanities. Increasingly they search for employees with knowledge in some field that is interrelated with modern engineering, for example, economics, law, communication, mathematics and computer science and many of the biological and physical sciences. Yet some Arts-Engineering students have opted for this five-year program mainly for the personal satisfaction it can provide. These students, while committed to engineering as a profession, seek to enrich their nonworking hours with artistic or cultural knowledge acquired while in the College of Arts and Science.

In this program, students pursue courses in both the College of Arts and Science and the College of Engineering. It has attracted all kinds of students, among them freshmen who are undecided between a career in engineering or some field in Arts and Science. After sampling courses in both colleges, they can decide to contin-

ue in the program or switch to a four-year engineering or Arts and Science program. Conversely, a significant number of students who graduate as Arts-Engineers transferred into the program at some later time in their college career, either seeking to enrich their engineering studies or, if they were originally Arts and Science majors, deciding to become engineers.

The five-year Arts and Science-Engineering program assumes that all requirements will be fulfilled in the engineering department of the student's choice. A minimum of thirty additional credits in Arts and Science is required. The additional courses are selected in consultation with an Arts and Science adviser in such a way as to fulfill all requirements in that college. Since many courses taken as part of the engineering curricula are also applicable to Arts and Science degrees, all requirements for both degrees can usually be met within the framework of the "bachelor's-plus-30."

For his or her degree in the College of Arts and Science the student must fulfill the following requirements.

Second Writing Course: Must be passed with a grade of C or better; the course may also simultaneously fulfill one of the group or elective courses listed below.

Language: Must pass in an intermediate-level language course or pass a proficiency test at the intermedi-

ate level. Note that credits earned in meeting the language requirements cannot be counted toward fulfilling the group requirements or the Arts and Science electives below.

Group Requirements

Group A: Analysis and appreciation of the creative arts and humanities (12 credits, in at least two departments or programs).

Group B: The study of culture and institutions over time (12 credits in at least two departments or programs).

Group C: Empirically based study of human beings and their environment (12 credits in at least two departments or programs).

Group D: The study of natural phenomena through experiment and analysis. Automatically satisfied by means of the engineering curriculum.

Consult the latest listing of courses fulfilling group requirements available at the Arts and Science Dean's Office, 127 Memorial Hall.

NOTE: The above groups differ from General Education groups of the College of Engineering. (See College General Education Program in the College of Engineering section.) This requires the student to make careful course selection in order to have courses that satisfy both curricula simultaneously.

Area of Concentration: 15 credits of Arts and Science electives to be used for acquiring some depth of knowledge in a field chosen by the student in consultation with an Arts and Science adviser. It is recognized that the 15 credits designated for specialization may well be insufficient to qualify the student for an official major in most departments of the College of Arts and Science. Hence no major is required. Arts-Engineers whose "Area of Concentration" falls short of a major will graduate with a B.A. from the College of Arts and Science.

However, some students do manage to major in an Arts and Science department either by taking more than the minimum number of Arts and Science courses, or by specializing in a scientific or mathematical field, several of whose courses are also required for their engineering program. Some science departments give B.A. and B.S. degrees. Arts-Engineers majoring in such a department can attain either degree by following the appropriate departmental requirements. But there is one exception. While a few departments do not require a language proficiency for a B.S., nevertheless all Arts-Engineers must fulfill the language requirement.

DEGREE: BACHELOR OF ARTS or BACHELOR OF SCIENCE —BACHELOR OF CHEMICAL ENGINEERING MAJOR: NONE REQUIRED—CHEMICAL ENGINEERING

CURRICULUM

CREDITS*

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing	3 ^{1S}
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content.#	3 ¹⁻⁴

ARTS AND SCIENCE COLLEGE REQUIREMENTS

Skill Requirements

Writing:	3
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A writing course involving significant writing experience including two papers with a combined minimum of 3,000 words to be submitted for extended faculty critique of both composition and content.

Foreign Language:	0-12
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Completion of the intermediate-level course (107 or 112) in a given language. Students with four or more years of high school work in a single foreign language may attempt to fulfill the requirement in that language by taking an exemption examination.

Breadth Requirements (See page 80)

Group A	12
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Understanding and appreciation of the creative arts and humanities. Twelve credits representing at least two areas.

Group B	12
---------------	----

The study of culture and institutions over time. Twelve credits representing at least two areas.

Group C	12
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Empirically based study of human beings and their environment. Twelve credits representing at least two areas.

The above groups differ from the General Education groups of the College of Engineering. This requires careful course selection in order to have courses that satisfy both curricula simultaneously.

AREA OF CONCENTRATION REQUIREMENTS

Area of Concentration:

Fifteen credits of Arts and Science electives to be used for acquiring some depth of knowledge in a field chosen in consultation with an Arts and Science adviser.	15
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Arts-Science Courses Completed	1-5
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The liberal arts component is listed as 51 credit hours. The absolute minimum required to satisfy the requirements listed above is 45; this assumes that the foreign language requirement is satisfied from high school work, the writing course is in one of the Groups A, B, or C, and that nine credits of the Area of Concentration are also from one of the Groups A, B, or C. Thus, students without language skills and concentrating in science or mathematics will need more than 51 credit hours to complete all of these requirements.

ENGINEERING COLLEGE REQUIREMENTS

Mathematics

MATH 241 Analytic Geometry and Calculus A	4 ^{1F}
MATH 242 Analytic Geometry and Calculus B	4 ^{1S}
MATH 243 Analytic Geometry and Calculus C	4 ^{2F}
MATH 302 Ordinary Differential Equations	3 ^{2S}

*Superior figures indicate semester (fall or spring) and/or years in which the course is normally taken, i.e., ^{1F}fall of freshman year, ^{2S}spring of sophomore year, etc.
#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 27.

Physics

PHYS 207	General Physics	4 ^{2F}
PHYS 208	General Physics	4 ^{2S}

MAJOR REQUIREMENTS**External to the College***Biology*

BISC 207	Introductory Biology I	4 ^{2F}
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Chemistry

CHEM 111	General Chemistry†	3 ^{1F}
CHEM 119	Quantitative Chemistry I	2 ^{1F}
CHEM 112	General Chemistry	3 ^{1S}
CHEM 120	Quantitative Chemistry II	3 ^{1S}
CHEM 443	Physical Chemistry	3 ^{3F}
CHEM 444	Physical Chemistry	3 ^{3S}
CHEM 331	Organic Chemistry	3 ^{2F}
CHEM 332	Organic Chemistry	3 ^{2S}
CHEM 333	Organic Chemistry Laboratory I	1 ^{1F}

Computer Science

CISC 106	General Computer Science for Engineers	3 ^{1F}
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Within the College

MASC 302	Material Science for Engineers	4 ^{4F}
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Within the Department

CHEG 009	Chemical Engineering Freshman Seminar	0 ^{2F}
CHEG 112	Introduction to Chemical Engineering	3 ^{2S}
CHEG 231	Chemical Engineering Thermodynamics	3 ^{3F}
CHEG 341	Fluid Mechanics	3 ^{4F}
CHEG 342	Heat and Mass Transfer	3 ^{4S}
CHEG 325	Chemical Engineering Thermodynamics	3 ^{3S}
CHEG 332	Chemical Engineering Kinetics	3 ^{4S}
CHEG 345	Chemical Engineering Laboratory I	3 ^{4S}
CHEG 443	Mass Transfer Operations	3 ^{5F}
CHEG 445	Chemical Engineering Laboratory II	3 ^{5F}
CHEG 432	Chemical Process Analysis	3 ^{5S}

Technical Electives*Technical Electives*

The purpose of the technical electives is to advance the scientific or engineering background of the chemical engineer at the intermediate (300-400) level. The technical electives program is a minimum of six credits taken from courses in the following list, normally two courses. Students should select their technical electives in the spring of sophomore year to avoid scheduling conflicts. Students should formulate an academic plan for their technical and chemical engineering electives with the assistance of their academic advisor.

Biology

BISC 301	Cellular and Molecular Biology	4
BISC 303	Genetic and Evolutionary Biology	4
BISC 305	Cell Biology	4
BISC 306	General Physiology	4
BISC 4xx	Biology course chosen with the approval of the adviser	3-4

Chemistry

CHEM 334	Organic Chemistry Majors Laboratory II	2
CHEM 457	Inorganic Chemistry	3
CHEM 527	Introductory Biochemistry	3
CHEM 6xx	Chemistry course chosen with the approval of the adviser	3
CHEM 8xx	Chemistry course chosen with the approval of the adviser	3

Computer Science

CISC 300	Introduction to Scientific Computation	3
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Mathematics

MATH 349	Elements of Linear Systems	3
MATH 389	Discrete Mathematics	3
MATH 426	Introduction to Numerical Analysis and Algorithmic Computation	3
MATH 427	Approximation Theory	3
MATH 428	Algorithmic and Numerical Solution of Differential Equations	3
MATH 5xx	Mathematics course chosen with the approval of the adviser	3
MATH 6xx	Mathematics course chosen with the approval of the adviser	3

Mechanical Engineering Applied Mathematics

MEEG 361	Applied Engineering Analysis	3
MEEG 863	Engineering Analysis	3
MEEG 864	Engineering Analysis	3

Physics

PHYS 419	Analytical Mechanics	3
PHYS 420	Analytical Mechanics	3
PHYS 6xx	Physics course chosen with the approval of the adviser	3

Statistics

STAT 450	Statistics for the Engineering and Physical Sciences	3
STAT 6xx	Statistics course chosen with the approval of the adviser	3

Electronic Materials

(please note prerequisites)

ELEG 314	Electronics and Instrumentation	4
ELEG 340	Solid State Electronics	3
ELEG 4xx	Solid State Fabrication Laboratory	1
ELEG 623	Electrical Properties of Matter I	3
ELEG 626	Integrated Circuits	3
ELEG 629	Digital Structures	3

Polymeric Materials

MEEG 410	Experimental Mechanics for Composite Materials	3
MEEG 415	Finite Element Analysis	3

Chemical Engineering Technical Electives

The curriculum provides three chemical engineering technical electives in the senior year. These courses are intended to provide some flexibility in selecting a chemical engineering program at the advanced level. Students should decide with the assistance of their adviser if they should conduct a program of independent research and then choose their course elective(s).

Chemical engineering technical electives are defined as follows: Any Chemical Engineering course numbered between 470 and 499; any 400- or higher-level Materials and Metallurgy course; UNIV 401-UNIV 402 Senior Thesis; any 600- or 800-level course in Chemical Engineering. Courses at the 600 level and 800 level are graduate courses open, with the consent of the instructor, to advanced students in senior standing.

Concentrations

The technical electives and chemical engineering electives can be coupled to provide a more intense concentration in an area of interest. The groupings below are some examples of this approach.

Applied Mathematics

MATH 426	Introduction to Numerical Analysis and Algorithmic Computation	3 ^{4S}
MATH 389	Discrete Mathematics	3 ^{5F}
CHEG 827	Chemical Engineering Problems	2-3 ^{5S}

†Students may enter Chemical Engineering after completing the eight-credit freshman Chemistry sequence, CHEM 103-104. However, an additional three-credit Chemistry course will be required.

<i>Biology</i>		
BISC 301	Cellular and Molecular Biology	4 ^{5S}
CHEM 527	Introductory Biochemistry	3 ^{5F}
CHEG 620	Biochemical Engineering	3 ^{5S}
<i>Chemistry</i>		
CHEM 457	Inorganic Chemistry	3 ^{4S}
CHEM 527	Introductory Biochemistry	3 ^{5F}
CHEG 606	Introduction to Catalysis	3 ^{5S}
CHEG 610	Industrial and Engineering Chemistry	3 ^{5S}
CHEG 836	Applied Chemical Kinetics	3 ^{5F}
<i>Electronic Materials</i>		
ELEG 314	Electronics and Instrumentation	4 ^{4F}
ELEG 340	Solid State Electronics	3 ^{4S}
ELEG 4xx	Solid State Fabrication Laboratory	1 ^{5F}
CHEG 667	Solid State Device Fabrication	3 ^{5S}
<i>Polymeric Materials</i>		
MEEG 213	Principles of Mechanics I	4 ^{4W}
MEEG 415	Finite Element Analysis	3 ^{5F}
MEEG 410	Experimental Mechanics for Composite Materials	3 ^{5W}
CHEG 601	Structure and Properties of Polymer Materials	3
or		
CHEG 603	Polymerization Reaction Engineering	3 ^{4F}
CHEG 602	Polymer Process Analysis and Design	3 ^{4S}
or		
CHEG 604	Introduction to Polymer Science and Engineering II	3
CREDITS TO TOTAL A MINIMUM OF		160

DEGREE: BACHELOR OF ARTS or BACHELOR OF SCIENCE
—BACHELOR OF CIVIL ENGINEERING
MAJOR: NONE REQUIRED—CIVIL ENGINEERING

CURRICULUM	CREDITS*
UNIVERSITY REQUIREMENTS	
ENGL 110 Critical Reading and Writing	3 ^{1S}
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content.#	3 ¹⁻⁴

ARTS AND SCIENCE COLLEGE REQUIREMENTS

Skill Requirements

Writing: 3

A writing course involving significant writing experience including two papers with a combined minimum of 3,000 words to be submitted for extended faculty critique of both composition and content

Foreign Language: 0-12
 Completion of the intermediate-level course (107 or 112) in a given language. Students with four or more years of high school work in a single foreign language may attempt to fulfill the requirement in that language by taking an exemption examination.

Breadth Requirements (See page 80)

Group A: 12
 Understanding and appreciation of the creative arts and humanities. Twelve credits representing at least two areas

Group B: 12
 The study of culture and institutions over time. Twelve credits representing at least two areas

Group C: 12
 Empirically based study of human beings and their environment. Twelve credits representing at least two areas

The above groups differ from the General Education groups of the College of Engineering. This requires careful course selection in order to have courses that satisfy both curricula simultaneously

AREA OF CONCENTRATION REQUIREMENTS

Area of Concentration:

Fifteen credits of Arts and Science electives to be used for 15
 acquiring some depth of knowledge in a field chosen in consultation with an Arts and Science adviser.

Arts-Science Courses Completed 1-5

The liberal arts component is listed as 51 credit hours. The absolute minimum required to satisfy the requirements listed above is 45; this assumes that the foreign language requirement is satisfied from high school work, the writing course is in one of the Groups A, B, or C, and that nine credits of the Area of Concentration are also from one of the Groups A, B, or C. Thus, students without language skills and concentrating in science or mathematics will need more than 51 credit hours to complete all of these requirements.

ENGINEERING COLLEGE REQUIREMENTS

Mathematics

MATH 241	Analytic Geometry and Calculus A	4 ^{1F}
MATH 242	Analytic Geometry and Calculus B	4 ^{1S}
MATH 243	Analytic Geometry and Calculus C	4 ^{2F}
MATH 302	Ordinary Differential Equations	3 ^{2S}

Physics

PHYS 207	General Physics	4 ^{1F}
PHYS 208	General Physics	4 ^{2F}

MAJOR REQUIREMENTS

External to the College

CHEM 103	General Chemistry	4 ^{1F}
CHEM 104	General Chemistry	4 ^{1S}
CISC 106	General Computer Science for Engineers	3 ^{2F}
GEOL 107	General Geology I	4 ^{2F}
ENGL 410	Technical Writing	3 ^{3S}
STAT 450	Statistics for the Engineering and Physical Sciences	3 ^{3S}

Within the College

EGGG 125	Introduction to Engineering (MASC)	2 ^{1F}
EGGG 132	Engineering Graphics/Analysis	2 ^{1F}
MECH 305	Fluid Mechanics	3 ^{3S}
MECH 306	Fluid Mechanics Laboratory	1 ^{3S}
MASC 302	Material Science for Engineers	4 ^{3F}

Within the Department

CIEG 211	Statics	3 ^{2F}
CIEG 212	Strength of Materials	3 ^{2S}
CIEG 213	Materials Laboratory	1 ^{2S}
CIEG 331	Introduction to Environmental Engineering	3 ^{3F}
CIEG 301	Analysis of Structures	4 ^{3F}
CIEG 311	Dynamics	3 ^{3F}
CIEG 351	Transportation Engineering	3 ^{3S}
CIEG 381	Civil Engineering Analysis	3 ^{3S}
CIEG 420	Soil Mechanics	4 ^{4F}
CIEG 461	Senior Design Project	3 ^{4S}
CIEG 482	Systems Design and Operation	3 ^{4F}

One of:

CIEG 402	Steel Design	3 ^{4F}
or		
CIEG 403	Concrete Design	3

*Superior figures indicate semester (fall or spring) and/or years in which the course is normally taken, i.e., ^{1F}fall of freshman year, ^{2S}spring of sophomore year, etc.
 #This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 27.

One of:		
CIEG 431	Water Supply Engineering	3 ^{4S}
or		
CIEG 432	Wastewater Engineering	3
One of:		
CIEG 441	Hydrology	3 ^{4S}
or		
CIEG 442	Hydraulic Engineering	3
Technical Electives†		
<i>Technical Electives</i>		12 ^{3,4}
Four courses: Three additional design points must be satisfied; see current department technical elective listing.		
CREDITS TO TOTAL A MINIMUM OF		161

DEGREE: BACHELOR OF ARTS or BACHELOR OF SCIENCE
—BACHELOR OF ELECTRICAL ENGINEERING
MAJOR: NONE REQUIRED—ELECTRICAL ENGINEERING

CURRICULUM **CREDITS***

UNIVERSITY REQUIREMENTS

ENGL 110	Critical Reading and Writing	3 ^{1S}
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content.#		3 ¹⁻⁴

ARTS AND SCIENCE COLLEGE REQUIREMENTS

Skill Requirements

<i>Writing:</i>	3
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A writing course involving significant writing experience including two papers with a combined minimum of 3,000 words to be submitted for extended faculty critique of both composition and content.

<i>Foreign Language:</i>	0-12
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Completion of the intermediate-level course (107 or 112) in a given language. Students with four or more years of high school work in a single foreign language may attempt to fulfill the requirement in that language by taking an exemption examination.

Breadth Requirements (See page 80)

<i>Group A</i>	12
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Understanding and appreciation of the creative arts and humanities. Twelve credits representing at least two areas.

<i>Group B</i>	12
----------------	----

The study of culture and institutions over time Twelve credits representing at least two areas.

<i>Group C</i>	12
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Empirically based study of human beings and their environment. Twelve credits representing at least two areas.

The above groups differ from the General Education groups of the College of Engineering. This requires careful course selection in order to have courses that satisfy both curricula simultaneously.

AREA OF CONCENTRATION REQUIREMENTS

Area of Concentration:

Fifteen credits of Arts and Science electives to be used for acquiring some depth of knowledge in a field chosen in consultation with an Arts and Science adviser.	15
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Arts-Science Courses Completed	1-5
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The liberal arts component is listed as 51 credit hours. The absolute minimum required to satisfy the requirements listed above is 45; this assumes that the foreign language requirement is satisfied from high school work, the writing course is in one of the Groups A, B, or C, and that nine credits of the Area of Concentration are also from one of the Groups A, B, or C. Thus, students without language skills and concentrating in science or mathematics will need more than 51 credit hours to complete all of these requirements.

ENGINEERING COLLEGE REQUIREMENTS

Physics

PHYS 207	General Physics	4 ^{1F}
PHYS 208	General Physics	4 ^{2S}

MAJOR REQUIREMENTS

External to the College

Mathematics

MATH 242	Analytic Geometry and Calculus B	4 ^{1F}
MATH 243	Analytic Geometry and Calculus C	4 ^{1S}
MATH 341	Differential Equations & Linear Algebra I	3 ^{2F}
MATH 342	Differential Equations & Linear Algebra II	3 ^{2S}

Chemistry

CHEM 103	General Chemistry	4 ^{1F}
CISC 180	Introduction to Computer Science I	3 ^{1F}
CISC 181	Introduction to Computer Science II	3 ^{1S}
ENGL 301	Problems in Composition	3 ^{3F}
PHIL 367	Ethics in the Engineering Profession	1 ^{4F}

Within the Department

ELEG 210	Introduction to Combinational Logic	2 ^{2F}
ELEG 211	Introduction to Sequential Circuits	2 ^{2S}
ELEG 205	Linear Circuit Theory	4 ^{3F}
ELEG 220	Microprocessor Based Systems I	2 ^{3F}
ELEG 309	Electronic Circuit Analysis I	4 ^{3S}
ELEG 221	Microprocessor Based Systems II	2 ^{3S}
ELEG 302	Electrical Properties of Materials	4 ^{3S}
ELEG 305	Signal Processing I	3 ^{4F}
ELEG 312	Electronic Circuit Analysis II	4 ^{4F}
ELEG 320	Field Theory	3 ^{4F}
ELEG 306	Signal Processing II	4 ^{4S}
ELEG 310	Random Signals and Noise	3 ^{4S}
ELEG 340	Solid State Electronics	3 ^{4S}
ELEG 417	Feedback Control Systems	3 ^{5F}
ELEG 413	Field Theory II	4 ^{5F}
ELEG 433	Energy Systems	3 ^{5S}

ELEG 310 may be taken in the senior year (s) and ELEG 413 and/or ELEG 433 in the junior year (s) when appropriate to a plan for a technical concentration.

Design Requirement

In addition to the design content of the normal program, every student must take at least one course in their senior year in which one design project is at least 50% of the coursework. Regularly offered courses that presently meet this requirement are ELEG 420, 422, 650 and 664. The design requirement may also be met with special projects carried out in conjunction with faculty research with the prior approval of the Departmental Undergraduate Representative. Students must consult with their advisers for the proper selection of design courses.

*Superior figures indicate semester (fall or spring) and/or year or years in which the course is normally taken, i.e., ^{1F}fall of freshman year, ^{2S}spring of sophomore year, etc.
 #This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 27.

†The technical elective program is under constant review by the faculty. An updated list is available in the department office. Students should check with their advisers before selecting courses and should be aware that a formal mechanism exists to provide additional flexibility in selection of their Technical Elective courses.

Technical Electives*Technical Electives*

Each student must select a concentration to structure their technical elective program. Four concentrations are now defined (computer engineering, systems and signals engineering, electronic devices and materials engineering, and power systems engineering). Students with a special interest may define their own concentrations in conjunction with their adviser. With some exceptions, upper-level engineering, computer science, physics, science and mathematics courses are acceptable technical electives. However, students planning their own programs of concentration should realize that there must be a theme holding together at least most of the courses chosen. Any special concentrations must be approved by the Departmental Undergraduate Representative prior to the start of the senior year.

Each of the four regular concentrations specifies 15, or more, of the 21 technical elective credits in the core program. Students should note that the requirement for a senior design project will, in some cases, further constrain the choice of technical electives.

The technical electives must be chosen from an area of concentration. The four concentrations follow:

Technical Electives—Computer Engineering

CISC 220	Data Structures	3 ^{4F}
CISC 360	Computer Architecture	3 ^{4S}
ELEG 323	Digital System Design I	3 ^{4S}
ELEG 422	Digital System Design II	3 ^{5F}
ELEG 618	Modern Control Engineering	3 ^{5S}
or		
ELEG 631	Digital Signal Processing	3 ^{5F}
Technical electives chosen with the approval of an adviser.		6 ⁵

Technical Electives—Systems and Signals Concentration

CISC 220	Data Structures	3 ^{4S}
MATH 426	Introduction to Numerical Analysis and Algorithmic Computation	3 ^{4F}
ELEG 403	Communication Systems Engineering	3 ^{5F}
ELEG 618	Modern Control Engineering	3 ^{5S}
ELEG 631	Digital Signal Processing	3 ^{5F}
Technical electives chosen with the approval of an adviser.		6 ⁵

Technical Electives—Devices and Materials Concentration

Students whose primary interest is in the Devices and Materials Engineering concentration should take:

PHYS 209	General Physics	3 ^{3S}
PHYS 313	Physical Optics	3 ^{4S}
ELEG 623	Electronic Properties of Matter	3 ^{5F}

Students whose primary interest is in optoelectronics and electro-optics should take:

ELEG 640	Optoelectronics	3 ^{5F}
and		
ELEG 642	Special Topics in Electrooptics	3 ^{5S}

Students whose primary interest is in electronic services should take:

ELEG 626	Integrated Circuits	3 ^{5F}
and		
ELEG 650	Semiconductor Device Design and Fabrication**	3 ^{5S}

Technical electives chosen with the approval of an adviser. 6⁵

Technical Electives—Power Systems Concentration

MEEG 307	Thermodynamics I	3 ^{3F}
ELEG 412	Introduction to Power Systems Analysis	4 ^{5F}
ELEG 414	Electrical Machines, Motors and Generators	4 ^{5S}

ELEG 618	Modern Control Engineering	3 ^{5S}
MEEG 408	Power Generation System Design	3 ^{3S}
or		
ELEG 323	Digital Systems Design I	3 ^{3S}
Technical electives chosen with the approval of an adviser.		6 ⁵
CREDITS TO TOTAL A MINIMUM OF		158

DEGREE: BACHELOR OF ARTS or BACHELOR OF SCIENCE
—BACHELOR OF ELECTRICAL ENGINEERING
MAJOR: SELECTED ARTS AND SCIENCE MAJOR
—MECHANICAL ENGINEERING

CURRICULUM**CREDITS*****UNIVERSITY REQUIREMENTS**

ENGL 110	Critical Reading and Writing	3 ^{1S}
Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related content.#		3 ¹⁻⁴

ARTS AND SCIENCE COLLEGE REQUIREMENTS*Skill Requirements*

<i>Writing:</i>	3
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A writing course involving significant writing experience including two papers with a combined minimum of 3,000 words to be submitted for extended faculty critique of both composition and content.

<i>Foreign Language:</i>	0-12
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Completion of the intermediate-level course (107 or 112) in a given language. Students with four or more years of high school work in a single foreign language may attempt to fulfill the requirement in that language by taking an exemption examination.

Breadth Requirements (See page 80)

<i>Group A</i>	12
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Understanding and appreciation of the creative arts and humanities. Twelve credits representing at least two areas.

<i>Group B</i>	12
----------------	----

The study of culture and institutions over time. Twelve credits representing at least two areas.

<i>Group C</i>	12
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Empirically based study of human beings and their environment. Twelve credits representing at least two areas.

The above groups differ from the General Education groups of the College of Engineering. This requires careful course selection in order to have courses that satisfy both curricula simultaneously.

AREA OF CONCENTRATION REQUIREMENTS*Area of Concentration:*

Fifteen credits of Arts and Science electives to be used for acquiring some depth of knowledge in a field chosen in consultation with an Arts and Science adviser.	15
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Arts-Science Courses Completed	1-5
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The liberal arts component is listed as 51 credit hours. The absolute minimum required to satisfy the requirements listed above is 45; this assumes that the foreign language requirement is satisfied from high school work, the writing course is in one of the Groups A, B, or C, and that nine credits of the Area of Concentration are also from one of the Groups A, B, or C.

*Superior figures indicate semester (fall or spring) and/or year or years in which the course is normally taken, i.e., ^{1F}fall of freshman year, ^{2S}spring of sophomore year, etc.

#This requirement may be fulfilled through a course taken to complete major, group, breadth, or elective requirements. See page 27

**Courses must be taken as a sequence, ELEG 640 and ELEG 642 or ELEG 626 and ELEG 650.

Thus, students without language skills and concentrating in science or mathematics will need more than 51 credit hours to complete all of these requirements.

ENGINEERING COLLEGE REQUIREMENTS

Mathematics

MATH 241	Analytic Geometry and Calculus A	4	1F
MATH 242	Analytic Geometry and Calculus B	4	1S
MATH 243	Analytic Geometry and Calculus C	4	2F
MATH 302	Ordinary Differential Equations I	3	2S

Physics

PHYS 207	General Physics	4	2F
PHYS 208	General Physics	4	2S

MAJOR REQUIREMENTS

External to the College

Chemistry

CHEM 103	General Chemistry	4	1F
CHEM 104	General Chemistry	4	1S

Within the College

EGGG 125	Introduction to Engineering (MEEG)	3	1F
EGGG 132	Engineering Graphics/Analysis	2	1S
MASC 302	Material Science for Engineers	4	2S
ELEG 314	Electronics and Instrumentation	4	4F
MECH 305	Fluid Mechanics	3	4F
MECH 306	Fluid Mechanics Laboratory	1	4F

Within the Department

MEEG 213	Principles of Mechanics I	3	2F
MEEG 214	Principles of Mechanics II	3	2S
MEEG 313	Strength of Materials	4	2S

MEEG 361	Applied Engineering Analysis	3	3F
MEEG 307	Thermodynamics I	3	4F
MEEG 308	Thermodynamics II	3	4S
MEEG 316	Materials Engineering	3	4F
MEEG 347	Mechanical Design I	3	4F
MEEG 348	Mechanical Design II	3	4S
MEEG 391	Engineering Science Laboratory I	4	3S
MEEG 336	Fluid Mechanics II	3	4S
MEEG 302	Heat Transfer	3	4S
MEEG 427	Systems Dynamics I	3	5F
MEEG 447	Design and Systems Synthesis I	3	5F
MEEG 448	Design and Systems Synthesis II	3	5S

Technical Electives†

The technical electives illustrated below are for concentration in Aerospace Engineering. The technical elective selections for the other four options are given in the program description of the standard MEEG curricula.

Technical Electives

A minimum of twelve credits to be selected from the following courses or substitute other courses in consultation with the adviser:

MEEG 411	Structural Mechanics for Mechanical and Aerospace Engineering	3
MEEG 413	Advanced Mechanics of Materials	3
MEEG 415	Finite Element Analysis	3
MEEG 432	Aerodynamics	3
MEEG 435	Propulsion	3
MEEG 436	Fluid Machinery	3
MEEG 445	Senior Research	3-6
MEEG 616	Composite Materials Structures	3

CREDITS TO TOTAL A MINIMUM OF 161

†The technical elective program is under constant review by the faculty. An updated list is available in the department office. Students should check with their advisers before selecting courses and should be aware that a formal mechanism exists to provide additional flexibility in selection of their Technical Elective courses.

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