

1. A solid foundation in the fundamentals of chemical engineering science, design, and practice;
2. A sound base in chemistry, mathematics, and physics;
3. An opportunity to explore advanced disciplines pertinent to career choice;
4. An opportunity to participate on multidisciplinary teams;
5. The opportunity and training to develop the written and oral communication skills required of a practicing engineer;
6. The opportunity to develop and comprehend professional and ethical behavior, to develop an understanding of the humanities and social sciences, and to develop the skills to engage in lifelong learning.

These objectives are consistent with those of the College of Engineering and New Mexico State University in their commitment to developing student excellence in an intellectually stimulating environment, cultural diversity, and broad education programs, while encouraging individual expression, professional behavior, civic responsibility, leadership, and an appreciation for continuing education.

The NMSU curriculum meets ABET accreditation requirements.

Requirements (Total credits 131)

In addition to satisfying the requirements of the university and the College of Engineering, all majors must pass departmental courses with a grade of C or better.

Freshman Year (31 credits)

CH E 100, Introduction to Engineering.....	1
CH E 111, Introduction to Computers in Chemical Engineering	3
CHEM 115, 116, Principles of Chemistry I, II	8
COMM 265G, Principles of Human Communication	3
ENGL 111G, Rhetoric and Composition	4
MATH 191, 192, Calculus and Analytic Geometry I, II	6
PHYS 215, Engineering Physics I.....	3
Humanities or social science elective ¹	3

Sophomore Year (33 credits)

CH E 201, Chemical Process Calculations	4
CH E 301, Chemical Engineering Thermodynamics I	3
CH E 305, Transport Operations I: Fluid Flow.....	3
CH E 311, Engineering Data Analysis	3
CHEM 313, 314, 315, Organic Chemistry I, II, Lab	8
ENGL 218G, Technical and Scientific Communication	3
MATH 291, Calculus and Analytic Geometry III.....	3
MATH 392, Differential Equations.....	3
PHYS 216, Engineering Physics II.....	3

Junior Year (34 credits)

CH E 302, Chemical Engineering Thermodynamics II.....	3
CH E 306, Transport Operations II: Heat and Mass Transfer	3
CH E 307, Transport Operations III: Staged Operations.....	3
CH E 315L, Process Instrumentation Lab	2
CH E 361, Engineering Materials	3
CH E 407L, Transport Operations Lab	2
CH E 441, Chemical Kinetics and Reaction Engineering.....	3
CH E 451, Engineering Economy	3
CHEM 434 or CHEM 456, Physical Chemistry elective	3
ECON 251G, Principles of Macroeconomics.....	3
Humanities or social science electives ¹	6

Senior Year (33 credits)

CH E 412, Process Control and Dynamics.....	3
CH E 422L, Unit Operations and Process Control Lab.....	2
CH E 452, Process Design, Analysis and Simulation.....	4
CH E 455, Advanced Plant Design.....	2
CH E 490, Senior Seminar	1
CH E upper-division elective ²	3
CHEM or natural science elective ³	3
EE 201, Networks I.....	3
ME 236, Engineering Mechanics I	3
Engineering elective ⁴	3
Humanities or social sciences electives ¹	6

¹ Humanities and social science electives must be selected to satisfy the university's general education requirements.

² Upper-division CH E courses with prior approval of your advisor except for CH E 395G.

³ Upper-division chemistry or natural science course (such as toxicology or biology) with prior approval of your adviser.

⁴ Upper-division engineering course selected with prior approval of adviser.

CIVIL ENGINEERING

Professor Kenneth R. White*, department head

Professor J. Phillip King*, associate department head

Professors Cadena-C,* Hanson[#], Idriss*, Jacquez*, Khandan[#], Samani[#], White*, Woodward*; **Associate Professors** Jauregui*, King*, Newton*; **Assistant Professors** Bandini, Bawazir, McNamara, Zhang; **College Professor** Madrid*; **Adjunct Professor** Hernandez^{##}
(505) 646-3801

*Registered Professional Engineer (NM)

Registered Professional Engineer (State other than NM)

Registered Land Surveyor (State other than NM)

DEGREE: Bachelor of Science in Civil Engineering

OPTION: General

OPTION: Structures

OPTION: Environmental

OPTION: Geotechnical

OPTION: Water Resources

MINOR: Agricultural Engineering

DEGREE: Bachelor of Science in Civil Engineering

The curricula in civil engineering is designed to provide a broad background and is so arranged that students may specialize in one or more of the options listed above or work in one or more areas of civil engineering in the senior year. Students may elect to obtain more than one option in civil engineering.

Requirements

In addition to the university requirements for graduation, a student must have a 2.0 grade-point average in all departmental courses and pass the Fundamentals of Engineering Examination prior to graduation.

The mission of the Civil Engineering Department is to offer a high quality and accredited degree that prepares our students for professional licensure leading to successful civil engineering careers in industry and government or for success at the graduate level. Toward this end, the Civil Engineering Department will recruit and maintain a diverse, highly skilled faculty that will consistently produce high-end teaching, research, and professional service.

Civil Engineering Program Educational Objectives

In support of the mission, the Civil Engineering Department adopts the following program educational objectives:

1. Prepare our graduates to achieve professional engineering licensure and productivity in a design office setting.
2. Prepare our graduates to be future leaders as public employees and private consultants in civil engineering fields.
3. Have 15% of our graduates pursue and complete a graduate level degree.
4. Maintain and further develop a high quality accredited civil engineering program that is competitive with comparable programs in the southwest and throughout the nation.

In addition, the Accreditation Board of Engineering and Technology, in conjunction with the American Society of Civil Engineers, requires that baccalaureate degree graduates in civil engineering will be able to

- 1) demonstrate proficiency in mathematics through differential equations, probability and statistics, calculus based physics and general chemistry;

- 2) demonstrate proficiency in a minimum of four recognized major civil engineering areas;
- 3) demonstrate the ability to conduct laboratory experiments and to critically analyze and interpret data in more than one of the recognized major civil engineering areas;
- 4) demonstrate the ability to perform civil engineering design by means of design experience integrated throughout the professional component of the curriculum; and
- 5) demonstrate an understanding of professional practice issues such as procurement of work; bidding versus quality-based selection processes; how the design professional and the construction professions interact to construct a project; the importance of professional licensure and continuing education; and/or other professional practice areas.

The ABET Criteria, in conjunction with the American Society of Civil Engineers also requires that civil engineering curriculums include in-depth instruction allowing students to accomplish the integration of systems using appropriate analytical, computational and experimental practices. They also require that faculty teaching in civil engineering departments show evidence of understanding professional practice and maintain currency in their respective professional areas. Program faculty must have responsibility and sufficient authority to define, revise, implement, and achieve program objectives.

Freshman Year (33 credits)

C E 151, Introduction to Civil Engineering.....	3
GEOG 111G, Survey of Geology.....	4
ENGL 111G, Rhetoric and Composition.....	4
MATH 191, 192, Calculus and Analytic Geometry I, II.....	6
OEDG 109, Computer Drafting.....	3
PHYS 215, Engineering Physics I.....	3
PHYS 215L, Engineering Physics I Laboratory.....	1
SUR 222, Plane Surveying.....	3
Humanities or social science electives*.....	6

Sophomore Year (32 credits)

C E 231, Introduction to Fluid Mechanics.....	3
C E 233, Mechanics-Statics.....	3
C E 256, Environmental Science.....	3
C E 256L, Environmental Science Laboratory.....	1
C E 301, Mechanics of Materials.....	3
C E 331, Hydraulic Engineering.....	3
CHEM 111, General Chemistry I.....	4
ECON 251G, Principles of Macroeconomics, or ECON 252G, Principles of Microeconomics.....	3
ENGL 218G, Technical and Professional Communication.....	3
MATH 291, Calculus and Analytic Geometry III.....	3
M E 234, Mechanics-Dynamics.....	3

Junior Year (31 credits)

C E 311, Properties of Materials.....	3
C E 315, Determinate Structures.....	3
C E 356, Fundamentals of Environmental Engineering.....	3
C E 357, Soil Mechanics.....	3
C E 365, Intermediate Structural Mechanics, or C E 445, Concrete Design.....	3
COMM 265G, Principles of Human Communication.....	3
E E 201, Networks I, or M E 240, Thermodynamics.....	3
MATH 392, Differential Equations.....	3
STAT 371, Statistics for Engineers and Scientists I, or approved upper-division math elective.....	3
PHYS 216 and PHYS 216L, Engineering Physics II and Lab, or CHEM 112, General Chemistry II.....	4

Senior Year (35 credits)

C E 450, Engineering Economy and Law.....	3
C E 497, Senior Seminar.....	2
Civil engineering options.....	6
Humanities or social science electives (upper-division)*.....	6
Humanities or social science elective*.....	3
CE 445, Concrete Design.....	3
CE 382, Hydraulic Design.....	3
CE 457, Foundation Design.....	3
CE 471, Highway Design or CE 477 Construction.....	3
CE 469, CE 482, CE 485 or ENVE 456.....	3

*Humanities and social science electives must be selected to satisfy the college and university general education requirements.

Civil Engineering Options

Electives for Environmental Option (6 credits):

ENVE 455, Solid and Hazardous Waste Systems Design.....	3
C E 483, Surface Water Hydrology.....	3

Electives for Structural Option (6 credits):

C E 444, Elements of Steel Design.....	3
C E 468, Intermediate Mechanics of Materials.....	3

Electives for Water Resources Option (6 credits):

C E 483, Surface Water Hydrology.....	3
G EN 452, Geohydrology.....	3

Electives for Geotechnical Option (6 credits):

G EN 452, Geohydrology.....	3
G EN 459, Geomechanics and Rock Engineering.....	3

Electives for General Civil Engineering Option (6 credits):

C E 444, Elements of Steel Design; C E 455, Masonry Design; ENVE 455, Solid and Hazardous Waster Systems Design; A EN 459, Design of Water Wells/Pumping Systems; G EN 452, Geohydrology; C E 483, Surface Water Hydrology; A EN 475, Soil and Water Conservation; A EN 478, Irrigation and Drainage Engineering; or A EN 479, Irrigation Systems Design and Management.....	6
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MINOR: Agricultural Engineering

Minimum of 18 credits, designated as follows:

College of Agriculture and Home Economics

Soil Science Requirements, 3 credits from: SOIL 472, Soil morphology and Classification; SOIL 476, Soil Microbiology; SOIL 477, Soil Physics; SOIL 479, Environmental Soil Chemistry.....	3
Plant/Animal Science Requirement, 3 credits from: AGRO/HORT 365, Principles of Crop Production; ANSC 351G, Agricultural Animals of the World.....	3
Institutions/Economics Requirement, 3 credits from: AG E 315G, World Agriculture and Food Problems; AG E 337G, Natural Resources Economics; AG E 484, Water Resource Economics.....	3

College of Engineering

Irrigation Requirement, 3 credits from: AEN 478, Irrigation and Drainage Engineering; AEN 498, Special Topics.....	3
Engineering Specialty Requirement, 3 credits from: AEN 335, Engineering for Biological Systems; AEN 475, Soil and Water Conservation.....	3
Design Requirement, 3 credits from: AEN 440, Design Applications; AEN 459, Design of Water Wells/Pumping Systems.....	3

ENGINEERING PHYSICS

DEGREE: Bachelor of Science in Engineering Physics

The Engineering Physics program is offered jointly by the Physics Department and the College of Engineering. The faculty is drawn from the Departments of Physics, Electrical and Computer Engineering, and Mechanical Engineering.

A strong grasp of underlying physical principles behind the development of new technologies is necessary to keep up with new developments in a high-tech world. The BS in Engineering Physics program is designed to provide quality education of students for immediate employment with technical jobs in private industries (especially high-tech industries), research laboratories, and public sectors. The program trains students with a combination of engineering knowledge, physics principles, mathematical background, problem-solving strategies, and effective communications skills. The BS in Engineering Physics also provides an excellent preparation for graduate studies in either physics or an engineering discipline.

The engineering physics program is offered jointly by the Department of Physics and College of Engineering. The BS in Engineering Physics confers an