

CHEM 211, Organic Chemistry, or CHEM 313, 314, 315, Organic Chemistry, I, II and Lab .....	4-8
BCHE 341, Survey of Biochemistry, or BCHE 395, Biochemistry .....	3
E ST 311G, Statistical Applications .....	3
MATH 142G, Applied Mathematics for Biological and Social Sciences I, or MATH 191, Calculus and Analytic Geometry I .....	3
PHYS 211, General Physics I or PHYS 221, General Physics for Life Sciences I .....	3
PHYS 212, General Physics II, or PHYS 222, General Physics for Life Sciences II .....	3
PHYS 211L/212L, General Physics Laboratory .....	2

#### Departmental Requirements

BIOL 111G, Natural History of Life .....	3
BIOL 111L, Natural History of Life Laboratory .....	1
BIOL 211G, Cellular and Organismal Biology .....	3
BIOL 211L, Cellular and Organismal Biology Laboratory .....	1
BIOL 305, Principles of Genetics .....	3
BIOL 467, Evolution .....	3

#### One course from each of the four following general areas:

Cellular integration: BIOL 311, 377, 474, 490	
Organismal integration: BIOL 314, 354, 381, 442, 480	
Ecology: BIOL 301, 473	
Evolutionary pattern: BIOL 312, 313, 322, 330, 433, 439, 440, 445, 447, 465, 472	
Sufficient credits numbered 300 or above to bring total upper-division credits in the major to 22. At least one upper-division course must include laboratory and/or field experience. The laboratory/field requirement can be satisfied by any BIOL course above the 300 level that includes a laboratory or a field trip—including BIOL 350 or BIOL 450 .....	3
Electives: Sufficient to bring the total credits to 128, including 54 upper-division.	

#### MAJOR: Microbiology

The major in microbiology provides a solid academic base for those planning to enter any of the various fields of microbiology.

#### Nondepartmental Requirements

CHEM 111,112, General Chemistry I, II .....	8
CHEM 211, Organic Chemistry* .....	4
CHEM 371, Analytical Chemistry* .....	4
BCHE 341, Survey of Biochemistry or BCHE 395, Biochemistry .....	3
C S 110G, Computer Literacy .....	3
MATH 142G, Applied Mathematics for Biological and Social Sciences I, or MATH 191, Calculus and Analytic Geometry I .....	3
PHYS 211, General Physics I or PHYS 221, General Physics for Life Sciences I .....	3
PHYS 212, General Physics II, or PHYS 222, General Physics for Life Sciences II .....	3
PHYS 211L, 212L, General Physics Laboratory .....	2
*CHEM 313, 314, 315, Organic Chemistry I, II, and Lab (8 credits), may substitute for CHEM 211, CHEM 371.	

#### Departmental Requirements

BIOL 111G, Natural History of Life .....	3
BIOL 111L, Natural History of Life Laboratory .....	1
BIOL 211G, Cellular and Organismal Biology .....	3
BIOL 211L, Cellular and Organismal Biology Laboratory .....	1
BIOL 311, General Microbiology .....	3
BIOL 311L, General Microbiology Laboratory .....	2
BIOL 305, Principles of Genetics .....	3
BIOL 451, Physiology of Microorganisms .....	3
BIOL 474, Immunology .....	3
BIOL 478, Molecular Biology of Microorganisms .....	3
BIOL 479, Medical Microbiology .....	3
BIOL 479L, Medical Microbiology Laboratory .....	1

Two additional credits related to microbiology numbered 300 or above to bring total upper-division credits in microbiology to 20. This course should be chosen in consultation with an adviser.

Electives: sufficient to bring total credits to 128 including 54 upper-division.

#### MINOR: Biology

A student cannot earn a bachelor's degree in Biology or Microbiology and also earn a minor in Biology.

18 credits in Biology, of which at least 9 credits must be numbered 300 and above. No more than 3 credits may be taken as special topics or individual study .....

#### MINOR: Conservation Ecology

A minor in Conservation Ecology is available for students who choose to major in other areas, but wish to include Conservation Ecology in their academic training. A minor in Conservation Ecology must include a minimum of 20 credits in the discipline with 9 of these coming from upper-division courses.

Core Curriculum (17 credits):

BIOL 111G, Natural History of Life .....	3
BIOL 111L, Natural History of Life, Lab .....	1
WLSC 230, Natural History of the Vertebrates .....	4
BIOL 301, Ecology .....	3
WLSC 447, Wildlife Law, Policy and Administration .....	3
BIOL 462, Conservation Biology; or WLSC 310, Managing Ecological Systems for Biodiversity .....	3
Conservation (3 credits): BIOL 488, Principles of Conservation Genetics; BIOL 467, Evolution; WLSC 409, Population Ecology; WLSC 445, Systems Ecology in Wildlife Science .....	3

#### MINOR: Microbiology

A student cannot earn a bachelor's degree in Biology or Microbiology and also earn a minor in Microbiology.

BCHE 341, Survey of Biochemistry, or BCHE 395, Biochemistry .....	3
BIOL 311, General Microbiology .....	3
BIOL 311L, General Microbiology Laboratory .....	2
At least 11 credits from among BIOL 412, Seminar in Microbiology, BIOL 451, Physiology of Microorganisms, BIOL 473, Ecology of Microorganisms, BIOL 474, Immunology, BIOL 475, Virology, BIOL 477, Applied and Environmental Microbiology, BIOL 478, Molecular Biology of Microorganisms, BIOL 479, Medical Microbiology, BIOL 479L, Medical Microbiology Laboratory, and/or BIOL 482, Microbial Systematics .....	11

## CHEMISTRY and BIOCHEMISTRY

#### Professor Amudhu Gopalan, department head

**Professors** Arterburn, Eiceman, Gopalan, Herndon, M. Johnson, Kuehn, Lambers, Rayson **Associate Professors** Quintana, Smirnov, D. Smith, Zoski; **Assistant Professors** Lara, Lyons, J. Smith, H. Wang; **Adjunct Professors** J. Wang; **College Professors** Alexander, Des Enfants, Dunlavy, Ewing, D. Johnson, Mahmoud, Mueller, Potenza, Ytuarte  
(505) 646-2505

**DEGREE: Bachelor of Science**  
**MAJOR: Chemistry**  
**MAJOR: Biochemistry**

**DEGREE: Bachelor of Arts**  
**MAJOR: Chemistry**

**MINORS: Biochemistry**  
**Chemistry**  
**Environmental Chemistry**

A degree in chemistry or biochemistry enables a student to pursue a wide variety of careers: in research, production, sales, management, and teaching. These degrees are also an excellent preparation for professional studies in medicine, dentistry, forensics, veterinary science, optometry, pharmacology, pharmacy, and law.

Chemistry majors who have completed the requirements for the Bachelor of Science degree may receive American Chemical Society certification if they take one additional one-semester course which includes 1 credit of laboratory.

Students who complete a B.S. in Biochemistry and wish to complete the B.A. in Chemistry must complete 6 additional upper-division chemistry credits that are not counted in the B.S. in Biochemistry.

**DEGREE: Bachelor of Science****MAJOR: Chemistry****Nondepartmental Requirements**

(May not be taken S/U and must earn a grade of C or better.)

MATH 191, 192, Calculus and Analytic Geometry I, II.....	6
MATH 291, Calculus, and Analytic Geometry III.....	3
MATH 391, MATH 392, C S 171, or STAT 371.....	3-4
PHYS 213, 213L, Mechanics and Experimental Mechanics.....	4
PHYS 214, 214L, Electricity and Magnetism and Lab.....	4
PHYS 315, Modern Physics for Engineers.....	3

**Departmental Requirements**

CHEM 115, 116, Principles of Chemistry I, II, or CHEM 111, 112, 217, General Chemistry I, II, III.....	8-11
CHEM 242, Explorations in Chemistry.....	1
CHEM 313, 314, 315, Organic Chemistry I, II, and Lab.....	8
CHEM 356, Descriptive Inorganic Chemistry.....	3
CHEM 357, Synthetic Inorganic Laboratory.....	2
CHEM 371, Analytical Chemistry.....	4
CHEM 433, 434, Physical Chemistry I, II.....	6
CHEM 435, Physical Chemistry Laboratory.....	2
CHEM 443, Senior Seminar.....	1
CHEM 456, Inorganic Structure and Bonding.....	3
CHEM 471, Instrumental Analysis.....	4

Electives: Sufficient to bring total credits to 128, including 54 upper-division.

Note: Students should work closely with their advisers and review carefully the prerequisites for and the sequential nature of courses required for the Bachelor of Science.

**DEGREE: Bachelor of Science****MAJOR: Biochemistry****Nondepartmental Requirements (May not be taken S/U and must earn a grade of C or better.)**

BIOL 211G, Cellular and Organismal Biology.....	3
BIOL 211L, Cellular and Organismal Biology Laboratory.....	1
BIOL 311, General Microbiology.....	3
BIOL 311L, General Microbiology Laboratory.....	2
BIOL 305, Principles of Genetics.....	3
BIOL 377, Cell Biology.....	3
C S 110G, Computer Literacy.....	3
E ST 311G, Statistical Applications.....	3
MATH 191, 192, Calculus and Analytical Geometry.....	6
PHYS 213, Mechanics, and PHYS 214, Electricity and Magnetism, or PHYS 211, General Physics I, and PHYS 212, General Physics II, or PHYS 221, General Physics for Life Sciences I, and PHYS 222, General Physics for Life Sciences II.....	6
PHYS 213L, Experimental Mechanics, and PHYS 214L, Electricity and Magnetism Lab, or PHYS 211L, General Physics I Lab, and PHYS 212L, General Physics II Lab.....	2

**Departmental Requirements**

CHEM 115, 116 or CHEM 111, 112, 217.....	8-11
CHEM 313, 314, 315, Organic Chemistry I, II, and Lab.....	8
CHEM 371, Analytical Chemistry.....	4
CHEM 433 and 434, or CHEM 431 and 456, or CHEM 431 and 356.....	6
BCHE 140, Introduction to Biochemistry (S/U).....	1
BCHE 395, Introductory Biochemistry.....	3
BCHE 396, Biochemistry and Biotechnology.....	3
BCHE 397, Experimental Biochemistry.....	3
BCHE 440, Biochemistry Seminar (S/U).....	1
BCHE 494, Techniques in Genetic Engineering.....	4

Electives: One additional upper-division, 3-credit chemistry course with sufficient other courses to bring total credits to 128, including 54 upper-division.

**DEGREE: Bachelor of Arts****MAJOR: Chemistry**

The Bachelor of Arts curriculum is designed to provide flexibility with less depth in chemistry, physics, and mathematics. The program may be used by stu-

dents planning extensive study in other areas and requires emphasis in a second field of study.

**Nondepartmental Requirements (May not be taken S/U and must earn a grade of C or better.)**

MATH 191, 192, Calculus and Analytic Geometry I, II.....	6
PHYS 211, 212, General Physics I, II, or PHYS 221, 222, General Physics for Life Sciences I, II.....	6
PHYS 211L, 212L, General Physics Laboratory I, II.....	2
Emphasis area.....	18

(Nine credits must be upper-division. See adviser for approval.)

**Departmental Requirements**

CHEM 115, 116, Principles of Chemistry I, II, or CHEM 111, 112, 217, General Chemistry I, II, III.....	8-11
CHEM 313, 314, 315, Organic Chemistry I, II, and Lab.....	8
CHEM 356, Descriptive Inorganic Chemistry.....	3
CHEM 357, Synthetic Inorganic Laboratory.....	2
CHEM 371, Analytical Chemistry.....	4
CHEM 431, Physical Chemistry.....	3
CHEM 443, Senior Seminar.....	1

Three additional chemistry credits (BCHE 341 or BCHE 395 can be used for electives but CHEM 310G and CHEM 342 will not count.)

Electives: sufficient to bring total credits to 128, including 54 upper-division.

**MINOR: Biochemistry**

A student cannot earn a bachelor's degree in Biology or Microbiology and also earn a minor in Biochemistry.

CHEM 111, General Chemistry I, or CHEM 115, Principles of Chemistry I.....	4
CHEM 112, General Chemistry II, or CHEM 116, Principles of Chemistry II.....	4
CHEM 313, Organic Chemistry I.....	3
CHEM 314, Organic Chemistry II.....	3
BCHE 395, Biochemistry.....	3
One additional Biochemistry credit, but not including BCHE 341, Survey of Biochemistry.....	1

The following courses do not count towards minor: CHEM 100, Basic Chemistry; CHEM 110G, Principles and Applications of Chemistry; CHEM 217, General Chemistry III; CHEM 241, Introduction to Research; CHEM 310G, Chemistry and Society; CHEM 351, Special Topics; CHEM 442, Glass Blowing; CHEM 443, Senior Seminar; BCHE 341, Survey of Biochemistry. Toxicology and supplemental instruction (SI) courses are not accepted. Course provisionally allowed: CHEM 441, Advanced Research (3 credits maximum); CHEM 451, Special Topics (by petition only.)

**MINOR: Chemistry**

A student cannot earn a bachelor's degree in Biology or Microbiology and also earn a minor in Chemistry.

CHEM 111, General Chemistry I, or CHEM 115, Principles of Chemistry I.....	4
CHEM 112, General Chemistry II, or CHEM 116, Principles of Chemistry II.....	4
CHEM 211, Organic Chemistry, or CHEM 313, Organic Chemistry I.....	3-4
CHEM 314, Organic Chemistry II.....	3
Sufficient additional upper division CHEM/BCHE credits to bring total upper division CHEM/BCHE credits to at least 9. Recommendations are below.....	2-6

Recommended courses for Physical/Analytical Chemistry emphases:

CHEM 356, Descriptive Inorganic Chemistry.....	3
CHEM 371, Analytical Chemistry.....	4
CHEM 431, Physical Chemistry.....	3
Recommended courses for Biochemical emphasis:	
CHEM 313, Organic Chemistry I.....	3
CHEM 314, Organic Chemistry II.....	3
BCHE 341, Survey of Biochemistry.....	3

The following courses do not count towards a minor in Chemistry: CHEM 100, Basic Chemistry; CHEM 110G, Principles and Applications of Chemistry; CHEM 217, General Chemistry III; CHEM 241, Introduction to Research; CHEM 310G, Chemistry and Society; CHEM 351, Special Topics; CHEM 442, Glass Blowing; CHEM 443, Senior Seminar; No BCHE courses except BCHE 341, Survey of Biochemistry. Toxicology and supplemental instruction (SI) courses are not accepted. Course provisionally allowed: CHEM 441, Advanced Research (3 credits maximum); CHEM 451, Special Topics (by petition only.)

**MINOR: Environmental Chemistry**

Students must pass the courses listed below. Check the undergraduate catalog for prerequisites.

CHEM 111, General Chemistry I, or CHEM 115, Principles of Chemistry I .....	4
CHEM 112, General Chemistry II, or CHEM 116, Principles of Chemistry II. ....	4
CHEM 211, Organic Chemistry or CHEM 313, Organic Chemistry I; CHEM 314, Organic Chemistry II and CHEM 315, Organic Chemistry Laboratory .....	8
CHEM 371, Analytical Chemistry, or CHEM 471, Instrumental Methods of Analysis .....	4
CHEM 422, Environmental Chemistry .....	3
TOX 361, Basic Toxicology .....	3
B.A. or B.S. majors in Chemistry or Biochemistry must pass an additional 9 credits from these courses:	
BIOL 477, Applied and Environmental Microbiology.....	4
C E 256, Environmental Science. ....	3
C E 355G, Technology and the Global Environment. ....	3
CE 356, Fundamentals of Environmental Engineering .....	3
CHEM 424, Soil Chemistry. ....	3
CHEM 451, Special Topics (as appropriate) .....	1-3
I E 411, Industrial Safety .....	3

The following courses do not count toward a minor in Environmental Chemistry: CHEM 100, Basic Chemistry; CHEM 110G, Principles and Applications of Chemistry; CHEM 310G, Chemistry and Society; 442, Glass Blowing. Supplemental instruction (SI) courses are not accepted.

## COMMUNICATION STUDIES

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**Professor Walter R. Zakahi, department head**

*Professors* Hacker, *Associate Professors* Lindsey, *Assistant Professors* Buker, Hubbell, Messal, Morgan  
(505) 646-2801

**DEGREE: Bachelor of Arts****MAJOR: Communication Studies****MINOR: Communication Studies**

The communication studies program is designed to enhance students' interpersonal skills, presentational skills, and critical thinking skills. Thus the successful graduate should be able to work effectively with people, assimilate, organize and analyze information, solve problems, make effective presentations, and show potential for leadership. The program prepares students for careers in several professions, such as training and development, public relations, law, advertising and sales, government service, mediation, customer relations, human resources, international service, fund raising, and the ministry.

**MAJOR: Communication Studies**

In addition to completing the general education requirements of the university and the college, students majoring in communication studies are required to complete 18 credits of core COMM courses and 18 credits of COMM electives for a total of 36 credits. Any exception to these policies requires department head approval.

All COMM courses must be completed with a grade of C or better.

**Communication Studies Core Courses (18 credits)**

COMM 265G, Principles of Human Communication .....	3
COMM 285, Survey of Communication Theory .....	3
COMM 305, Communication Research Methods .....	3
COMM 370, Organizational Communication .....	3
COMM 376, Communication and Culture .....	3
COMM 384, Interpersonal Communication .....	3

**Communication Studies Elective Courses (18 credits)**

To reach a total of 36 credits, students must complete successfully an additional 18 COMM credits of their choosing.

**MINOR: Communication Studies**

COMM 265G, Principles of Human Communication .....	3
Two of COMM 370, Organizational Communication; COMM 376, Communication and Culture; and COMM 384, Interpersonal Communication.....	6
Three of COMM 253G, Public Speaking; COMM 285, Survey of Communication Theory; COMM 305, Communication Research Methods; COMM 351, Persuasion Theory and Practice; COMM 353, Advanced Public Speaking; COMM 377, Conflict Management; COMM 425, Small Group Communication; COMM 435, Psychology of Human Communication; COMM 440, Political Communication; COMM 450, Technologies of Human Communication; COMM 465, Nonverbal Communication;	
COMM 470, Leadership Communication; COMM 475, International Communication; COMM 480, Health Communication; COMM 490, Independent Study; COMM 491, Selected Topics .....	9

## COMPUTER SCIENCE

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**Professor Desh Ranjan, department head**

*Professor* Pontelli; *Associate Professors* Cook, Hartley, Leung; *Assistant Professors* Bhattacharya, He, Jeffery, Pfeiffer, Pivkina, Song, Tran; *College Professor* Steiner; *College Assistant Professor* Villaverde  
(505) 646-3723

**DEGREE: Bachelor of Science****MAJOR: Computer Science****MINORS: Algorithm Theory****Bioinformatics****Computer Systems****Software Development**

The undergraduate computer science program prepares students for graduate study in computer science and for employment in positions involving the design, construction, and application of computer systems. Students should review their programs of study in consultation with their advisers each semester, preferably using the most recent Undergraduate Catalog. The department also offers a minor degree, with specialized tracks in algorithm theory, bioinformatics, computer systems, and software development. For more information on the Department of Computer Science, please visit the web site [www.cs.nmsu.edu](http://www.cs.nmsu.edu).

**DEGREE: Bachelor of Science****MAJOR: Computer Science****General Requirements Exception**

A grade of at least C must be earned in each of the courses taken to satisfy the departmental and nondepartmental requirements. No course may be counted as satisfying both a departmental and a nondepartmental requirement. No course taken to satisfy either a departmental or a nondepartmental requirement may be taken S/U.

**Departmental Requirements (54-56 credits)**

C S 171, Algorithmic Computation.....	4
C S 271, Introduction to Object-Oriented Programming.....	4
C S 272, Introduction to Data Structures.....	4
C S 273, Machine Programming and Organization.....	4
C S or MATH 278, Discrete Structures .....	4
C S 370, Compilers and Automata Theory.....	4
C S 371, Software Development .....	4
C S 372, Data Structures and Algorithms.....	4
C S 448, Senior Project, or C S 449, Senior Thesis.....	4
C S 471, Programming Language Structure I.....	3
C S 473, Architectural Concepts I.....	3
C S 474, Operating Systems I.....	3
Two of the following: C S 451, Functional Programming; C S 461, Logic Programming; C S 475, Artificial Intelligence I; C S 476, Computer Graphics I; C S 481, Visual Programming; C S 482, Database Management Systems I; C S 483, Introduction to Robotics; C S 484, Computer Networks I; C S 485, User	