

SCHOOL OF SCIENCES

BIOCHEMISTRY • BIOLOGY • BIOMEDICAL SCIENCE • CHEMISTRY • COMPUTER SCIENCE • ENGINEERING PHYSICS
 MATHEMATICS • NATURAL SCIENCE • PHYSICS

ADMINISTRATION

DR. JOHNNY B. HOLMES, *Dean*

DR. DENNIS MERAT, *Chair, Chemistry Department*

DR. PASCAL BEDROSSIAN, *Chair, Mathematics/Computer Science*

DR. STANLEY EISEN, *Director, Pre-Professional Health Programs*

DR. SANDRA THOMPSON-JAEGER, *Chair, Biology Department*

DR. JOHN A. VARRIANO, *Chair, Physics/Natural Science*

DR. PEGGY INGRAM VEESER, *Director, Nursing*

FACULTY

BIOLOGY

STANLEY EISEN, *Professor*

B.S., State University of New York at Stony Brook; M.A., Ph.D., Indiana University

MALINDA E. C. FITZGERALD, *Professor*

B.S., M.S., University of Memphis; Ph.D., University of Tennessee, Memphis

JAMES E. MOORE, *Assistant Professor*

B.S., West Virginia State College; M.S., University of North Carolina Greensboro; Ph.D. University of Memphis

MARY L. OGILVIE, *Professor*

B.S., M.S., Ph.D., Memphis State University

ANNA E. ROSS, *Professor*

A.B., Hope College; Ph.D., Clemson University

KATHLEEN SAUSER, *Assistant Professor*

B.S., University of Tennessee at Martin; M.S., Florida Institute of Technology;
 Ph.D., Memphis State University

SANDRA THOMPSON-JAEGER, *Associate Professor*

B.S. Ouachita Baptist University; M.S., Ph.D., University of Munich (Germany)

CHEMISTRY

DAVID P. DAWSON, *Associate Professor*

B.S., Rhodes College; Ph.D. University of Arkansas

DENNIS MERAT, *Associate Professor*

B.S., Southern Methodist University; Ph.D. Texas A & M University

WILLIAM PEER, *Assistant Professor*

B.S. University of Michigan; Ph.D. University of Texas at Austin

ANTHONY TRIMBOLI, *Assistant Professor*

B.S., Muhlenburg College; Ph.D., University of South Carolina

JOHN YOUNG, *Assistant Professor*

B.A. Hendrix College; Ph.D. Mississippi State University

MATHEMATICS/COMPUTER SCIENCE

LEIGH C. BECKER, *Professor*

B.S., Illinois Institute of Technology; M.S., University of Illinois;
 M.S., Ph.D., Southern Illinois University

PASCAL BEDROSSIAN, *Professor*

B.S., Christian Brothers University; M.S., Ph.D., Memphis State University

CATHY W. CARTER, *Professor*

B.A., M.A., University of Mississippi

SANDRA DAVIS, *Instructor*

B.A., Cameron University; M.S., Memphis State University

ANDREW M. DIENER, *Assistant Professor*

B.A., St. Mary's University (San Antonio, TX);

M.S., Ph.D., Texas A&M University

HOLMES PEACHER-RYAN, *Associate Professor*

A.B., Princeton University; M.S., Ph.D., University of Memphis

BROTHER WALTER SCHREINER, FSC, *Associate Professor*

B.A., University of St. Thomas; M.S., University of Notre Dame;

Ph.D., University of Illinois

ARTHUR A. YANUSHKA, *Professor*

B.A., Fordham University; M.S., State University of New York at Stony Brook;

Ph.D., University of Illinois

NURSING

SUE LEHMAN TRZYNSKA, *Assistant Professor, Assistant Director of Nursing*

B.S.N., M.S.N., Northern Illinois University; Ph.D., University of Pittsburgh

PEGGY INGRAM VEESER, *Professor*

B.S.N., Vanderbilt University; M.S., University of Tennessee, Memphis; Ed.D., University of Memphis

PHYSICS/NATURAL SCIENCE

TED CLARKE, *Assistant Professor*

B.S., M.S., Ph.D., University of Memphis

JOHNNY B. HOLMES, *Professor*

B.S., Rockhurst College; M.S., Ph.D., University of Miami

JOHN A. VARRIANO, *Professor*

B.S., University of Pittsburgh; Ph.D., University of Rochester

PROFESSORS EMERITI

BROTHER JOEL BAUMEYER, FSC, *Professor, Director of Math Center*

B.A., M.Ed., St. Mary's College; M.A., Ph.D., St. Louis University

WILLIAM J. BUSLER, *Professor*

B.S., Christian Brothers College; Ph.D., University of Tennessee Center for the Health Sciences

STEWART MICHAEL CONDREN

B.S., University of Arkansas; M.S., Ph.D., University of Missouri-Rolla

MARGUERITE B. COOPER

A.B., University of North Carolina; M.S., Ph.D., Memphis State University

LAWRENCE GULDE

B.S., M.A.T., St. Mary's College; M.A., Boston College; Ph.D., Memphis State University

RELBUE M. MORGAN

B.S., Christian Brothers College; Ph.D., Iowa State University

BROTHER EDWARD SALGADO, FSC, *Professor*

B.A., La Salle University; M.S., St. Mary's University; Ph.D., University of the Philippines

BROTHER ROBERT STAUB, FSC

B.S., St. Mary's College; M.A., Ph.D., University of Minnesota

LYLE D. WESCOTT, JR.

B.S., Georgia Institute of Technology; Ph.D., Pennsylvania State University

PART-TIME FACULTY

BROTHER KEVIN MALACHY RYAN, FSC, *Assistant Professor*

B.S., M.Ed., St. Mary's College

LYNDA R. MILLER, *Lab Coordinator*

B.A., Southern Illinois University, M.S., Memphis State University

MISSION

THE SCHOOL OF SCIENCES offers programs leading to Bachelor of Science degrees in Biochemistry, Biology, Biomedical Science, Chemistry, Computer Science, Mathematics, Natural Science, Physics, and Engineering Physics, as well as a Bachelor of Arts degree in Mathematics. Students seeking to enter schools of medicine, dentistry, pharmacy, or any health-related professional school traditionally enroll in the School of Sciences. The baccalaureate degrees in Biochemistry, Biology, Biomedical Science, and Chemistry are designed to meet the entrance requirements of all health-related professional schools.

The course of study for each degree program is designed to meet these criteria:

1. Critical thinking-- an active, purposeful, organized and disciplined effort to make sense out of our world and our lives-- is the essential foundation of lifelong learning.
2. The knowledge bases and skills needed to deal effectively with the challenge of living in contemporary society are multidisciplinary.
3. A person should be able to make personal and professional decisions within religious and ethical contexts.

The degree programs are constructed to produce graduates who will be able to excel as professionals in science, who will succeed in pursuing further education in graduate or professional schools, and who will use their science background as a foundation for careers in other areas such as business, law, education, and engineering.

DUAL DEGREES

Dual degrees are being offered in the School of Science. See the CBU web page for the various possibilities.

DEGREE REQUIREMENTS

In order to graduate, a student must complete 122 semester credit hours with an overall grade point average of 2.0 or above and a minimum 2.0 grade point average in the satisfaction of major requirements. In addition, every student must satisfy the requirements of 6 hours in English composition; a minimum of 18 hours in humanities/social science that must include at least 3 hours in literature, 6 hours in religious studies, 3 hours in moral values course work, and 6 hours in the social sciences. All Math and Natural Science requirements, and sometimes some of the other above requirements, are already specified for the majors in Science. Details on permitted or recommended courses can be found in the General Education section of this catalog.

COURSE REQUIREMENTS FOR B.S. IN BIOCHEMISTRY

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
CHEM 113 Principles of Chemistry I & Lab	4	CHEM 114 Principles of Chemistry II & Lab	4
ENG 111 English Composition I	3	ENG 112 English Comp II	3
MATH 131 Calculus I	3	MATH 201 Applied Statistics	3
BIOL 111 Principles of Biology I & Lab	4	SPCH 125 Speech Communication	3
Orientation	0	BIOL 112 Principles of Biology II & Lab	4
Total.....	14	Total.....	17

SOPHOMORE YEAR Semester I		Semester II	
CHEM 211 Organic Chemistry I & Lab	4	CHEM 212 Org. Chem. II & Lab	4
BIOL 217 Anatomy & Physiology I & Lab	4	BIOL 218 Anatomy & Physiology II & Lab	4
PHYS 201 Introductory Physics I & Lab	4	PHYS 202 Introductory Physics II & Lab	4
Foreign Language I ¹	3	Foreign Language II ¹	3
Total.....	15	Total.....	15

JUNIOR YEAR Semester I		Semester II	
CHEM 315 Biochemistry I & Lab	4	BIOL 321 Microbiology & Lab	4
CHEM 330 Research Seminar I	0	CHEM 316 Biochemistry II	3
BIOL 311 & lab (Genetics)	4	CHEM 214 Quantitative Analysis & Lab	4
ENG 211, 212, 221, or 222	3	CHEM 331 Research Seminar II	0
Religious Studies Elective	3	CHEM Elective ²	3
Social Science Elective	3	Total.....	14
Total.....	17		

SENIOR YEAR Semester I		Semester II	
CHEM 428 Research Seminar III	0	CHEM 410 Advanced Biochemistry & Lab	4
BIOL 415 Immunology & Lab	4	CHEM 429 Research Seminar IV	2
Social Science Elective	3	CHEM 498 Senior Comprehensives/BIOCHEM	0
Religious Studies Elective	3	Moral Values elective	3
CHEM elective ²	3	BIOL 421 Cell/Molecular Biology & Lab	4
Free Electives ³	1	CS 240 Bioinformatics	3
Total.....	14	Total.....	16

Total credits required for the degree 122.

¹ Must be in the same language.

² Chemistry electives must be chosen from the following courses: CHEM 311, 342, 415 & 415L, and 438.

COURSE REQUIREMENTS FOR B.S. IN BIOLOGY

This paradigm applies to all biology majors including students seeking to enter health-related professional schools and other graduate programs.

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
BIOL 111 & 111L Principles of Biology I & Lab.....	4	BIOL 112 & 112L Principles of Biology II & Lab.....	4
CHEM 113 & 113L Principles of Chemistry I & Lab	4	CHEM 114 & 114L Principles of Chemistry II & Lab	4
ENG 111 English Composition I	3	ENG 112 English Comp II	3
Elective ^{1,2}	3	MATH 131 Calculus I	3
Orientation	0	Liberal Arts Elective.....	3
Total.....	14	Total.....	17

SOPHOMORE YEAR Semester I	Credits	Semester II	Credits
Biology Elective & Lab ³	4	CHEM 212 & 212L Organic Chemistry II & Lab	4
CHEM 211 & 211L Organic Chemistry I & Lab	4	PHYS 202 & 202L Introduction to Physics II & Lab.....	4
PHYS 201 & 201L Introduction to Physics I & Lab.....	4	Biology Elective & Lab.....	4
Religious Studies (200 level).....	3	Free Elective.....	3
Total.....	15	Total.....	15

JUNIOR YEAR Semester I	Credits	Semester II	Credits
BIOL 311 & 311L Genetics & Lab.....	4	BIOL 362 Biology Seminar	1
Chemistry & Lab ⁴	4	Biology Elective & Lab.....	4
Social Science Elective	3	Biology Elective	3
Literature Elective	3	MATH 201 Applied Statistics	3
Religious Studies (300 level).....	3	Moral Values Elective.....	3
Total.....	17	Total.....	14
SUMMER: BIOL 463 Research I ⁵	1		

SENIOR YEAR Semester I	Credits	Semester II	Credits
BIOL 464 Research II ⁵	2	BIOL 465 Research III ⁵	2
Biology Elective & Lab.....	4	Biology Elective & Lab.....	4
Biology Elective	4	Biology Elective	3
Elective.....	3	Social Science Elective.....	3
BIOL 499 Senior Comprehensive.....	0	Elective	3
Total.....	13	Total.....	15

Total credits required for the degree 122.

Minimum GPA of 2.0 in biology courses is required for graduation. Transfer students must take at least 20 hours of biology at or above the 300 level at Christian Brothers University.

BIOLOGY ELECTIVES (*Students should choose at least one course from each group*)

Group I: BIOL 211 Embryology; 217 Anatomy & Physiology I; 218 Anatomy & Physiology II; 236 Nutrition; BIOL 312 Human Physiology; 414 Histology; 451 Neuroscience.

Group II: BIOL 212 Comparative Anatomy; 216 Botany; 335 Invertebrate Zoology; 413 Parasitology.

Group III: BIOL 346 Evolution; 381 Animal Behavior; 412 Ecology.

Group IV: BIOL 321 Microbiology; 367 Pharmacology; 370 Toxicology; 415 Immunology; 421 Cell Biology.

¹ Students need to take MATH 117 and/or CHEM 101 if they do not place into MATH 131 and/or CHEM 113

² Minimum of 9 hours of free electives; no more than 6 hours can be in Biology unless the minimum exceeds 122 hours; ENG 100, CHEM 101, MATH 103, ALG 110, ALG 115, and ALG 120 do not fill the free electives requirement

³ Minimum of 30 hours of biology electives at or above the 200 level must include at least one course from each of the four groups listed above; minimum of 16 hours of biology electives must be at or above the 300 level.

⁴ Recommended: CHEM 315 Biochemistry or CHEM 214 Quantitative Analysis; any chemistry course with a lab at the 200 level or above will satisfy the requirement.

⁵ Substitute BIOL 461-462 only with permission of the Chair or Course Director. Students who take BIOL 461 and 462 Independent Research will have to make up three credits in biology in order to complete the 122 hours required minimum.

COURSE REQUIREMENTS FOR B.S. IN BIOLOGY

Concentration In Environmental Studies

This paradigm applies to all biology majors including students seeking to enter health-related professional schools and other graduate programs.

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
BIOL 111 & 111L Principles of Biology I & Lab.....	4	BIOL 112 & 112L Principles of Biology II & Lab.....	4
CHEM 113 & 113L Principles of Chemistry I & Lab ¹	4	CHEM 114 & 114L Principles of Chemistry II & Lab	4
ENG 111 English Composition I	3	ENG 112 English Comp II	3
Elective ²	3	MATH 131 Calculus I	3
Orientation	0		
Total.....	14	Total.....	14

SOPHOMORE YEAR Semester I		Semester II	
Biology Elective & Lab ³	4	CHEM 212 & 212L Organic Chemistry II & Lab	4
CHEM 211 & 211L Organic Chemistry I & Lab	4	PHYS 202 & 202L Introduction to Physics II & Lab.....	4
PHYS 201 & 201L Introduction to Physics I & Lab.....	4	Biology Elective & Lab ³	4
Biology Elective & Lab ³	4	Free Elective.....	3
Total.....	16	Total.....	15

JUNIOR YEAR Semester I		Semester II	
BIOL 311 & 311L Genetics & Lab.....	4	BIOL 362 Biology Seminar	1
CHEM 312 & 312L Biochemistry & Lab ⁴	4	Biology Elective & Lab ³	4
Literature Elective	3	MATH 201 Applied Statistics	3
Religious Studies (200 Level)	3	Religious Studies (300 Level)	3
Social Science Elective.....	3	Moral Values Elective (Environmental Ethics recommended).....	3
Total.....	17	Total.....	14
SUMMER: BIOL 463 Research I ⁵	1		

SENIOR YEAR Semester I		Semester II	
BIOL 464 Research II ⁵	2	BIOL 465 Research III ⁵	2
Biology Elective & Lab ³	4	Biology Elective & Lab ³	4
Biology Elective	4	Biology Elective	3
Elective ^{2,6}	3	Social Science Elective.....	3
Liberal Arts Elective.....	3	Elective ^{2,6}	3
BIOL 499 Senior Comprehensive.....	0		
Total.....	16	Total.....	15

Total credits required for the degree 122.

Minimum GPA of 2.0 in biology courses is required for graduation. Transfer students must take at least 20 hours of biology at or above the 300 level at Christian Brothers University.

BIOLOGY ELECTIVES

Group I: BIOL 312 Human Physiology; 370 Toxicology; 421 Cell Biology; 451 Neuroscience.

Group II: BIOL 216 Botany; 321 Microbiology; 335 Invertebrate Zoology; 413 Parasitology.

Group III: BIOL 246 Evolution; 381 Animal Behavior; 412 Ecology.

Group IV: BIOL 107 Environmental Biology; CE 305 Environmental Site Assessment; CE 404 Solid and Hazardous Waste Management; CE 405 Remediation of Organically Contaminated Soil and Water; CE 406 Air Pollution; CHEM 214 Quantitative Analysis.

¹ Students may need to take MATH 117 and/or CHEM 101 if they do not place into MATH 131 Calculus I and/or CHEM 113.

² Recommended free elective for environmental track students.

³ Minimum of 30 hours of biology electives at or above the 200 level must include at least one course from each of the four groups listed above; minimum of 16 hours of biology electives must be at or above the 300 level. Biology courses designed for non-majors do not fulfill the Biology elective requirement.

⁴ Recommended chemistry elective: CHEM 315 and 316

⁵ May substitute BIOL 461-462 only with permission of the Chair and Course Director. Students who take BIOL 461 and 462 Independent Research will have to make up three credits in biology in order to complete the 122 hours required minimum.

⁶ Minimum of 12 hours of free electives. No more than 6 hours can be in biology unless the excess is added to the 122 minimum credits for graduation. ALG 110, 115, 120, MATH 103, ENG 100 and CHEM 101 do not fulfill the free electives requirement.

COURSE REQUIREMENTS FOR B.S. IN BIOMEDICAL SCIENCES

This paradigm applies to students who are seeking to enter medical, dental, or veterinary schools.

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
BIOL 111 & 111L Principles of Biology I & Lab.....	4	BIOL 112 & 112L Principles of Biology II & Lab.....	4
CHEM 113 & 113L Principles of Chemistry I & Lab	4	CHEM 114 & 114L Principles of Chemistry II & Lab	4
ENG 111 English Composition I	3	ENG 112 English Comp II	3
Social Science Elective.....	3	MATH 131 Calculus I	3
Elective ^{1,2}	3	Religious Studies (200 level).....	3
Orientation	0		
Total.....	17	Total.....	17

SOPHOMORE YEAR Semester I		Semester II	
BIOL 211 & 211L Embryology & Lab.....	4	CHEM 212 & 212L Organic Chemistry II & Lab	4
CHEM 211 & 211L Organic Chemistry I & Lab	4	PHYS 202 & 202L Introduction to Physics II & Lab.....	4
PHYS 201 & 201L Introduction to Physics I & Lab	4	Biology Elective & Lab.....	4
Literature Elective	3	School of Arts Elective.....	3
Total.....	15	Total.....	15

JUNIOR YEAR Semester I		Semester II	
BIOL 311 & 311L Genetics & Lab.....	4	BIOL 362 Biology Seminar	1
CHEM 315 & 315L Biochemistry I & Lab.....	4	BIOL 321 Microbiology & Lab & Lab	4
BIOL 312 & 312L Vert. Physics & Lab	4	CHEM 316 Biochemistry II	3
Elective	3	PHIL 322 Medical Ethics	3
		MATH 201 Applied Statistics	3
Total.....	15	Total.....	14
SUMMER: BIOL 463 Research I.....	1		

SENIOR YEAR Semester I		Semester II	
BIOL 464 Research II	2	BIOL 465 Research III	2
BIOL 413 Parasitology & Lab	4	BIOL 414 Histology & Lab (or BIOL 321 & Lab)	4
BIOL 415 Immunology & Lab	4	Biology Elective ^{2,3}	3
Religious Studies (300 Level)	3	Social Science Elective.....	3
BIOL 499 Senior Comprehensive.....	0	Elective.....	3
Total.....	13	Total.....	15

Total credits required for the degree 122.

BIOLOGY ELECTIVES

Group I: BIOL 211 Embryology; 217 Anatomy & Physiology I; 218 Anatomy & Physiology II; 236 Nutrition; 451 Neuroscience.

Group II: BIOL 212 Comparative Anatomy; 216 Botany; 335 Invertebrate Zoology.

Group III: BIOL 346 Evolution; 381 Animal Behavior; 412 Ecology.

Group IV: BIOL 367 Pharmacology; 370 Toxicology; 415 Immunology; 421 Cell Biology.

Minimum GPA of 2.0 in biology courses is required for graduation. Transfer students must take at least 20 hours of biology at or above the 300 level at Christian Brothers University.

¹ Students may need to take MATH 117 and/or CHEM 101 if they do not place into MATH 131 and/or CHEM 113.

² Minimum of 9 hours of free electives; no more than 6 hours can be in Biology unless the minimum exceeds 122 hours; ENG 100, CHEM 101, MATH 103, ALG 110, ALG 115, and ALG 120 do not fill the free electives requirement

³ One biology elective must be taken from the Group III list

COURSE REQUIREMENTS FOR B.S. IN CHEMISTRY

FRESHMAN YEAR Semester I		Credits	Semester II		Credits
CHEM 113 & 113L Principles of Chemistry I & Lab	4		CHEM 114 & 114L Principles of Chemistry II & Lab	4	
ENG 111 English Composition I	3		ENG 112 English Composition II	3	
MATH 131 Calculus I	3		MATH 132 Calculus II	3	
Foreign Language I ¹	3		Religious Studies Elective	3	
Social Science Elective.....	3		Foreign Language II ¹	3	
Orientation	0				
Total.....	16		Total.....	16	
<hr/>					
SOPHOMORE YEAR Semester I			Semester II		
CHEM 211 & 211L Organic Chemistry I & Lab	4		CHEM 212 & 212L Organic Chemistry II & Lab	4	
MATH 231 Differential Equations	3		CHEM 214 & 214L Quantitative Analysis & Lab	4	
PHYS 150 & 150L Physics I & Lab	4		MATH 232 Calculus III	3	
Literature Elective ²	3		PHYS 251 & 251L Physics II & Lab.....	4	
Total.....	14		Total.....	15	
<hr/>					
JUNIOR YEAR Semester I			Semester II		
CHEM 351 & 351L Physical Chemistry & Lab	4		CHEM 331 Research Seminar II.....	0	
CHEM 330 Research Seminar I	0		CHEM 352 & 352L Physical Chemistry II & Lab.....	4	
Moral Values Elective	3		CHEM 415 & 415L Analytical Chemistry & Lab	4	
PHYS 252 & 252L Physics III & Lab	4		MATH 308 Statistics.....	3	
Free Elective.....	4		Free Elective.....	3	
Total.....	15		Total.....	14	
<hr/>					
SENIOR YEAR Semester I			Semester II		
CHEM 315 & 315L Biochemistry I & Lab	4		CHEM 422 & 422L Inorganic Chemistry & Lab.....	4	
CHEM 428 Research Seminar III	0		CHEM 429 Research Seminar IV	2	
Social Science Elective.....	3		CHEM 499 Senior Comprehensives/CHEMISTRY	0	
Religious Studies Elective	3		Chemistry Elective ³	3	
Free Electives	6		Free Electives	7	
Total.....	16		Total.....	16	

Total credits required for the degree 122.

The maximum number of credits in chemistry applicable to the degree is 52 hours.

Transfer students must take at least 15 hours of the required Chemistry courses numbered at or above the 300 level at Christian Brothers University

¹ Must be same language.

² ENG 211, 212, 221, or 222.

³ Chemistry elective must be a 300 or 400 level course; CHEM 316 may not be used to satisfy this requirement.

COURSE REQUIREMENTS FOR B.S. IN CHEMISTRY (PRE-MED)

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
CHEM 113 & 113L Principles of Chemistry I & Lab	4	CHEM 114 & 114L Principles of Chemistry II & Lab	4
BIOL 111 & 111L Principles of Biology I & Lab.....	4	BIOL 112 & 112L Principles of Biology II & Lab.....	4
ENG 111 English Composition I	3	ENG 112 English Composition II.....	3
MATH 131 Calculus I	3	MATH 132 Calculus II	3
Orientation	0	Religious Studies Elective	3
Total.....	14	Total.....	17

SOPHOMORE YEAR Semester I		Semester II	
CHEM 211 & 211L Organic Chemistry I & Lab	4	CHEM 212 & 212L Organic Chemistry II & Lab	4
Biology Elective & Lab ²	4	CHEM 214 & 214L Quantitative Analysis & Lab	4
MATH 231 Differential Equations	3	MATH 232 Calculus III.....	3
PHYS 150 & 150L Physics I & Lab.....	4	PHYS 251 & 251L Physics II & Lab.....	4
Total.....	15	Total.....	15

JUNIOR YEAR Semester I		Semester II	
CHEM 351 Physical Chemistry I & Lab	4	CHEM 331 Research Seminar II.....	0
CHEM 330 Research Seminar I	0	CHEM 352 & 352L Physical Chemistry II & Lab.....	4
PHYS 252 & 252L Physics III & Lab.....	4	CHEM 415 & 415L Analytical Chemistry & Lab	4
Foreign Language I ¹	3	MATH 308 Statistics.....	3
Biology Elective & Lab ²	4	Foreign Language II ¹	3
Total.....	15	Elective	3
		Total.....	17

SENIOR YEAR Semester I		Semester II	
CHEM 315 & 315L Biochemistry I & Lab.....	4	CHEM 422 & 422L Inorganic Chemistry & Lab.....	4
CHEM 428 Research Seminar III.....	0	CHEM 429 Research Seminar IV	2
Literature Elective ³	3	CHEM 499 Senior Comprehensives/CHEMISTRY	0
Religious Studies Elective	3	Chemistry Elective (Upper Division) ⁴	3
Social Science Elective.....	3	Social Science Elective.....	3
Free Electives	1	Moral Values Elective	3
Total.....	14	Total.....	15

Total credits required for the degree 122.

The maximum number of credits in chemistry applicable to the degree is 52 hours.

Transfer students must take at least 15 hours of the required Chemistry courses numbered at or above the 300 level at Christian Brothers University

¹ Must be same language.

² BIOL 211 & 211 L Vertebrate Embryology & Lab, BIOL 311 & 311L Genetics & Lab, and BIOL 312 & 312L are strongly recommended.

³ ENG 211, 212, 221, or 222.

⁴ Chemistry Elective must be a 300 or 400 level chemistry course; CHEM 316 may not be used to satisfy this requirement.

COURSE REQUIREMENTS FOR B.S. IN CHEMISTRY (PRE-PHARMACY)

FRESHMAN YEAR Semester I		Credits	Semester II		Credits
CHEM 113 & 113L Principles of Chemistry I & Lab	4		CHEM 114 & 114L Principles of Chemistry II & Lab	4	
BIOL 111 & 111L Principles of Biology I & Lab.....	4		BIOL 112 & 112L Principles of Biology II & Lab.....	4	
ENG 111 English Composition I	3		ENG 112 English Composition II.....	3	
MATH 131 Calculus I	3		MATH 132 Calculus II	3	
Orientation	0		Religious Studies Elective	3	
Total.....	14		Total.....	17	
<hr/>			<hr/>		
SOPHOMORE YEAR Semester I			Semester II		
CHEM 211 & 211L Organic Chemistry I & Lab	4		CHEM 212 & 212L Organic Chemistry II & Lab	4	
MATH 231 Differential Equations	3		CHEM 214 & 214L Quantitative Analysis & Lab	4	
PHYS 150 & 150L Physics I & Lab.....	4		MATH 232 Calculus III.....	3	
Literature Elective ¹	3		PHYS 251 & 251L Physics II & Lab.....	4	
Total.....	14		Total.....	15	
<hr/>			<hr/>		
JUNIOR YEAR Semester I			Semester II		
BIOL 217 & 217L Anatomy/Physiology I & Lab.....	4		BIOL 218 & 218L Anatomy & Physiology II & Lab	4	
CHEM 351 & 351L Physical Chemistry I & Lab.....	4		CHEM 331 Research Seminar II.....	0	
CHEM 330 Research Seminar I	0		CHEM 352 & 352L Physical Chemistry II & Lab.....	4	
PHYS 252 & 252L Physics III & Lab.....	4		CHEM 415 & 415L Analytical Chemistry & Lab	4	
Social Science Elective.....	3		MATH 308 Statistics.....	3	
Total.....	15		Total.....	15	
<hr/>			<hr/>		
SENIOR YEAR Semester I			Semester II		
CHEM 315 & 315L Biochemistry I & Lab.....	4		CHEM 422 & 422L Inorganic Chemistry & Lab.....	4	
CHEM 428 Research Seminar III.....	0		CHEM 429 Research Seminar IV	2	
Foreign Language I ²	3		CHEM 499 Senior Comprehensives/CHEMISTRY	0	
Religious Studies Elective	3		Chemistry Elective ³	3	
Social Science Elective.....	3		Foreign Language II ²	3	
Moral Values Elective	3		Free Electives ⁴	3	
Total.....	16		Total.....	15	

Total credits required for the degree 122.

A maximum of 52 hours in chemistry are applicable to the degree.

Transfer students must take at least 15 hours of the required Chemistry courses numbered at or above the 300 level at Christian Brothers University

¹ ENG 211, 212, 221, or 222.

² Must be same language

³ Chemistry Elective must be a 300 or 400 level chemistry course; CHEM 316 may not be used to satisfy this requirement.

⁴ Recommended for some Pharmacy Schools: BIOL 415 Immunology and lab, (Fall), BIOL 321 Microbiology and Lab (Spring), CHEM 316 Biochemistry II (Spring).

COURSE REQUIREMENTS FOR B.S. IN CHEMISTRY (PRE-FORENSICS)

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
CHEM 113 & 113L Principles of Chemistry I & Lab	4	CHEM 114 & 114L Principles of Chemistry II & Lab	4
BIOL 111 & 111L Principles of Biology I & Lab.....	4	BIOL 112 & 112L Principles of Biology II & Lab.....	4
ENG 111 English Composition I	3	ENG 112 English Composition II.....	3
MATH 131 Calculus I	3	MATH 132 Calculus II	3
Orientation	0	Social Science Elective.....	3
Total.....	14	Total.....	17

SOPHOMORE YEAR Semester I		Semester II	
CHEM 211 & 211L Organic Chemistry I & Lab	4	CHEM 212 & 212L Organic Chemistry II & Lab	4
MATH 231 Differential Equations	3	CHEM 214 & 214L Quantitative Analysis & Lab	4
PHYS 150 & 150L Physics I & Lab	4	MATH 232 Calculus III	3
Religious Studies Elective	3	PHYS 251 & 251L Physics II & Lab	4
Total.....	14	Total.....	15

JUNIOR YEAR Semester I		Semester II	
CHEM 351 & 351L Physical Chemistry I & Lab	4	CHEM 331 Research Seminar II.....	0
CHEM 330 Research Seminar I	0	CHEM 352 & 352L Physical Chemistry II & Lab.....	4
Literature Elective I ¹	3	CHEM 415 & 415L Analytical Chemistry & Lab	4
PHYS 252 & 252L Physics III & Lab	4	BIOL 321 & 321L Microbiology & Lab	4
Foreign Language I ²	3	Foreign Language II ²	3
Total.....	14	Total.....	15

SENIOR YEAR Semester I		Semester II	
CHEM 315 & 315L Biochemistry I & Lab.....	4	CHEM 422 & 422L Inorganic Chemistry & Lab.....	4
CHEM 428 Research Seminar III.....	0	CHEM 429 Research Seminar IV	2
BIOL 311 & 311L Genetics & Lab	4	CHEM 499 Senior Comprehensives/CHEMISTRY	0
Social Science Elective.....	3	Chemistry Elective ³	3
Moral Values Elective.....	3	MATH 308 Statistics.....	3
Religious Studies Elective	3	Elective ⁴	4
Total.....	17	Total.....	16

Total credits required for the degree 122.

A maximum of 52 hours in chemistry are applicable to the degree.

Transfer students must take at least 15 hours of the required Chemistry courses numbered at or above the 300 level at Christian Brothers University

¹ ENG 211, 212, 221, or 222.

² Must be same language

³ Chemistry Elective must be a 300 or 400 level chemistry course; CHEM 316 may not be used to satisfy this requirement.

⁴ Recommended Electives: ANTH 126 Forensic Anthropology & Lab (Fall), BIOL 421 & Lab Cell/Molecular Biology (Spring) and CHEM 205 Forensic Chemistry (Fall).

COURSE REQUIREMENTS FOR B.S. IN COMPUTER SCIENCE

FRESHMAN YEAR Semester I		Credits	Semester II		Credits
ENG 111 English Composition I	3		CS 172 & 172L Fundamentals of Computer Science & Lab.....	4	
ECE 101 Intro to Engineering Problem Solving	3		ECE 250 Digital Design	3	
MATH 131 Calculus I	3		ENG 112 English Composition II	3	
Religious Studies Elective	3		MATH 132 Calculus II	3	
Social Science Elective ¹	3		Religious Studies Elective	3	
Orientation	0				
Total.....	15		Total.....	16	
<hr/>					
SOPHOMORE YEAR Semester I			Semester II		
CS 234 Data Structures & Lab	4		CS 360 Object Oriented Design	3	
Social Science Elective ¹	3		MATH 141 Discrete Mathematics	3	
PHYS 150 & 150L Physics I & Lab	4		PHYS 251/202 Physics II & Lab	4	
Option/Minor Elective.....	6		Option/Minor Elective.....	6	
Total.....	17		Total.....	16	
<hr/>					
JUNIOR YEAR Semester I			Semester II		
CS 471 Database Design.....	3		CS 370 Operating Systems	3	
Option/Minor Elective.....	6		CS 400 Internship.....	3	
Philosophy Elective ²	3		Option Minor Elective.....	6	
Free elective	3		Literature Elective	3	
Total.....	15		Total.....	15	
<hr/>					
SENIOR YEAR Semester I			Semester II		
CS 481 Project I	1		CS 482 Project II	3	
Option Elective	9		CS 440 Algorithms.....	3	
Minor Elective.....	3		Option Elective	6	
Total.....	13		Minor Elective	3	
			Total.....	15	

Total credits required for the degree 122.

A maximum of 47 credits in Computer Science is applicable toward the degree.

Transfer students must take at least one half of the required computer related courses numbered 300 or above at Christian Brothers University.

Note: A minor is required in both the Engineering and Information Systems Options. The minor may not be in Computer Engineering, Computer Science.

Bioinformatics Option: The minor for the Bioinformatics option must be either Biology or Chemistry. The minor in Biology includes BIOL 111, 111Lab, 112, 112Lab, 311, 311Lab, 321, 321Lab, 421, 421Lab. Other required courses are BIOL/CS 240; CHEM 113, 113Lab, 114, 114Lab, 211, 211Lab, 212, 212Lab. The minor in Chemistry includes CHEM 113, 113Lab, 114, 114Lab, 211, 211Lab, 212, 212Lab, 315, 315Lab, 316. Other required courses are BIOL/CS 240; BIOL 111, 111Lab, 112, 112Lab, 311, 311Lab.

Engineering Option: required courses are ECE 221, 251, 350, 450; MATH 231; two from ECE 451, 453, 454, and 480-489 Special Topics.

Forensics Option: The minor for the Forensics option must be Biology which includes BIOL 111, 111L, 112, 112L, 217, 217Lab, 218, 218Lab, 321, 321Lab. Other required courses are MATH 201; CHEM 113, 113Lab, 114, 114Lab; ANTH 126, 126Lab, 301.

Business Option: required courses are MIS 231, ECON 214, MKTG 311, ECE 314, MGMT 320, MKTG 438, and MGMT 352.

¹ Six hours of Social Sciences must be chosen to satisfy the General Education requirements.

² Must satisfy the moral values requirement

COURSE REQUIREMENTS FOR B.S. IN COMPUTER SCIENCE & B.S. IN MATHEMATICS

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
ENG 111 English Composition I	3	CS 172 & 172L Fundamentals of Computer Science and Lab	4
ECE 101 Intro to Engineering Problem Solving	3	ECE 250 Digital Design	3
MATH 131 Calculus I	3	ENG 112 English Composition II	3
Religious Studies Elective	3	MATH 132 Calculus II	3
Social Science Elective ¹	3	PHYS 150 & 150L Physics I & Lab	4
Orientation	0		
Total.....	15	Total.....	17

SOPHOMORE YEAR Semester I		Semester II	
CS 234 Data Structures & Lab	4	CS 360 Object Oriented Design	3
MATH 231 Differential Equations	3	MATH 232 Calculus III	3
PHYS 251 & 251L Physics II & Lab	4	Social Science Elective ¹	3
ECE 221 Circuit I	3	ECE 251 Microprocessor Architecture	4
Religious Studies Elective	3	ENG Literature Elective	3
Total.....	17	Total.....	16

JUNIOR YEAR Semester I		Semester II	
CS 471 Database Design	3	CS 370 Operating Systems	3
MATH 401 Linear Algebra	3	CS 400 Internship	3
MATH 329 Applied Numerical Analysis	3	ECE 450 Computer Networks	3
MATH Elective	3	MATH 402 Abstract Algebra	3
ECE 350 Systems Architecture	3	MATH 405 Discrete Math	3
		MATH/CS Elective	3
Total.....	15	Total.....	18

SENIOR YEAR Semester I		Semester II	
MATH 413 Complex Analysis	3	CS 440 Algorithms	3
MATH 481 Math Seminar I	1	MATH 482 Math Seminar II	2
CS 481 Computer Science Project I	1	CS 482 Computer Science Project II	3
Philosophy Elective ²	3	Foreign Language	3
Foreign Language	3	ECE Elective	3
ECE Elective	3	MATH 414 Real Analysis	3
Total.....	14	Total.....	17

Total credits required for the degree 129.

Transfer students must take at least one half of the required math and computer science courses numbered 300 or above at Christian Brothers University.

MATH 482 & CS 482 can be met by a single project if the student's project has both significant Math and CS content.

¹ Six hours of social science must be chosen to satisfy the General Education requirements.

² Must satisfy the moral values requirement.

COURSE REQUIREMENTS FOR B.S. IN ENGINEERING PHYSICS

FRESHMAN YEAR Semester I		Credits	Semester II		Credits
ENG 111 English Composition I	3		CHEM 115 & 115L General Chemistry	4	
ME 112 Computer Elective	3		ENG 112 English Composition II	3	
MATH 131 Calculus I	3		MATH 132 Calculus II	3	
ME 121 Solids Modeling	3		PHYS 150 & 150L Physics I & Lab	4	
Elective	3				
Orientation	0				
Total.....	15		Total.....	14	
<hr/>					
SOPHOMORE YEAR Semester I			Semester II		
ECE 221 Circuit Analysis I	3		ECE 201 Engineering Instrumentation	2	
MATH 231 Differential Equations	3		MATH 232 Calculus III	3	
PHYS 251 & 251L Physics II & Lab	4		ECE 222 Circuit Analysis II	3	
Literature Elective	3		ME 305 Thermodynamics I	3	
Religious Studies Elective	3		PHYS 252 Physics III	3	
Total.....	16		Total.....	14	
<hr/>					
JUNIOR YEAR Semester I			Semester II		
ECE 331 Electronics I	3		Engineering Elective ¹	3	
ECE 331L Junior Lab	1		ENGR/PHYS/MATH Elective ¹	3	
PHYS 252L Physics III Lab	1		PHYS 347 Special Relativity	2	
PHYS 353 Solid State Physics	3		Moral Values Elective	3	
PHYS 380 Advanced Mechanics	3		Social Science/History	3	
Elective	3		Elective	3	
Total.....	14		Total.....	17	
<hr/>					
SENIOR YEAR Semester I			Semester II		
MATH 309 Probability	3		PHYS 452 Advanced Physics Lab	1	
PHYS 337/ECE 406 E & M Fields	3		PHYS 492 Research II	2	
PHYS 415/415L Optics & Lab	4		PHYS 499 Comprehensives	0	
PHYS 447 Quantum Mechanics	3		Engineering Elective ¹	3	
PHYS 491 Research I	0		Social Science/History	3	
Religious Studies Elective	3		Elective	7	
Total.....	16		Total.....	16	

Total credits required for the degree 122.

Transfer students must take at least one-half of the required courses numbered above 300 at CBU.

¹ Engineering electives must be numbered 300 or above and can be from any field of engineering but must be approved by the Physics Department.

COURSE REQUIREMENTS FOR B.S. IN MATHEMATICS

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
ENG 111 English Composition I	3	ENG 112 English Composition II	3
MATH 131 Calculus I	3	MATH 132 Calculus II	3
ECE 101 Intro to Engineering Problem Solving	3	Foreign Language	3
Foreign Language	3	Science Elective ¹	4
Religious Studies Elective	3	Social Science Elective	3
Orientation	0		
Total.....	15	Total.....	16

SOPHOMORE YEAR Semester I		Semester II	
ENG Literature Elective	3	MATH 141 Discrete Mathematics	3
MATH 231 Differential Equations	3	MATH 232 Calculus III	3
Religious Studies Elective	3	Minor Elective ²	4
Philosophy Elective ⁴	3	Elective	3
Science Elective ¹	4	Social Science Elective	3
Total.....	16	Total.....	16

JUNIOR YEAR Semester I		Semester II	
MATH 401 Linear Algebra	3	MATH 402 Abstract Algebra	3
Mathematics Elective ³	3	Mathematics Elective ³	3
Minor Electives ²	7	Elective	3
Elective	3	Minor Electives ²	4
Total.....	16	Total.....	13

SENIOR YEAR Semester I		Semester II	
MATH 413 Complex Analysis	3	MATH 414 Real Analysis	3
MATH 481 Seminar I	1	MATH 482 Seminar II	2
Mathematics Elective ³	3	Minor Electives ²	3
Minor Electives ²	4	Electives	6
Electives	5		
Total.....	16	Total.....	14

Total credits required for the degree 122.

A maximum of 47 credits in mathematics is applicable toward the degree.

Transfer students must take at least one half of the required mathematics courses numbered above 300 at Christian Brothers University.

Forensics Option: The minor for Forensics option must be Biology which includes BIOL 111, 111Lab, 112, 112Lab, 217, 217Lab, 218, 218Lab, 321, 321Lab. Other required courses are CHEM 113, 113Lab, 114, 114Lab; 214, 214Lab; ANTH 126, 126Lab, 301.

Bioinformatics Option: The minor for the Bioinformatics option must be Biology which includes BIOL 111, 111Lab, 112, 112Lab, 311, 311Lab, 321, 321Lab, 421, 421Lab. Other required courses are BIOL/CS 240; CS 440; CHEM 113, 113Lab, 114, 114Lab, 211, 211Lab, 212, 212Lab.

¹ Science electives must include at least 8 hours in one of Biology, Chemistry, or Physics outside the area chosen for the minor.

² Minor electives must be chosen to obtain a minor in one of Bioinformatics, Biology, Chemistry, Computer Science, Forensics, or Physics. Credits necessary for the minor vary with the requirements for that minor. Reduce free electives by the difference of those credits required by the chosen minor and those listed as minor elective credits in this paradigm.

³ The Mathematics electives must be chosen from MATH 301, 308, 309, 329, 405, or 470-479.

⁴ Must satisfy moral values requirement.

COURSE REQUIREMENTS FOR B.A. IN MATHEMATICS

FRESHMAN YEAR Semester I		Credits	Semester II		Credits
ENG 111 English Composition I	3		ENG 112 English Composition II.....	3	
MATH 131 Calculus I	3		MATH 132 Calculus II	3	
ECE 101 Intro to Engineering Problem Solving.....	3		Foreign Language ¹	3	
Foreign Language ¹	3		Science Elective ²	4	
Religious Studies Elective.....	3		Elective	3	
Orientation	0				
Total.....	15		Total.....	16	
<hr/>					
SOPHOMORE YEAR Semester I			Semester II		
ENG Literature Elective	3		ENG Literature Elective	3	
MATH 231 Differential Equations	3		MATH 141 Discrete Mathematics	3	
Foreign Language ¹	3		MATH 232 Calculus III	3	
Religious Studies Elective.....	3		Foreign Language ¹	3	
Science Elective ²	4		History Elective	3	
Total.....	16		Total.....	15	
<hr/>					
JUNIOR YEAR Semester I			Semester II		
MATH 401 Linear Algebra	3		MATH 402 Abstract Algebra	3	
Mathematics Elective ³	3		Mathematics Elective ³	3	
Philosophy Elective ⁴	3		Philosophy Elective ⁴	3	
Liberal Arts Elective ⁵	3		Liberal Arts Elective ⁵	3	
Elective.....	3		Social Science Elective.....	3	
Total.....	15		Total.....	15	
<hr/>					
SENIOR YEAR Semester I			Semester II		
MATH 413 Complex Analysis	3		MATH 414 Real Analysis.....	3	
MATH 481 Seminar I.....	1		MATH 482 Seminar II.....	2	
Mathematics Elective ³	3		Electives	9	
Electives	9				
Total.....	16		Total.....	14	

Total credits required for the degree 122.

A maximum of 47 credits in mathematics is applicable toward the degree.

Transfer students must take at least one half of the required mathematics courses numbered above 300 at Christian Brothers University.

¹ A minimum of 12 credits in a modern foreign language is required.

² The required science electives must be from only one of these fields: Biology, Chemistry, or Physics.

³ The mathematics electives must be chosen from MATH 301, 308, 309, 329, 405, or 470-479.

⁴ At least one philosophy course must satisfy the General Education Moral Values requirement.

⁵ A total of 51 credits in the Arts must be distributed in such a way that 12 credits are in one of the Social Sciences, Philosophy, Religious Studies, or History.

COURSE REQUIREMENTS FOR B.S. IN NATURAL SCIENCE

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
BIOL 111 & 111L Principles of Biology I ¹	4	BIOL 112 & 112L Principles of Biology II ¹	4
CHEM 113 & 113L Principles of Chemistry I	4	CHEM 114 & 114L Principles of Chemistry II	4
ENG 111 English Composition I	3	ENG 112 (English Comp II)	3
MATH 117/131	3	MATH 106/131/132	3
Orientation	0	Elective	3
Total	14	Total	17

SOPHOMORE YEAR Semester I		Semester II	
Science Area I ²	4	Science Area I	4
PHYS 150/201 Physics I & Lab ³	4	PHYS 251/202 Physics II & Lab ³	4
Literature Elective	3	Moral Values Elective	3
Elective	3	Social Science/History	3
Total	14	Total	14

JUNIOR YEAR Semester I		Semester II	
Science Area I	4	Science (Any Area)	3
Science (Any Area)	3	Religious Studies Elective	3
Religious Studies Elective	3	Electives	9
Social Science Elective	3		
Electives	3		
Total	16	Total	15

SENIOR YEAR Semester I		Semester II	
NSCI 410 Senior Thesis I	1	Science (Any Area)	3
Science (Any Area)	4	Electives	12
Electives	12		
Total	16	Total	15

Total credits required for the degree: 122.

Transfer students must take at least one-half of the required courses numbered at or above the 200 level at CBU, and this must include at least two courses (6 to 8 hours excluding NSCI 410,411) at or above the 300 level.

CHEM 101 does not supply any credit for Major Requirements. It can supply 3 credit hours of Free Electives.

General education, science, and free electives can be chosen to satisfy the following options.

Forensics Option: The following courses are recommended: ANTH 126/126L, 301; BIOL 217/217L, 218/218L 321/321L, 414/414L; CHEM 211/211L, 212/212L, 312/312L; MATH 201

Professional Writing Option: A certificate in professional writing is earned by taking four upper level writing courses chosen from ENG 370, 371, 373, 375, 377, 376, 389.

Sales/Marketing Option: The following courses are recommended: MKTG 311, 334, 338, 348.

Teaching Licensure Option: Refer to the School of Arts section of the Catalog where paradigms for teaching licensure (grades 7-12) are listed. These paradigms are part of a five-year plan where the student earns a Master of Arts in Teaching.

¹ Students who choose Physics as Science Area I can take BIOL 109 & 109L instead of BIOL 111, 111L, 112 & 112L.

² Students must have at least 30 hours of science (biology, chemistry, or physics) at or above the 200+ level. At least 12 of these 30 hours must be in the same field (Science Area I). At least 14 of these 30 hours must be at the 300+ level (including NSCI 410 & 411).

³ Students who choose Physics as Science Area I must take PHYS 150, 251, 252 and the associated labs.

COURSE REQUIREMENTS FOR B.S. IN NATURAL SCIENCE WITH A CONCENTRATION IN PUBLIC HEALTH

GENERAL EDUCATION REQUIREMENTS (See Page 24).....	30-33 hours
Aesthetics (Fulfilled by GER literature requirement)	0 hours
English Composition (ENG 111 & 112)	6 hours
Any Statistics (see General Education requirements).....	0-3 hours
MATH 117 or 131 and MATH 106, 131, or 201 ¹	6 hours
Into to Sociology (SOC 101)	3 hours
General Psychology (PSYC 105)	3 hours
Literature (ENG 211 or 212)	3 hours
Religious Studies Electives (a 200 and a 300 level recommended)	6 hours
Moral Values (PHIL 322 or, 325)	3 hours
Orientation	0 hours
SCHOOL OF SCIENCES REQUIREMENTS	60 hours
Public Health (BIOL 101)	3 hours
Principles of Epidemiology (BIOL 102)	3 hours
Biology of Addiction & Lab (BIOL 103)	4 hours
Environmental Biology & Lab (BIOL 107).....	4 hours
Principles of Biology I & Lab (BIOL 111)	4 hours
Principles of Biology II & Lab (BIOL 112)	4 hours
Nutrition (BIOL 236).....	3 hours
Parasitology & Lab (BIOL 413)	4 hours
BIOL Elective (300 Level or higher).....	3 hours
Biology Research (BIOL 461 & 462)	2 hours
Principles of Chemistry I & Lab (CHEM 113)	4 hours
Principles of Chemistry II & Lab (CHEM 114).....	4 hours
Physics I & Lab (PHYS 150 or 201)	4 hours
Physics II & Lab (PHYS 251 or 202)	4 hours
Science Electives (200 Level or higher)	10 hours
SOCIAL SCIENCE REQUIREMENTS	18 hours
SOC/ANTH/GS 350	3 hours
15 Credits from the following: ANTH/SOC 160, 301; PSYC/SOC 345; PSYC 218, 230; SOC 202, 362, PSYC/SOC 353	15 hours
FREE ELECTIVES	14 hours
TOTAL FOR GRADUATION	122 hours

Transfer students must take at least one-half of the required courses numbered at or above the 200 level at CBU, and this must include at least two courses (6 to 8 hours excluding NSCI 410,411) at or above the 300 level.

CHEM 101 does not supply any credit for Major Requirements. It can supply 3 credit hours of Free Electives.

¹ If MATH 201 is not taken as the second math course, a statistics course must be taken.

COURSE REQUIREMENTS FOR R.N. TO B.S. IN NURSING

This paradigm applies only to students who hold a license as a Registered Nurse seeking to complete a Bachelor of Science in Nursing degree.

This degree program is offered in an evening cohort format.

Semester I	Credits	Semester II	Credits
NURS 301 Transition to Professional Nursing ¹	1	NURS 402 Professional Role Development II	3
NURS 303 Professional Role Development I	3	NURS 404 Community Health	3
NURS 305 Health Assessment	3	NURS 406 Community Health – Clinical ²	2
ENG 111 English Composition I	3	ENG 112 English Composition II	3
Natural/Physics Science w/Lab Elective ³	4	MATH 162 Health Science Applications of Algebra and Statistics	3
Total	14	Total	14
Semester III		Summer	
NURS 411 Prof Practice & Leadership	3	Social Science/History Elective	3
NURS 413 Prof Practice & Leadership – Clinical	2	Philosophy Elective (Moral Values) ⁶	3
NURS 415 Nursing Research	3	Religious Studies (200 level course)	3
ENG 21/ 212 Introduction to Literature I/II ⁴	3	Religious Studies (300 level course)	3
Social Science/History Elective ⁵	3	Free Elective	3
Total	14	Total	15
Block Credit			
Nursing ⁷	30		
Total	30		

Total credits required for the degree 122.

Transfer of equivalent courses will be noted on advisement and the plan of study will be adjusted.

¹ Attendance to the Transition to Professional Nursing is mandatory.

² Clinical rotations are similar to internships in that the clinical will take place outside of the evening class hours and will be located in a health care agency/institution.

³ Students will choose a NAT/PHY Science course from the following list: BIOL 103, 107, 109, 111; CHEM 113, 115, NSCI 111, 115, 118, 122, 126, 128; PHYS 150, 201; or one recommended by their faculty advisor.

⁴ Students may choose either ENG-211 or ENG-212 in order to complete the Literature/Aesthetics requirement.

⁵ Students may choose courses within the Sociology, Psychology, History, or Political Sciences cluster in order to fulfill the Social Science/History requirement.

⁶ Students may choose one course from following list: PHIL 219, 220, 223, 224, 234, 321, 322, 324, 325, 340, 391, or 395 in order to complete the Philosophy requirement.

⁷ Students will receive 30 credit hours; which will be posted to their records after they have successfully completed the Professional Role Development II and before graduation.

COURSE REQUIREMENTS FOR B.S. IN PHYSICS

FRESHMAN YEAR Semester I	Credits	Semester II	Credits
CHEM 113 & 113L Principles of Chemistry I & Lab	4	CHEM 114 & 114L Principles of Chemistry II & Lab	4
ENG 111 English Composition I	3	ENG 112 English Composition II	3
ECE 130 or ME 112 Computer Elective	3	MATH 132 Calculus II	3
MATH 131 Calculus I	3	PHYS 150 Physics I & Lab	4
Elective ¹	3		
Orientation	0		
Total.....	16	Total.....	14

SOPHOMORE YEAR Semester I		Semester II	
Elective ¹	3	MATH 232 Calculus III	3
ECE 221 Circuit Analysis I	3	PHYS 252 Physics III	3
MATH 231 Differential Equations	3	Philosophy or Literature Elective	3
PHYS 251 & 251L Physics II & Lab	4	Moral Values Elective	3
Literature Elective	3	ECE 201 Engineering Instrumentation	2
Total.....	16	Total.....	14

JUNIOR YEAR Semester I		Semester II	
MATH 309 Probability	3	PHYS 347 Special Relativity	2
PHYS 252L Physics III Lab	1	PHYS 381 Advanced Mechanics II	1
PHYS 353 Solid State Physics	3	Religious Studies Elective	3
PHYS 380 Advanced Mechanics I	3	Elective ²	3
Social Science/History	3	Mathematics Elective ²	3
Elective ¹	3	Social Science/History	3
Total.....	16	Total.....	15

SENIOR YEAR Semester I		Semester II	
PHYS 337/ECE 406 E & M Fields	3	PHYS 430 Thermal Physics	3
PHYS 415 & 415L Optics & Lab	4	PHYS 448 Quantum Mechanics II	3
PHYS 447 Quantum Mechanics I	3	PHYS 452 Advanced Physics Lab	1
PHYS 491 Research I	0	PHYS 492 Research II	2
Mathematics Elective ²	3	PHYS 499 Comprehensives	0
Religious Studies Elective	3	Mathematics Elective ²	3
		Elective ¹	3
Total.....	16	Total.....	15

Total credits required for the degree 122.

Transfer students must take at least one-half of the required courses numbered above 300 at CBU.

¹ A maximum of 3 elective hours may be in physics.

² All Mathematics electives must be at the 300+ level.

MINORS IN THE SCHOOL OF SCIENCES

At least 50% of required courses for a minor must be taken at CBU.

MINOR IN BIOLOGY: A minor in Biology requires a minimum of 23 hours in BIOL courses, including BIOL 111 and BIOL 112 and laboratory corequisites plus 15 hours in BIOL courses numbered 200 or above including 7 hours in BIOL courses numbered 300 and above and earned at CBU. See the information about the Bioinformatics Option and the Forensics Option on the pages associated with the B.S. in Computer Science and the B.S. in Mathematics.

MINOR IN CHEMISTRY: A minor in Chemistry requires a minimum of 23 hours in CHEM courses excluding CHEM 101, 115, and 115L. At least 7 of the hours must be in CHEM courses numbered 300 or above and earned at CBU.

MINOR IN COMPUTER SCIENCE: A minor in Computer Science requires the following courses CS 172, 172L, 234, 234L, 360, 471; MATH 141 or 405; and one course selected from CS 370, 440, 460-469.

MINOR IN MATHEMATICS: A minor in Mathematics requires 21 hours in MATH courses including MATH 131, 132, 231, 232, and three MATH courses numbered 300 or above. At least 6 hours in MATH courses numbered 300 or above must be earned at CBU.

MINOR IN PHYSICS: A minor in Physics requires a minimum of 21 hours in PHYS courses including the following courses: PHYS 150, 150L, 251, 251L, 252, 252L, and at least 9 hours in PHYS courses numbered 300 or above. At least 5 hours in PHYS courses numbered 300 or above must be earned at CBU, and no more than 4 hours in PHYS courses numbered 300 or above may be earned via challenge exams.

MINOR IN PUBLIC HEALTH (SCIENCE OPTION): A minor in Public Health (science option) requires 36 hours including BIOL 101, 102, 111, 111L, 112, 112L, CHEM 113, 113L, PHIL 322 or 325, SOC/ANTH 387, and 12 hours selected from the following: BIOL 103, 103L, 107, 107L, 236, 321, 321L, 370, 412, 412L, 413, 413L, and 492 (a special topics course in public health with the permission of the biology department). Note that BIOL 321 requires CHEM 211 as a prereq, and BIOL 370 requires CHEM 212 as a prerequisite.