College of Mathematics and Science

Academic Degree Programs, Minors and Certificate
Program: Actuarial Science  
Major: Actuarial Science  
Degree: Bachelor of Science (B.S.)

Department: Mathematics and Statistics  
College: Mathematics and Science  
Major Code: 6140

University Core  (Total Listed 42-44)

- American Historical and Political Analysis ........................................... 6
- American National Government ....................................................... 3
- American History .............................................................................. 3
- Cultural and Language Analysis ....................................................... 3-4
- Second Language ............................................................................... 4
- OR
- Cultural Analysis ............................................................................... 3
- Social and Behavioral Analysis ........................................................... 3
- Life Skills ............................................................................................ 5
- Required Health Course ................................................................. 2
- Elective Life Skills ............................................................................... 3

Prerequisite Courses  
Minimum Required Hours  

Prerequisite Courses ................................................................. 0-6

Required courses:
* MATH 1533 Precalculus-Algebra OR
  MATH 1513 College Algebra OR Placement Score AND
* MATH 1593 Plane Trigonometry OR Placement Score

* A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Upon completion of the above courses, corresponding university core requirements will be satisfied. (These courses are required for this major regardless of previous degrees conferred.)

Major Requirements  

Actuarial Science ................................................................. 66

Mathematics Core .............................................................................. 18

Required courses:
- MATH 2313 Calculus 1
- MATH 2323 Calculus 2
- MATH 2333 Calculus 3
- MATH 2343 Calculus 4
- MATH 2753 Technology for Professional Math and Statistics
- MATH 3143 Linear Algebra

Actuarial Core .................................................................................... 12

Required courses:
# MATH 3133 Theory of Interest 1
# MATH 4333 Theory of Interest 2
# MATH 4223 Mathematics of Life Contingencies 1
# MATH 4233 Mathematics of Life Contingencies 2

Statistics Core .................................................................................... 15

Required courses:
- STAT 2113 Statistical Methods
# STAT 4113 Mathematical Statistics 1
*# STAT 4123 Mathematical Statistics 2
# STAT 4213 Applied Regression Analysis
# STAT 4513 Data Mining & Statistical Learning

Finance and Insurance Electives ........................................................ 15

Select from the following:
* ACCT 2113 Accounting 1

Minimum Grade Requirements

1. Average in (a) all college course work, (b) course work at UCO, and (c) major courses ........................................ 2.50
2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96. Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication .......................................................... 9
Quantitative Reasoning/Scientific Method ........................................... 10-11
• Math .................................................................................................. 3
• Life Science ....................................................................................... 4
• Physical Science .............................................................................. 3-4
Critical Inquiry and Aesthetic Analysis ................................................ 6
Aesthetic Analysis ............................................................................... 3
Critical Inquiry ................................................................................... 3

Support Courses

Support Courses .......................................................... 0-6

Students majoring in Biology are encouraged to complete the following courses in high school.

Two years of high school algebra and one year of Trigonometry OR
MATH 1513 College Algebra AND
MATH 1593 Plane Trigonometry

Major Requirements

Biology Core .......................................................... 67
Biology Core (required of all degree candidates) ......................... 26

Required Courses:
BIO 1204 Biology for Majors: Principles
BIO 1225 Biology for Majors: Diversity
BIO 2203 Cell Biology
BIO 2211 Cell Biology Laboratory
BIO 3054 Microbiology for Majors and Lab
BIO 3303 Genetics
BIO 3543 General Ecology
BIO 3703 Evolution
*BIO 4840 Capstone

Mathematics .......................................................... 6

Required courses:
MATH 2153 BioCalculus
STAT 2103 Intro Statistics for Sciences

Chemistry .......................................................... 15

Required courses:
CHEM 1103 General Chemistry I
CHEM 1112 General Chemistry I - Recitation/Lab
CHEM 1223 General Chemistry II
CHEM 1232 General Chemistry II - Recitation/Lab
CHEM 3303 Organic Chemistry I OR
CHEM 3013 Organic Chemistry for Life Sciences
CHEM 3312 Organic Chemistry I Lab OR
CHEM 3022 Organic Chemistry for Life Sciences Lab

Physics .......................................................... 4

Required course:
PHY 1114 General Physics I and Lab

American Historical and Political Analysis ...................................... 6
American National Government ............................................... 3
American History ................................................................. 3
Cultural and Language Analysis ....................................................... 3-4
Second Language ......................................................................... 4
OR
Cultural Analysis ......................................................................... 3
Social and Behavioral Analysis ....................................................... 3

Life Skills ................................................................................. 5
Required Health Course ......................................................... 2
Elective Life Skills ................................................................. 3

Upper Division Biology Electives (to bring major total to 67)** .................................................. 16
** Any 3000/4000 level UCO BIO course or its equivalent AND/OR
CHEM 3403 Biochemistry I

** At least five courses taken for the B.S. in Biology must be BIO courses with a lab. These courses include the three lab courses required as part of the core: BIO 1225, BIO 2211, and BIO 3054.

*To enroll in a Capstone Experience, students must complete a minimum of 60 credit hours. This 0 credit hour course is designed to be taken in conjunction with a capstone experience. Capstone experiences may include the following courses or special projects in biology. Special projects include but are not limited to independent research, service learning, professional school applications, or other equivalent experiences as approved by the Capstone Coordinator. Approval of the Capstone Coordinator is required before starting any capstone experience. A reflective writing piece, which must receive a passing score, will be required for all capstones.

BIO 3000 Workshop in Biology
BIO 3990 Advanced Topics in Biology
BIO 4012 Intro to Biological Research
BIO 4871 Senior Seminar
BIO 4900 Practicum in Biology
BIO 4920 Workshop in Biology
BIO 4930 Individual Study in Biology
BIO 4950 Internship in Biology
BIO 4960 Institute in Biology
BIO 4970 Study Tour in Biology

A maximum of 2 credit hours of the courses listed above, whether taken in conjunction with the capstone experience or not, will apply to the 67 credit hours required in the major except when BIO 4012 is chosen. If BIO 4012 is chosen as the capstone experience, an additional 2 credit hours may be taken.
Electives to bring total to........................................ 124

General Physics II is a recommended elective.

Graduating seniors must take a national assessment exam in Biology as a graduation requirement for the B.S. in Biology.

Minimum Grade Requirements
1. Average in (a) all college course work, (b) course work at UCO, and (c) major courses............................................. 2.00
2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
**University Core** *(Total Listed 42-44)*

- American Historical and Political Analysis ........................................ 6
- American National Government ....................................................... 3
- American History ............................................................................ 3
- Cultural and Language Analysis ...................................................... 3-4
- Second Language ........................................................................... 4
- OR
- Cultural Analysis ............................................................................ 3
- Social and Behavioral Analysis ......................................................... 3
- Life Skills ......................................................................................... 5
- Required Health Course ................................................................. 2
- Elective Life Skills ........................................................................... 3

**Support Courses**

Students majoring in Biology-Biomedical Sciences are encouraged to complete the following courses in high school.

- Two years of high school algebra and one year of Trigonometry
- OR
- MATH 1513 College Algebra
- MATH 1593 Plane Trigonometry

**Major Requirements**

**Biology-Biomedical Sciences** ....................................................... 73

**Biology Core** ................................................................................. 20

- BIO 1204 Biology for Majors: Principles
- BIO 1225 Biology for Majors: Diversity
- BIO 2203 Cell Biology
- BIO 2211 Cell Biology Laboratory
- BIO 3054 Microbiology for Majors and Lab
- BIO 3303 Genetics
- *BIO 4840 Capstone

**Mathematics** .................................................................................. 6

- Required courses:
  - MATH 2153 BioCalculus
  - STAT 2103 Intro Statistics for Sciences

**Chemistry** .......................................................................................... 15

- Required courses:
  - CHEM 1103 General Chemistry I
  - CHEM 1112 General Chemistry I - Recitation/Lab
  - CHEM 1223 General Chemistry II
  - CHEM 1232 General Chemistry II - Recitation/Lab
  - CHEM 3303 Organic Chemistry I OR
  - CHEM 3013 Organic Chemistry for Life Sciences
  - CHEM 3312 Organic Chemistry I Lab OR
  - CHEM 3022 Organic Chemistry for Life Sciences Lab

**Physics** .................................................................................................. 4

- Required course:
  - PHY 1114 General Physics I and Lab

**Guided Electives** ............................................................................... 28

Selected from the following:
- **Elective Life Skills** ........................................................................... 3
- **Support Courses** ............................................................................. 6
- **American Historical and Political Analysis** ........................................ 6
- **American National Government** .................................................... 3
- **American History** .......................................................................... 3
- **Cultural and Language Analysis** ..................................................... 3-4
- **Second Language** ........................................................................... 4
- **OR**
- **Cultural Analysis** .......................................................................... 3
- **Social and Behavioral Analysis** ....................................................... 3
- **Life Skills** ....................................................................................... 5
- **Required Health Course** ............................................................... 2
- **Elective Life Skills** ........................................................................... 3

*To enroll in a Capstone Experience, students must complete a minimum of 60 credit hours. This 0 credit hour course is designed to be taken in conjunction with a capstone experience. Capstone experiences may include the above courses, or special projects in biology. Special projects include but are not limited to independent research, service learning.
Minimum 
Required Hours
University of Central Oklahoma Undergraduate Catalog 2019-2020

- CONTINUED FROM PREVIOUS PAGE -

professional school applications, or other equivalent experiences as approved by the Capstone Coordinator. Approval of the Capstone Coordinator is required before starting any capstone experience. A reflective writing piece, which must receive a passing score, will be required for all capstones.

Minimum Hours required .................... 125*

*Total hours required for this major may exceed the minimum 124 credit hour institutional requirement and will vary according to course selection. It is recommended students complete high school algebra II, trigonometry, physics, and two years of a second language in high school. Graduating seniors must take a national assessment exam in Biology as a graduation requirement for the B.S. in Biology-Biomedical Sciences.

Minimum Grade Requirements
1. Average in (a) all college course work, (b) course work at UCO, and (c) major courses................................................................. 2.00
2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.

**Students accepted to graduate medical and allied health professional schools (e.g. Chiropractic, Dentistry, Medicine, Optometry, Osteopathic Medicine, Pharmacy, Veterinary Medicine) prior to completing this degree will be allowed to transfer a maximum of 30 credit hours from the first year of medical course work toward the guided electives and electives included in this degree.

To be eligible, students must have successfully completed the following minimum requirements from UCO before matriculation into the professional program: 1) 94 credit hours total; 2) 30 credit hours in residence at UCO; 3) 15 upper division credit hours in the major; 4) 50% of the total major credit hours; and 5) all regular degree requirements, including general education. (Students must apply for their bachelor’s degree within two years of completing their UCO work, but no later than graduation from medical school.)
Program: Biology
Major: Biology-Medical Laboratory Science
Degree: Bachelor of Science (B.S.)

University of Central Oklahoma Undergraduate Catalog 2019-2020

Specific courses within the University Core are listed on pages 95-96.
• Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication ................................................. 9
Quantitative Reasoning/Scientific Method .................................... 10-11
• Math ................................................................. 3
• Life Science ...................................................... 4
• Physical Science ................................................... 3-4

Critical Inquiry and Aesthetic Analysis ........................................ 6
Aesthetic Analysis ................................................................. 3
Critical Inquiry ................................................................. 3

Support Courses ........................................................................ 0-3
Support Courses ................................................................. 0-3

Students majoring in Biology-Medical Laboratory Science are encouraged to complete the following courses in high school.

Two years of high school algebra OR
MATH 1513 College Algebra

Major Requirements

Biology-Medical Laboratory Sciences ............... 87
Students may earn the B.S. in Biology-Medical Laboratory Science from UCO upon completion of the following three year curriculum and an additional one year in a hospital school approved by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS).

Biology and Chemistry ......................................................... 47
Required Courses:
BIO 1204 Biology for Majors: Principles
BIO 1225 Biology for Majors: Diversity
BIO 2203 Cell Biology
BIO 2211 Cell Biology Laboratory
BIO 2604 Human Physiology and Lab
BIO 3054 Microbiology for Majors and Lab
BIO 3303 Genetics
BIO 4515 Pathogenic Microbiology and Immunology and Lab
CHEM 1103 General Chemistry I
CHEM 1112 General Chemistry I-Recitation/Lab
CHEM 1223 General Chemistry II
CHEM 1232 General Chemistry II-Recitation/Lab
CHEM 3303 Organic Chemistry I
CHEM 3312 Organic Chemistry I Lab
CHEM 3403 Biochemistry I
Mathematics ................................................................. 6
Required courses:
MATH 2153 BioCalculus
STAT 2103 Intro Statistics for Sciences
Elective Biology and/or Chemistry ......................... 4
Selected from the following courses:
BIO 3403 Comparative Animal Physiology OR
BIO 3464 Comparative Animal Physiology and Lab
BIO 3414 Histology and Lab

American Historical and Political Analysis ...................... 6
American National Government ....................................... 3
American History .......................................................... 3

Cultural and Language Analysis ................................... 3-4
Second Language .......................................................... 4
OR
Cultural Analysis .......................................................... 3

Social and Behavioral Analysis .......................................... 3

Life Skills ........................................................................ 5
Required Health Course .................................................. 2
Elective Life Skills ........................................................... 3

Minimum Required Hours

American Historical and Political Analysis ...................... 6
American National Government ....................................... 3
American History .......................................................... 3

Cultural and Language Analysis ................................... 3-4
Second Language .......................................................... 4
OR
Cultural Analysis .......................................................... 3

Social and Behavioral Analysis .......................................... 3

Life Skills ........................................................................ 5
Required Health Course .................................................. 2
Elective Life Skills ........................................................... 3

Minimum Grade Requirements
1. Average in (a) all college course work, (b) course work at UCO, and (c) major courses............................................. 2.00
2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
Program: Biomedical Engineering  
Major: Biomedical Engineering  
Degree: Bachelor of Science (B.S.)

### University Core (Total Listed 42-44)

**Speciﬁc courses within the University Core are listed on pages 95-96.**

- Courses from the major may apply to the areas marked in the University Core.

**Written and Oral Communication** .......................................................... 9

**Quantitative Reasoning/Scientiﬁc Method** ........................................... 10-11
- Math........................................................................................................ 3
- Life Science ............................................................................................ 4
- Physical Science ...................................................................................... 3-4

**Critical Inquiry and Aesthetic Analysis** .................................................. 6
- Aesthetic Analysis .................................................................................... 3
- Critical Inquiry ....................................................................................... 3

<table>
<thead>
<tr>
<th>Support Courses</th>
<th>Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 1123 Contemporary Moral Problems</td>
<td>9-18</td>
</tr>
<tr>
<td>ECON 1103 Introduction to Economics</td>
<td></td>
</tr>
<tr>
<td>FMKT 2323 Global Protocol and Diversity (or Foreign Language)</td>
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<tr>
<td>*MATH 1533 Precalculus-Algebra OR MATH 1513 College Algebra OR Placement Score AND MATH 1593 Plane Trigonometry OR Placement Score</td>
<td></td>
</tr>
</tbody>
</table>

*A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.*

Students majoring in Biomedical Engineering are encouraged to complete the following course in high school.

- **One year High School Physics OR PHY 1003 Introduction to Physics**

### Major Requirements

#### Biomedical Engineering ................................................................. 96-98

**Biology** ................................................................................................. 11
- Required courses:
  - BIO 1204 Biology for Majors: Principles
  - BIO 2203 Cell Biology
  - BIO 2604 Human Physiology and Laboratory

**Chemistry** ............................................................................................... 5
- Required courses:
  - CHEM 1103 General Chemistry I
  - CHEM 1112 General Chemistry I Recitation/Laboratory

**Engineering** ........................................................................................... 48
- Required courses:
  - ENGR 1112 Introduction to Engineering and Laboratory
  - ENGR 1213 Engineering Computing and Laboratory
  - BME 1311 Introduction to Biomedical Engineering
  - ENGR 2033 Statics
  - ENGR 2303 Electrical Science
  - ENGR 2311 Electrical Science Laboratory
  #BME 3043 Biomedical Engineering

### American Historical and Political Analysis ....................................... 6
- American Historical Government ...................................................... 3
- American History .................................................................................. 3

**Cultural and Language Analysis** ...................................................... 3-4
- Second Language .................................................................................. 4
- OR Cultural Analysis ............................................................................. 3

**Social and Behavioral Analysis** ....................................................... 3

**Life Skills** ............................................................................................. 5
- Required Health Course ....................................................................... 2
- Elective Life Skills ................................................................................ 3

<table>
<thead>
<tr>
<th>Support Courses</th>
<th>Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 3113 Principles of Biomedical Engineering</td>
<td></td>
</tr>
<tr>
<td>ENGR 3223 Digital Logic Design and Laboratory</td>
<td></td>
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<tr>
<td>ENGR 3303 Engineering Probability and Statistics</td>
<td></td>
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<tr>
<td>ENGR 3323 Signals and Systems</td>
<td></td>
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<tr>
<td>ENGR 3331 Signals and Systems Laboratory</td>
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<tr>
<td>ENGR 3403 Analog Electronics</td>
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<tr>
<td>ENGR 3421 Analog Electronics Laboratory</td>
<td></td>
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<tr>
<td>#BME 4132 Biomedical Engineering Laboratory</td>
<td></td>
</tr>
<tr>
<td>#BME 4223 Biomedical Imaging</td>
<td></td>
</tr>
<tr>
<td>#BME 4233 Biomedical Instrumentation</td>
<td></td>
</tr>
<tr>
<td>#BME 4343 Biomechanics</td>
<td></td>
</tr>
<tr>
<td>#ENGR 4882 Senior Engineering Design I</td>
<td></td>
</tr>
<tr>
<td>#ENGR 4892 Senior Engineering Design II</td>
<td></td>
</tr>
</tbody>
</table>

### Mathematics ......................................................................................... 15
- Required courses:
  - MATH 2313 Calculus I
  - MATH 2323 Calculus II
  - MATH 2333 Calculus III
  - MATH 2343 Calculus IV
  - MATH 3103 Differential Equations

**Physics** ................................................................................................. 8
- Required courses:
  - PHY 2014 Physics for Science and Engineering I and Laboratory
  - ^PHY 2114 Physics for Science and Engineering II and Laboratory

^A grade of “C” or better must be earned in PHY 2114.

**Biomedical Engineering Elective** ....................................................... 3-6
- Any 3000/4000 level BME, PHY or ENGR course with the following exceptions: PHY 3014, 3044, 3054 or 3503.

Students in Concentration A are required to have 3 credit hours from Biomedical Engineering electives. Students in Concentration B are required to have 6 credit hours from Biomedical Engineering electives.

- CONTINUED ON NEXT PAGE -
Program: Biomedical Engineering  - continued
Major: Biomedical Engineering
Degree: Bachelor of Science (B.S.)

Minimum Required Hours

- CONTINUED FROM PREVIOUS PAGE -

Complete all the courses from one of the following concentrations:

Concentration A: (courses in preparation for Pre-Med fields)
CHEM 1223 General Chemistry II
CHEM 1232 General Chemistry II Recitation/Laboratory
CHEM 3303 Organic Chemistry I

Concentration B: (courses in preparation for Instrumentation fields)
PHY 3883 Mathematical Physics I

The number of credits needed to meet degree requirements exceeds 124 hours and will vary according to course selection.

The following courses are strongly recommended electives:
BME 4243 Modeling and Analysis of Biomedical Systems
#ENGR 3443 Fluid Mechanics
CHEM 3403 Biochemistry I
CHEM 3323 Organic Chemistry II (for Concentration A)
#ENGR 3183 Electromagnetic Fields I (for Concentration B)

# Admission into Engineering and Physics Upper Division is required.

Minimum Grade Requirements

1. Average in (a) all college course work, and (b) course work at UCO, ................................................................. 2.00
2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.

Admission into Engineering and Physics Upper Division

Students seeking the B.S. in Biomedical Engineering, Electrical Engineering, Mechanical Engineering, and Engineering Physics – Physics are required to make formal application to the Chairperson of the Department of Engineering and Physics for admission into the upper division of each of these majors. Applications must be submitted to the Department of Engineering and Physics on or before the last Monday of January for Fall admission and the last Monday of August for Spring admission.

Upper division admission is open to students meeting Engineering and Physics upper division admission requirements. To be admitted into upper division, the student must have:

• A minimum retention grade point average (GPA) of 2.00 in all course work completed by the time the student is formally admitted into upper division.
• Completed 60 semester credit hours by the time the student is formally admitted into upper division.

The number of credits needed to meet degree requirements exceeds 124 hours and will vary according to course selection.

The following courses are strongly recommended electives:
BME 4243 Modeling and Analysis of Biomedical Systems
#ENGR 3443 Fluid Mechanics
CHEM 3403 Biochemistry I
CHEM 3323 Organic Chemistry II (for Concentration A)
#ENGR 3183 Electromagnetic Fields I (for Concentration B)

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1. Average in (a) all college course work, and (b) course work at UCO, ................................................................. 2.00
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• Completed 60 semester credit hours by the time the student is formally admitted into upper division.

The number of credits needed to meet degree requirements exceeds 124 hours and will vary according to course selection.

The following courses are strongly recommended electives:
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#ENGR 3443 Fluid Mechanics
CHEM 3403 Biochemistry I
CHEM 3323 Organic Chemistry II (for Concentration A)
#ENGR 3183 Electromagnetic Fields I (for Concentration B)

# Admission into Engineering and Physics Upper Division is required.

Minimum Grade Requirements

1. Average in (a) all college course work, and (b) course work at UCO, ................................................................. 2.00
2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.

Admission into Engineering and Physics Upper Division

Students seeking the B.S. in Biomedical Engineering, Electrical Engineering, Mechanical Engineering, and Engineering Physics – Physics are required to make formal application to the Chairperson of the Department of Engineering and Physics for admission into the upper division of each of these majors. Applications must be submitted to the Department of Engineering and Physics on or before the last Monday of January for Fall admission and the last Monday of August for Spring admission.

Upper division admission is open to students meeting Engineering and Physics upper division admission requirements. To be admitted into upper division, the student must have:

• A minimum retention grade point average (GPA) of 2.00 in all course work completed by the time the student is formally admitted into upper division.
• Completed 60 semester credit hours by the time the student is formally admitted into upper division.

The number of credits needed to meet degree requirements exceeds 124 hours and will vary according to course selection.

The following courses are strongly recommended electives:
BME 4243 Modeling and Analysis of Biomedical Systems
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Minimum Grade Requirements

1. Average in (a) all college course work, and (b) course work at UCO, ................................................................. 2.00
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For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.

Admission into Engineering and Physics Upper Division

Students seeking the B.S. in Biomedical Engineering, Electrical Engineering, Mechanical Engineering, and Engineering Physics – Physics are required to make formal application to the Chairperson of the Department of Engineering and Physics for admission into the upper division of each of these majors. Applications must be submitted to the Department of Engineering and Physics on or before the last Monday of January for Fall admission and the last Monday of August for Spring admission.

Upper division admission is open to students meeting Engineering and Physics upper division admission requirements. To be admitted into upper division, the student must have:

• A minimum retention grade point average (GPA) of 2.00 in all course work completed by the time the student is formally admitted into upper division.
• Completed 60 semester credit hours by the time the student is formally admitted into upper division.
Program: Chemistry  
Major: Chemistry  
Degree: Bachelor of Science (B.S.)

Dept: Chemistry  
College: Mathematics and Science  
Major Code: 6060

University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.  
• Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication ........................................ 9

Quantitative Reasoning/Scientific Method .......................... 10-11
• Math ................................................................. 3
• Life Science ...................................................... 4
• Physical Science ............................................... 3-4

Critical Inquiry and Aesthetic Analysis ............................... 6
Aesthetic Analysis .................................................... 3
Critical Inquiry ....................................................... 3

American Historical and Political Analysis ....................... 6
American National Government .................................... 3
American History ................................................ 3

Cultural and Language Analysis .................................... 3-4
Second Language .................................................... 4
OR
Cultural Analysis .................................................. 3

Social and Behavioral Analysis ...................................... 3

Life Skills ................................................................. 5
Required Health Course ............................................. 2
Elective Life Skills ................................................... 3

Support Courses  ...................................................... 0-6

Required Courses:
* MATH 1533 Precalculus-Algebra OR
  MATH 1513 College Algebra OR Placement Score AND
* MATH 1593 Plane Trigonometry OR Placement Score

*A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Major Requirements  ................................................ 68

Common Core .......................................................... 47
Required courses:
CHEM 1103 General Chemistry I
CHEM 1112 General Chemistry I - Recitation/Lab
CHEM 1223 General Chemistry II
CHEM 1232 General Chemistry II - Recitation/Lab
CHEM 2104 Quantitative Analysis and Lab
CHEM 2621 Professionalism in Chemistry I
CHEM 3303 Organic Chemistry I
CHEM 3312 Organic Chemistry I Lab
CHEM 3323 Organic Chemistry II
CHEM 3332 Organic Chemistry II Lab
CHEM 3454 Fundamentals of Instrumental Analysis and Lab
CHEM 3621 Professionalism in Chemistry II
MATH 2313 Calculus I
MATH 2323 Calculus 2
MATH 2333 Calculus 3
PHY 2014 Physics for Science and Engineering I and Lab
PHY 2114 Physics for Science and Engineering II and Lab

Advanced Chemistry .................................................. 21
Required courses: ....................................................... 12
CHEM 3503 Physical Chemistry I
CHEM 3513 Physical Chemistry II
CHEM 3602 Experimental Physical Chemistry
CHEM 4502 Directed Research and Lab (taken twice)

Minimum Grade Requirements
1. Average in (a) all college course work, and (b) course work at UCO .................................................... 2.25
2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
Program: Chemistry  
Major: Chemistry - ACS Certificate  
Degree: Bachelor of Science (B.S.)

University of Central Oklahoma Undergraduate Catalog 2019-2020

University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.

- Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication .................................................... 9

Quantitative Reasoning/Scientific Method .................................. 10-11

- Math ........................................................................................ 3
- Life Science ................................................................. 4
- Physical Science ......................................................... 3-4

Critical Inquiry and Aesthetic Analysis ..................................... 6

- Aesthetic Analysis .......................................................... 3
- Critical Inquiry ............................................................... 3

Support Courses

Required Courses: .......................................................... 0-6

* MATH 1533 Precalculus-Algebra OR
  MATH 1513 College Algebra OR Placement Score AND
  MATH 1593 Plane Trigonometry OR Placement Score

*A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Major Requirements

Chemistry - ACS Certificate ................................................. 76

Common Core .............................................................. 47

- CHEM 1103 General Chemistry I
- CHEM 1112 General Chemistry I - Recitation/Lab
- CHEM 1223 General Chemistry II
- CHEM 1232 General Chemistry II - Recitation/Lab
- CHEM 2104 Quantitative Analysis and Lab
- CHEM 2621 Professionalism in Chemistry I
- CHEM 3303 Organic Chemistry I
- CHEM 3312 Organic Chemistry I Lab
- CHEM 3323 Organic Chemistry II
- CHEM 3332 Organic Chemistry II Lab
- CHEM 3454 Fundamentals of Instrumental Analysis and Lab
- CHEM 3621 Professionalism in Chemistry II
- MATH 2313 Calculus 1
- MATH 2323 Calculus 2
- MATH 2333 Calculus 3
- PHY 2014 Physics for Science and Engineering I and Lab
- PHY 2114 Physics for Science and Engineering II and Lab

Advanced Chemistry ACS approved ........................................... 29

- CHEM 3403 Biochemistry I
- CHEM 3503 Physical Chemistry I
- CHEM 3513 Physical Chemistry II
- CHEM 3602 Experimental Physical Chemistry

Electives to bring total to .................................................. 124

The following are highly recommended:

- CHEM 4454 Advanced Instrumental Analysis and Lab
- ENG 4023 Technical Writing
- MATH 2343 Calculus 4
- PHY 3103 Modern Physics

Minimum Grade Requirements

1. Average in (a) all college course work, and (b) course work at UCO ......................................................... 2.25

2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
Program: Chemistry  
Major: Chemistry - Health Sciences  
Degree: Bachelor of Science (B.S.)  

**University Core (Total Listed 42-44)**

Specific courses within the University Core are listed on pages 95-96. 
- Courses from the major may apply to the areas marked in the University Core.

<table>
<thead>
<tr>
<th>Area</th>
<th>Minimum Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written and Oral Communication</td>
<td>9</td>
</tr>
<tr>
<td>Quantitative Reasoning/Scientific Method</td>
<td>10-11</td>
</tr>
<tr>
<td>Critical Inquiry and Aesthetic Analysis</td>
<td>6</td>
</tr>
</tbody>
</table>

**Support Courses**

<table>
<thead>
<tr>
<th>Support Courses</th>
<th>Minimum Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Courses</td>
<td>0-6</td>
</tr>
</tbody>
</table>

**Major Requirements**

<table>
<thead>
<tr>
<th>Chemistry - Health Sciences</th>
<th>Minimum Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Core</td>
<td>56</td>
</tr>
</tbody>
</table>

**Electives to bring total to**

<table>
<thead>
<tr>
<th>Minimum Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>124</td>
</tr>
</tbody>
</table>

**American Historical and Political Analysis**  
American National Government  
American History  

**Cultural and Language Analysis**  
Second Language  
OR  
Cultural Analysis  

**Life Skills**  
Required Health Course  
Elective Life Skills  

**Minimum Grade Requirements**

1. Average in (a) all college course work, and (b) course work at UCO  
2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
Program: Computer Science
Major: Computer Science
Degree: Bachelor of Science (B.S.)

Dept: Computer Science
College: Mathematics and Science
Major Code: 6100

University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.
• Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication ................................................. 9
Quantitative Reasoning/Scientific Method ................................... 10-11
• Math .............................................................. 3
  Life Science ..................................................... 4
• Physical Science ................................................. 3-4
Critical Inquiry and Aesthetic Analysis ............................ 6
Aesthetic Analysis ..................................................... 3
Critical Inquiry ..................................................... 3

Minimum Required Hours

Support Courses

Support Courses ................................................................. 0-9
Students majoring in Computer Science are encouraged to complete the following courses in high school.

Advanced Placement High School Programming Course OR
CMSC 1513 Beginning Programming

*MATH 1533 Precalculus-Algebra OR
MATH 1513 College Algebra OR Placement Score AND
*MATH 1593 Plane Trigonometry OR Placement Score

*A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Upon completion of the above courses, corresponding university core requirements will be satisfied. (These courses are required for this major regardless of previous degrees conferred.)

Major Requirements

Computer Science ............................................................. 80-81

Required ................................................. 60

^ CMSC 1613 Programming I
^ CMSC 1621 Programming I Laboratory
^ CMSC 2123 Discrete Structures
^ CMSC 2613 Programming II
^ CMSC 2621 Programming II Laboratory
^ CMSC 2833 Computer Organization I
^ SE 3103 Object Oriented Software Design and Construction
^ CMSC 3613 Data Structures and Algorithms
^ CMSC 3833 Computer Organization II
^ CMSC 4003 Applications of Database Management Systems
^ CMSC 4023 Programming Languages OR
^ CMSC 4173 Translator Design
^ CMSC 4153 Operating Systems
^ CMSC 4273 Theory of Computing
^ SE 4283 Software Engineering I
^ CMSC 4323 Computer and Network Security
^ CMSC 4401 Ethics in Computing
^ CMSC 4513 Software Design and Development

American Historical and Political Analysis .......................... 6
American National Government ........................................... 3
American History .......................................................... 3

Cultural and Language Analysis ........................................ 3-4
Second Language ......................................................... 4
OR
Cultural Analysis .......................................................... 3

Social and Behavioral Analysis ........................................... 3

Life Skills ................................................................. 5
Required Health Course ................................................... 2
Elective Life Course ....................................................... 3

Minimum Required Hours

Elective Science Courses .................................................. 4-5
PHY 1114 General Physics I and Laboratory OR
PHY 2014 Physics for Science & Engineering I & Lab OR
CHEM 1103 General Chemistry I AND
CHEM 1112 General Chemistry I Recitation/Laboratory

Elective CMSC or SE courses ............................................. 16
Any 3/4000 level CMSC or SE courses
6 hours of CMSC or SE electives may be taken at the 2000 level
SE 4513 may not be used to satisfy the CMSC or SE elective requirement.

No more than four (4) hours of Internship and Individual Study combined may be used to satisfy the CMSC or SE elective requirement.

Credit cannot be received for both CMSC 3303 and SE 4283.

Electives to bring total to ............................................ 124

Minimum Grade Requirements

Average in (a) all college course work, (b) course work at UCO,
and (c) major courses .................................................. 2.00

For other regulations pertaining to graduation, see
Program: **Computer Science**  
Major: **Computer Science - Applied**  
Degree: Bachelor of Science (B.S.)  
Dept: **Computer Science**  
College: **Mathematics and Science**  
Major Code: 6101

### University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96. Courses from the major may apply to the areas marked in the University Core.

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<tbody>
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<td>10-11</td>
</tr>
<tr>
<td>Critical Inquiry and Aesthetic Analysis</td>
<td>6</td>
</tr>
</tbody>
</table>

#### Support Courses

**Major Support Courses** ..........0-9

Students majoring in Computer Science-Applied are encouraged to complete the following courses in high school.

- Advanced Placement High School Programming Course **OR**
  - CMSC 1513 Beginning Programming
- *MATH 1533 Precalculus-Algebra **OR**
  - MATH 1513 College Algebra Placement Score **AND**
  - MATH 1593 Plane Trigonometry Placement Score

* A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

<table>
<thead>
<tr>
<th>Minimum Required</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Support Courses</strong></td>
<td></td>
</tr>
</tbody>
</table>

##### Major Requirements

**Computer Science - Applied** ..........60

**Required** ..........48

- **CMSC 1613 Programming I**
- **CMSC 1621 Programming I Laboratory**
- **CMSC 2123 Discrete Structures**
- **CMSC 2413 Visual Programming**
- **CMSC 2613 Programming II**
- **CMSC 2621 Programming II Laboratory**
- **CMSC 2833 Computer Organization I**
- **SE 3103 Object Oriented Software Design and Construction**
- **CMSC 3303 Systems Analysis and Design **OR**
  - **SE 4283 Software Engineering I**
- **CMSC 3613 Data Structures and Algorithms**
- **CMSC 4003 Applications of Database Management Systems**
- **CMSC 4023 Programming Languages **OR**
- **CMSC 4173 Translator Design**
- **CMSC 4153 Operating Systems**
- **CMSC 4401 Ethics in Computing**
- **CMSC 4513 Software Design and Development**
- **MATH 2313 Calculus I**

**American Historical and Political Analysis** ..........6
- **American National Government** ..........3
- **American History** ..........3

**Cultural and Language Analysis** ..........3-4
- **Second Language** ..........4
  - **OR**
  - **Cultural Analysis** ..........3

**Social and Behavioral Analysis** ..........3

**Life Skills** ..........5
- **Required Health Course** ..........2
- **Elective Life Skills** ..........3

**Minimum Required Hours**

<table>
<thead>
<tr>
<th>Minimum Required</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Support Courses</strong></td>
<td></td>
</tr>
</tbody>
</table>

- **MATH 2323 Calculus 2**
- **STAT 2113 Statistical Methods **OR**
  - **STAT 2103 Introduction to Statistics for Sciences OR**
  - **STAT 4113 Mathematical Statistics I**

*A grade of ‘C’ or better must be earned in all required CMSC, SE, MATH, and STAT courses.

* CMSC 4513 is recommended to be taken in the last semester prior to graduation.

**Elective CMSC or SE courses** ..........12

Any 3/4000 level CMSC or SE courses except SE 4513

No more than three (3) hours of Internship and Individual Study combined may be used to satisfy the CMSC or SE elective requirement.

Credit cannot be received for both CMSC 3303 and SE 4283.

**Applied Area of Study** ..........18

**Minor**

The student will complete a minor; if the student is completing a second Bachelor’s degree, the first degree’s major will satisfy the requirements for the minor.

**OR**

**Second Major**

The student will complete a second major.

**OR**

Associate degree or comparable concentration in an information technology-related discipline transferred from a regionally accredited two- or four-year college or international equivalent with the approval of the Computer Science Department.

If less than 18 hours are transferred under this category, the student should take 2/3/4000 level CMSC electives to make up the difference. A student may take additional CMSC 3/4000 electives to bring the total hours of upper-division courses to 40.

- CONTINUED ON NEXT PAGE -
<table>
<thead>
<tr>
<th>Program:</th>
<th>Computer Science - continued</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major:</td>
<td>Computer Science - Applied</td>
</tr>
<tr>
<td>Degree:</td>
<td>Bachelor of Science (B.S.)</td>
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<tr>
<td>Dept:</td>
<td>Computer Science</td>
</tr>
<tr>
<td>College:</td>
<td>Mathematics and Science</td>
</tr>
<tr>
<td>Major Code:</td>
<td>6101</td>
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</table>

Minimum Required Hours

- CONTINUED FROM PREVIOUS PAGE -

Electives to bring total to .............................................. 124

Minimum Grade Requirements
Average in (a) all college course work, (b) course work at UCO, and (c) major courses .................................................. 2.00

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
Program: Computer Science
Major: Computer Science - Information Science
Degree: Bachelor of Science (B.S.)
Dept: Computer Science
College: Mathematics and Science
Major Code: 6102

University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.
* Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication .......................................................... 9
Quantitative Reasoning/Scientific Method ................................................. 10-11
* Math................................................. 3
* Life Science....................................... 4
* Physical Science................................ 3-4
Critical Inquiry and Aesthetic Analysis ..................................................... 6
* Aesthetic Analysis................................ 3
* Critical Inquiry.................................. 3

Support Courses

Major Support Courses ................................................................. 0-12

Students majoring in Computer Science-Information Science are encouraged to complete the following courses in high school.

A high school computer technology course using a word processor, spreadsheet, e-mail, browser, and search engines OR
CMSC 1053 Professional Computer Applications and Problem Solving
Advanced Placement High School Programming Course OR
CMSC 1513 Beginning Programming

*MATH 1533 Precalculus-Algebra OR
MATH 1513 College Algebra OR Placement Score AND
*MATH 1593 Plane Trigonometry OR Placement Score

*A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Upon completion of the above courses, corresponding university core requirements will be satisfied. (These courses are required for this major regardless of previous degrees conferred.)

Major Requirements

Computer Science - Information Science......... 81

Required................................................................. 66
* CMSC 1613 Programming I
* CMSC 1621 Programming I Laboratory
* CMSC 2123 Discrete Structures
* CMSC 2413 Visual Programming
* CMSC 2613 Programming II
* CMSC 2621 Programming II Laboratory
* CMSC 2833 Computer Organization I
* SE 3103 Object Oriented Software Design and Construction
* CMSC 3303 Systems Analysis and Design
* CMSC 3413 Enterprise Programming
* CMSC 3613 Data Structures and Algorithms
* CMSC 4003 Applications of Database Management Systems
* CMSC 4063 Networks

University Core

American Historical and Political Analysis ................................. 6
American National Government ............................................. 3
American History............................................................. 3
Cultural and Language Analysis ................................................ 3-4
Second Language................................................. 4
OR
Cultural Analysis.......................................................... 3
Social and Behavioral Analysis ....................................................... 3

Life Skills ................................................................. 5
Required Health Course......................................................... 2
* Elective Life Skills.......................................................... 3

Elective CMSC or SE courses .................................................. 9
Any 3/4000 level CMSC or SE courses except SE 4513

No more than three (3) hours of Internship and Individual Study combined may be used to satisfy the CMSC or SE elective requirement.

Credit cannot be received for both CMSC 3303 and SE 4283.

Other areas of application ......................................................... 6

Selected from the following:
ACCT 3113 Managerial Accounting
FIN 3563 Fundamentals of Business Finance
ISOM 3323 Business Analytics
ISOM 4063 Computer Simulation
ISOM 4283 Developing Decision Support Systems
ISOM 4363 Information Systems Management
ISOM 4513 Virtualization

- CONTINUED ON NEXT PAGE -
Program:  Computer Science - continued  
Major:  Computer Science - Information Science  
Degree:  Bachelor of Science (B.S.)

Minimum Required Hours

Electives to bring total to..............................................124

Minimum Grade Requirements
Average in (a) all college course work, (b) course work at UCO, and (c) major courses..............................................2.00

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
## University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.
- Courses from the major may apply to the areas marked in the University Core.

### Written and Oral Communication .................................................... 9

### Quantitative Reasoning/Scientific Method ........................................ 10-11
- Math ........................................................................ 3
- Life Science .......................................................... 4
- Physical Science ..................................................... 3-4

### Critical Inquiry and Aesthetic Analysis ............................................ 6
- Aesthetic Analysis ..................................................... 3
- Critical Inquiry ......................................................... 3

### Support Courses

Students majoring in the Data Science program are encouraged to complete the following courses in high school.

Advanced Placement High School Programming Course OR
- CMSC 1513 Beginning Programming
- MATH 1533 Precalculus-Algebra OR
  - MATH 1513 College Algebra OR Placement Score AND
  - MATH 1593 Plane Trigonometry OR Placement Score

*A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Upon completion of the above courses, corresponding university core requirements will be satisfied. (These courses are required for this major regardless of previous degrees conferred.)

### Major Requirements

#### Data Science ................................................................. 65

### Required Courses .......................................................... 47

- CMSC 1613 Programming I
- CMSC 1621 Programming I Laboratory
- CMSC 2613 Programming II
- CMSC 2621 Programming II Laboratory
- CMSC 2123 Discrete Structures
- CMSC 3613 Data Structures and Algorithms
- CMSC 4003 Applications of Database Management Systems
- MATH 2313 Calculus 1
- MATH 2323 Calculus 2
- MATH 2333 Calculus 3
- MATH 3143 Linear Algebra
- STAT 2113 Statistical Methods
- STAT 3213 Fundamentals of Data Science
- STAT 4413 Data Visualization and Exploration
- STAT 4213 Applied Regression Analysis
- STAT 4513 Statistical Consulting OR
- STAT 4950 Internship in Statistics (3 hours)
- STAT 4533 Data Mining & Stat Learning

---

**American Historical and Political Analysis ........................................ 6**
- American Historical and Political Analysis ........................................ 6
- American Historical and Political Analysis ........................................ 6

** Cultural and Language Analysis .................................................. 3-4**
- Cultural Analysis .................................................................... 3
- OR
- Second Language ..................................................................... 4

** • Social and Behavioral Analysis .................................................. 3**
- Life Skills .............................................................................. 5
- Required Health Course ......................................................... 2
- Elective Life Skills .................................................................... 3

### Electives to bring total to ...................................................... 124

- Upper Division Electives ........................................................... 18
- Computer Science or Software Engineering ................................ 6
- Any combination of 3000-4000 level CMSC or SE courses
- Statistics ................................................................................. 6
- Any combination of 3000-4000 level STAT courses
- Computer Science, Software Engineering, Mathematics, or
  Statistics ................................................................................. 6
- Any combination of 3000-4000 level courses from either
  CMSC, SE, MATH, or STAT

### Minimum Grade Requirements

1. Average in (a) all college course work, and (b) course work at
   UCO ........................................................................ 2.50
2. A minimum grade of “C” must be earned in all courses in the
   major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
Program: Electrical Engineering
Major: Electrical Engineering
Degree: Bachelor of Science (B.S.)

University of Central Oklahoma Undergraduate Catalog 2019-2020

University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.
- Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication ................................................. 9

Quantitative Reasoning/Scientific Method ................................... 10-11
- Math .............................................................................. 3
- Life Science ................................................................. 4
- Physical Science ............................................................ 3-4

Critical Inquiry and Aesthetic Analysis ...................................... 6
- Aesthetic Analysis .......................................................... 3
- Critical Inquiry ............................................................... 3

Support Courses

Support Courses ................................................................. 9-18

PHIL 1123 Contemporary Moral Problems
ECON 1103 Introduction to Economics
FMKT 2323 Global Protocol and Diversity
(or Foreign Language)
*MATH 1533 Precalculus-Algebra OR
MATH 1513 College Algebra OR Placement Score AND
*MATH 1593 Plane Trigonometry OR Placement Score

*A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Students majoring in the Electrical Engineering program are encouraged to complete the following course in high school.

One year of high school physics OR
PHY 1003 Introduction to Physics

Major Requirements

Electrical Engineering ......................................................... 92

Physics .............................................................................. 14
- Required courses:
  PHY 2014 Physics for Science and Engineering I and Lab
  PHY 2114 Physics for Science and Engineering II and Lab
  PHY 3103 Modern Physics
  PHY 3883 Mathematical Physics I

Engineering .......................................................................... 55
- Required courses:
  ENGR 1112 Introduction to Engineering and Laboratory
  ENGR 1213 Engineering Computing and Laboratory
  ENGR 2033 Statics
  ENGR 2303 Electrical Science
  ENGR 2311 Electrical Science Laboratory
  *ENGR 3183 Electromagnetic Fields I
  ENGR 3223 Digital Logic Design and Laboratory
  ENGR 3303 Engineering Probability & Statistics
  *ENGR 3323 Signals and Systems

American Historical and Political Analysis .......................... 6
- American National Government ........................................ 3
- American History ......................................................... 3

- Cultural and Language Analysis ..................................... 3-4
  - Second Language ....................................................... 4
  - OR
  - Cultural Analysis ....................................................... 3

- Social and Behavioral Analysis ....................................... 3

Life Skills ........................................................................ 5
- Required Health Course ................................................ 2
- Elective Life Skills ......................................................... 3

Mathematics ....................................................................... 15
- Required courses:
  MATH 2313 Calculus 1
  MATH 2323 Calculus 2
  MATH 2333 Calculus 3
  MATH 2343 Calculus 4
  MATH 3103 Differential Equations

Chemistry ......................................................................... 5
- Required courses:
  CHEM 1315 Chemistry for Engineering and Lab

Guided Engineering Electives .............................................. 3
- Select from the following:
  *ENGR 4183 Electromagnetic Fields II
  ENGR 4263 Engineering Optics
  ENGR 4303 Control Systems
  *ENGR 4613 Photonics
  *ENGR 4633 Solid State Devices

*Students in the Accelerated BS/MS program in Engineering Physics must enroll in the graduate level versions of this course, and must choose the 5000 level of either Photonics, Electromagnetic Fields II or Solid State Devices as one of the engineering electives. Students need only three 5000-level courses as part of the accelerated program.

# Admission into Engineering and Physics Upper Division is required.

- CONTINUED ON NEXT PAGE -
Program: Electrical Engineering - continued
Major: Electrical Engineering
Degree: Bachelor of Science (B.S.)

- CONTINUED FROM PREVIOUS PAGE -

Minimum Hours required .......................... 125*

*Total hours required for this major may exceed the minimum 124 credit hour institutional requirement and will vary according to course selection. It is recommended students complete high school algebra II, trigonometry, physics and two years of a second language in high school.

Minimum Grade Requirements
1. Average in (a) all college course work, and (b) course work at UCO ......................................................... 2.00
2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.

Admission into Engineering and Physics Upper Division
Students seeking the B.S. in Biomedical Engineering, Electrical Engineering, Engineering Physics – Physics and Mechanical Engineering are required to make formal application to the Chairperson of the Department of Engineering and Physics for admission into the upper division of each of these majors. Applications must be submitted to the Department of Engineering and Physics on or before the last Monday of January for Fall admission and the last Monday of August for Spring admission.

Upper division admission is open to students meeting Engineering and Physics upper division admission requirements. To be admitted into upper division, the student must have:
- A minimum retention grade point average (GPA) of 2.00 in all course work completed by the time the student is formally admitted into upper division.
- Completed 60 semester credit hours by the time the student is formally admitted into upper division.
- Completed the following courses or their equivalent with a minimum grade of “C” by the time the student is formally admitted into upper division:

  - MATH 2313 Calculus 1
  - MATH 2323 Calculus 2
  - MATH 2333 Calculus 3
  - MATH 2343 Calculus 4
  - MATH 3103 Differential Equations (Recommended)
  - PHY 2014 Physics for Science & Engineering I & Lab
  - PHY 2114 Physics for Science & Engineering II & Lab
  - ENGR 1112 Introduction to Engineering & Lab
  - ENGR 1213 Engineering Computing & Lab
  - ENGR 2033 Statics
  - ENGR 2303 Electrical Science
  - ENGR 2311 Electrical Science Lab
  - ENGR 3303 Engineering Probability and Statistics (Recommended)
  - CHEM 1112 General Chemistry I Recitation/Lab AND (for Biomedical Engineering)
  - CHEM 1103 General Chemistry I OR (for Biomedical Engineering)

Formal approval by the department Faculty Advisor and Department Chair is required for admission. Preference is given to University of Central Oklahoma students. The student may enroll in no more than nine (9) hours of 3000 and 4000 level courses in the major prior to admission into upper division unless they secure formal approval from the Department of Engineering and Physics.
Program: Engineering Physics
Major: Engineering Physics - Physics
Degree: Bachelor of Science (B.S.)

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<thead>
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<td>Critical Inquiry and Aesthetic Analysis .................................. 6</td>
</tr>
<tr>
<td>Aesthetic Analysis ......................................... 3</td>
</tr>
<tr>
<td>* Critical Inquiry ........................................ 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Minimum Required Hours</th>
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</thead>
<tbody>
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<td>Support Courses ........... 9-18</td>
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<td>ECON 1103 Introduction to Economics</td>
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<tr>
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<tr>
<td>*MATH 1533 Precalculus-Algebra OR</td>
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<td>MATH 1513 College Algebra OR Placement Score AND</td>
</tr>
<tr>
<td>*MATH 1593 Plane Trigonometry OR Placement Score</td>
</tr>
<tr>
<td>*A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.</td>
</tr>
</tbody>
</table>

Students majoring in the Engineering Physics program are encouraged to complete the following course in high school.

One year of high school physics OR
PHY 1003 Introduction to Physics

<table>
<thead>
<tr>
<th>Major Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Physics - Physics ............... 91-96</td>
</tr>
<tr>
<td>Physics .................................................. 23</td>
</tr>
<tr>
<td>Required courses ..................................... 17</td>
</tr>
<tr>
<td>PHY 2014 Physics for Science and Engineering I and Lab</td>
</tr>
<tr>
<td>PHY 2114 Physics for Science and Engineering II and Lab</td>
</tr>
<tr>
<td>PHY 3103 Modern Physics</td>
</tr>
<tr>
<td>PHY 3883 Mathematical Physics I</td>
</tr>
<tr>
<td>*PHY 4203 Quantum Mechanics</td>
</tr>
<tr>
<td>*Physics or Engineering Elective .................. 3</td>
</tr>
<tr>
<td>4000-level PHY, ENGR, or BME course</td>
</tr>
<tr>
<td>*Physics Elective ...................................... 3</td>
</tr>
<tr>
<td>4000-level PHY course</td>
</tr>
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</table>

| Engineering ........................................... 48 |
| Required courses ..................................... 45 |
| ENGR 1112 Introduction to Engineering and Laboratory |
| ENGR 1213 Engineering Computing and Laboratory |
| ENGR 2033 Statics |
| ENGR 2043 Dynamics |

| American Historical and Political Analysis ........................................... 6 |
| American National Government ...................................................... 3 |
| American History ................................................................. 3 |
| * Cultural and Language Analysis ............................................ 3-4 |
| Second Language ................................................................. 4 |
| OR |
| Cultural Analysis ............................................................... 3 |
| * Social and Behavioral Analysis ............................................. 3 |
| Life Skills ............................................................... 5 |
| Required Health Course .................................................. 2 |
| * Elective Life Skills ................................................. 3 |

<table>
<thead>
<tr>
<th>Support Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 2303 Electrical Science</td>
</tr>
<tr>
<td>ENGR 2311 Electrical Science Laboratory</td>
</tr>
<tr>
<td>#ENGR 3183 Electromagnetic Fields I</td>
</tr>
<tr>
<td>ENGR 3203 Thermodynamics</td>
</tr>
<tr>
<td>ENGR 3303 Engineering Probability and Statistics</td>
</tr>
<tr>
<td>#ENGR 3323 Signals and Systems</td>
</tr>
<tr>
<td>ENGR 3331 Signals and Systems Laboratory</td>
</tr>
<tr>
<td>ENGR 3403 Analog Electronics</td>
</tr>
<tr>
<td>ENGR 3421 Analog Electronics Laboratory</td>
</tr>
<tr>
<td>#ENGR 3443 Fluid Mechanics</td>
</tr>
<tr>
<td>ENGR 3703 Computational Methods in Engineering</td>
</tr>
<tr>
<td>ENGR 4263 Engineering Optics</td>
</tr>
<tr>
<td>#ENGR 4882 Senior Engineering Design I</td>
</tr>
<tr>
<td>#ENGR 4892 Senior Engineering Design II</td>
</tr>
</tbody>
</table>

| Engineering Electives ........................................ 3 |
| Any 2000-level, 3000-level, or 4000-level ENGR or BME course |

| Mathematics .................................................. 15 |
| Required courses: |
| MATH 2313 Calculus 1 |
| MATH 2323 Calculus 2 |
| MATH 2333 Calculus 3 |
| MATH 2343 Calculus 4 |
| MATH 3103 Differential Equations |

| Chemistry .................................................. 5-10 |
| Required courses: |
| CHEM 1315 Chemistry for Engineering and Lab OR |
| CHEM 1103 General Chemistry I AND |
| CHEM 1112 General Chemistry I Recitation/Laboratory AND |
| CHEM 1223 General Chemistry II AND |
| CHEM 1232 General Chemistry II Recitation/Laboratory |

*Students in the Accelerated BS/MS program in Engineering Physics must enroll in the graduate level versions of this course. Students may take a maximum of nine hours and three 5000-level courses as part of the accelerated program.

# Admission into Engineering and Physics Upper Division is required.

- CONTINUED ON NEXT PAGE -
Program: Engineering Physics - continued
Major: Engineering Physics - Physics
Degree: Bachelor of Science (B.S.)

- CONTINUED FROM PREVIOUS PAGE -

Electives to bring total to ......................... 124*

*Total hours required for this major may exceed the minimum 124 credit hour institutional requirement and will vary according to course selection. It is recommended students complete high school algebra II, trigonometry, physics and two years of a second language in high school.

Minimum Grade Requirements
1. Average in (a) all college course work, and (b) course work at UCO ................................................................. 2.00
2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.

Admission into Engineering and Physics Upper Division
Students seeking the B.S. in Biomedical Engineering, Electrical Engineering, Engineering Physics – Physics and Mechanical Engineering are required to make formal application to the Chairperson of the Department of Engineering and Physics for admission into the upper division of each of these majors. Applications must be submitted to the Department of Engineering and Physics on or before the last Monday of January for Fall admission and the last Monday of August for Spring admission.

Upper division admission is open to students meeting Engineering and Physics upper division admission requirements. To be admitted into upper division, the student must have:

- A minimum retention grade point average (GPA) of 2.00 in all course work completed by the time the student is formally admitted into upper division.
- Completed 60 semester credit hours by the time the student is formally admitted into upper division.
- Completed the following courses or their equivalent with a minimum grade of “C” by the time the student is formally admitted into upper division:
  - MATH 2133 Calculus 1
  - MATH 2323 Calculus 2
  - MATH 2333 Calculus 3
  - MATH 2343 Calculus 4
  - MATH 3103 Differential Equations (Recommended)
  - PHY 2014 Physics for Science & Engineering I & Lab
  - PHY 2114 Physics for Science & Engineering II & Lab
  - ENGR 1112 Introduction to Engineering & Lab
  - ENGR 1213 Engineering Computing & Lab
  - ENGR 2033 Statics
  - ENGR 2303 Electrical Science
  - ENGR 2311 Electrical Science Lab
  - ENGR 3303 Engineering Probability and Statistics (Recommended)
  - CHEM 1112 General Chemistry I Recitation/Lab AND (for Biomedical Engineering)
  - CHEM 1103 General Chemistry I OR (for Biomedical Engineering)

Formal approval by the department Faculty Advisor and Department Chair is required for admission. Preference is given to University of Central Oklahoma students. The student may enroll in no more than nine (9) hours of 3000 and 4000 level courses in the major prior to admission into upper division unless they secure formal approval from the Department of Engineering and Physics.
Program: Funeral Service  
Major: Funeral Service  
Degree: Bachelor of Science (B.S.)

<table>
<thead>
<tr>
<th>University Core (Total Listed 42-44)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific courses within the University Core are listed on pages 95-96.</td>
</tr>
<tr>
<td>* Courses from the major may apply to the areas marked in the University Core.</td>
</tr>
<tr>
<td>Written and Oral Communication ................................................. 9</td>
</tr>
<tr>
<td>Quantitative Reasoning/Scientific Method .................................. 10-11</td>
</tr>
<tr>
<td>Math .............................................................. 3</td>
</tr>
<tr>
<td>Life Science .................................................. 4</td>
</tr>
<tr>
<td>* Physical Science ........................................... 3-4</td>
</tr>
<tr>
<td>Critical Inquiry and Aesthetic Analysis ................................... 6</td>
</tr>
<tr>
<td>Aesthetic Analysis ....................................... 3</td>
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<tr>
<td>Critical Inquiry ........................................ 3</td>
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<table>
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<tr>
<th>Major Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required / Tem Hours</td>
</tr>
<tr>
<td>Funeral Service ......................... 67</td>
</tr>
<tr>
<td>Required Course .......................... 2</td>
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<tr>
<td>* FNRL 4522 Board Review</td>
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<tr>
<td>Basic Sciences ......................... 15</td>
</tr>
<tr>
<td>Required courses:</td>
</tr>
<tr>
<td>BIO 2314 Introduction to Microbiology and Lab</td>
</tr>
<tr>
<td>CHEM 1014 Introduction to Chemistry and Lab</td>
</tr>
<tr>
<td>FNRL 2214 Introduction to Human Anatomy and Dissection</td>
</tr>
<tr>
<td>FNRL 3433 Introduction to Pathology</td>
</tr>
<tr>
<td>Mortuary Arts and Sciences ............. 20</td>
</tr>
<tr>
<td>Required courses:</td>
</tr>
<tr>
<td>FNRL 3054 Embalming Chemistry</td>
</tr>
<tr>
<td>FNRL 3204 Embalming</td>
</tr>
<tr>
<td>FNRL 3304 Restorative Art</td>
</tr>
<tr>
<td>* FNRL 4118 Practicum in Embalming &amp; Funeral Directing</td>
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<tr>
<td>Mortuary Administration ................. 30</td>
</tr>
<tr>
<td>Required courses:</td>
</tr>
<tr>
<td>FNRL 1211 Orientation to Funeral Service</td>
</tr>
<tr>
<td>FNRL 2313 Contemporary Funeral Service</td>
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<td>FNRL 2413 Funeral Home Administration</td>
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<tr>
<td>FNRL 3374 Funeral Home Management I</td>
</tr>
<tr>
<td>FNRL 3383 Funeral Service Statutory Law</td>
</tr>
<tr>
<td>FNRL 3393 Mortuary Jurisprudence</td>
</tr>
<tr>
<td>FNRL 3493 Funeral Service Communication</td>
</tr>
<tr>
<td>FNRL 3513 History of Funeral Directing</td>
</tr>
<tr>
<td>FNRL 4214 Funeral Home Management II</td>
</tr>
<tr>
<td>FNRL 3483 Psychology of Grief</td>
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<thead>
<tr>
<th>Minimum Grade Requirements</th>
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</thead>
<tbody>
<tr>
<td>1. Average in (a) all college course work, (b) course work at UCO, and (c) major courses ......................... 2.00</td>
</tr>
<tr>
<td>2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.</td>
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<thead>
<tr>
<th>Program</th>
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<tbody>
<tr>
<td>American Historical and Political Analysis .................... 6</td>
</tr>
<tr>
<td>American National Government .................................... 3</td>
</tr>
<tr>
<td>American History .................................................. 3</td>
</tr>
<tr>
<td>Cultural and Language Analysis .......................... 3-4</td>
</tr>
<tr>
<td>Second Language .............................................. 4</td>
</tr>
<tr>
<td>OR</td>
</tr>
<tr>
<td>Cultural Analysis ........................................... 3</td>
</tr>
<tr>
<td>Social and Behavioral Analysis ........................ 3</td>
</tr>
<tr>
<td>Life Skills .................................................. 5</td>
</tr>
<tr>
<td>Required Health Course ..................................... 2</td>
</tr>
<tr>
<td>* Elective Life Skills ........................................ 3</td>
</tr>
</tbody>
</table>

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.

National Board Examination scores, graduation rates, and employment rates for this and other ABFSE-accredited programs are available at www.abfse.org. To request a printed copy of this program’s scores and rates, go to: UCO Department of Funeral Service, CHS 154, 100 North University Drive, Edmond, OK 73034 or by e-mail at funeralservice@uco.edu, or by telephone, (405) 974-5001.

The Department of Funeral Service Bachelor of Science Degree and Certificate of Completion Programs at the University of Central Oklahoma are accredited by the American Board of Funeral Service Education (ABFSE) 3414 Ashland Avenue, Suite G, St. Joseph, Missouri 64506 (816)233-3747 www.abfse.org.

The Department of Funeral Service has as its central aim recognition of the importance of funeral service education personnel as:
1. Members of a human services profession.
2. Members of the community in which they serve.
3. Participants in the relationship between bereaved families and those engaged in the funeral service profession.
4. Professionals knowledgeable of and compliant with federal, state, provincial/territorial, and local regulatory guidelines (in the geographic area where they practice).
5. Professionals sensitive to the responsibility for public health, safety, and welfare in caring for human remains.

Department of Funeral Service Objectives
1. To enlarge the background and knowledge of students about the funeral service profession.
2. To educate students in every phase of funeral service and to help enable them to develop proficiency and skills necessary for the profession, as defined in the Preamble above.
3. To educate students concerning the responsibilities of the funeral service profession to the community at large.
4. To emphasize high standards of ethical conduct.
5. To provide a curriculum at the post-secondary level of instruction.
6. To encourage student and faculty research in the field of funeral service.

All funeral service students must apply for admission to the funeral service program. Each applicant must provide an official transcript of high school or college work that is directly mailed from the institution where the credits were received. Said transcripts must be sent to: Department of Funeral Service, University of Central Oklahoma, 100 N. University Drive, Edmond, OK 73034.

To apply for admission, please visit http://www.uco.edu/funeral/application
Program: Mathematics  
Major: Mathematics  
Degree: Bachelor of Science (B.S.)

Department: Mathematics and Statistics  
College: Mathematics and Science  
Major Code: 6160

University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.
• Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication .................................................... 9

Quantitative Reasoning/Scientific Method ......................................... 10-11
• Math................................................................. 3
  Life Science .......................................................... 4
  Physical Science....................................................... 3-4

Critical Inquiry and Aesthetic Analysis .............................................. 6
  Aesthetic Analysis...................................................... 3
  Critical Inquiry......................................................... 3

Prerequisite Courses

Prerequisite Courses ......................................................... 0-6

*MATH 1533  Precalculus-Algebra OR
  MATH 1513  College Algebra OR Placement Score AND
*MATH 1593  Plane Trigonometry OR Placement Score

*A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Upon completion of the above courses, corresponding general education requirements will be satisfied. (These courses are required for this major regardless of previous degrees conferred.)

Major Requirements

Mathematics ......................................................... 47

Required................................................................. 30

 MATH 2313  Calculus 1
 MATH 2323  Calculus 2
 MATH 2333  Calculus 3
 MATH 2343  Calculus 4
 MATH 2753  Technology for Professional Math and Statistics
 MATH 3113  Foundations of Advanced Math
 MATH 3143  Linear Algebra
 MATH 3183  Introduction to Modern Algebra
 MATH 4143  Introduction to Analysis 1
 STAT 4113  Mathematical Statistics 1

Electives ................................................................. 17
At least nine (9) hours must be selected from the following:
 MATH 3103  Differential Equations
 MATH 3163  Elementary Number Theory
 MATH 4153  Introduction to Analysis 2
 MATH 4483  History of Mathematics
 STAT 4123  Mathematical Statistics 2

All other elective courses must be selected from 3000 and 4000 level MATH courses (including those MATH courses listed above).

Electives to bring total to ............................................. 124

American Historical and Political Analysis ........................................ 6
  American National Government ........................................ 3
  American History ....................................................... 3

Cultural and Language Analysis .................................................. 3-4
  Second Language .................................................... 4
  OR
  Cultural Analysis ....................................................... 3

Social and Behavioral Analysis ................................................... 3

Life Skills ........................................................................... 5
  Required Health Course ................................................ 2
  Elective Life Skills ......................................................... 3

Minimum Grade Requirements

1. Average in (a) all college course work, (b) course work at UCO, and (c) major courses ........................................... 2.50

2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.

It is strongly recommended that PHY 1114 General Physics I and Lab be taken in the general education core.
Program: Mathematics  
Major: Mathematics - Applied Mathematics  
Degree: Bachelor of Science (B.S.)

Department: Mathematics and Statistics  
College: Mathematics and Science  
Major Code: 6161

University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.
- Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication .................................................... 9
Quantitative Reasoning/Scientific Method .................................... 10-11
  - Math.............................................................................................. 3
  - Life Science ................................................................................. 4
  - Physical Science.......................................................................... 3-4
Critical Inquiry and Aesthetic Analysis .............................................. 6
  - Aesthetic Analysis...................................................................... 3
  - Critical Inquiry......................................................................... 3

American Historical and Political Analysis ...................................... 6
  - American National Government ............................................. 3
  - American History....................................................................... 3

Cultural and Language Analysis ...................................................... 3-4
  - Second Language....................................................................... 4
  - OR
  - Cultural Analysis....................................................................... 3

Social and Behavioral Analysis....................................................... 3

Life Skills .......................................................................................... 5
  - Required Health Course.......................................................... 2
  - Elective Health Skills................................................................. 3

Critical Inquiry and Aesthetic Analysis .............................................. 6
  - Aesthetic Analysis...................................................................... 3
  - Critical Inquiry......................................................................... 3

Minimum Grade Requirements
1. Average in (a) all college course work, (b) course work at UCO, and (c) major courses ................................................. 2.50
2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.

Prerequisite Courses

Prerequisite Courses ................................................................. 0-6

*MATH 1533 Precalculus-Algebra OR
  MATH 1513 College Algebra OR Placement Score AND
*MATH 1593 Plane Trigonometry OR Placement Score

*A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Upon completion of the above courses, corresponding general education requirements will be satisfied. (These courses are required for this major regardless of previous degrees conferred.)

Major Requirements

Mathematics - Applied Mathematics ......................... 48

Required courses ............................................................... 27
  MATH 2313 Calculus 1
  MATH 2323 Calculus 2
  MATH 2333 Calculus 3
  MATH 2343 Calculus 4
  MATH 2753 Technology for Professional Math and Statistics
  MATH 3113 Foundations of Advanced Math
  MATH 3143 Linear Algebra
  MATH 3183 Introduction to Modern Algebra
  MATH 4143 Introduction to Analysis 1

Applied Mathematics ............................................................. 21

Required courses:
  STAT 2113 Statistical Methods
  MATH 3103 Differential Equations
  MATH 4113 Operations Research 1
  STAT 4113 Mathematical Statistics 1
  MATH 4263 Numerical Linear Algebra OR
  MATH 4363 Applied Numerical Analysis

Any 3000 and 4000 level MATH or STAT course to bring the total to 21.

Electives to bring total to ................................................. 124
Program: Mathematics
Major: Mathematics - Statistics
Degree: Bachelor of Science (B.S.)

Deprit: Mathematics and Statistics
College: Mathematics and Science
Major Code: 6162

University of Central Oklahoma Undergraduate Catalog 2019-2020

University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.
- Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication ............................................. 9
Quantitative Reasoning/Scientific Method .............................. 10-11
- Math ................................................................. 3
- Life Science ....................................................... 4
- Physical Science ................................................. 3-4

Critical Inquiry and Aesthetic Analysis ................................. 6
- Aesthetic Analysis ................................................ 3
- Critical Inquiry .................................................... 3

American Historical and Political Analysis ............................ 6
American National Government ....................................... 3
American History ............................................................ 3

Cultural and Language Analysis ........................................ 3-4
- SD Language ......................................................... 4
OR
- Cultural Analysis .................................................. 3

Social and Behavioral Analysis ........................................... 3

Life Skills ........................................................................ 5
- Required Health Course ........................................... 2
- Elective Life Skills .................................................... 3

Prerequisite Courses ......................................................... 0-6

MATH 1533 Precalculus-Algebra OR
MATH 1513 College Algebra OR Placement Score AND
MATH 1593 Plane Trigonometry OR Placement Score

*A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Upon completion of the above courses, corresponding general education requirements will be satisfied. (These courses are required for this major regardless of previous degrees conferred.)

Major Requirements
Mathematics - Statistics ................................................... 54

Mathematics ................................................................. 27
- MATH 2313 Calculus 1
- MATH 2323 Calculus 2
- MATH 2333 Calculus 3
- MATH 2343 Calculus 4
- MATH 2753 Technology for Professional Math and Statistics
- MATH 3103 Differential Equations
- MATH 3113 Foundations of Advanced Math
- MATH 3143 Linear Algebra
- MATH 3183 Introduction to Modern Algebra OR
- MATH 4143 Introduction to Analysis 1

Statistics ................................................................. 27
- STAT 2113 Statistical Methods
- STAT 4103 Applied Experimental Design
- STAT 4113 Mathematical Statistics 1
- STAT 4123 Mathematical Statistics 2
- STAT 4213 Applied Regression Analysis
- STAT 4513 Statistical Consulting

Electives ................................................................. 9
- Selected from the following:
  STAT 3213 Fundamentals of Data Science
  STAT 4253 Computer Applications in Statistics

Minimum Grade Requirements

1. Average in (a) all college course work, (b) course work at UCO, and (c) major courses .............................................. 2.50
2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
Program: Mathematics Education  
Major: Mathematics Education  
Degree: Bachelor of Science in Education (B.S.Ed.)

Dept: Mathematics and Statistics  
College: Mathematics and Science  
Major Code: 6180

University Core  (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.  
• Courses from the major may apply to the areas marked in the University Core.

• Written and Oral Communication ................................................................. 9
• Quantitative Reasoning/Scientific Method ...................................................... 10-11
  • Math ........................................................................................................... 3
  • Life Science ................................................................................................. 4
  • Physical Science .......................................................................................... 3-4

Critical Inquiry and Aesthetic Analysis .......................................................... 6
  Aesthetic Analysis .......................................................................................... 3
  Critical Inquiry ............................................................................................... 3

Minimum Required Hours

Support and Prerequisite Courses

Support Courses ................................................................................................ 9
MCOM  1113  Fundamentals of Speech
ENG  1113  English Composition
ENG  1213  English Composition and Research

Prerequisite Courses ....................................................................................... 0-6
* MATH  1533  Precalculus-Algebra OR
  MATH  1513  College Algebra OR Placement Score AND
  * MATH  1593  Plane Trigonometry OR Placement Score

* A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Major Requirements

Mathematics Education ..................................................................................... 41-42

Required courses ............................................................................................. 36
MATH  2123  Survey of Discrete for Math Education
MATH  2313  Calculus 1
MATH  2323  Calculus 2
MATH  2333  Calculus 3
MATH  2343  Calculus 4
MATH  2743  Technology and Mathematics Education
MATH  3113  Foundations of Advanced Mathematics
MATH  3123  College Geometry
MATH  3143  Linear Algebra
MATH  3163  Elementary Number Theory OR
  MATH  3183  Introduction to Modern Algebra
MATH  4483  History of Mathematics
STAT  2113  Statistical Methods

Mathematics Electives ....................................................................................... 5-6
Select at least two of the following:
MATH  2023  Foundations of Geometry and Measurement
MATH  3103  Differential Equations
MATH  3163  Elementary Number Theory
MATH  3183  Introduction to Modern Algebra
MATH  4143  Introduction to Analysis 1
MATH  4960  Institute in Mathematics (2 hours)
STAT  4113  Mathematical Statistics 1

American Historical and Political Analysis ................................................... 6
American National Government ..................................................................... 3
American History ........................................................................................... 3

Cultural and Language Analysis ................................................................... 3-4
Second Language ............................................................................................ 4
OR
Cultural Analysis ............................................................................................. 3

Social and Behavioral Analysis ...................................................................... 3

Life Skills ......................................................................................................... 5
Required Health Course .................................................................................. 2
Elective Life Skills ............................................................................................ 3

Minimum Required Hours

Professional Education ................................................................................... 32
PTE  1010  Introduction to Teacher Education
PTE  3023  Foundations of American Education/Clinical Exp
PTE  3153  Adolescent Psychology
SPED  4123  Teaching Individuals with Disabilities
MATH  3183  Teaching Middle School Math
*MATH  4843  Teaching Secondary Mathematics
*MATH  4811  Contemporary Issues
*MATH  4838  Internship/Student Teaching Secondary
*MATH  4853  Classroom Management & Instruction

^ Admission to Teacher Education required
#To be taken the same semester

Electives to bring total to ............................................................................... 124

It is strongly recommended PHY 1114 General Physics I and Lab be taken in the general education core. Students planning to do graduate work should take MATH 3183, Introduction to Modern Algebra and MATH 4143, Introduction to Analysis 1.

Minimum Graduation Requirements

1. Overall GPA in all college course work .................................................... 2.50
2. Average in course work at UCO ............................................................... 2.00
3. Courses in English Composition, Fundamentals of Speech, Professional Education, and area of specialization (major)....... “C”
4. Proficiency in foreign language ............................................................... Novice 4 level

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
Program: Mechanical Engineering  
Major: Mechanical Engineering  
Degree: Bachelor of Science (B.S.)  
Dept: Engineering and Physics  
College: Mathematics and Science  
Major Code: 6270

University Core  (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.
• Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication .................................................. 9
Quantitative Reasoning/Scientific Method ..................................... 10-11
• Math .......................................................... 3
Life Science .......................................................... 4
• Physical Science ..................................................... 3-4
Critical Inquiry and Aesthetic Analysis ........................................ 6
Aesthetic Analysis ............................................................. 3
• Critical Inquiry ......................................................... 3

Minimum Required Hours

Support Courses ................................................................. 9-18
PHIL 1123 Contemporary Moral Problems
ECON 1103 Introduction to Economics
FMKT 2323 Global Protocol and Diversity (or Foreign Language)
*MATH 1533 Precalculus-Algebra OR MATH 1513 College Algebra OR Placement Score AND MATH 1593 Plane Trigonometry OR Placement Score
*A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Students majoring in the Mechanical Engineering program are encouraged to complete the following course in high school.

One year of high school physics OR
PHY  1003 Introduction to Physics

Major Requirements ............................................................... 94

Physics ................................................................................. 11
Required courses:
PHY 2014 Physics for Science and Engineering I and Lab
PHY 2114 Physics for Science and Engineering II and Lab
PHY 3883 Mathematical Physics I

Engineering ........................................................................... 57
Required courses:
ENGR 1112 Introduction to Engineering and Laboratory
ENGR 1213 Engineering Computing and Laboratory
ENGR 2033 Statics
ENGR 2043 Dynamics
ENGR 2143 Strength of Materials
ENGR 2151 Strength of Materials Lab
ENGR 2303 Electrical Science
ENGR 2311 Electrical Science Laboratory
ENGR 3203 Thermodynamics
ENGR 3211 Thermal Engineering Laboratory
ENGR 3303 Engineering Probability and Statistics

American Historical and Political Analysis ................................ 6
American National Government .................................................. 3
American History ................................................................... 3
• Cultural and Language Analysis ........................................... 3-4
Second Language .................................................................... 4
OR
Cultural Analysis ................................................................... 3
• Social and Behavioral Analysis ............................................. 3
Life Skills .................................................................................. 5
Required Health Course ............................................................ 2
• Elective Life Skills ................................................................ 3

Minimum Required Hours

American Historical and Political Analysis ................................ 6
American National Government .................................................. 3
American History ................................................................... 3
• Cultural and Language Analysis ........................................... 3-4
Second Language .................................................................... 4
OR
Cultural Analysis ................................................................... 3
• Social and Behavioral Analysis ............................................. 3
Life Skills .................................................................................. 5
Required Health Course ............................................................ 2
• Elective Life Skills ................................................................ 3

Support Courses ................................................................. 9-18
#ENGR 3323 Signals and Systems
#ENGR 3331 Signals and Systems Laboratory
#ENGR 3363 Mechanical Engineering Design
#ENGR 3413 Materials Science
#ENGR 3443 Fluid Mechanics
#ENGR 3451 Fluid Mechanics Lab
#ENGR 3703 Computational Methods in Engineering
#*ENGR 4123 Heat Transfer
#ENGR 4141 Heat Transfer Lab
#*ENGR 4533 Thermal Systems Design
#*ENGR 4803 Mechatronics & Laboratory
#ENGR 4882 Senior Engineering Design I
#ENGR 4892 Senior Engineering Design II

Mathematics ............................................................................. 15
Required courses:
MATH 2313 Calculus 1
MATH 2323 Calculus 2
MATH 2333 Calculus 3
MATH 2343 Calculus 4
MATH 3103 Differential Equations

Chemistry .................................................................................. 5
Required courses:
CHEM 1315 Chemistry for Engineering and Lab

Guided Physics or Engineering Electives .................................. 6
Selected from the following:
ENGR 3153 Machine Dynamics
ENGR 3223 Digital Logic Design and Laboratory
ENGR 3803 Electrical Power Systems
ENGR 4103 Finite Element Analysis
ENGR 4153 Vibration
ENGR 4203 Refrigeration and Air Conditioning
ENGR 4303 Control Systems
ENGR 4313 Fluid Dynamics
BME 4343 Biomechanics
PHY 4163 Analytical Mechanics

*Students in the Accelerated BS/MS program in Engineering Physics must enroll in the graduate level versions of this course.

# Admission into Engineering and Physics Upper Division is required.

- CONTINUED ON NEXT PAGE -
Minimum Hours required ..................... 127*

*Total hours required for this major may exceed the minimum 124 credit hour institutional requirement and will vary according to course selection. It is recommended students complete high school algebra II, trigonometry, physics and two years of a second language in high school.

Minimum Grade Requirements

1. Average in (a) all college course work, and (b) course work at UCO ................................................................. 2.00

2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.

Admission into Engineering and Physics Upper Division

Students seeking the B.S. in Biomedical Engineering, Electrical Engineering, Engineering Physics – Physics and Mechanical Engineering are required to make formal application to the Chairperson of the Department of Engineering and Physics for admission into the upper division of each of these majors. Applications must be submitted to the Department of Engineering and Physics on or before the last Monday of January for Fall admission and the last Monday of August for Spring admission.

Upper division admission is open to students meeting Engineering and Physics upper division admission requirements. To be admitted into upper division, the student must have:

- A minimum retention grade point average (GPA) of 2.00 in all course work completed by the time the student is formally admitted into upper division.
- Completed 60 semester credit hours by the time the student is formally admitted into upper division.
- Completed the following courses or their equivalent with a minimum grade of “C” by the time the student is formally admitted into upper division:
  - MATH 2313 Calculus 1
  - MATH 2323 Calculus 2
  - MATH 2333 Calculus 3
  - MATH 2343 Calculus 4
  - MATH 3103 Differential Equations (Recommended)
  - PHY 2014 Physics for Science & Engineering I & Lab
  - PHY 2114 Physics for Science & Engineering II & Lab
  - ENGR 1112 Introduction to Engineering & Lab
  - ENGR 1213 Engineering Computing & Lab
  - ENGR 2033 Statics
  - ENGR 2303 Electrical Science
  - ENGR 2311 Electrical Science Lab
  - ENGR 3303 Engineering Probability and Statistics (Recommended)
  - CHEM 1112 General Chemistry I Recitation/Lab AND (for Biomedical Engineering)
  - CHEM 1103 General Chemistry I OR (for Biomedical Engineering)
Program: Nursing
Major: Nursing
Degree: Bachelor of Science (B.S.)

Dept: Nursing
College: Mathematics and Science
Major Code: 6200

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University Core  (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.
• Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication .................................................... 9
Quantitative Reasoning/Scientific Method ...................................... 10-11
Math .......................................................... 3
• Life Science ............................................ 4
• Physical Science .................................... 3-4

Critical Inquiry and Aesthetic Analysis ......................................... 6
Aesthetic Analysis ............................................. 3
• Critical Inquiry ...................................... 3

Minimum Required Hours

Major Requirements

Nursing................................................................. 98

The baccalaureate degree in nursing at UCO is accredited by the Commission on Collegiate Nursing Education (http://www.ccneaccreditation.org). Graduates of this state approved program are eligible to apply to write the National Council Licensure Examination (NCLEX-RN) for registered nurses.

Pre-Professional .......................................................... 39

The following courses:
CHEM 1014  Introductory Chemistry and Lab
BIO 1114  General Biology OR
BIO 1204  Biology for Majors: Principles
NTRN 1513  Introduction to Nutrition
PSY 1103  General Psychology
SOC 2103  Sociology
BIO 2314  Introductory Microbiology and Lab
BIO 2504  Human Anatomy and Lab OR
FNRL 2214  Elementary Human Anatomy and Dissection
BIO 2604  Human Physiology and Lab
ECON 2173  Principles of Business Statistics OR
PSY 2753  Psychological Statistics OR
SOC 4043  Sociological Statistics OR
STAT 2113  Statistical Methods OR
ECON 2303  Statistics for Healthcare OR
STAT 2103  Introduction to Statistics for Sciences
PHIL 1103  Logic and Critical Thinking OR
PHIL 1113  Introduction to Philosophy OR
PHIL 1123  Contemporary Moral Problems OR
PHIL 2073  Social & Political Philosophy
NURS 1221  Introduction to Nursing
NURS 2113  Individual and Family Development Through the Lifespan

Professional................................................................. 59

The following courses:
NURS 2207  Foundations of Nursing
NURS 3202  Introduction to Pharmacology
NURS 3307  Adult Medical-Surgical Nursing I
NURS 3314  Maternal-Newborn Nursing

American Historical and Political Analysis ............................... 6
American National Government ............................................ 3
American History ....................................................... 3

Cultural and Language Analysis ............................................ 3-4
Second Language ....................................................... 4
OR
Cultural Analysis .............................................................. 3

• Social and Behavioral Analysis ............................................ 3

Life Skills ........................................................................ 5
Required Health Course .................................................... 2
• Elective Life Skills ......................................................... 3

Electives to bring total to ..................................................... 124*

*Total hours required for this major may exceed the minimum 124 credit hour institutional requirement and will vary according to course selection. It is recommended students complete two years of a second language in high school.

Minimum Grade Requirements

1. Average in (a) all college course work, and (b) course work at UCO ......................................................... 2.00

2. A minimum grade of “C” must be earned in all courses in the major to count toward meeting degree requirements.

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.

- CONTINUED ON NEXT PAGE -
Admission to Nursing Program

Students planning to become candidates for the Bachelor of Science with a major in Nursing are required to make formal application to the Chairperson of the Department of Nursing for admission into the Professional Nursing program. Applications must be submitted to the Department of Nursing on or before the last Friday of January for fall admission, and the second Friday of September for spring admission into the program.

Admission is competitive as applications exceed the number of positions available. Formal approval by the selection committee is required for admission. Preference is given to University of Central Oklahoma students. The student will be notified eight to ten weeks after the filing date as to the disposition of the application.

The following must be submitted to the Department of Nursing as part of the admission process and are used by the faculty in selection of candidates:

A. Transcript(s) reflecting a minimum retentive grade point average of 2.50 in all course work completed at the time of the application.

B. A minimum grade of “C” in chemistry, all biological sciences, NURS 1221 and NURS 2113 is required. Two of the five required science courses must be successfully completed prior to the application deadline. Human Anatomy must be successfully completed before starting NURS 2207 Foundations of Nursing. Students may enroll a maximum of two times in any nursing course.

C. Score on the Test of Essential Academic Skills (TEAS) or HESI A2 Exam.

D. Submit a criminal background check (OSBI).

E. Meet “Performance Standards for Admission and Progression in the Department of Nursing” (available in application packet).

F. International students (i.e. students for whom English is a second language regardless of resident status) must have a minimum TOEFL score of 83 on the internet version or equivalent on the written examination (560).

Career Ladder Students

RN to BS
Registered nurses who have graduated from an ACEN accredited associate degree program may be eligible for matriculation into the program on an advanced standing basis. For information regarding criteria and application, go to http://www.uco.edu/cms/nursing/index.asp, or contact the Department of Nursing.

Accelerated RN-MS
A tailored, accelerated RN-MS option is offered to qualifying RN-BS students. Students who are accepted to the RN to BS degree option may take three specified 5000-level NURS courses (9 credit hours) during the senior year of the BS program. These courses will count towards both the BS and MS degrees. Formal application and department permission is required. Specifics of the requirements are located in the UCO Graduate Catalog under Nursing: Master of Science (M.S.).
University Core  (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.

- Courses from the major may apply to the areas marked in the University Core.
- Written and Oral Communication ................................................................. 9
- Quantitative Reasoning/Scientific Method .................................................. 10-11
- Math .......................................................... 3
- Life Science ......................................................... 4
- Physical Science ....................................................... 3-4

Critical Inquiry and Aesthetic Analysis ......................................................... 6
- Aesthetic Analysis ...................................................... 3
- Critical Inquiry .......................................................... 3

American Historical and Political Analysis ................................................. 6
American National Government ................................................................. 3
American History ................................................................. 3

Cultural and Language Analysis ............................................................... 3-4
- Second Language ....................................................... 4
- OR
- Cultural Analysis ................................................................. 3

Social and Behavioral Analysis ................................................................. 3

Life Skills ................................................................................. 5
- Required Health Course ................................................................. 2
- Elective Life Skills ................................................................. 3

Degree: Bachelor of Science in Education (B.S.Ed.)
Major Code: 6040

Support Courses ................................................................. 9-15

Support Courses .................................................................
- MCOM 1113 Fundamentals of Speech
- ENG 1113 English Composition
- ENG 1213 English Composition and Research

Students majoring in the Biology Education program are encouraged to complete the following courses in high school.

Two years of high school Algebra and one year of Trigonometry OR
- MATH 1513 College Algebra AND
- MATH 1593 Plane Trigonometry

Major Requirements ................................................................. 65

Science Education - Biology ................................................................. 65

Biology ................................................................. 26
- Required courses:
  - BIO 1204 Biology for Majors: Principles
  - BIO 1225 Biology for Majors: Diversity
  - BIO 2203 Cell Biology
  - BIO 2211 Cell Biology Laboratory
  - BIO 3054 Microbiology for Majors and Lab
  - BIO 3303 Genetics
  - BIO 3543 General Ecology
  - BIO 3703 Evolution

Chemistry ................................................................. 10
- Required courses:
  - CHEM 1103 General Chemistry I AND
  - CHEM 1112 General Chemistry I Recitation/Lab
  - CHEM 1223 General Chemistry II AND
  - CHEM 1232 General Chemistry II Recitation/Lab

Physics ................................................................. 8
- Required courses:
  - PHY 1114 General Physics I and Lab OR
  - PHY 2014 Physics for Science and Engineering I and Lab
  - PHY 1214 General Physics II and Lab OR
  - PHY 2114 Physics for Science and Engineering II and Lab

Mathematics ................................................................. 6
- Required courses:
  - MATH 2153 BioCalculus
  - STAT 2103 Introduction to Statistics for Sciences

Elective 3000/4000 Biology ................................................................. 15
- Any 3000/4000 level BIO course

Professional Education ................................................................. 31
- PTE 1010 Introduction to Teacher Education
- PTE 3023 Foundations of American Education/Clinical Exp
- PTE 3153 Adolescent Psychology
- SPED 4123 Teaching Individuals with Disabilities
- BIO 4812 Teaching and Learning in Science Classrooms
- BIO 4833 General Methods of Teaching Science and Lab
- PTE 4172 Educational Assessment
- PTE 4533 Contemporary Learning Sciences
- PTE 4811 Contemporary Issues
- #PTE 4838 Internship/Student Teaching Secondary
- #PTE 4853 Classroom Management & Instruction

^ Admission to Teacher Education required
#To be taken the same semester

Minimum Hours required ............................................. 128*

*Total hours required for this major may exceed the minimum 124 credit hour institutional requirement and will vary according to course selection. It is recommended students complete high school algebra II, trigonometry, and two years of a second language in high school.
- CONTINUED FROM PREVIOUS PAGE -

Graduating seniors must take a national assessment exam in Biology as a degree requirement for the B.S.Ed. in Science Education - Biology.

**Minimum Graduation Requirements**

1. Overall GPA in all college course work ........................................ 2.50
2. Average in course work at UCO ............................................... 2.00
3. Courses in English Composition, Fundamentals of Speech, Professional Education, and area of specialization (major)........... “C”
4. Proficiency in foreign language .............................................. Novice 4 level

*For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.*
University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.
- Courses from the major may apply to the areas marked in the University Core.

- Written and Oral Communication.................................................. 9

Quantitative Reasoning/Scientific Method ..................................... 10-11
- Math.................................................................................. 3
- Life Science........................................................................ 4
- Physical Science...................................................................... 3-4

Critical Inquiry and Aesthetic Analysis ......................................... 6
Aesthetic Analysis........................................................................ 3
Critical Inquiry.......................................................................... 3

Support Courses............................................................................ 9-15

MCOM 1113 Fundamentals of Speech
ENG 1113 English Composition
ENG 1213 English Composition and Research

Students majoring in the Chemistry Education program are encouraged to complete the following courses in high school.

Two years of high school Algebra and one year of Trigonometry OR
MATH 1513 College Algebra AND
MATH 1593 Plane Trigonometry

Science Education - Chemistry .................................................. 65

Science Education Core............................................................. 37

Required courses:
BIO 1204 Biology for Majors: Principles
BIO 1225 Biology for Majors: Diversity

Chemistry..................................................................................... 10

Required courses:
CHEM 1103 General Chemistry I AND
CHEM 1112 General Chemistry I Recitation/Lab
CHEM 1223 General Chemistry II AND
CHEM 1232 General Chemistry II Recitation/Lab

Physics......................................................................................... 8

Required courses:
PHY 1114 General Physics I and Lab OR
PHY 2044 Physics for Science and Engineering I and Lab
PHY 1214 General Physics II and Lab OR
PHY 2114 Physics for Science and Engineering II and Lab

Earth Science ............................................................................... 4
PHY 3014 Earth Science

Computer Science................................................................. 3
CMSC 1513 Beginning Programming

Mathematics............................................................................... 3
STAT 2103 Introduction to Statistics for Sciences

Minimum Required Hours

Science Education - Chemistry.................................................. 28

Required Courses..................................................................... 18
CHEM 2104 Quantitative Analysis and Lab
CHEM 3303 Organic Chemistry I
CHEM 3312 Organic Chemistry I Lab
CHEM 3323 Organic Chemistry II
CHEM 3203 Introduction to Physical Chemistry
CHEM 3403 Biochemistry I

Elective Courses........................................................................ 10
Any 3/4000 level Biology, Chemistry, Physics or Math courses

Professional Education......................................................... 31

PTE 1010 Introduction to Teacher Education
PTE 3023 Foundations of American Education/ Clinical Exp
PTE 3153 Adolescent Psychology
SPED 4123 Teaching Individuals with Disabilities
*BIO 4812 Teaching and Learning in Science Classrooms
*BIO 4853 General Methods of Teaching Science & Lab
^PTE 4172 Educational Assessment
^PTE 4533 Contemporary Learning Sciences
^PTE 4811 Contemporary Issues
^PTE 4838 Internship/Student Teaching Secondary
^PTE 4853 Classroom Management & Instruction

^ Admission to Teacher Education required
#To be taken the same semester

Minimum Hours required .................................................. 128*

*Total hours required for this major may exceed the minimum 124 credit hour institutional requirement and will vary according to course selection. It is recommended students complete high school algebra II, trigonometry, and two years of a second language in high school.

- CONTINUED ON NEXT PAGE -
Program: Science Education - continued
Major: Science Education - Chemistry
Degree: Bachelor of Science in Education (B.S.Ed.)

- CONTINUED FROM PREVIOUS PAGE -

Minimum Graduation Requirements

1. Overall GPA in all college course work .................. 2.50
2. Average in course work at UCO .......................... 2.00
3. Courses in English Composition, Fundamentals of Speech, Professional Education, and area of specialization (major) .... “C”
4. Proficiency in foreign language ......................... Novice 4 level

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
**Program:** Science Education  
**Major:** Science Education - General Science  
**Degree:** Bachelor of Science in Education (B.S.Ed.)

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**University Core (Total Listed 42-44)**

Specific courses within the University Core are listed on pages 95-96.  
• Courses from the major may apply to the areas marked in the University Core.

**• Written and Oral Communication** .............................................. 9

**Quantitative Reasoning/Scientific Method** .............................. 10-11  
• Math ............................................................... 3
• Life Science ....................................................... 4
• Physical Science ............................................... 3-4

**Critical Inquiry and Aesthetic Analysis** ................................. 6  
Aesthetic Analysis .................................................... 3
Critical Inquiry ........................................................ 3

**Support Courses**

<table>
<thead>
<tr>
<th>Minimum</th>
<th>Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Courses ............................................. 9-15</td>
<td></td>
</tr>
</tbody>
</table>

**MCOM 1113** Fundamentals of Speech  
**ENG 1113** English Composition  
**ENG 1213** English Composition and Research

Students majoring in the General Science Education program are encouraged to complete the following courses in high school.

Two years of high school Algebra and one year of Trigonometry **OR**  
**MATH 1513** College Algebra **AND**  
**MATH 1593** Plane Trigonometry

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**Major Requirements**

**Science Education - General Science** .................................. 64

**Science Education Core** ................................................. 34

**Biology** ................................................................. 9  
Required courses:  
**BIO 1204** Biology for Majors: Principles  
**BIO 1225** Biology for Majors: Diversity

**Chemistry** .............................................................. 10  
Required courses:  
**CHEM 1103** General Chemistry I **AND**  
**CHEM 1112** General Chemistry I Recitation/Lab  
**CHEM 1223** General Chemistry II **AND**  
**CHEM 1232** General Chemistry II Recitation/Lab

**Physics** ................................................................. 8  
Required courses:  
**PHY 1114** General Physics I and Lab **OR**  
**PHY 2014** Physics for Science and Engineering I and Lab  
**PHY 1214** General Physics II and Lab **OR**  
**PHY 2114** Physics for Science and Engineering II and Lab

**Mathematics** ........................................................... 3  
Required course:  
**STAT 2103** Introduction to Statistics for Sciences

**Earth Science** .......................................................... 4  
Required course:  
**PHY 3014** Earth Science

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**American Historical and Political Analysis** ............................ 6  
American National Government ............................................. 3
American History ......................................................... 3

**Cultural and Language Analysis** ...................................... 3-4  
Second Language .................................................................. 4
OR  
Cultural Analysis .......................................................... 3

**Social and Behavioral Analysis** ....................................... 3

**Life Skills** .............................................................. 5  
Required Health Course .................................................. 2
Elective Life Skills ......................................................... 3

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**Science Education - General Science** .................................. 30  
Required courses:  
**BIO 2203** Cell Biology  
**BIO 2211** Cell Biology Laboratory  
**BIO 3054** Microbiology for Majors and Lab  
**BIO 3303** Genetics  
**BIO 3543** General Ecology  
**BIO 3703** Evolution  
**CHEM 2104** Quantitative Analysis and Lab  
**CHEM 3303** Organic Chemistry I **OR**

**CHEM 3013** Organic Chemistry for Life Sciences  
**CHEM 3312** Organic Chemistry I Lab **OR**

**CHEM 3022** Organic Chemistry for Life Sciences Laboratory  
**PHY 1304** Descriptive Astronomy

**Professional Education** ................................................. 31  
**PTE 1010** Introduction to Teacher Education  
**PTE 3023** Foundations of American Education/Clinical Exp  
**PTE 3153** Adolescent Psychology  
**SPED 4123** Teaching Individuals with Disabilities  
**^BIO 4812** Teaching and Learning in Science Classrooms  
**^BIO 4853** General Methods of Teaching Science and Lab  
**^PTE 4172** Educational Assessment  
**^PTE 4533** Contemporary Learning Sciences  
**^PTE 4811** Contemporary Issues  
**^PTE 4838** Internship/Student Teaching Secondary  
**^PTE 4853** Classroom Management & Instruction

^ Admission to Teacher Education required  
#To be taken the same semester
Minimum Hours required ..................... 127*

*Total hours required for this major may exceed the minimum 124 credit hour institutional requirement and will vary according to course selection. It is recommended students complete high school algebra II, trigonometry, and two years of a second language in high school.

Minimum Graduation Requirements
1. Overall GPA in all college course work .................................. 2.50
2. Average in course work at UCO .............................................. 2.00
3. Courses in English Composition, Fundamentals of Speech, Professional Education, and area of specialization (major)........ “C”
4. Proficiency in foreign language ......................... Novice 4 level

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
Program: Science Education  
Major: Science Education - Physical Science  
Degree: Bachelor of Science in Education (B.S.Ed.)

#### University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.
- Courses from the major may apply to the areas marked in the University Core.
- Written and Oral Communication .................................................. 9
- Quantitative Reasoning/Scientific Method ................................. 10-11
  - Math .................................................................................. 3
  - Life Science ........................................................................ 4
  - Physical Science ................................................................. 3-4
- Critical Inquiry and Aesthetic Analysis ..................................... 6
  - Aesthetic Analysis .................................................................. 3
  - Critical Inquiry ...................................................................... 3

<table>
<thead>
<tr>
<th>Minimum Required Hours</th>
<th>Support Courses</th>
<th>Minimum Required Hours</th>
</tr>
</thead>
</table>
| Department: Engineering and Physics  
Major: Mathematics and Science  
Major Code: 6043 |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>STAT 2103</td>
<td>Introduction to Statistics for Sciences</td>
</tr>
</tbody>
</table>

#### Science Education - Physical Science .............. 65

### Science Education Core ......................................................... 37

- Biology .................................................................................... 9
  - Required courses:
    - BIO 1204 Biology for Majors: Principles
    - BIO 1225 Biology for Majors: Diversity
- Chemistry ................................................................................. 10
  - Required courses:
    - CHEM 1103 General Chemistry I AND
    - CHEM 1112 General Chemistry I Recitation/Lab
    - CHEM 1223 General Chemistry II AND
    - CHEM 1232 General Chemistry II Recitation/Lab
  - * Physics .................................................................................. 8
  - Required courses:
    - PHY 1114 General Physics I and Lab OR
    - PHY 2014 Physics for Science and Engineering I and Lab
    - PHY 1214 General Physics II and Lab OR
    - PHY 2114 Physics for Science and Engineering II and Lab

- Earth Science ........................................................................... 4
  - Required course:
    - PHY 3014 Earth Science

- Mathematics ............................................................................. 3
  - Required course:
    - STAT 2103 Introduction to Statistics for Sciences

- American Historical and Political Analysis ......................... 6
- American National Government ............................................. 3
- American History ................................................................. 3

### Cultural and Language Analysis ........................................... 3-4

- Second Language ..................................................................... 4
  - OR
- Cultural Analysis ..................................................................... 3

### Social and Behavioral Analysis ........................................... 3

### Life Skills .............................................................................. 5

- Required Health Course ......................................................... 2
- Elective Life Skills .................................................................. 3

**Computer Science ................................................................. 3**
- Required course:
  - CMSC 1513 Beginning Programming

#### Science Education - Physical Science ......................... 28

<table>
<thead>
<tr>
<th>Required course</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 2104</td>
</tr>
<tr>
<td>CHEM 3303</td>
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<tr>
<td>CHEM 3312</td>
</tr>
<tr>
<td>CHEM 3403</td>
</tr>
<tr>
<td>CHEM 3442</td>
</tr>
<tr>
<td>PHY 1304</td>
</tr>
<tr>
<td>ENGR 1112</td>
</tr>
</tbody>
</table>

- Elective Science ................................................................. 8
- Select from the following:
  - CHEM 3323 | Organic Chemistry II |
  - CHEM 3332 | Organic Chemistry II Laboratory |
  - CHEM 3203 | Introductory Physical Chemistry |
  - ENGR 2303 | Electrical Science |
  - ENGR 2311 | Electrical Science Lab |
  - ENGR 3403 | Analog Electronics |
  - ENGR 3421 | Analog Electronics Laboratory |
  - PHY 4910 | Seminar in Physics (1 - 3 hours) |

* Students choosing to take PHY 1114 and PHY 1214 Gen Physics I & II can only take CHEM courses within the Elective Science due to prerequisites. To take Engineering courses, students must take PHY 2014 Physics for Science and Engineering I and Lab and PHY 2114 Physics for Science and Engineering II and Lab. PHY 2014 and 2114 have MATH 2313, 2323 and 2333 as prerequisites.

#### Professional Education ....................................................... 31

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>PTE 1010</td>
<td>Introduction to Teacher Education</td>
</tr>
<tr>
<td>PTE 3023</td>
<td>Foundations of American Education/Clinical Exp</td>
</tr>
<tr>
<td>PTE 3153</td>
<td>Adolescent Psychology</td>
</tr>
<tr>
<td>SPED 4123</td>
<td>Teaching Individuals with Disabilities</td>
</tr>
<tr>
<td>*BIO 4812</td>
<td>Teaching and Learning in Science Classrooms</td>
</tr>
<tr>
<td>*BIO 4853</td>
<td>General Methods of Teaching Science and Lab</td>
</tr>
<tr>
<td>*PTE 4172</td>
<td>Educational Assessment</td>
</tr>
</tbody>
</table>

- CONTINUED ON NEXT PAGE -
Program: Science Education - continued
Major: Science Education - Physical Science
Degree: Bachelor of Science in Education (B.S.Ed.)

- CONTINUED FROM PREVIOUS PAGE -

^PTE  4533  Contemporary Learning Sciences
^#PTE  4811  Contemporary Issues
^#PTE  4838  Internship/Student Teaching Secondary
^#PTE  4853  Classroom Management & Instruction

^ Admission to Teacher Education required
#To be taken the same semester

Minimum Hours required ................. 128*

*Total hours required for this major may exceed the minimum 124 credit hour institutional requirement and will vary according to course selection. It is recommended students complete high school algebra II, trigonometry, and two years of a second language in high school.

Minimum Graduation Requirements
1. Overall GPA in all college course work ......................... 2.50
2. Average in course work at UCO ................................. 2.00
3. Courses in English Composition, Fundamentals of Speech, Professional Education, and area of specialization (major)....... “C”
4. Proficiency in foreign language ......................... Novice 4 level

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
University Core (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.

- Courses from the major may apply to the areas marked in the University Core.

- Written and Oral Communication ......................................................... 9
- Quantitative Reasoning/Scientific Method ................................................ 10-11
  - Math ................................................................................................. 3
  - Life Science ..................................................................................... 4
  - Physical Science ............................................................................... 3-4

Critical Inquiry and Aesthetic Analysis ...................................................... 6
  Aesthetic Analysis ................................................................................... 3
  Critical Inquiry ...................................................................................... 3

Minimum Required Hours

<table>
<thead>
<tr>
<th>Support Courses</th>
<th>Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCOM 1113</td>
<td>3</td>
</tr>
<tr>
<td>ENG 1113</td>
<td>3</td>
</tr>
<tr>
<td>ENG 1213</td>
<td>3</td>
</tr>
<tr>
<td>MATH 1533</td>
<td>3</td>
</tr>
<tr>
<td>MATH 1513</td>
<td>3</td>
</tr>
<tr>
<td>MATH 1593</td>
<td>3</td>
</tr>
</tbody>
</table>

* A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Major Requirements

Science Education - Physics ......................................................... 62

Science Education Core ................................................................. 34

- Biology .............................................................................................. 9
  - Required courses:
    - BIO 1204 | Biology for Majors: Principles |
    - BIO 1225 | Biology for Majors: Diversity |
  - Chemistry ......................................................................................... 10
    - Required courses:
      - CHEM 1103 | General Chemistry I AND |
      - CHEM 1112 | General Chemistry I Recitation/Lab |
      - CHEM 1223 | General Chemistry II AND |
      - CHEM 1232 | General Chemistry II Recitation/Lab |
  - Physics ............................................................................................. 8
    - Required courses:
      - PHY 2014 | Physics for Science and Engineering I and Lab |
      - PHY 2114 | Physics for Science and Engineering II and Lab |
  - Earth Science ................................................................................... 4
    - Required course:
      - PHY 3014 | Earth Science |
  - Computer Science ............................................................................... 3
    - Required course:
      - CMSC 1513 | Beginning Programming |

American Historical and Political Analysis ........................................ 6
  - American National Government ....................................................... 3
  - American History .............................................................................. 3

Cultural and Language Analysis ....................................................... 3-4
  - Second Language ............................................................................... 4
  - OR
  - Cultural Analysis ............................................................................... 3

Social and Behavioral Analysis .......................................................... 3
  - Life Skills ......................................................................................... 5
    - Required Health Course ................................................................. 2
    - Elective Life Skills .......................................................................... 3

Minimum Required Hours

<table>
<thead>
<tr>
<th>Science Education - Physics</th>
<th>Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math Courses</td>
<td>15</td>
</tr>
<tr>
<td>MATH 2313</td>
<td>Calculus 1</td>
</tr>
<tr>
<td>MATH 2323</td>
<td>Calculus 2</td>
</tr>
<tr>
<td>MATH 2333</td>
<td>Calculus 3</td>
</tr>
<tr>
<td>MATH 2343</td>
<td>Calculus 4</td>
</tr>
<tr>
<td>MATH 3103</td>
<td>Differential Equations</td>
</tr>
</tbody>
</table>

Physics and Engineering Courses ...................................................... 13

- ENGR 2033 | Statics |
| ENGR 2043 | Dynamics |
| ENGR 3303 | Engineering Probability and Statistics |
| ENGR 2303 | Electrical Science |
| ENGR 2311 | Electrical Science Lab |

Professional Education ................................................................. 31

- PTE 1010 | Introduction to Teacher Education |
| PTE 3023 | Foundations of American Education/Clinical Exp |
| PTE 3153 | Adolescent Psychology |
| SPED 4123 | Teaching Individuals with Disabilities |
| BIO 4812 | Teaching and Learning in Science Classrooms |
| BIO 4853 | General Methods of Teaching Science and Lab |
| PTE 4172 | Educational Assessment |
| PTE 4533 | Contemporary Learning Sciences |
| PTE 4811 | Contemporary Issues |
| PTE 4838 | Internship/Student Teaching Secondary |
| PTE 4853 | Classroom Management & Instruction |

^ Admission to Teacher Education required
# To be taken the same semester

Minimum Hours required ............................................................... 125*

*Total hours required for this major may exceed the minimum 124 credit hour institutional requirement and will vary according to course selection. It is recommended students complete high school algebra II, trigonometry, and two years of a second language in high school.

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**Minimum Graduation Requirements**

1. Overall GPA in all college course work ........................................ 2.50
2. Average in course work at UCO ...................................................... 2.00
3. Courses in English Composition, Fundamentals of Speech, Professional Education, and area of specialization (major)....... “C”
4. Proficiency in foreign language ............................... Novice 4 level

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
Program: Software Engineering  
Major: Software Engineering  
Degree: Bachelor of Science (B.S.)

Department: Computer Science  
College: Mathematics and Science  
Major Code: 6110

University of Central Oklahoma Undergraduate Catalog 2019-2020

Minimum Required Hours

University Core  (Total Listed 42-44)

Specific courses within the University Core are listed on pages 95-96.
• Courses from the major may apply to the areas marked in the University Core.

Written and Oral Communication .......................................................... 9
Quantitative Reasoning/Scientific Method ............................................. 10-11
• Math ........................................................................... 3
Life Science ........................................................................ 4
• Physical Science ................................................................ 3-4
Critical Inquiry and Aesthetic Analysis ................................................... 6
Aesthetic Analysis ........................................................................ 3
Critical Inquiry ........................................................................... 3

Support Courses

Support Courses ......................................................... 0-9

Students majoring in Software Engineering are encouraged to complete the following courses in high school.

Advanced Placement High School Programming Course OR
CMSC 1513 Beginning Programming

*MATH 1533 Precalculus-Algebra OR
MATH 1513 College Algebra OR Placement Score AND
*MATH 1593 Plane Trigonometry OR Placement Score

*A grade of ‘C’ or better is required for either MATH 1513 or MATH 1533 and MATH 1593 to take MATH 2313.

Upon completion of the above courses, corresponding university core requirements will be satisfied. (These courses are required for this major regardless of previous degrees conferred.)

Major Requirements

Software Engineering  ..................... 77-80

Required ................................................. 54

^CMSC 1613 Programming I
^CMSC 1621 Programming I Laboratory
^CMSC 2123 Discrete Structures
^CMSC 2613 Programming II
^CMSC 2621 Programming II Laboratory
^CMSC 2833 Computer Organization I
^SE 3103 Object Oriented Software Design and Construction
^CMSC 3613 Data Structures and Algorithms
^CMSC 4003 Applications of Database Management Systems
^SE 4283 Software Engineering I
^CMSC 4323 Computer and Network Security
^CMSC 4401 Ethics in Computing
^SE 4423 Software Engineering II
^SE 4433 Software Architecture and Design
^SE 4513 Software Engineering Senior Project *
^MATH 2313 Calculus 1
^MATH 2323 Calculus 2
^MATH 2333 Calculus 3

American Historical and Political Analysis .................................... 6
American National Government .................................................. 3
American History ................................................................. 3

Cultural and Language Analysis .................................................. 3-4
Second Language .................................................................. 4
OR
Cultural Analysis ................................................................. 3

Social and Behavioral Analysis ....................................................... 3

Life Skills ............................................................................... 5
Required Health Course ....................................................... 2
Elective Life Skills ............................................................... 3

Elective Science/Math courses ..................................................... 8-11

Select a minimum of eight (8) hours including at least one of the CHEM or PHY lab courses:
CHEM 1103 General Chemistry I
CHEM 1112 General Chemistry I Recitation/Laboratory
CHEM 1223 General Chemistry II
CHEM 1232 General Chemistry II Recitation/Laboratory
PHY 1114 General Physics I and Laboratory
PHY 1214 General Physics II and Laboratory
PHY 2014 Physics for Science & Engineering I and Lab
PHY 2114 Physics for Science & Engineering II and Lab

Any non-required 2/3/4000 level MATH or STAT courses with the following exceptions: MATH 2013, 2053, 2113, 2123, 2133, 2153, 2743, 3323, or 4843.

Elective Courses ................................................................. 9

Choose nine (9) hours from one of the two application areas:
Application Development
CMSC 3413 Enterprise Programming
CMSC 4133 Concepts of Artificial Intelligence
CMSC 4303 Mobile Apps Programming
CMSC 4373 Web Server Programming

System Development
CMSC 4023 Programming Languages
CMSC 4063 Networks
CMSC 4153 Operating Systems
CMSC 4173 Translator Design
CMSC 4193 Introduction to Robotics

- CONTINUED ON NEXT PAGE -
Program: Software Engineering  
Major: Software Engineering  
Degree: Bachelor of Science (B.S.)  

Dept: Computer Science  
College: Mathematics and Science  
Major Code: 6110

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Elective CMSC or SE Courses .......................................................... 6
   Any 3/4000 level CMSC or SE courses except CMSC 4513

No more than three (3) hours of Internship and Individual Study combined may be used to satisfy the CMSC or SE elective requirement.

Credit cannot be received for both CMSC 3303 and SE 4283.

Electives to bring total to ............................................. 124

Minimum Grade Requirements
Average in (a) all college course work, (b) course work at UCO, and (c) major courses ......................................................... 2.00

For other regulations pertaining to graduation, see pages 66-67 of the 2019-2020 catalog.
College of Math and Science Minors

A minor is an optional component of a student’s degree (unless otherwise stated) that, upon graduation, will be reflected on the student’s transcript. A student may earn a minor or multiple minors in the same program, provided the minor differ at the major level. Minors may not be earned independently of a bachelor’s degree granted by the University of Central Oklahoma. Minors may not be earned as a part of an associate degree. Minors do not appear on diplomas.

Minimum Requirements for Minors

Minimums for minors unless otherwise specified:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Minimum</th>
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<tbody>
<tr>
<td>Total Hours</td>
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<tr>
<td>Upper Division Hours (3/4000 level)</td>
<td>6</td>
</tr>
<tr>
<td>Residency Hours</td>
<td>6</td>
</tr>
<tr>
<td>GPA</td>
<td>2.00</td>
</tr>
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</table>

**Biology**

Required courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>BIO 1204</td>
<td>Biology for Majors: Principles</td>
</tr>
<tr>
<td>BIO 1225</td>
<td>Biology for Majors: Diversity</td>
</tr>
<tr>
<td>BIO 2203</td>
<td>Cell Biology</td>
</tr>
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</table>

Elective Biology (upper division): 6-7

Select 2 courses from this list:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 3054</td>
<td>Microbiology for Majors</td>
</tr>
<tr>
<td>BIO 3303</td>
<td>Genetics</td>
</tr>
<tr>
<td>BIO 3543</td>
<td>General Ecology</td>
</tr>
<tr>
<td>BIO 3703</td>
<td>Evolution</td>
</tr>
</tbody>
</table>

A grade of “C” or better is required in each course.

**Chemistry**

Required courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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</thead>
<tbody>
<tr>
<td>CHEM 1103</td>
<td>General Chemistry I</td>
</tr>
<tr>
<td>CHEM 1112</td>
<td>General Chemistry I-Recitation/Lab</td>
</tr>
<tr>
<td>CHEM 1223</td>
<td>General Chemistry II</td>
</tr>
<tr>
<td>CHEM 1232</td>
<td>General Chemistry II-Recitation/Lab</td>
</tr>
<tr>
<td>CHEM 2104</td>
<td>Quantitative Analysis and Lab</td>
</tr>
</tbody>
</table>

Elective Chemistry (3/4000 level): 6

**Computer Science**

Required courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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</thead>
<tbody>
<tr>
<td>CMSC 1613</td>
<td>Programming I</td>
</tr>
<tr>
<td>CMSC 1621</td>
<td>Programming I Laboratory</td>
</tr>
<tr>
<td>CMSC 2123</td>
<td>Discrete Structures</td>
</tr>
<tr>
<td>CMSC 2613</td>
<td>Programming II</td>
</tr>
<tr>
<td>CMSC 2621</td>
<td>Programming II Laboratory</td>
</tr>
<tr>
<td>CMSC 2833</td>
<td>Computer Organization I</td>
</tr>
<tr>
<td>CMSC 3613</td>
<td>Data Structures and Algorithms</td>
</tr>
</tbody>
</table>

Elective CMSC or SE Courses (3/4000 level): 3

**Engineering Physics**

Required courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHY 2014</td>
<td>Physics for Science and Engineering I and Lab</td>
</tr>
<tr>
<td>PHY 2114</td>
<td>Physics for Science and Engineering II and Lab</td>
</tr>
<tr>
<td>PHY 3103</td>
<td>Modern Physics</td>
</tr>
<tr>
<td>ENGR 2033</td>
<td>Statics OR</td>
</tr>
<tr>
<td>ENGR 2303</td>
<td>Electrical Science AND</td>
</tr>
<tr>
<td>ENGR 2311</td>
<td>Electrical Science Lab</td>
</tr>
</tbody>
</table>

Elective Physics and Engineering: 3-4

Any 3000 or 4000 level ENGR course.

**Grief, Death, and Dying**

Required courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>FNRL 3483</td>
<td>Psychology of Grief</td>
</tr>
<tr>
<td>FNRL 3493</td>
<td>Thanatology and Unresolved Grief</td>
</tr>
<tr>
<td>FNRL 4183</td>
<td>Natural History of Bereavement</td>
</tr>
</tbody>
</table>

Elective courses: 9-10

Selected from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>FNRL 2313</td>
<td>Contemporary Funeral Service</td>
</tr>
<tr>
<td>FNRL 3304</td>
<td>Restorative Art</td>
</tr>
<tr>
<td>FNRL 3383</td>
<td>Funeral Service Statutory Law</td>
</tr>
<tr>
<td>FNRL 3393</td>
<td>Mortuary Jurisprudence</td>
</tr>
<tr>
<td>FNRL 3433</td>
<td>Introduction to Pathology</td>
</tr>
<tr>
<td>FNRL 3493</td>
<td>Funeral Service Communication</td>
</tr>
<tr>
<td>FNRL 3513</td>
<td>History of Funeral Directing</td>
</tr>
</tbody>
</table>

**Mathematics**

Required courses:

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<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 2313</td>
<td>Calculus 1</td>
</tr>
<tr>
<td>MATH 2323</td>
<td>Calculus 2</td>
</tr>
<tr>
<td>MATH 2333</td>
<td>Calculus 3</td>
</tr>
<tr>
<td>MATH 2343</td>
<td>Calculus 4</td>
</tr>
</tbody>
</table>

Elective Mathematics (3/4000 level): 6

(May include three hours from a 3000 or 4000 level statistics course.)

**Science Education**

Required courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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</thead>
<tbody>
<tr>
<td>PTE 4333</td>
<td>Meeting Secondary Students’ Needs</td>
</tr>
<tr>
<td>PTE 4433</td>
<td>Designing Instruction for Secondary Students</td>
</tr>
<tr>
<td>PTE 4543</td>
<td>Managing Secondary Classrooms</td>
</tr>
<tr>
<td>PTE 4623</td>
<td>Secondary Class Assessment</td>
</tr>
<tr>
<td>BIO 4812</td>
<td>Teaching and Learning in Science Classrooms</td>
</tr>
<tr>
<td>BIO 4853</td>
<td>General Methods of Teaching Science and Lab</td>
</tr>
</tbody>
</table>
College of Math and Science Minors - continued

* BIO 4930 Individual Study in Biology (1 hour) OR
  PHY 4930 Individual Study in Physics (1 hour) OR
  CHEM 4930 Individual Study in Chemistry (1 hour)
* Students will take the Individual Study from the Science Education coordinator within their content area.

A grade of “C” or better is required in each course.

Statistics

Statistics ................................................................................................................. 18
Minor Code: 6178

Any 18 hours of Statistics (6 hours at 3/4000 level)
Certificate

Funeral Service Certificate

UCO Code:  6121

I. General Courses ........................................................................... 27
The following courses:
HLTH 1112  Healthy Life Skills
ENG 1113  English Composition
ENG 1213  English Composition and Research
MCOM 1113  Fundamentals of Speech
BIO 1114  General Biology OR
    BIO 1214  General Biology and Lab
CHEM 1014  Introduction to Chemistry and Lab
PSY 1103  General Psychology
MATH 1513  College Algebra OR
    higher level math
* FNRL 4522  Board Review

II. Basic Sciences ............................................................................ 11
The following courses:
BIO 2314  Introduction to Microbiology and Lab
FNRL 2214  Intro Human Anatomy and Dissection
FNRL 3433  Introduction to Pathology

III. Mortuary Arts and Sciences ..................................................... 20
The following courses:
FNRL 3054  Embalming Chemistry
FNRL 3204  Embalming
FNRL 3304  Restorative Art
* FNRL 4118  Practicum in Embalming and Funeral Directing

IV. Mortuary Administration ............................................................ 30
The following courses:
FNRL 1211  Orientation to Funeral Service
FNRL 2313  Contemporary Funeral Service
FNRL 2413  Funeral Home Administration
FNRL 3374  Funeral Home Management I
FNRL 3383  Funeral Home Statutory Law
FNRL 3393  Mortuary Jurisprudence
FNRL 3493  Funeral Service Communication
FNRL 3513  History of Funeral Directing
FNRL 4214  Funeral Home Management II
FNRL 3483  Psychology of Grief

* Must be taken concurrently during a student’s final semester.

Total hours required ................................................................. 88

The above course work meets licensing examination requirements in many states. Additional college hours of credit are required for Oklahoma funeral directing and embalming licensure. Students should check with their home state for specific requirements. A minimum grade point average of 2.00 must be earned in all work applicable to the program. A minimum grade of “C” must be earned in all Funeral Service major courses. Students must have completed a minimum of 30 semester hours credit in residence at the University of Central Oklahoma including 15 hours in residence at UCO of the final 30 hours applied toward the certificate program.

National Board Examination scores, graduation rates, and employment rates for this and other ABFSE-accredited programs are available at www.abfse.org. To request a printed copy of this program’s scores and rates, go to: UCO Department of Funeral Service, CHS 154, 100 North University Drive, Edmond, OK 73034 or by e-mail at funeralservice@uco.edu, or by telephone, (405) 974-5001.

The Department of Funeral Service has as its central aim recognition of the importance of funeral service education personnel as:
1. Members of a human services profession.
2. Members of the community in which they serve.
3. Participants in the relationship between bereaved families and those engaged in the funeral service profession.
4. Professionals knowledgeable of and compliant with federal, state, provincial/territorial, and local regulatory guidelines (in the geographic area where they practice).
5. Professionals sensitive to the responsibility for public health, safety, and welfare in caring for human remains.

Department of Funeral Service Objectives
1. To enlarge the background and knowledge of students about the funeral service profession.
2. To educate students in every phase of funeral service and to help enable them to develop proficiency and skills necessary for the profession, as defined in the Preamble above.
3. To educate students concerning the responsibilities of the funeral service profession to the community at large.
4. To emphasize high standards of ethical conduct.
5. To provide a curriculum at the post-secondary level of instruction.
6. To encourage student and faculty research in the field of funeral service.

Admission to this program has special requirements. See page 54 of the 2019-2020 catalog for selective admission criteria.