

School of

# MATHEMATICS AND NATURAL SCIENCES

## MAJORS

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- Chemistry (ACS-Certified Chemistry) BS
- Chemistry (Biochemistry) BS
- Chemistry (Chemistry Education) BS
- Mathematics (Mathematics Education) BS
- Mathematics BS
- Physics (Physics Education) BS
- Physics BS

## MINORS


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- Chemistry Minor
- Mathematics Minor
- Physics Minor

## CONTACT US

 6601.266.4934

 [usm.edu/mathematics-natural-sciences](https://usm.edu/mathematics-natural-sciences)

 @usmartsandsciences





Post-secondary students in the State of Mississippi often choose to attend a Mississippi community college (MS CC) and earn an associate degree before transferring to The University of Southern Mississippi to complete their bachelor's degree. To make this transition as smooth as possible and to ensure no credits are lost, we have created this transfer guide. In most, but not all, cases, students may complete a bachelor's degree in what we refer to as a '2+2' format:

2 years at a MS CC for an associate degree, which includes general education coursework  
 +  
 2 years at USM to complete the bachelor's degree

Please use the key below to determine which courses you must, should, or could take at a Mississippi community college before transferring to Southern Miss.

**KEY**



 <b>MUST</b>	Students who do not complete these requirements at a MS CC cannot complete their bachelor's degree in the 2+2 format.
 <b>SHOULD</b>	Students should complete these requirements at a MS CC in order to have the smoothest transition to Southern Miss. It may still be possible to complete a bachelor's degree in the 2+2 format without taking these courses, but it will be challenging.
 <b>COULD</b>	Students could complete these requirements at a MS CC if they desire. Not taking these courses prior to transferring will not affect a student's ability to complete their bachelor's degree in the 2+2 format.
 <b>CALCULUS READINESS</b>	Calculus is required on this degree plan. Students should arrive at Southern Miss ready to take Calculus I, which means they must have completed Trigonometry or have a Math ACT subscore $\geq 26$ . Students may complete Calculus I prior to transferring if they desire.



**NOTE:** *This document is intended as a guide; it does not guarantee graduation in the 2+2 format. Degree requirements are subject to change. Please consult the school of your desired major for up-to-date requirements.*

Additional majors are available from the other Southern Miss colleges.

**College of Education & Human Sciences**

Hattiesburg 601.266.4568  
 Gulf Park 228.214.3340

**College of Nursing & Health Professions**

Hattiesburg 601.266.5445  
 AskCNHP@usm.edu

**College of Business & Economic Development**

Hattiesburg 601.266.4659  
 Gulf Park 228.214.3447  
 business@usm.edu





# CHEMISTRY

CHEMISTRY (ACS-CERTIFIED), CHEMISTRY EDUCATION, BIOCHEMISTRY



## PROGRAM INFO

Chemistry provides the fundamentals for a molecular understanding of materials, whether they are organic, inorganic, or biological. Chemistry's unique perspective also presents a variety of different career options to students. These include careers in medicine, government, military, as well as the pharmaceutical, textile, polymer, cosmetic, paint, food, petrochemical, and agrochemical industries.

There are five areas of chemistry:


- Analytical Chemistry - foundation for qualitative and quantitative aspects of chemical reactions
- Biochemistry - connection to living organisms
- Inorganic Chemistry - chemical aspects of all elements and their reactivities
- Organic Chemistry - foundation of life processes and chemical synthesis of new molecules
- Physical Chemistry - physical basis for molecular reactions

Chemistry Education majors also learn pedagogical skills applicable every day in their classrooms.

## CAREER OUTLOOK

According to the Bureau of Labor Statistics, employment of chemists is projected to grow 7% from 2020 to 2030. Some of the most common career paths for chemistry majors include: research and development, environmental science, healthcare, and education. Chemistry graduates often work for government agencies such as the EPA, the FDA, and the Department of Defense. A degree in chemistry also lays a foundation for further study in medical, dental, or pharmacy school.

 601.266.4716

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## RESEARCH AT USM

In addition to classroom learning, chemistry students perform cutting-edge research. USM faculty invite students to obtain valuable experience by participating in their research agendas, which helps students advance their future careers.



## SCHOLARSHIPS

There are more than a dozen program-specific scholarships available each year. Students should apply through the "Golden Opportunities" GO System.

## KNOWLEDGE & SKILLS

Coursework in Chemistry fosters an understanding of matter and its properties. Chemists are skilled in:

- Analysis
- Problem-solving
- Oral and written communication
- Collaboration
- Laboratory techniques

Chemistry has applications in many fields, including medicine, engineering, environmental science, and material science. Studying chemistry creates a solid foundation in these interdisciplinary areas and prepares students for a wide range of experiences after graduation.

# CHEMISTRY BS (Page 1/2) **2+2**

[usm.edu/admissions/apply](https://usm.edu/admissions/apply)

(ACS Certified, Biochemistry, or Chemistry Education)

Complete all requirements for a MS community college associate degree, including general education coursework, and...



- \* MUST** Take Chemistry I & II and Organic Chemistry I & II to ensure Junior standing after transfer.
- fx CALCULUS READINESS** Pass MAT 1323 Trigonometry (MAT 103 at Southern Miss) or have a Math ACT subscore  $\geq 26$ .
- 👍 SHOULD** Take the emphasis-specific courses on page two if selecting an emphasis area.
- 💡 COULD** Take Calculus I & II. Complete a Physics I & II sequence either with or without calculus.

## CHECKLIST

## COURSES

Updated August 2023

	Courses at Community College	Equivalent Courses at Southern Miss
<input type="checkbox"/>	<b>* CHE 1213 and CHE 1211</b> (or CHE 1214)	<b>CHE 106/L</b> General Chemistry I Lecture and Laboratory
<input type="checkbox"/>	<b>* CHE 1223 and CHE 1221</b> (or CHE 1224)	<b>CHE 107/L</b> General Chemistry II Lecture and Laboratory
<input type="checkbox"/>	<b>* CHE 2423 and CHE 2421</b> (or CHE 2424)	<b>CHE 255/L</b> Organic Chemistry I Lecture and Laboratory
<input type="checkbox"/>	<b>* CHE 2433 and CHE 2431</b> (or CHE 2434)	<b>CHE 256/L</b> Organic Chemistry II Lecture and Laboratory
<input type="checkbox"/>	<b>💡 MAT 1613 or MAT 1815</b>	<b>MAT 167</b> Calculus I
<input type="checkbox"/>	<b>💡 MAT 1623 or MAT 1825</b>	<b>MAT 168</b> Calculus II
<input type="checkbox"/>	<b>💡 PHYSICS I &amp; II</b> (Select 1 sequence) Algebra & Trigonometry-based <b>PHY 2413 and PHY 2411</b> (or <b>PHY 2414</b> ) and <b>PHY 2423 and PHY 2421</b> (or <b>PHY 2424</b> ) or Calculus-based <b>PHY 2513 and PHY 2511</b> (or <b>PHY 2514</b> ) and <b>PHY 2523 and PHY 2521</b> (or <b>PHY 2524</b> )	<b>PHY 111/L</b> General Physics I Lecture and Laboratory  <b>PHY 112/L</b> General Physics II Lecture and Laboratory  <b>PHY 201/L</b> General Physics I w/ Calculus Lecture and Lab  <b>PHY 202/L</b> General Physics II w/ Calculus Lecture and Lab



**NOTE:** This document is intended as a guide. Please contact the School of Mathematics and Natural Sciences at 601.266.4934 or [Theofanis.Kitsopoulos@usm.edu](mailto:Theofanis.Kitsopoulos@usm.edu) to check on current degree requirements.



# CHEMISTRY BS (Page 2/2) **2+2**

(ACS Certified, Biochemistry, or Chemistry Education)

Complete all requirements for a MS community college associate degree, including general education coursework, and...



**\* MUST**

Take Chemistry I & II and Organic Chemistry I & II to ensure Junior standing after transfer.

**fx CALCULUS READINESS**

Pass MAT 1323 Trigonometry (MAT 103 at Southern Miss) or have a Math ACT subscore  $\geq 26$ .

**👍 SHOULD**

Take the emphasis-specific courses below if selecting an emphasis area.

**💡 COULD**

Take Calculus I & II. Complete a Physics I & II sequence either with or without calculus.

## CHECKLIST

## COURSES

Updated August 2023

	Courses at Community College	Equivalent Courses at Southern Miss
<input type="checkbox"/>	<b>BIOCHEMISTRY</b>	
<input type="checkbox"/>	👍 <b>BIO 1133 and BIO 1131</b> (or <b>BIO 1134</b> )	<b>BSC 110/L</b> Principles of Biological Science I Lecture and Lab
<input type="checkbox"/>	👍 <b>BIO 1143 and BIO 1141</b> (or <b>BIO 1144</b> )	<b>BSC 111/L</b> Principles of Biological Science II Lecture and Lab
<input type="checkbox"/>	👍 <b>BIO 2923 and BIO 2921</b> (or <b>BIO 2924</b> )	<b>BSC 282/L</b> General Microbiology Lecture and Laboratory
<input type="checkbox"/>	<b>CHEMISTRY EDUCATION</b>	
<input type="checkbox"/>	👍 <b>BIO 1133 and BIO 1131</b> (or <b>BIO 1134</b> )	<b>BSC 110/L</b> Principles of Biological Science I Lecture and Lab
<input type="checkbox"/>	👍 <b>BIO 1143 and BIO 1141</b> (or <b>BIO 1144</b> )	<b>BSC 111/L</b> Principles of Biological Science II Lecture and Lab
<input type="checkbox"/>	👍 <b>HIS 1113 or HIS 1163</b>	<b>HIS 101</b> World Civilizations: Beginnings to 1500 C.E.
<input type="checkbox"/>	👍 <b>HIS 1123 or HIS 1173</b>	<b>HIS 102</b> World Civilizations: 1500 to the Present
<input type="checkbox"/>	👍 <b>PSY 1513</b> General Psychology	<b>PSY 110</b> General Psychology



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# MATHEMATICS

MATHEMATICS, MATHEMATICS EDUCATION



## PROGRAM INFO

The Bachelor of Science in Mathematics is based on a flexible curriculum so that students may tailor their degree to fit specific educational and career objectives. The BS in Mathematics lays a sound foundation for a broad range of careers in education, industry, business, and government.

## CAREER OUTLOOK

Mathematical modeling and logic prepare graduates for a wide variety of fields from aircraft design to the spread of viruses, law, medicine, digital manufacturing, and robotics. Plus, there's always a need for quality mathematics teachers!

Many of today's challenging careers call for continuing education beyond the bachelor's degree, and an undergraduate major in mathematics provides a versatile avenue of preparation for advanced studies in many fields, including mathematics, computer science, statistics, management science, actuarial science, mathematics education, engineering, and public health (4+1 accelerated Public Health MPH program available in partnership with the School of Health Professions).



### SCHOLARSHIPS

Mathematics Undergraduate Research Scholarships are provided by the Wright W. and Annie Rea Cross Endowment with a stipend of up to \$2,000 for each year.

There is over \$30,000 in student support available through about 20 scholarships.

## RESEARCH AT USM

The Wright W. and Annie Rae Cross Endowment for Undergraduate Research in Mathematics supports undergraduate research with scholarships, travel support, equipment support and more. Qualified students complete assigned or self-generated projects with a faculty research mentor. Recent project topics include data analysis of successful college student characteristics, analyzing on-line gaming revenues with probability theory, using celestial mechanics to find special orbits for certain objects, and investigating the Allee Effects due to hunting cooperation in food chain models with mathematical biology.

## KNOWLEDGE & SKILLS

Every mathematical topic is alluring as well as the foundation for practical work.

- Calculus provides the foundation for modern science and engineering.
- Probability and Statistics are the pillars that support Data Analysis.
- Numerical Analysis uses state of the art technology and algorithms to analyze complex models.
- Proofs teach us to be highly precise when analyzing a subject.
- Pedagogical skills are applicable every day in the classroom.
- Digital manufacturing applies to and enhances all the skills above.

601.266.4934

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# MATHEMATICS BS AND **2+2** MATHEMATICS (MATHEMATICS EDUCATION) BS

Complete all requirements for a MS community college associate degree, including general education coursework, and...












-  **MUST** Take Calculus I and II.
-  **SHOULD** Take additional calculus courses.  
Take World Civilizations and General Psychology (math ed. majors).
-  **COULD** Take Differential Equations.  
Select 1 CSC course (non-education majors).

Updated March 2024

## CHECKLIST

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## COURSES

Courses at Community College	Equivalent Courses at Southern Miss
 <b>MAT 1613</b> or <b>MAT 1815</b>	<b>MAT 167</b> Calculus I
 <b>MAT 1623</b> or <b>MAT 1825</b>	<b>MAT 168</b> Calculus II
 <b>MAT 2613</b>	<b>MAT 169</b> Calculus III
 <b>MAT 2623</b>	<b>MAT 280</b> Calculus IV
 <b>MAT 2913</b>	<b>MAT 285</b> Introduction to Differential Equations I
 <b>COMPUTER SCIENCE</b> (non-education majors only, select 1)  <b>CSC 1213</b> Visual Basic Computer Programming I <b>CSC 1613</b> Computer Programming I <b>CSC 2134</b> Programming I with C++	<b>CSC 101/L</b> Computer Science I
<b>LICENSURE REQUIREMENTS</b> (education majors only, may duplicate general education coursework)  <b>HIS 1113</b> or <b>HIS 1163</b>  <b>HIS 1123</b> or <b>HIS 1173</b>  <b>PSY 1513</b> General Psychology	<b>HIS 101</b> World Civilizations: Beginnings to 1500 C.E. <b>HIS 102</b> World Civilizations: 1500 to the Present <b>PSY 110</b> General Psychology



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# PHYSICS

PHYSICS, PHYSICS EDUCATION



## PROGRAM INFO

All natural laws are laws of physics, making physics the most fundamental of the natural sciences. By studying how these laws can be applied to produce new insights, physics majors become universal problem solvers. Our program boasts small classes and dedicated faculty.

## CAREER OUTLOOK

The physics program prepares students for technical positions in the industrial and governmental sectors or graduate study in physics. We train our students to think critically and solve complex problems, making them ideal candidates for research positions in academic, government, and private sector institutions. Common career paths include computer hardware & software, engineering, data science, education, and medicine.

## RESEARCH AT USM

Current faculty research areas include computer simulations of solid-state and polymer systems, nuclear theory, experimental atomic and molecular physics, optics, and computational ocean acoustics. Each student participates in a research project with faculty as part of the curriculum.

- 601.266.5368
- [usm.edu/mathematics-natural-sciences](http://usm.edu/mathematics-natural-sciences)
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## KNOWLEDGE & SKILLS

Fundamental areas of physics:

- **Mechanics:** The study of forces, particles, and their interactions. The foundation for phenomena such as stability of buildings and jet propulsion.
- **Electrodynamics:** The study of electromagnetic fields. The foundation for wireless communication.
- **Quantum mechanics:** The study of the amazing world at the nanoscale and beyond. The final frontier for computer design and approaches to computing.
- **Relativity:** The study of gravity and particles at high speeds. The new frontier for study of the early universe.

Skills learned by physics students:

- Analytical and problem-solving skills
- Mathematical proficiency
- Critical thinking
- Experimental and laboratory techniques
- Data analysis and modeling
- Computational skills
- Communication
- Research
- Ethical and professional responsibility



## SCHOLARSHIPS

There are more than 10 program-specific scholarships awarded annually.



# PHYSICS BS AND 2+2 PHYSICS (PHYSICS EDUCATION) BS

(Page 1/2)



Complete all requirements for a MS community college associate degree, including general education coursework, and...

- \* **MUST** Take Physics I and II with Calculus. Calculus I and II to prepare for theoretical Physics courses.
- 👍 **SHOULD** Take chemistry and additional calculus courses. *Physics education emphasis only:* Take additional lab sciences on page two, World Civilizations, and General Psychology courses.
- 💡 **COULD** *Physics non-education majors only:* Take Differential Equations and computer science.

## CHECKLIST

## COURSES

Updated August 2023

	Courses at Community College	Equivalent Courses at Southern Miss
<input type="checkbox"/>	<span style="background-color: #FFD700; border-radius: 50%; padding: 2px;">*</span> <b>PHY 2513 and PHY 2511</b> (or <b>PHY 2514</b> )	<b>PHY 201/L</b> General Physics I <u>w/ Calculus</u> Lecture and Lab
<input type="checkbox"/>	<span style="background-color: #FFD700; border-radius: 50%; padding: 2px;">*</span> <b>PHY 2523 and PHY 2521</b> (or <b>PHY 2524</b> )	<b>PHY 202/L</b> General Physics II <u>w/ Calculus</u> Lecture and Lab
<input type="checkbox"/>	<span style="background-color: #FFD700; border-radius: 50%; padding: 2px;">*</span> <b>MAT 1613 or MAT 1815</b>	<b>MAT 167</b> Calculus I
<input type="checkbox"/>	<span style="background-color: #FFD700; border-radius: 50%; padding: 2px;">*</span> <b>MAT 1623 or MAT 1825</b>	<b>MAT 168</b> Calculus II
<input type="checkbox"/>	<span style="background-color: #FFD700; border-radius: 50%; padding: 2px;">👍</span> <b>MAT 2613</b>	<b>MAT 169</b> Calculus III
<input type="checkbox"/>	<span style="background-color: #FFD700; border-radius: 50%; padding: 2px;">👍</span> <b>MAT 2623</b>	<b>MAT 280</b> Calculus IV
<input type="checkbox"/>	<span style="background-color: #FFD700; border-radius: 50%; padding: 2px;">👍</span> <b>CHE 1213 and CHE 1211</b> (or <b>CHE 1214</b> )	<b>CHE 106/L</b> General Chemistry I Lecture and Laboratory
<input type="checkbox"/>	<span style="background-color: #FFD700; border-radius: 50%; padding: 2px;">👍</span> <b>CHE 1223 and CHE 1221</b> (or <b>CHE 1224</b> )	<b>CHE 107/L</b> General Chemistry II Lecture and Laboratory



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# PHYSICS BS AND PHYSICS (PHYSICS EDUCATION) BS

(Page 2/2)

2+2

Complete all requirements for a MS community college associate degree, including general education coursework, and...



-  **MUST** Take Physics I and II with Calculus. Calculus I and II to prepare for theoretical Physics courses.
-  **SHOULD** Take chemistry and additional calculus courses. *Physics education emphasis only:* Take additional lab sciences below, World Civilizations, and General Psychology courses.
-  **COULD** *Physics non-education majors only:* Take Differential Equations and computer science.

## CHECKLIST










## COURSES

Updated August 2023

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### Courses at Community College

### Equivalent Courses at Southern Miss

<p><b>PHYSICS EDUCATION</b> (education emphasis only)</p> <ul style="list-style-type: none"> <li> <b>BIO 1133 and BIO 1131</b> (or <b>BIO 1134</b>)</li> <li> <b>BIO 1143 and BIO 1141</b> (or <b>BIO 1144</b>)</li> <li> <b>PHY 1113 and PHY 1111</b> (or <b>PHY 1114</b>)</li> <li> <b>GLY 1113 and GLY 1111</b> (or <b>GLY 1114</b>)</li> <li> <b>HIS 1113 or HIS 1163</b></li> <li> <b>HIS 1123 or HIS 1173</b></li> <li> <b>PSY 1513</b> General Psychology</li> </ul>	<p><b>BSC 110/L</b> Principles of Biological Science I Lecture and Lab</p> <p><b>BSC 111/L</b> Principles of Biological Science II Lecture and Lab</p> <p><b>AST 111/L</b> General Astronomy I Lecture and Laboratory</p> <p><b>GLY 101/L</b> Physical Geology Lecture and Laboratory</p> <p><b>HIS 101</b> Western Civilizations: Beginnings to 1500 C.E.</p> <p><b>HIS 102</b> Western Civilizations: 1500 to the Present</p> <p><b>PSY 110</b> General Psychology</p>
<p><b>PHYSICS BS</b> (non-education only)</p> <ul style="list-style-type: none"> <li> <b>MAT 2913</b> Differential Equations</li> <li> <b>COMPUTER SCIENCE (Select 1)</b> <ul style="list-style-type: none"> <li><b>CSC 1213</b> Visual Basic Computer Programming I</li> <li><b>CSC 1613</b> Computer Programming I</li> <li><b>CSC 2134</b> Programming I with C++</li> </ul> </li> </ul>	<p><b>MAT 285</b> Introduction to Differential Equations I</p> <p><b>CSC 101/L</b> Computer Science I Laboratory</p>



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