The Bachelor of Science in Microbiology and Cell Science offers a flexible curriculum that develops an excellent knowledge base and an understanding of concepts in microbiology, cell biology and the biomolecular sciences. Emphasis is placed on application of the scientific method to gain an understanding of the biological world at the cellular and molecular levels. Students learn to evaluate hypotheses, interpret experimental data, and communicate results effectively.

**About this Program**
- **College:** Agricultural and Life Sciences (http://catalog.ufl.edu/UGRD/colleges-schools/UGAGL/)
- **Degree:** Bachelor of Science
- **Credits for Degree:** 120
- **Contact:** 1.855.99GATOR
- **More Info**

To graduate with this major, students must complete all university, college, and major requirements.

**Department Information**
The Department of Microbiology and Cell Science is committed to excellence in education, research and service to the community. The curriculum provides an excellent preparation for students who wish to enter the workforce or continue their education in professional programs such as medical, dental, pharmacy, veterinary programs, graduate school or public health degrees. B.S. degrees are offered through both the College of Agricultural and Life Sciences and the College of Liberal Arts and Sciences and the M.S. and Ph.D. degrees are offered through the College of Agricultural and Life Sciences. Combination degrees are available.

**Website** (http://microcell.ufl.edu/)

**CONTACT**
Email (bkorithoski@ufl.edu) | 352.392.1906 (tel) | 352.846.0950 (fax)

P.O. Box 110700
1355 Museum Drive
MICROBIOLOGY AND CELL SCIENCE BUILDING (MCSB)
GAINESVILLE FL 32611-0700
Map (http://campusmap.ufl.edu/#/index/0981)

**Curriculum**
- Bioinformatics Minor
- Combination Degrees
- Microbiology and Cell Science UF Online
- Microbiology and Cell Science | CALS
- Microbiology and Cell Science | CLAS
- Pathogenesis Minor

This major prepares students for entry into professional programs in medicine, dentistry and veterinary medicine and provides a strong foundation for graduate studies in microbiology, cell biology and related cellular and biomedical sciences. The major also provides a background for entry into government, industrial research and diagnostic laboratories.

The curriculum develops fundamental knowledge of prokaryotic and eukaryotic cells and viruses. Courses include the physiology and genetics of microorganisms, mechanisms of pathogenesis and innate immunity systems, astrobiology, bacterial and genome sequencing and bioinformatics.

**Coursework for the Major**
All majors must take 28-29 credits: 15 credits are core requirements, 10 credits are upper-division department electives and 3-4 credits are the quantitative requirement. A minimum of one credit in an advanced laboratory is required as part of the 10 department-elective credits.

Minimum grades of C, attained within two attempts (including withdrawals), are required in all critical-tracking courses, major courses, department core requirements, department electives and the quantitative requirement. Second attempts must be completed the next semester of enrollment. A 2.0 cumulative GPA of also is required.

**Required Coursework**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSC 2010 &amp; 2010L</td>
<td>Integrated Principles of Biology 1 and Integrated Principles of Biology Laboratory 1</td>
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<tr>
<td>BSC 2011 &amp; 2011L</td>
<td>Integrated Principles of Biology 2 and Integrated Principles of Biology Laboratory 2</td>
<td>4</td>
</tr>
<tr>
<td>CHM 2045 &amp; 2045L</td>
<td>General Chemistry 1 and General Chemistry 1 Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHM 2046 &amp; 2046L</td>
<td>General Chemistry 2 and General Chemistry 2 Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>MAC 2311</td>
<td>Analytic Geometry and Calculus 1</td>
<td>4</td>
</tr>
</tbody>
</table>

Select one:
- Option One
  - PHY 2053 & 2053L | Physics 1 and Laboratory for Physics 1 | 4 |
  - PHY 2054 & 2054L | Physics 2 and Laboratory for Physics 2 | 4 |

- Option Two
  - PHY 2048 & 2048L | Physics with Calculus 1 and Laboratory for Physics with Calculus 1 | 4 |
  - PHY 2049 & 2049L | Physics with Calculus 2 and Laboratory for Physics with Calculus 2 | 4 |

- CHM 2210 | Organic Chemistry 1 | 3 |
- CHM 2211 | Organic Chemistry 2 | 5 |
- CHM 2211L | and Organic Chemistry Laboratory | 1 |

**Core Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BCH 4024</td>
<td>Introduction to Biochemistry and Molecular Biology</td>
<td>4</td>
</tr>
<tr>
<td>or CHM 3218</td>
<td>Organic Chemistry/Biochemistry 2</td>
<td>4</td>
</tr>
<tr>
<td>MCB 3015C</td>
<td>Lab Skills Bootcamp</td>
<td>1</td>
</tr>
<tr>
<td>MCB 3023</td>
<td>Principles of Microbiology</td>
<td>3</td>
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</tbody>
</table>

Select one:
- MCB 4203 | Bacterial Pathogens (offered fall) | 3 |
- PCB 4233 | Immunology (offered spring) | 4 |

Select one:
- MCB 4304 | Genetics of Microorganisms (offered fall) | 1-4 |
- PCB 4522 | Molecular Genetics (offered spring) | 1 |
- MCB 4934 | Special Topics in Microbiology and Cell Science | 4 |

**Department Elective Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCB 4034L</td>
<td>Advanced Microbiology Laboratory</td>
<td>1</td>
</tr>
</tbody>
</table>

Select three:
More Info (jorsini@ufl.edu?Subject=Microbiology%20and%20Cell%20Science%20Combination-Degree%20Appointment)

**Preparation for Graduate Study**
This major prepares students for entry into graduate studies in microbiology, cell biology, biochemistry and other areas.

All students interested in graduate education should develop a strong background in chemistry. Suggested schedules for students who plan to attend graduate school are available on the website. Students planning graduate study in microbiology, biochemistry or molecular biological sciences should consider taking these courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHM 3218</td>
<td>Organic Chemistry/Biochemistry 2</td>
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<tr>
<td>MAC 2312</td>
<td>Analytic Geometry and Calculus 2</td>
<td>4</td>
</tr>
<tr>
<td>STA 2023</td>
<td>Introduction to Statistics 1</td>
<td>3</td>
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<tr>
<td>MCB 4403</td>
<td>Prokaryotic Cell Structure and Function (required department elective)</td>
<td>3</td>
</tr>
<tr>
<td>PCB 3134</td>
<td>Eukaryotic Cell Structure and Function (required department elective)</td>
<td>3</td>
</tr>
<tr>
<td>CHM 3400</td>
<td>Physical Chemistry for the Biosciences (required department elective)</td>
<td>3</td>
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<tr>
<td>MCB 5305L</td>
<td>Microbial Genetics and Biotechnology Laboratory (microbiology advanced laboratory requirement)</td>
<td>2</td>
</tr>
<tr>
<td>PCB 4233</td>
<td>Immunology (pathogens or immunology requirement)</td>
<td>3</td>
</tr>
<tr>
<td>MCB 4905</td>
<td>Independent Study (valuable laboratory research experience)</td>
<td>4</td>
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</table>

**Total Credits**: 29

**Course Details**

MCB 4911 may be taken for a maximum of three credits per semester and six credits total. This policy applies to all microbiology and cell science majors registered for undergraduate research in other out-of-department undergraduate research courses such as BCH 4905, BMS 4905, ZOO 4905, etc.

**Undergraduate Research**

A majority of MCS students are actively involved in undergraduate research for credit with mentors throughout the university. The department encourages preprofessional and graduate school bound students to complete a minimum of two semesters of undergraduate research. The department maintains a list of mentors across campus who allow undergraduate students to participate in valuable research under their guidance. Additional information is available about undergraduate research and faculty mentors who have worked with microbiology and cell science students.

More Info (http://microcell.ufl.edu/undergraduate-programs/)

**Combination Degree Program**

A Bachelor of Science and Master of Science (non-thesis) program is offered by the College of Agricultural and Life Sciences. Microbiology majors in both the College of Agricultural and Life Sciences and the College of Liberal Arts and Sciences are eligible for admission to the combination degree program. Students should email for an appointment to determine their eligibility for this program.

**Relevant Minors and/or Certificates**

The Department of Microbiology and Cell Science also offers a minor in bioinformatics to students majoring in any life sciences subject, including and not limited to microbiology, biology or biochemistry.

So integrated is bioinformatics with the life sciences that it is difficult to find an active research program that does not rely on bioinformatic analysis to achieve results. By integrating bioinformatic and traditional methods, the minor in bioinformatics provides critical training to future professionals in the life science disciplines.

**Critical Tracking**

Critical Tracking records each student’s progress in courses that are required for entry to each major. Please note the critical-tracking requirements below on a per-semester basis.

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites (http://www.flvc.org/cpp/displayRecord.jsp?cip=260503&track=01) may be used for transfer students.

**Semester 1**

- Complete CHM 1025 or CHM 2045/CHM 2045L
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required
Semester 2
• Complete CHM 2045/CHM 2045L and BSC 2010/BSC 2010L
  • 2.5 GPA required for all critical-tracking courses
  • 2.0 UF GPA required

Semester 3
• Complete CHM 2046/CHM 2046L and MAC 2311
  • 2.5 GPA required for all critical-tracking courses
  • 2.0 UF GPA required

Semester 4
• Complete BSC 2011/BSC 2011L
  • 2.5 GPA required for all critical-tracking courses
  • 2.0 UF GPA required

Semester 5
• Complete CHM 2210
  • 2.5 GPA required for all critical-tracking courses
  • 2.0 UF GPA required

Semester 6
• Complete MCB 3023
  • 2.0 Upper division GPA required
  • 2.0 UF GPA required

Semester 7
• Complete MCB 4203 (Fall) or PCB 4233 (Spring) or PCB 3134 (fall/spring) or MCB 4403 (Fall)
  • 2.0 Upper division GPA required
  • 2.0 UF GPA required

Semester 8
• Complete MCB 4034L
  • 2.0 Upper division GPA required
  • 2.0 UF GPA required

Model Semester Plan
To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold.

This semester plan represents an example progression through the major. Actual courses and course order may be different depending on the student’s academic record and scheduling availability of courses. Prerequisites still apply.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>Quest 1 (Gen Ed Humanities)</td>
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<tr>
<td>MAC 2311</td>
<td>Analytic Geometry and Calculus 1 (Critical Tracking; State Core Gen Ed Mathematics)</td>
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<tr>
<td>CHM 2045 &amp; 2045L</td>
<td>General Chemistry 1 and General Chemistry 1 Laboratory (Critical Tracking; State Core Gen Ed Physical Sciences)</td>
<td>4</td>
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</tbody>
</table>
MCB 4034L Advanced Microbiology Laboratory (Critical Tracking) 1
Gen Ed Mathematics 3
Department elective 3

Credits 14

Semester Seven
Select one: 4-5
PHY 2048 & 2048L Physics with Calculus 1 and Laboratory for Physics with Calculus 1
PHY 2053 & 2053L Physics 1 and Laboratory for Physics 1
State Core Gen Ed Humanities (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext) 3
Writing Requirement 3
Department elective 3
Elective 3

Credits 16-17

Semester Eight
Select one: 4-5
PHY 2049 & 2049L Physics with Calculus 2 and Laboratory for Physics with Calculus 2
PHY 2054 & 2054L Physics 2 and Laboratory for Physics 2
Gen Ed Social and Behavioral Sciences 3
Department elective 3
Science Elective 3
Elective 3

Credits 16-17

Total Credits 120

1 ENC 1101 recommended.
2 MCB 4203 is taught only in the fall; PCB 4233 is taught only in the spring.
3 Choice depends on courses taken in Semesters Three and Four.
4 MCB 4304 is taught only in the fall; PCB 4522 is taught only in the spring.

Academic Learning Compact
The Bachelor of Science in microbiology and cell science, offered by both the College of Agricultural and Life Sciences and the College of Liberal Arts and Sciences, offers students flexibility in a curriculum that develops an excellent knowledge base and an understanding of concepts in microbiology, cell biology and the biomolecular sciences. Emphasis will be placed on application of the scientific method to gain an understanding of the biological world at the cellular and molecular levels. Students will learn to evaluate hypotheses, to interpret experimental data and to communicate results effectively.

Before Graduating Students Must
Complete requirements for the baccalaureate degree, as determined by faculty.

Students in the Major will Learn to

Student Learning Outcomes (SLOs)

Content
1. Describe fundamental concepts, skills and processes in microbiology, molecular biology and in host/pathogen interactions.
2. Apply fundamental concepts, skills and protocols used to conduct research in fields of microbiology, molecular biology and in host/pathogen.

Critical Thinking
3. Evaluate information and data in the general areas of microbiology and the cellular and molecular biological sciences.
4. Solve typical problems that are encountered in general areas of microbiology and cellular and molecular biological sciences.

Communication
5. Communicate effectively in written form in a manner appropriate in microbiology and the cellular and molecular biological sciences.
6. Communicate orally (including visual aids) in an effective manner appropriate in microbiology and the cellular and molecular biological sciences.

Curriculum Map
I = Introduced; R = Reinforced; A = Assessed

<table>
<thead>
<tr>
<th>Courses</th>
<th>SLO 1</th>
<th>SLO 2</th>
<th>SLO 3</th>
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Assessment Types
- Genome and lab projects
- Presentations
- Exams
- Final grades