# Schedule for MCBI 7420 “Physiology and Ultrastructure of Microorganisms”

**Fall 2024**

## Section 1 – The Cell Envelope & Signaling Systems

<table>
<thead>
<tr>
<th>Date</th>
<th>Instructor</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Mon, Aug 19</td>
<td>Pesci</td>
<td>Structure and Function I: Overview of the Cell Envelope</td>
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<tr>
<td>Tues, Aug 20</td>
<td>Pesci</td>
<td>Structure and Function II: Specific Cell Envelope Structures</td>
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<tr>
<td>Wed, Aug 21</td>
<td>Pesci</td>
<td>Export: Efflux Systems</td>
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<tr>
<td>Thurs, Aug 22</td>
<td>Pesci</td>
<td>Paper Discussion</td>
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<tr>
<td>Mon, Aug 26</td>
<td>Motaleb</td>
<td>Mechanisms of Genetic Switching</td>
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<td>Tues, Aug 27</td>
<td>Martin</td>
<td>Transport I: Porins, Symport, Antiport, Group Translocation</td>
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<td>Wed, Aug 28</td>
<td>Martin</td>
<td>Transport II: TonB-dependent, ABC-type transporters</td>
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<tr>
<td>Thurs, Aug 29</td>
<td>Martin</td>
<td>paper discussion</td>
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<tr>
<td>Mon, Sept 02</td>
<td>No Class</td>
<td>NO CLASS STATE HOLIDAY</td>
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<td>Tues, Sept 03</td>
<td>Martin</td>
<td>Export: Secretion Systems</td>
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<td>Wed, Sept 04</td>
<td>Martin</td>
<td>Sigma Factors in Gene Regulation</td>
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<td>Thurs, Sept 05</td>
<td>Martin</td>
<td>Paper discussion</td>
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<td><strong>Mon, Sept 09</strong></td>
<td><strong>Exam 1</strong></td>
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<td>Tues, Sept 10</td>
<td>Motaleb</td>
<td>Motility and Chemotaxis: The Che System</td>
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<td>Wed, Sept 11</td>
<td>Motaleb</td>
<td>Two-component Regulatory systems</td>
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<td>Thurs, Sept 12</td>
<td>Motaleb</td>
<td>paper discussion</td>
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<tr>
<td>Mon, Sept 16</td>
<td>Motaleb</td>
<td>Cyclic Nucleotide Signaling Systems</td>
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Section 2 – Catabolism and Energy Generation/Biosynthesis of Cellular Components

Wed, Sept 18 Coleman Overview of Bacterial Nutrition
Thurs, Sept 19 Coleman Central Pathways I – Glycolytic pathways
Mon, Sept 23 Coleman Central Pathways II – TCA and Anapleurotic Pathways
Tues, Sept 24 Coleman Central Pathways III – Fermentation Pathways
Wed, Sept 25 Coleman Paper discussion
Thurs, Sept 26 Coleman Bacterial Energetics – Overview
Mon, Sept 30 Coleman Bacterial Energetics — Electron Transport Systems
Tues, Oct 01 Coleman Bacterial Energetics – ATP Synthesis
Wed, Oct 02 Coleman Paper discussion
Thurs, Oct 03 Study Day/Makeup Day

Sat, Oct 5 – Tues, Oct 8 Fall Break

Wed, Oct 09 Exam 2
Thurs, Oct 10 Barton Prokaryotic Genome Structure
Mon, Oct 14 Roop Genetic Analysis of Bacteria
Tues, Oct 15 Rocha Control of Energy Generating Pathways; Choice of Electron Acceptor
Wed, Oct 16 Rocha Ammonia Assimilation: Glutamine Synthetase, Glutamate Dehydrogenase, Glutamate Synthase
Thurs, Oct 17 Rocha Paper Discussion
Mon, Oct 21 Rocha Sulfate Assimilation and Cysteine Biosynthesis
Tues, Oct 22 Pechous TBA
Wed, Oct 23 Pechous Paper Discussion
Thurs, Oct 24 Pechous TBA
Mon, Oct 28 Pechous Paper Discussion
Tues, Oct 29 Study Day
Wed, Oct 30 Exam 3

Section 3 – Growth and Global Regulatory Systems

Thurs, Oct 31 Pesci Quorum sensing: Who’s Out There
Mon, Nov 04  Pesci  Paper Discussion
Tues, Nov 05  Farrow  The CRISPR/CAS system
Wed, Nov 06  Farrow  The CRISPR/CAS system paper discussion
Thurs, Nov 07  Farrow  Bacterial Immunity: Novel Antiphage Defense Systems
Mon Nov 11  Farrow  Paper discussion
Tues, Nov 12  Farrow  Biofilms: Adhesion and Antimicrobial Tolerance
Wed, Nov 13  Farrow  Paper Discussion
Thurs, Nov 14  Roop  Role of Small Regulatory RNAs in Microbial Physiology
Mon, Nov 18  Bitzer  Generalized Cytoplasmic and Extracytoplasmic Stress Responses
Tues, Nov 19  Bitzer  Paper discussion
Wed, Nov 20  Barton  Stringent Response/Stationary Phase
Thurs, Nov 21  Barton  Paper discussion
Mon, Nov 25  Roop  Bacterial Persistence and Dormancy
Tues, Nov 26  Roop  Paper discussion

Wed, Nov 27—Sun, Dec 01  Thanksgiving Break

Mon, Dec 02  Roop  Iron Homeostasis
Tues, Dec 03  Study Day/Makeup Day
Thurs, Dec 05  Exam 4
Mon, Dec 09  Grades Due

Class:
The class will meet in the Biotechnology Building conference room 110 from 11 AM – 12 Noon.

Exams: All exams will be in Biotechnology Building Room 110 from 10 AM to Noon.

Exam 1 covers lectures from August 19 to September 05
Exam 2 covers lectures from September 10 to October 02
Exam 3 covers lectures from October 10 to October 28
Exam 4 covers lectures from October 31 to December 02

Course grading policy:
The course grade will be calculated from the combined scores of the four exams, with each exam carrying equal weight. These exams will be based on the lectures and any additional material in your assigned readings.

No specific text has been adopted for the course. Individual instructors will provide you with your assigned reading materials. Specific papers discussed in class will be handed out at least 5 days before the discussion period.

Course Director – MD MOTALEB (252-744-3129; motalebm@ecu.edu) Biotech 116