**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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<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>Mon, Sept 09</td>
<td>Exam 1</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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Mon, Sept 16  Motaleb  Cyclic Nucleotide Signaling Systems  
Tues, Sept 17  Motaleb  Paper Discussion

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  Roop  Paper discussion
Tues, Nov 19  Roop  Generalized Cytoplasmic and Extracytoplasmic Stress Responses
Wed, Nov 20  Roop  Paper discussion
Thurs, Nov 21  Roop  Stringent Response/Stationary Phase
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