

**COLLEGE OF GRADUATE STUDIES  
MEDICAL UNIVERSITY OF SOUTH CAROLINA**

**GUIDE TO THE FIRST YEAR CURRICULUM  
IN BIOMEDICAL SCIENCES**

The Guide for Students and Faculty was conceived in 2001 by Dr. George Lindenmayer, then-Associate Dean of the College of Graduate Studies, as a single-source reference to all aspects of the Biomedical Sciences First Year Curriculum in the College of Graduate Studies at MUSC. The Guide is updated annually with valuable contributions from numerous faculty participating in the curriculum, and is edited by the curriculum course director. I especially acknowledge the boundless support I receive from Dr. Perry Halushka, Dean of the College of Graduate Studies, and the unstinting administrative assistance provided by Keisha Brown, Karla Locklear, Debra Shoemaker and Dodie Weise in the College of Graduate Studies Office.

Adam J. Smolka, Ph.D.  
Professor of Medicine  
Curriculum Course Director  
1 August, 2007

## TABLE OF CONTENTS

|   | Page |
|---|------|
| From the Dean . . . . .   | 5    |
| Objectives of the First Year Curriculum . . . . .                   | 7    |
| Structure of the Curriculum . . . . .                               | 7    |
| Foundations of Biomedical Sciences . . . . .                        | 7    |
| First Year Curriculum Comprehensive Calendar . . . . .              | 9    |
| CGS 701/702 Unit Syllabi . . . . .                                  | 13   |
| Recommended Textbooks . . . . .                                     | 21   |
| Ph.D. Program Exposures . . . . .                                   | 22   |
| Essential Scientific Practices . . . . .                            | 23   |
| Laboratory Rotations . . . . .                                      | 24   |
| Important Unanswered Questions in the Biomedical Sciences . . . . . | 26   |
| Spring Selectives . . . . .   | 27   |
| Student Evaluation of Course Effectiveness . . . . .                | 29   |
| Enrollment in the Curriculum . . . . .                              | 30   |
| First Year Curriculum Steering Committee . . . . .                  | 31   |
| First Year Curriculum Progress Committee . . . . .                  | 31   |
| WebCT . . . . .   | 32   |
| <br><b>APPENDICES</b>   |      |
| I. Grading Scale for CGS 701/702 . . . . .                          | 33   |
| II. Laboratory Rotation Grade Report . . . . .                      | 34   |
| III. Ph.D. Program and Mentor Selection . . . . .                   | 35   |
| IV. CGS 701/702 Evaluation Questions . . . . .                      | 36   |

## FROM THE DEAN

Together with the participating faculty and current students, I welcome you to the College of Graduate Studies First Year Curriculum.

Why have a interdisciplinary curriculum for first year graduate students in the biomedical sciences? The answer is simple; the complexity and interdisciplinary nature of science demand that scientists be well rounded and have a broad exposure to all the disciplines of the biomedical sciences. Furthermore, students can make an informed programmatic career decision only after they have had adequate exposure to all the basic sciences. This opportunity does not occur during undergraduate studies; therefore, the curriculum has been designed to ensure that first year students will be able to make informed decisions through a combination of exposure to all the research training programs as well as advice and guidance from the faculty.

Furthermore, the First Year Curriculum provides you with what can best be described as a fundamental tool box which will give you the necessary skills and fund of knowledge to tackle any hypothesis in any field. Through the acquisition of the basic laboratory skills and knowledge base you will be able to ask important questions that have the potential to make significant impacts in a scientific field.

The curriculum designed by the faculty is comprehensive, current, exciting and provides many novel educational experiences. The faculty have spent countless hours working to make this an outstanding and challenging curriculum. Their efforts are clearly evident as one reads the course schedule, syllabus and novel features that have been incorporated into this curriculum. As a student you will interact formally and informally with the faculty who are teaching this course. Our more senior students will also be involved in teaching various parts of the curriculum. This important educational experience for our senior students will also allow first year students to meet their senior peers.

By virtue of the fact that science is dynamic and constantly changing, the First Year Curriculum is responsive through yearly upgrades to the latest important new discoveries. Changes are dictated by at least two major criteria; 1) are the topics being well presented? 2) what is the latest cutting-edge science? Thus, a critical aspect of the curriculum will be your evaluation of the course content and its presentation by the faculty. Your input in this process is invaluable. Your evaluations are used to continually improve the curriculum and to select candidates for the outstanding teacher of the year award.

As both faculty and mentors, we are excited about providing you with outstanding research training experiences. Before you know it, we will be calling you colleagues.

Finally, as your Dean, I want you to know that I have an open door policy and welcome your thoughts and suggestions on how to create for you the best possible educational experiences.

Perry V. Halushka, Ph.D., M.D.  
Professor of Pharmacology and Medicine  
Dean, College of Graduate Studies

## **OBJECTIVES OF THE FIRST YEAR CURRICULUM**

1. Develop a broad-based understanding of the basic biomedical sciences and their interdisciplinary nature.
2. Develop critical thinking skills.
3. Promote self-learning.
4. Maximize student exposure to the individual scientific disciplines and technologies.
5. Promote written and oral communication skills.
6. Expose students to faculty and research laboratories so that informed career decisions can be made.

## **STRUCTURE OF THE CURRICULUM**

The goal of the Biomedical Sciences First Year Curriculum is to provide students with the critical knowledge, skills, and scientific insight necessary to be successful in any of the professional specialties in the College of Graduate Studies at MUSC. The First Year Curriculum lays the groundwork for the student's later advanced coursework and research training in a specific Ph.D. program, or program track, with a specific mentor, advisory committee and Ph.D. dissertation project.

The curriculum as a whole has five complementary elements: Foundations of Biomedical Sciences (CGS 701/702), Essential Scientific Practices (CGS 710/711/712), Laboratory Rotations (CGS 720/721), Important Unanswered Questions in the Biomedical Sciences (CGS 760), and Spring Selectives (various). To familiarize students with doctoral training programs offered by the College of Graduate Studies, a series of Program Exposures that highlight individual departments and/or programs are held at the beginning of the fall semester. As a prerequisite for the PhD degree, the College requires that students demonstrate a predetermined level of statistical competence. This may be achieved by either enrolling in and completing BMTRY 723 in the second or subsequent years of graduate study, or by providing transcript evidence of satisfactory completion of previously-taken statistical course(s) that fulfill the College requirement.

## **FOUNDATIONS OF BIOMEDICAL SCIENCES (CGS 701 AND 702)**

Adam J. Smolka, Ph.D., Course Director  
(smolkaaj@musc.edu)

21 August, 2007 to 7 March, 2008

Monday, Tuesday, Thursday, Friday 8:30 am–11:30 am  
Room 435, Basic Science Building

A guiding principle of Foundations of Biomedical Sciences is that students must develop depth of knowledge, and an understanding of how to extend that knowledge by asking relevant questions and designing experiments that give solid answers. Just as importantly, students must acquire skill in articulate, clear discussion of scientific principles and data. Thus, students and faculty are encouraged to develop scientific interchange through interactive discussion-based forums that are integrated into all nine Units. Full student participation is essential; all students are required to attend all classes, and absences must be cleared through the appropriate Unit Leader.

Foundations of Biomedical Sciences comprises six Units in the fall semester, and three Units in the first half of the spring semester. The fall Units (CGS 701) address the basic molecular mechanisms of biology, and are based on a metaphorical journey which begins in the cell nucleus, traverses the cytoplasm and its multitude of functional metabolic compartments, and emerges into the extracellular world of signals. The journey leads back into the cell through receptors, follows the cellular processing of signals, and culminates in regulation of gene expression and a survey of genetics and genomics. The spring Units (CGS 702) extend molecular understanding to cellular, tissue and organismal biology levels, from a consideration of cell structure and functions, through mechanisms of disease and defense, and finally to appreciation of integrated physiological systems.

Merit grades are assigned for Foundations of Biomedical Sciences CGS 701 and 702. The final grade for each Foundations of Biomedical Sciences course is the average of the Unit scores, and is predicated on completion of all elements of that course. Each Unit grade is derived from performance on graded In-Unit assignments, quizzes and interactive discussion-based forums, and from open-book, take-home exams. All exams, tests, quizzes, written work, laboratory work and research activities at MUSC are conducted under the Honor Code, detailed at [www.musc.edu/honorcode/honorcode.html](http://www.musc.edu/honorcode/honorcode.html).

First Year Curriculum students are required to maintain a minimum overall grade point average (GPA) of 3.0 and to attain a passing grade (70% or higher) in Foundations of Biomedical Sciences (CGS 701/702) Units according to the following guidelines:

1. Failure to attain a minimum grade of 70% in any two of the nine CGS 701/702 Units or failure to maintain a minimum cumulative GPA of 3.0 results in a student being placed on academic probation.
2. A student placed on academic probation is required to meet with his or her first year advisor and the chair of the Progress committee. The advisor and chair will make a report to the Progress Committee.
3. If a student placed on academic probation completes CGS 701/702 with a minimum grade of 70% for seven of the nine Units and a minimum cumulative GPA of 3.0, he or she will be removed from academic probation.
4. A student on academic probation who fails three (or more) CGS 701/702 Units or whose cumulative GPA for CGS 701/702 is less than 3.0 will be dismissed from the program. The student has the right to appeal this decision to the Progress Committee. Any decision by the Progress Committee can be appealed to the Dean.

As graduate students progress in their studies, becoming integral members of the academic community, they are encouraged to teach in the First Year Curriculum. Graduate student (and postdoctoral fellow) participation may include presentation of formal lectures, composition of exam questions, assisting Unit leaders or designees with grading of student assignments/tests, and participation in flex-time activities (small-group discussions or technical demonstrations). Unit leaders will determine the extent to which graduate students and postdoctoral fellows teach in their Units. Unit leaders will review all graduate student and postdoc presentations, exam questions, grading, and proposed flex-time activities for appropriate content, accuracy and professional delivery. A prerequisite for students and postdoc teaching in the First Year Curriculum will be completion of CGS 725 (Teaching Techniques, Dr. Patterson), or documented evidence of equivalent training or teaching experience.

5/9/07

# First Year Curriculum Calendar 2007-2008

|                  | MONDAY<br>20                               | TUESDAY<br>21                                       | WEDNESDAY<br>22  | THURSDAY<br>23                   | FRIDAY<br>24                     | SATURDAY<br>25                             |
|------------------|--|---|--|----------------------------------|----------------------------------|--|
| <b>AUGUST</b>    |  |   |  |                                  |                                  |  |
| 8:30 - 11:30     | Orientation                                | Course Overview<br>Macromolecules:<br>Nucleic Acids |  | Macromolecules:<br>Nucleic Acids | Macromolecules:<br>Nucleic Acids | CGS 710<br>Research<br>Conduct<br>Workshop |
| 12:00 - 1:00     |  |   |  |                                  |                                  |  |
| 1:00 - 3:00      | Outstanding Graduate<br>Lecture (5:00 pm)  |   | Program Exposure   | CGS 710 Research Conduct         | Pathology Program<br>Exposure    |  |
| 3:00 - 6:00      |  |   |  |                                  |                                  |  |
| <b>AUGUST</b>    | <b>27</b>                                  | <b>28</b>   | <b>29</b>  | <b>30</b>                        | <b>31</b>                        |  |
| 8:30 - 11:30     | Macromolecules:<br>Nucleic Acids           | Macromolecules:<br>Nucleic Acids                    |  | Macromolecules:<br>Nucleic Acids | Macromolecules:<br>Nucleic Acids |  |
| 12:00 - 1:00     |  |   |  |                                  |                                  |  |
| 1:00 - 3:00      |  | CGS 710 Research Conduct                            | Program Exposure   | CGS 710 Research Conduct         |                                  |  |
| 3:00 - 6:00      | Program Exposure                           |   |  |                                  | Program Exposure                 |  |
| <b>SEPTEMBER</b> | <b>3</b>                                   | <b>4</b>  | <b>5</b>   | <b>6</b>                         | <b>7</b>                         | <b>8</b>                                   |
| 8:30 - 11:30     | Labor Day                                  | Macromolecules:<br>Nucleic Acids                    |  | Macromolecules:<br>Nucleic Acids | Macromolecules:<br>Nucleic Acids | CGS 710<br>Research<br>Conduct<br>Workshop |
| 12:00 - 1:00     |  |   |  |                                  |                                  |  |
| 1:00 - 3:00      |  | CGS 710 Research Conduct                            |  | CGS 710 Research Conduct         |                                  |  |
| 3:00 - 6:00      |  |   |  |                                  | Program Exposure                 |  |
| <b>SEPTEMBER</b> | <b>10</b>                                  | <b>11</b>   | <b>12</b>  | <b>13</b>                        | <b>14</b>                        | <b>15</b>                                  |
| 8:30 - 11:30     | Macromolecules:<br>Proteins                | Macromolecules:<br>Proteins                         |  | Macromolecules:<br>Proteins      | Macromolecules:<br>Proteins      | CGS 710<br>Research<br>Conduct<br>Workshop |
| 12:00 - 1:00     |  |   |  |                                  |                                  |  |
| 1:00 - 3:00      | Program Exposure                           | CGS 710 Research Conduct                            | Program Exposure   | CGS 710 Research Conduct         | Program Exposure                 |  |
| 3:00 - 6:00      |  |   |  |                                  |                                  |  |
| <b>SEPTEMBER</b> | <b>17</b>                                  | <b>18</b>   | <b>19</b>  | <b>20</b>                        | <b>21</b>                        |  |
| 8:30 - 11:30     | Macromolecules:<br>Proteins                | Macromolecules:<br>Proteins                         | 1st Lab Rotation<br>Begins<br>(this color signifies<br>lab research) | Macromolecules:<br>Proteins      | Macromolecules:<br>Proteins      |  |
| 12:00 - 1:00     | Selection Deadline for<br>1st Lab Rotation | Unanswered Questions                                |  |                                  |                                  |  |
| 5:00 - 6:00      |  |   |  | CGS 711 Diversity                |                                  |  |
| <b>SEPTEMBER</b> | <b>24</b>                                  | <b>25</b>   | <b>26</b>  | <b>27</b>                        | <b>28</b>                        |  |
| 8:30 - 11:30     | Macromolecules:<br>Proteins                | Macromolecules:<br>Proteins                         |  | Metabolism and<br>Bioenergetics  | Metabolism and<br>Bioenergetics  |  |
| 12:00 - 1:00     |  | Unanswered Questions                                |  |                                  |                                  |  |
| 1:00 - 6:00      |  |   |  |                                  |                                  |  |
| <b>OCTOBER</b>   | <b>1</b>                                   | <b>2</b>  | <b>3</b>   | <b>4</b>                         | <b>5</b>                         |  |
| 8:30 - 11:30     | Metabolism and<br>Bioenergetics            | Metabolism and<br>Bioenergetics                     |  | Metabolism and<br>Bioenergetics  | Metabolism and<br>Bioenergetics  |  |
| 12:00 - 1:00     |  | Unanswered Questions                                |  |                                  |                                  |  |
| 5:00 - 6:00      |  |   |  | CGS 711 Diversity                |                                  |  |
| <b>OCTOBER</b>   | <b>8</b>                                   | <b>9</b>  | <b>10</b>  | <b>11</b>                        | <b>12</b>                        |  |
| 8:30 - 11:30     | Metabolism and<br>Bioenergetics            | Metabolism and<br>Bioenergetics                     |  | Metabolism and<br>Bioenergetics  | Metabolism and<br>Bioenergetics  |  |
| 12:00 - 1:00     |  | Unanswered Questions                                |  |                                  |                                  |  |
| 1:00 - 6:00      |  |   |  |                                  |                                  |  |
| <b>OCTOBER</b>   | <b>15</b>                                  | <b>16</b>   | <b>17</b>  | <b>18</b>                        | <b>19</b>                        |  |
|                  | CGS 701 Mid-Term<br>Exams                  | CGS 701 Mid-Term<br>Exams                           | CGS 701 Mid-Term<br>Exams  | CGS 701 Mid-Term<br>Exams        | CGS 701 Mid-Term<br>Exams        |  |
| <b>OCTOBER</b>   | <b>22</b>                                  | <b>23</b>   | <b>24</b>  | <b>25</b>                        | <b>26</b>                        |  |
| 8:30 - 11:30     | Receptors &<br>Signaling                   | Receptors &<br>Signaling                            |  | Receptors &<br>Signaling         | Receptors &<br>Signaling         |  |
| 12:00 - 1:00     |  | Unanswered Questions                                |  |                                  |                                  |  |
| 5:00 - 6:00      |  |   |  | CGS 711 Diversity                |                                  |  |
| <b>OCTOBER</b>   | <b>29</b>                                  | <b>30</b>   | <b>31</b>  | <b>November 1</b>                | <b>2</b>                         |  |
| 8:30 - 11:30     | Receptors &<br>Signaling                   | Receptors &<br>Signaling                            | Selection Deadline<br>for 2nd Lab Rotation                           | Receptors &<br>Signaling         | Research Day                     |  |
| 12:00 - 1:00     |  | Unanswered Questions                                |  |                                  |                                  |  |
| 1:00 - 6:00      |  |   |  | 1st Lab Rotation Ends            |                                  |  |

| NOVEMBER     | 5                       | 6               | 7 | 8               | 9               |
|--------------|-------------------------|-----------------|---|-----------------|-----------------|
| 8:30 - 11:30 | Receptors & Signaling   | Gene Expression |   | Gene Expression | Gene Expression |
| 12:00 - 1:00 | 2nd Lab Rotation Begins |                 |   |                 |                 |
| 1:00 - 6:00  |                         |                 |   |                 |                 |

| NOVEMBER     | 12              | 13                   | 14 | 15                | 16              |
|--------------|-----------------|----------------------|----|-------------------|-----------------|
| 8:30 - 11:30 | Gene Expression | Gene Expression      |    | Gene Expression   | Gene Expression |
| 12:00 - 1:00 |                 | Unanswered Questions |    |                   |                 |
| 5:00 - 6:00  |                 |                      |    | CGS 711 Diversity |                 |

| NOVEMBER     | 19              | 20              | 21 | 22                 | 23 |
|--------------|-----------------|-----------------|----|--------------------|----|
| 8:30 - 11:30 | Gene Expression | Gene Expression |    | Thanksgiving Break |    |
| 12:00 - 1:00 |                 |                 |    |                    |    |
| 1:00 - 6:00  |                 |                 |    |                    |    |

| NOVEMBER     | 26                    | 27                    | 28 | 29                    | 30                    |
|--------------|-----------------------|-----------------------|----|-----------------------|-----------------------|
| 8:30 - 11:30 | Genetics and Genomics | Genetics and Genomics |    | Genetics and Genomics | Genetics and Genomics |
| 12:00 - 1:00 |                       | Unanswered Questions  |    |                       |                       |
| 5:00 - 6:00  |                       |                       |    | CGS 711 Diversity     |                       |

| DECEMBER     | 3                     | 4                     | 5 | 6                     | 7                     |
|--------------|-----------------------|-----------------------|---|-----------------------|-----------------------|
| 8:30 - 11:30 | Genetics and Genomics | Genetics and Genomics |   | Genetics and Genomics | Genetics and Genomics |
| 12:00 - 1:00 |                       | Unanswered Questions  |   |                       |                       |
| 1:00 - 6:00  |                       |                       |   |                       |                       |

| DECEMBER | 10                  | 11                  | 12                  | 13                  | 14                  |
|----------|---------------------|---------------------|---------------------|---------------------|---------------------|
|          | CGS 701 Final Exams | CGS 701 Final Exams | CGS 701 Final Exams | CGS 701 Final Exams | CGS 701 Final Exams |
|          |                     |                     |                     |                     | End of Term         |

| JANUARY      | 1            | 2                | 3              | 4              |
|--------------|--------------|------------------|----------------|----------------|
| 8:30 - 11:30 | Winter Break | Spring Semester: | Cell Functions | Cell Functions |
| 12:00 - 1:00 |              |                  |                |                |
| 5:00-6:00    |              |                  |                |                |

| JANUARY      | 7              | 8                    | 9                                       | 10             | 11                    |
|--------------|----------------|----------------------|---|----------------|-----------------------|
| 8:30 - 11:30 | Cell Functions | Cell Functions       | Selection Deadline:<br>3rd Lab Rotation | Cell Functions | Cell Functions        |
| 12:00 - 1:00 |                | Unanswered Questions |   |                |                       |
| 1:00 - 6:00  |                |                      |   |                | 2nd Lab Rotation Ends |

| JANUARY      | 14                      | 15                   | 16 | 17             | 18             |
|--------------|-------------------------|----------------------|----|----------------|----------------|
| 8:30 - 11:30 | Cell Functions          | Cell Functions       |    | Cell Functions | Cell Functions |
| 12:00 - 1:00 | 3rd Lab Rotation Begins | Unanswered Questions |    |                |                |
| 1:00-6:00    |                         |                      |    |                |                |

| JANUARY      | 21                     | 22                   | 23 | 24                   | 25                   |
|--------------|------------------------|----------------------|----|----------------------|----------------------|
| 8:30 - 11:30 | Martin Luther King Day | Cell Functions       |    | Cell Injury/Response | Cell Injury/Response |
| 12:00 - 1:00 |                        | Unanswered Questions |    |                      |                      |
| 1:00 - 6:00  |                        |                      |    |                      |                      |

| JANUARY      | 28                   | 29                   | 30 | 31                   | February 1           |
|--------------|----------------------|----------------------|----|----------------------|----------------------|
| 8:30 - 11:30 | Cell Injury/Response | Cell Injury/Response |    | Cell Injury/Response | Cell Injury/Response |
| 12:00 - 1:00 |                      | Unanswered Questions |    |                      |                      |
| 1:00-6:00    |                      |                      |    |                      |                      |

| FEBRUARY     | 4                    | 5                    | 6 | 7                    | 8                    |
|--------------|----------------------|----------------------|---|----------------------|----------------------|
| 8:30 - 11:30 | Cell Injury/Response | Cell Injury/Response |   | Cell Injury/Response | Cell Injury/Response |
| 12:00 - 1:00 |                      | Unanswered Questions |   |                      |                      |
| 1:00 - 6:00  |                      |                      |   |                      |                      |

| FEBRUARY     | 11                   | 12                   | 3 | 14              | 15              |
|--------------|----------------------|----------------------|---|-----------------|-----------------|
| 8:30 - 11:30 | Cell Injury/Response | Systems Biology      |   | Systems Biology | Systems Biology |
| 12:00 - 1:00 |                      | Unanswered Questions |   |                 |                 |
| 1:00-6:00    |                      |                      |   |                 |                 |

| FEBRUARY     | 18              | 19                   | 20 | 21              | 22              |
|--------------|-----------------|----------------------|----|-----------------|-----------------|
| 8:30 - 11:30 | Systems Biology | Systems Biology      |    | Systems Biology | Systems Biology |
| 12:00 - 1:00 |                 | Unanswered Questions |    |                 |                 |
| 1:00 - 6:00  |                 |                      |    |                 |                 |

| FEBRUARY     | 25              | 26                   | 27                                      | 28              | 29                    |
|--------------|-----------------|----------------------|---|-----------------|-----------------------|
| 8:30 - 11:30 | Systems Biology | Systems Biology      | Selection Deadline for 4th Lab Rotation | Systems Biology | Systems Biology       |
| 12:00 - 1:00 |                 | Unanswered Questions |   |                 |                       |
| 1:00-6:00    |                 |                      |   |                 | 3rd Lab Rotation Ends |

| MARCH | 3                   | 4                   | 5                   | 6                   | 7                   |
|-------|---------------------|---------------------|---------------------|---------------------|---------------------|
|       | CGS 702 Final Exams | CGS 702 Final Exams | CGS 702 Final Exams | CGS 702 Final Exams | CGS 702 Final Exams |

| MARCH | 10           | 11 | 12 | 13 | 14 |
|-------|--------------|----|----|----|----|
|       | Spring Break |    |    |    |    |

| MARCH | 17                      | 18 | 19 | 20 | 21 |
|-------|-------------------------|----|----|----|----|
|       | Selectives Begin        |    |    |    |    |
|       | 4th Lab Rotation Begins |    |    |    |    |

| MARCH | 24 | 25 | 26 | 27                        | 28 |
|-------|----|----|----|---------------------------|----|
|       |    |    |    | Outstanding Teacher Award |    |

| MARCH/APRIL | 31 | April 1 | 2 | 3 | 4 |
|-------------|----|---------|---|---|---|
|             |    |         |   |   |   |

| APRIL | 7 | 8 | 9 | 10 | 11 |
|-------|---|---|---|----|----|
|       |   |   |   |    |    |

| APRIL | 14 | 15 | 16 | 17 | 18 |
|-------|----|----|----|----|----|
|       |    |    |    |    |    |

| APRIL | 21 | 22 | 23 | 24 | 25 |
|-------|----|----|----|----|----|
|       |    |    |    |    |    |

| APRIL | 28 | 29 | 30 | May 1 | 2                     |
|-------|----|----|----|-------|-----------------------|
|       |    |    |    |       | Selectives Exams      |
|       |    |    |    |       | 4th Lab Rotation Ends |
|       |    |    |    |       | End of Term           |

|            |                         |           |           |           |                              |
|------------|-------------------------|-----------|-----------|-----------|------------------------------|
| <b>MAY</b> | <b>5</b>                | <b>6</b>  | <b>7</b>  | <b>8</b>  | <b>9</b>                     |
|            |                         |           |           |           | Program/Mentor Selection Due |
| <b>MAY</b> | <b>12</b>               | <b>13</b> | <b>14</b> | <b>15</b> | <b>16</b>                    |
|            |                         |           |           |           |                              |
| <b>MAY</b> | <b>19</b>               | <b>20</b> | <b>21</b> | <b>22</b> | <b>23</b>                    |
|            | Enter Mentor Laboratory |           |           |           |                              |
| <b>MAY</b> | <b>26</b>               | <b>27</b> | <b>28</b> | <b>29</b> | <b>30</b>                    |
|            |                         |           |           |           |                              |

**SUMMER SEMESTER 2008**

|                  |           |                       |           |           |                 |
|------------------|-----------|-----------------------|-----------|-----------|-----------------|
| <b>JUNE</b>      | <b>2</b>  | <b>3</b>              | <b>4</b>  | <b>7</b>  | <b>6</b>        |
| 9:00-11:00       |           | ESP 712 Grant Writing |           |           |                 |
| <b>JUNE</b>      | <b>9</b>  | <b>10</b>             | <b>11</b> | <b>12</b> | <b>13</b>       |
| 9:00-11:00       |           | ESP 712 Grant Writing |           |           |                 |
| <b>JUNE</b>      | <b>16</b> | <b>17</b>             | <b>18</b> | <b>19</b> | <b>20</b>       |
| 9:00-11:00       |           | ESP 712 Grant Writing |           |           |                 |
| <b>JUNE</b>      | <b>23</b> | <b>24</b>             | <b>25</b> | <b>26</b> | <b>27</b>       |
| 9:00-11:00       |           | ESP 712 Grant Writing |           |           |                 |
| <b>JUNE/JULY</b> | <b>30</b> | <b>July 1</b>         | <b>2</b>  | <b>3</b>  | <b>4</b>        |
| 9:00-11:00       |           | ESP 712 Grant Writing |           |           | Fourth of July  |
| <b>JULY</b>      | <b>7</b>  | <b>8</b>              | <b>9</b>  | <b>10</b> | <b>11</b>       |
| 9:00-11:00       |           | ESP 712 Grant Writing |           |           |                 |
| <b>JULY</b>      | <b>14</b> | <b>15</b>             | <b>16</b> | <b>17</b> | <b>18</b>       |
| 9:00-11:00       |           | ESP 712 Grant Writing |           |           |                 |
| <b>JULY</b>      | <b>21</b> | <b>22</b>             | <b>23</b> | <b>24</b> | <b>25</b>       |
| 9:00-11:00       |           | ESP 712 Grant Writing |           |           |                 |
| <b>JULY</b>      | <b>28</b> | <b>29</b>             | <b>30</b> | <b>31</b> | <b>August 1</b> |
| 9:00-11:00       |           | ESP 712 Grant Writing |           |           |                 |
| <b>AUGUST</b>    | <b>4</b>  | <b>5</b>              | <b>6</b>  | <b>7</b>  | <b>8</b>        |
| 9:00-11:00       |           | ESP 712 Grant Writing |           |           |                 |
| <b>AUGUST</b>    | <b>11</b> | <b>12</b>             | <b>13</b> | <b>14</b> | <b>15</b>       |
| 9:00-11:00       |           | ESP 712 Grant Writing |           |           | End of Term     |









## CGS 701/702 UNIT SYLLABI

### MACROMOLECULES: NUCLEIC ACIDS

Dr. Christopher Davies  
BSB 519; 792-1468  
[davies@musc.edu](mailto:davies@musc.edu)

| Date         | Lectures   | Flex                | Instructor             |
|--------------|--|---------------------|------------------------|
| Tues Aug 21  | 1. Molecular structure<br>2. Conformational equilibria                               | Sample Problems     | Beeson<br>(beesonc)    |
| Thurs Aug 23 | 1. Biomolecular structure<br>2. Solvation and electrostatics                         |                     | Dix<br>(dixta)         |
| Fri Aug 24   | 1. Structural electronics<br>2. Chemical reactivity                                  | Sample Problems     | Beeson                 |
| Mon Aug 27   | 1. History, DNA structure<br>2. A, B & Z forms, W&C, base pairing                    |                     | Hennig<br>(hennig)     |
| Tues Aug 28  | 1. Genetic code<br>2. Superhelicity + topoisomerases                                 |                     | Hennig                 |
| Thurs Aug 30 | 1. DNA replication-DNA polymerases<br>2. DNA replication (continued)                 |                     | Brown<br>(broweri)     |
| Fri Aug 31   | 1. Recombination<br>2. DNA repair  | Group presentations | Brown                  |
| Tues Sept 4  | 1. Transcription in prokaryotic genes<br>2. Mechanisms of transcriptional regulation | Topic discussion    | Ogretmen<br>(ogretmen) |
| Thurs Sept 6 | 1. tRNA synthetases, translation<br>2. Structure of the ribosome – decoding          |                     | Davies<br>(davies)     |
| Fri Sept 7   | 1. Catalytic RNA & RNA processing<br>2. RNA interference                             |                     | Davies                 |

#### General reading

Prerequisite: Chapters 4-7 of Molecular Biology of the Cell, 4th Ed, Alberts *et al.* Also useful are Chapters 4, 5, 28, 29 & 30 in Stryer, 6th ed.

Background for August 21, 23, and 24:

<http://www.cem.msu.edu/~reusch/VirtualText/intro1.htm#contnt>

Sections: Chemical Bonding & Valence, Charge Distribution in Molecules, Isomers, Resonance, Conformational Isomers, Chirality & Symmetry

Free energy & equilibria: <http://www.chem1.com/acad/webtext/thermeq/TE5.html>

#### Specific Reading for Flex Times

1. "Genes and Signaling" by Mark Ptashne (2002). Cold Spring Harbor Laboratory Press. ISBN 0-87969-633-8. The MUSC library has at least one copy of this book and copies of selected parts of this book will be available in class. Mark Ptashne's lectures covering this book are at: <http://www.rockefeller.edu/events/archive.php>

Other papers will also be available on WebCT prior to the relevant lecture.

## MACROMOLECULES: PROTEINS

Dr. Kevin Schey  
CRI 311; 792-4367  
[scheykl@musc.edu](mailto:scheykl@musc.edu)

| Date          | Lectures                                    | Flex                        | Instructor                          |
|---------------|---|-----------------------------|-------------------------------------|
| Mon Sept 10   | Amino Acids to Protein Structure & Function |                             | Hennig (hennig)                     |
| Tues Sept 11  | Principles of X-ray Crystallography         | Molecular Modeling Exercise | Davies (davies)<br>Hazard (hazards) |
| Thurs Sept 13 | Protein Modification                        | Student Paper discussion    | Schey (scheykl)                     |
| Fri Sept 14   | Protein Folding and Stability               |                             | Schey                               |
| Mon Sept 17   | Protein-Protein Interactions                |                             | Hsu (hsuy)                          |
| Tues Sept 18  | Enzymes and Catalysis                       |                             | Krupenko (krupenko)                 |
| Thurs Sept 20 | Enzyme Kinetics                             |                             | Hansen (hansenjl)                   |
| Fri Sept 21   | Protein Purification                        | Paper discussion            | Schey                               |
| Mon Sept 24   | Protein Characterization                    |                             | Schey                               |
| Tues Sept 25  | Proteomics                                  | Computer Exercise           | Schey                               |

**General reading** Prerequisite reading for this Unit is Stryer's Biochemistry (5<sup>th</sup> Ed, Chapters 3, 4 and 8.

## METABOLISM AND BIOENERGETICS

Dr. Craig Beeson  
QF309C; 876-5091  
[beesonc@musc.edu](mailto:beesonc@musc.edu)

| Date          | Lectures  | Flex                | Instructor     |
|---------------|---|---------------------|----------------|
| Thurs Sept 27 | 1. Biological thermodynamics & kinetics<br>2. Overview of bioenergetics & redox         |                     | Beeson         |
| Fri Sept 28   | 1. Lipids, bilayers & membranes<br>2. Compartments, gradients & transporters            | Sample Questions    | Sweet (sweetd) |
| Mon Oct 1     | 1. Transporters & channels: classes, function<br>2. Transporters & channels: techniques | Paper Discussion    | Sweet          |
| Tues Oct 2    | 1. Overview of catabolism, anabolism  | Building a Nano-Bot | Beeson         |

|              |   |                  |           |
|--------------|---|------------------|-----------|
|              | 2. Signaling in regulation of metabolism                                |                  |           |
| Thurs Oct 4  | 1. Citric Acid Cycle<br>2. Beta oxidation                               |                  | Lemasters |
| Fri Oct 5    | 1. Electron transport chain<br>2. Biophysics of mitochondrial membranes | Paper Discussion | Lemasters |
| Mon Oct 8    | 1. Chemisomotic energy transduction<br>2. Oxidative Phosphorylation     | Quiz             | Lemasters |
| Tues Oct 9   | 1. Mechanisms in Glycolysis<br>2. Structural Aspects of Regulation      |                  | Davies    |
| Thurs Oct 11 | 1. Gluconeogenesis<br>2. Pentose phosphate pathway                      | Paper Discussion | Davies    |
| Fri Oct 12   | 1. Glycogen metabolism<br>2. Fatty acid biosynthesis                    | Quiz             | Beeson    |

### General Reading

|  | Lehninger | Mathews | Stryer |
|--|-----------|---------|--------|
| Intro to Metabolism                      | 14        | 12      | 15     |
| Bioenergetics                            | 13        |         |        |
| Lipids, membranes                        | 10        | 10      | 12     |
| Ion channels                             | 11        | 10      | 13     |
| Glycolysis                               | 14, 15    | 13      | 16     |
| TCA                                      | 16        | 14      | 17     |
| Oxidative-Phosph                         | 19        | 15      | 18     |
| Fatty Acid Oxidation                     | 17        | 18      | 22     |
| Pentose Phosphate<br>Pathway (HMP-shunt) | 15        | 14      | 20     |
| Gluconeogenesis                          | 14-15     | 16      | 16     |
| Glycogen Synthesis                       | 15        | 16      | 21     |
| Glycogen Catabolism                      | 15        | 13      | 21     |
| Fatty Acid Synthesis                     | 17        | 18      | 22     |

### Useful Websites:

<http://www.bmb.leeds.ac.uk/illingworth/oxphos/>  
<http://www.esf.edu/efb/course/EFB325/default.htm>  
<http://www.aw-bc.com/mathews/>  
<http://www.rpi.edu/dept/bcbp/molbiochem/MBWeb/mb1/MB1index.html>

### RECEPTORS & SIGNALING

Dr. Steven A. Rosenzweig  
 HCC 612; 792-5841  
[rosenzsa@musc.edu](mailto:rosenzsa@musc.edu)

| Date        | Lectures                            | Flex   | Instructor |
|-------------|-------------------------------------|--|------------|
| Mon Oct 22  | Overview of receptors & signaling I | Methods of Studying<br>Ligand:Receptor<br>Interactions | Rosenzweig |
| Tues Oct 23 | G protein coupled receptors         | Paper discussion (1)                                   | Luttrell   |

|              |   |                      |                                  |
|--------------|---|----------------------|----------------------------------|
|              |   |                      | (luttrell)                       |
| Thurs Oct 25 | G proteins and their regulatory proteins            | Paper discussion (2) | Blumer<br>(blumerjb)             |
| Fri Oct 26   | Receptor tyrosine kinases                           | Paper discussion (3) | Rosenzweig                       |
| Mon Oct 29   | Protein:protein interactions in signal transduction | Paper discussion (4) | Ball<br>(balle)                  |
| Tues Oct 30  | Protein kinases: MAP kinases                        | Paper discussion (5) | Eblen<br>(eblen)                 |
| Thurs Nov 1  | Signaling to apoptosis                              | Methods exercise     | Voelkel-<br>Johnson<br>(johnsov) |
| Mon Nov 5    | Cell signaling in disease: Animal models of cancer  | Paper discussion (6) | Neumann<br>(neumannc)            |

**General reading** Prerequisite: Chapters 15, 17 & 23 of Molecular Biology of the Cell, 4th Ed, Alberts *et al.*

**Specific Reading** Papers will be posted on WebCT as required

### REGULATION OF GENE EXPRESSION

Dr. Donald Menick  
Gazes/Strom Thurmond 203; 876-5045  
[menickd@musc.edu](mailto:menickd@musc.edu)

| Date         | Lectures  | Flex                                | Instructor             |
|--------------|---|-------------------------------------|------------------------|
| Tues Nov 6   | Lectures 1 and 2: Eukaryotic Transcription/Regulation of Gene Expression  | Discussion of student presentations | Kyu-Ho Lee<br>(leeh)   |
| Thurs Nov 8  | Lecture 3: Integrating Transcriptional Regulation Signaling Events<br>Lecture 4: Epigenetic Regulation of Gene Expression |                                     | Kyu-Ho Lee             |
| Fri Nov 9    | Lectures 5 and 6: HDAC's and HAT's Role in Gene Expression  |                                     | Menick<br>(menickd)    |
| Mon Nov 12   | Lectures 7 and 8: RNA Interference  |                                     | Menick                 |
| Tues Nov 13  | Lectures 9 and 10: Regulation of mRNA Processing and Localization   |                                     | McDermott<br>(mcdermp) |
| Thurs Nov 15 | Lecture 11: Regulation of mRNA Stability and Translation<br>Lecture 12: Regulation of Translation and Degradation         | Practice talks                      | McDermott              |
| Fri Nov 16   | Student presentations of research papers  | Practice talks                      |                        |

|             |  |  |  |
|-------------|--|--|--|
|             |  |  |  |
| Mon Nov 19  | Student presentations of research papers |  |  |
| Tues Nov 20 | Student presentations of research papers |  |  |

**General Reading** Prerequisite: Chapters 10, 11 and 12 of Lodish *et al*, 5th Ed. Additional reading from recent reviews will be assigned by each lecturer.

**Flex-Time:** Primary research papers will be presented and discussed. Each student will select a current paper on gene expression (instructors will provide examples). Selected papers will be submitted for Unit leader approval by Friday, November 9, 2007. The Unit Leaders will give sample presentations, and students' initial flex-time presentations on November 15 and 16, 2007 will be in small groups (~6-7 students) to maximize questions and input. Within each group, an instructor, postdoc TA or senior student will critique each presentation. Students will present to the entire class on November 19 and 20, 2007. A secondary focus of Flex-times will be discussion of topics or techniques relevant to gene expression arising from lectures that day.

**Grading:** 30% of the Unit grade will derive from in-Unit research paper presentation, and 70% will derive from the Unit exam (take-home).

#### GENETICS AND GENOMICS

Dr. Denise Quigley  
CH 222, 792-1181  
[quigleyd@musc.edu](mailto:quigleyd@musc.edu)

| Date         | Lectures   | Flex                                  | Instructor                      |
|--------------|--|---------------------------------------|---------------------------------|
| Mon Nov 26   | 1. Chromosomal Basis of Heredity/<br>Epigenetics<br>2. Hearing Loss Database/project intro | Molecular Methods:<br>study design    | Wolff<br>(wolffd)<br>Quigley    |
| Tues Nov 27  | 1. Bioinformatics<br>2. Genomics   | Non-Mendelian<br>Project              | Schwacke<br>(schwacke)<br>Gross |
| Thurs Nov 29 | 1. Non-Mendelian Genetics, student<br>presentations  |                                       | Wolff<br>Quigley                |
| Fri Nov 30   | 1. Pharmacogenomics  | Hypothesis<br>Statement<br>Discussion | Zhu<br>(zhuyu)                  |
| Mon Dec 3    | 1. Genetic Model Systems   | Molecular Methods:<br>Real time PCR   | Cunningham<br>(cunninll)        |
| Tues Dec 4   | 1. Genomic Copy Number Variation   | Paper discussion                      | Wolff                           |
| Thurs Dec 6  | 1. Population Genetics/Human Genetics  |                                       | Quigley                         |
| Fri Dec 7    | 1. Small group discussion<br>2. Presentation of representative proposals                   |                                       | all                             |

## General Reading

Prerequisite reading for this Unit is Chapters 1-3, 6, 12, and 19 of *Introduction to Genetic Analysis*, 8th ed, Anthony Griffiths *et al.*

**Specific Reading** (additional papers may be posted on WebCT before the relevant lecture)

1. Ünal M, Tamer L, Dogruer ZN, *et al.* (2005). N-Acetyltransferase 2 Gene Polymorphism and Presbycusis. *The Laryngoscope* 115:2238-2241
2. Garringer HJ, Pankratz ND, Nichols WC, Reed T. (2006) Hearing Impairment Susceptibility in Elderly Men and the DFNA18 Locus. *Arch Otolaryngol Head Neck Surg* 132:506-510
3. Rovelet-Lecrux A, Hannequin D, Raux G, *et al.* (2006). APP locus duplication causes autosomal dominant early-onset Alzheimer disease with cerebral amyloid angiopathy. *Nature Genet* 38(1):24-26
4. Wong KK, deLeeuw RJ, Dosanjh NS, *et al.* (2007). A Comprehensive Analysis of Common Copy-Number Variations in the Human Genome. *American Journal Human Genetics* 80(1):91-104

This journal article will be discussed in class Tuesday Dec 4th.

## CELLULAR FUNCTIONS

Dr. Edward Krug  
CRI 607; 792-1543  
[krugel@musc.edu](mailto:krugel@musc.edu)

| Date         | Lectures                                | Flex             | Instructor             |
|--------------|---|------------------|------------------------|
| Thurs Jan 3  | Cell:Extracellular Matrix Interactions  |                  | Bradshaw<br>(bradshad) |
| Fri Jan 4    | Cell Motility                           | Paper discussion | Bradshaw               |
| Mon Jan 7    | Cytoskeletal Dynamics                   |                  | Krug<br>(krugel)       |
| Tues Jan 8   | Molecular Motors                        |                  | Krug                   |
| Thurs Jan 10 | Secretion and Vesicular Trafficking     | Paper discussion | Krug                   |
| Fri Jan 11   | The Eukaryotic Cell Cycle               |                  | Kurtz<br>(kurtzdt)     |
| Mon Jan 14   | Oncogenes and cancer                    |                  | Kurtz                  |
| Tues Jan 15  | Tumor suppressor genes                  | Paper discussion | Kurtz                  |
| Thurs Jan 17 | Integrating Cells Into Tissues          |                  | Gourdie<br>(gourdier)  |
| Fri Jan 18   | Panel Discussions of Current Literature |                  | Faculty and Class      |
| Tues Jan 22  | Panel Discussions of Current Literature |                  | Faculty and Class      |

**General Reading** Chap 6, 16, 17, 19, 20, 21 and 23, *Molecular Cell Biology*, 5<sup>th</sup> ed., Lodish

**Specific Reading:** Papers will be posted on WebCT before the relevant lecture.

## CELL INJURY AND RESPONSE

Dr. Debra Hazen-Martin  
Walton Research Building 8<sup>th</sup> floor complex, 792-2906  
[hazenmad@musc.edu](mailto:hazenmad@musc.edu)

| Date         | Lectures   | Flex   | Instructor  |
|--------------|--|--|---|
| Thurs Jan 24 | 1. Introduction<br>2. Causes, mechanisms, morphology of cell and tissue injury                         | Multihead scopes with pathologists.<br>In-Unit assign #1.              | Hazen-Martin (l)*<br>(hazenmad)                                       |
| Fri Jan 25   | 1. Cellular adaptations, cell death, and necrosis<br>2. Introduction to inflammation and repair        | Tissue injury – a discussion of time-line of events.<br>Assign #1 due. | Hazen-Martin (l/f)*   |
| Mon Jan 28   | 1. Components of immune system I<br>2. Components of immune system II                                  | Chose techniques rotation.<br>In-Unit assign #2.                       | L. London (l/f)<br>(londonl)  |
| Tues Jan 29  | 1. Immune system III   | POPS**   | L. London (l/f)   |
| Thurs Jan 31 | 1. Inflammation in acute cellular injury<br>2. Immunopathology – 2 examples of inflammation in disease | No flex; all lecture   | Hazen-Martin (l)<br>S. Self (l)<br>(selfs)                            |
| Fri Feb 1    | No lecture/all flex  | Paper discussion #1  | Schnellman (f)<br>(schnell)   |
| Mon Feb 4    | No lecture/all flex  | Techniques rotation;<br>in-Unit assign #3                              |   |
| Tues Feb 5   | 1. Cellular senescence<br>2. Aging   | Techniques follow up – discuss choice of papers with group             | Zhou (l)<br>(zhoud)<br>Hazen-Martin (f)                               |
| Thurs Feb 7  | 1. Apoptosis – historical overview<br>2. Apoptosis – Causes, mechanisms, and detection                 | Promote?/Prevent?<br>Paper discussion #2                               | Cunningham (l)<br>(cunninll)<br>Brown (f) (broweri)<br>Wei (f) (weil) |
| Fri Feb 8    | 1. Benign and malignant neoplasms<br>2. Biology of tumor growth  | Work on group presentations.   | Metcalf (l)<br>(metcalfj)   |
| Mon Feb 11   | Student Techniques Presentations   |  |   |

\*(l)=lecture, (f)=flex

\*\*a group problem-solving workshop

**General reading** Robbins Basic Pathology, 7<sup>th</sup> edition (on reserve); the following chapters will supplement lecture notes:

- Chapter 1: Cellular Injury and response  
Aging  
Apoptosis
- Chapter 2: Inflammation
- Chapter 5: Diseases of Immunity
- Chapter 6: Neoplasia

If you prefer a more comprehensive version of this text try Robbins Pathologic Basis of Disease which is available on line through MD Consult. Additional articles and/or reviews may be provided in class.

Kuby's Immunology, 6<sup>th</sup> edition (2006, by Janis Kuby, et.al.) Chapters 1-10 contain basic information that supplements lecture notes.

**Specific Reading** will be posted on WebCT before the relevant lecture and/or assignment.

### SYSTEMS BIOLOGY

Dr. Perry Halushka  
BSB 102B1; 792-3012  
[halushpv@musc.edu](mailto:halushpv@musc.edu)

Dr. James Cook  
SEI 611; 792 2978  
[cookja@musc.edu](mailto:cookja@musc.edu)

| Date         | Lectures  | Flex | Instructor<br>(email)  |
|--------------|---|------|------------------------|
| Tues Feb 12  | 1. Introduction to the Unit<br>2. Molecular Mechanism for Aspirin Mediated Cardiovascular Prophylaxis |      | Halushka<br>(halushpv) |
| Thurs Feb 14 | 1. Mechanisms of Neurotransmission  |      | Ramamoorthy<br>(rama)  |
| Fri Feb 15   | 1. Autonomic Nervous System Control of the CV System  |      | Webb<br>(webbj)        |
| Mon Feb 18   | 1. Molecular Basis of Electrical Mechanical Coupling  |      | Menick<br>(menickd)    |
| Tues Feb 19  | 1. Molecular/Genetic Basis of Congenital Heart Disease  |      | McQuinn<br>(mcquinnt)  |
| Thurs Feb 21 | 1. Molecular Basis of Atherosclerosis   |      | Hammad<br>(hammadsm)   |
| Fri Feb 22   | 1. Molecular Basis of Neurodegenerative Diseases  |      | Granholm<br>(granholm) |
| Mon Feb 25   | 1. Renal Physiology   |      | Bell<br>(bellpd)       |
| Tues Feb 26  | 1. Proteomic Tools for Analysis of Renal Disease  |      | Arthur<br>(arthurj)    |
| Thurs Feb 28 | 1. Microbial Basis of Infectious Diseases   |      | John<br>(johnjf)       |
| Fri Feb 29   | 1. Molecular Mechanisms of Innate Immunity  |      | Cook<br>(cookja)       |

## FIRST YEAR CURRICULUM RECOMMENDED TEXTBOOKS

There is no assigned textbook for the First Year Curriculum. A number of standard texts (shown below) are recommended for background reading in the topics students will encounter during the curriculum. Multiple copies of all these textbooks are available on reserve in the Library for the exclusive use of first year graduate students; please check with the Circulation Desk for borrowing privileges.

| <b>Title</b>   | <b>Edition</b>         | <b>Authors</b>                     |
|--|------------------------|------------------------------------|
| Biochemistry *   | 6 <sup>th</sup> (2006) | Lubert Stryer                      |
| Biochemistry   | 3 <sup>rd</sup> (1990) | Mathews and Van Holde              |
| Biomembranes: Molecular Structure and Function                                     | 1 <sup>st</sup> (1989) | Robert B. Gennis                   |
| DNA Replication  | 2 <sup>nd</sup> (2005) | Arthur Kornberg                    |
| Lehninger Principles of Biochemistry   | 4 <sup>th</sup> (2004) | David L. Nelson and Michael M. Cox |
| Advanced Organic Chemistry-Reactions, Mechanisms, and Structure                    | 5 <sup>th</sup> (2001) | M.S. Smith and J. March            |
| Molecular Biology of the Cell  | 4 <sup>th</sup> (2002) | Bruce Alberts <i>et al.</i>        |
| Molecular Biology of the Gene *  | 5 <sup>th</sup> (2003) | James D. Watson <i>et al.</i>      |
| Molecular Cell Biology *   | 5 <sup>th</sup> (2004) | Harvey Lodish <i>et al.</i>        |
| Review of Organic Functional Groups: Introduction to Medicinal Organic Chemistry * | 4 <sup>th</sup> (2003) | T.L. Lemke                         |
| Basic Pathology  | 7 <sup>th</sup> (2002) | Stanley L. Robbins <i>et al.</i>   |
| Introduction to Genetic Analysis   | 8 <sup>th</sup> (2004) | Griffiths <i>et al.</i>            |

### Program-Related Textbooks

|                                 |                        |                               |
|---------------------------------|------------------------|-------------------------------|
| Cellular & Molecular Immunology | 4 <sup>th</sup> (2005) | Abul K. Abbas <i>et al.</i>   |
| Fundamental Neuroscience        | 2 <sup>nd</sup> (2002) | Michael Zigmond <i>et al.</i> |
| Immunology                      | 5 <sup>th</sup> (2002) | Richard Goldsby <i>et al.</i> |
| The Immune System               | 1 <sup>st</sup> (2004) | Peter Parham                  |

(\* Highly Recommended)

## PH.D. PROGRAM EXPOSURES

Mon, Wed and Fri afternoons, August 22-September 14, 2007

During the first four weeks of the Curriculum, departmental faculty, along with their students and postdoctoral fellows, present their Ph.D. programs to matriculating graduate students, familiarizing them with the overall themes of the individual programs, advanced coursework, the nature of qualifying exams, and dissertation research opportunities. Ph.D. Program Exposures provide students with important information that will be useful in selecting faculty mentors for their laboratory rotations. The schedule of Program Exposures for Fall 2007 is as follows:

| <i>Date</i>              | <i>Program</i>  | <i>Contact</i>   | <i>Time</i>   | <i>Place</i>                   |
|--------------------------|---|--|---|--------------------------------|
| Wednesday<br>22 August   | Cell and Molecular<br>Pharmacology                            | Dr. Steve Rosenzweig<br><a href="mailto:rosenzsa@musc.edu">rosenzsa@musc.edu</a><br>792-5841 | 1:00-3:00 pm  | BSB 350                        |
| Friday<br>24 August      | Pathology and Laboratory<br>Medicine                          | Dr. Lisa Cunningham<br><a href="mailto:cunninll@musc.edu">cunninll@musc.edu</a><br>792-8324  | 1:00-6:00 pm<br>(posters/cocktails<br>at 5:00 pm)                           | CHP A-<br>204                  |
| Monday<br>27 August      | Clemson-MUSC<br>Bioengineering                                | Dr. Richard Swaja<br><a href="mailto:swajar@musc.edu">swajar@musc.edu</a><br>792 0430        | 2:00-3:30 pm  | BSB 202                        |
| Wednesday<br>29 August   | Pharmaceutical Sciences                                       | Dr. Douglas Sweet<br><a href="mailto:sweetd@musc.edu">sweetd@musc.edu</a><br>792 2348        | Noon-3:00 pm<br>(lunch provided)  | QF 106                         |
| Wednesday<br>5 September | Neuroscience  | Dr. Judson Chandler<br><a href="mailto:chandj@musc.edu">chandj@musc.edu</a><br>792 5224      | 3:00-7:00 pm<br>(posters and<br>reception at 4:30<br>pm)                    | BSB 402,<br>Wickliffe<br>House |
| Friday<br>7 September    | Molecular and Cellular<br>Biology and Pathobiology<br>Program | Dr. Don Menick<br><a href="mailto:menickd@musc.edu">menickd@musc.edu</a><br>876 5045         | 4:00-6:00 pm<br>(hors d'oeuvres &<br>beer, optional trip<br>to Ft. Johnson) | HCC<br>Room 120                |

|                           |  |   |                                   |                             |
|---------------------------|--|---|-----------------------------------|-----------------------------|
| Monday<br>10 September    | Microbiology and<br>Immunology                       | Dr. Laura Kasman<br><a href="mailto:kasmanl@musc.edu">kasmanl@musc.edu</a><br>792-8117            | 1:00-3:00 pm                      | BSB 202                     |
| Wednesday<br>12 September | Biostatistics,<br>Bioinformatics and<br>Epidemiology | Dr. Dan Lackland<br><a href="mailto:lackland@musc.edu">lackland@musc.edu</a><br>876 1141          | 11 am-1:00 pm<br>(lunch provided) | Cannon<br>Place<br>Room 301 |
| Friday<br>14 September    | Biochemistry and<br>Molecular Biology                | Dr. Maurizio Del<br>Poeta<br><a href="mailto:delpoeta@musc.edu">delpoeta@musc.edu</a><br>792-8381 | noon-2:00 pm<br>(lunch provided)  | BSB 502                     |

### **ESSENTIAL SCIENTIFIC PRACTICES I, II AND III**

Essential Scientific Practices I, II and III (CGS 710, CGS 711 and CGS 712) address the imperatives of performing biomedical research in an ethically responsible manner, the requirements facing scientists as they navigate the increasingly complex spectrum of regulations governing scientific practice, and the importance of effective scientific and social communication with a professionally and ethnically diverse audience.

CGS 710 emphasizes ethical principles and regulations concerning animal models and human subjects in research, accurate record keeping and data management, and safe laboratory practices for using hazardous biologicals, chemicals and radiation. The course also presents essential skills for searching the scientific literature, and for reading and critical analysis of manuscripts. Finally, the course explores the moral reasoning behind the responsible conduct of research. Students will increase their knowledge of ethical theory and develop core competencies that include institutional policies on research misconduct as well as relevant governmental regulations on the conduct of research.

#### **CGS 710 Responsible Conduct of Research**

Edward L. Krug, Ph.D. Course Director

[krugel@musc.edu](mailto:krugel@musc.edu)

| <b>Date</b>                              | <b>Time</b>                        | <b>Topic</b>   | <b>Instructor</b>                         |
|--|------------------------------------|--|---|
| August 23 (Th)<br>BSB 656                | 1:00 to 1:50 pm<br>2:00 to 2:50 pm | Mentoring<br>Oral Presentation Skills  | E. Krug<br>P. Halushka                    |
| August 25 (Sat)<br>CSB300                | 8:30 am to noon                    | RCR Workshop I <ul style="list-style-type: none"> <li>• Brief History of RCR</li> <li>• Misconduct</li> <li>• Ethical Decision Making</li> </ul>         | E. Krug and faculty                       |
| August 28 (T)<br>library<br>computer lab | 1:00 to 2:50 pm                    | Literature Databases   | T. L. Herbert,<br>B. Poyer and faculty    |
| August 30 (Th)<br>BSB 656                | 1:00 to 1:50 pm<br>2:00 to 2:50 pm | Human Subjects Research<br>Animals Use in Research   | P. Arford<br>A. Smith                     |
| September 4 (T)<br>BSB 656               | 1:00 to 1:50 pm<br>2:00 to 2:50 pm | Reading Scientific Literature<br>Scientific Writing  | R. Schnellman<br>T. Smith                 |
| September 6 (Th)<br>BSB 656              | 1:00 to 1:50 pm<br>2:00 to 2:50 pm | Radiation Safety<br>Chemical Hazards   | J. Rutan<br>J. Avant                      |
| September 8 (Sat)<br>CSB300              | 8:30 am to noon                    | RCR Workshop II <ul style="list-style-type: none"> <li>• Data Management &amp; Selection</li> <li>• Reporting Research</li> <li>• Peer Review</li> </ul> | E. Krug and faculty                       |
| September 11 (T)<br>BSB 656              | 1:00 to 1:50 pm<br>2:00 to 2:50 pm | Biohazards<br>Intellectual Property  | M. Schmidt/L. Steed<br>C. Hood/R. Gourdie |
| September 13 (Th)<br>BSB 656             | 1:00 to 1:50 pm<br>2:00 to 2:50 pm | Conflict of Interest<br>Time Management  | T. Higerd<br>E. Krug                      |
| September 15 (Sat)<br>CSB300             | 8:30 am to noon                    | RCR Workshop III <ul style="list-style-type: none"> <li>• Reporting Misconduct</li> <li>• Emerging Issues</li> </ul>                                     | E. Krug and faculty                       |
| September 19 (W)                         |                                    | <b>First Lab Rotation Begins</b>   |   |

**Notes:** This is a Pass/Fail course. Attendance is mandatory-please contact Dr. Krug should any problems or conflicts arise. Lectures and quizzes will be posted on WebCT (100% required for each quiz).

### **CGS 711: Diversity in Science**

Cynthia F. Wright, Ph.D., Course Director

([wrightcf@musc.edu](mailto:wrightcf@musc.edu))

BSB 302, Thursdays: 5:00 pm-6:00 pm

(Sept 20, Oct 4, Oct 25, Nov 8, Nov 29)

In CGS 711, students address topics that pertain to concerns facing both under-represented minority and majority groups in the biomedical sciences. Topics discussed include how to succeed in the scientific community, hurdles and how to overcome them, and working in and developing a diverse workforce. Invited speakers discuss how they have succeeded in science and the obstacles they overcame. This is a Pass/Fail course. Attendance is mandatory-please contact Dr. Wright should any problems or conflicts arise.

**CGS 712 Grant Writing**  
Edward L. Krug, Ph.D., Course Director  
([krugel@musc.edu](mailto:krugel@musc.edu))  
June 3-August 12  
Tues, 9:00-11:00 am, QF302A

In CGS 712, offered in the summer after a mentor or program of study has been selected, students create a short grant proposal. This exercise develops effective scientific writing skills, promotes early student:mentor interaction, encourages appreciation of the benefits of giving and receiving constructive criticism, and introduces the mechanics of extramural funding. Faculty facilitators and each student's mentor provide critical feedback on section drafts of their proposal over the summer. Students will also partner with one another to critique each other's proposal. Class time discussion is devoted to selected samples of submitted writing. The top four proposals selected by an outside grant consultant are placed on reserve in the College of Graduate Studies office and their authors receive a year's subscription to *Science*.

**LABORATORY ROTATIONS (CGS 720/721)**

Jacqueline F. McGinty, Ph.D., Course Director ([mcginty@musc.edu](mailto:mcginty@musc.edu))

First Year Curriculum students are required to enroll in two laboratory rotations in the fall semester and two laboratory rotations in the spring semester. Laboratory rotations are from six to nine weeks long. Students rotate through at least three different laboratories (different mentors) to maximize their exposure to a diversity of scientific approaches, projects, technologies and experiences. Rotation objectives may include one or all of the following:

1. To acquaint students with potential dissertation mentors. Students will:
  - a. Receive a briefing on the research focus of the laboratory
  - b. Receive 1-3 review and/or research papers to read and discuss with the mentor during the rotation
2. To introduce students to conduct of laboratory science. Students will:
  - a. Work on limited projects with the goal of understanding the basis for the hypothesis being tested and the general approach to test the hypothesis
  - b. Participate in weekly group or laboratory meetings
  - c. Attend department or program seminars
3. To acquire skill in diverse laboratory techniques. Students will:
  - a. Learn techniques (theory, limitations, etc) associated with the rotation project by collaborating with investigator (mentor, graduate student, postdoctoral trainee and/or technician)
  - b. Conduct laboratory research throughout the week and weekends when indicated
4. To acquaint students with other graduate students, faculty, seminars, journal clubs and other research activities of the department or program.

**Mentor Selection.** Early in the Fall semester, having explored each research program in Program Exposures, students nominate two faculty members (with their approval) as potential mentors for the first laboratory rotation. Deficiencies in laboratory resources should be weighed carefully in selecting rotations; students should ensure that space and financial support would be available if the student decided to pursue his/her dissertation in that mentor's lab. Names of

first and second choice potential mentors are submitted to Keisha Brown in the Graduate Office. Every effort is made to accommodate students' first choices; however, if several students select the same mentor, students who delay submission may be assigned their second choice of mentor or they may need to select another mentor. Schedules for the laboratory rotations and form submission deadlines are shown here and in the FYC Calendar (pages 7 to 10).

| <b>Rotation</b> | <b>Submit Choices</b> | <b>Begin</b>  | <b>End</b>   | <b>Evaluations Due</b> |
|-----------------|-----------------------|---------------|--------------|------------------------|
| 1               | Sept 17, 2007         | Sept 19, 2007 | Nov 1, 2007  | Nov 1, 2007            |
| 2               | Oct 31, 2007          | Nov 5, 2007   | Jan 11, 2008 | Jan 11, 2008           |
| 3               | Jan 9, 2008           | Jan 14, 2008  | Feb 29, 2008 | Feb 29, 2008           |
| 4               | Feb 27, 2008          | Mar 17, 2008  | May 2, 2008  | May 2, 2008            |

**Evaluation of Lab Rotations.** At the end of the laboratory rotation, mentors are responsible for submitting a signed evaluation form (APPENDIX II) to Keisha Brown in the Graduate Office. Prompt submission of the evaluation form provides the necessary information for the Course Director to assign an Honors/Pass/Fail grade. In addition, students will complete a mandatory WebCT-based evaluation of the laboratory rotation. Failure to submit timely evaluations will result in an incomplete grade for the rotation.

**Selection of Dissertation Mentor.** Laboratory Rotations, Program Exposures, Spring Selectives, attendance and participation in journal clubs and seminars, and focused discussion throughout the year with faculty advisors, mentors, and senior students regarding all aspects of available Ph.D. programs should facilitate selection of a dissertation mentor by the end of the spring semester. Students should submit their Ph.D. program selection form (Appendix III) in the two week period following the last laboratory rotation.

**IMPORTANT UNANSWERED QUESTIONS IN THE BIOMEDICAL SCIENCES  
(CGS 760)**

Perry V. Halushka, M.D., Ph.D., Course Director ([halushpv@musc.edu](mailto:halushpv@musc.edu))  
Tuesdays, 12:00 noon (lunch is provided)  
Sept 18-Dec 4, 2007 and Jan 8-Feb 26, 2008  
Basic Science Building, Room 402

**The Seminar Series.** Our status as an academic medical center is focused on human health and disease requires our student's and faculty's research to parallel the mission of the institution. This seminar series is designed to meet two objectives; 1) excite our students and broaden their perspectives on translational research and 2) develop critical thinking skills that encompass the evaluation of data and the design of hypothesis-driven research. Seminar speakers are chosen for their area of research, which should be hypothesis-driven clinical or basic research, the latter with a potential clinical application. The seminar topics are picked to coincide with the particular topic being covered in the didactic portion of the First Year Curriculum.

**The Unanswered Questions.** Almost invariably, the results of a research project or seminar lead to additional important unanswered questions. At the end of the seminar, students should be thinking about how they would take the research to the next level. There is often no single correct direction in which to move the research. Thus, the challenge for the students is to determine what they would do. To meet this challenge, students are required to pose a question or hypothesis that they feel is directly related to the results presented. They have to support their idea(s) with a rationale based on the results presented and/or evidence from the literature. The final piece of the assignment is to design at least one and preferably two experiments that one would perform and provide a description of the anticipated results.

**Evaluation of Student Comprehension.** Students are required to submit their answers (minimum of one double-spaced page, maximum of two pages) through WebCT within a week of the seminar; failure to submit an answer on time earns a zero for that seminar. Students missing a seminar for a legitimate reason are not assigned a grade for that seminar. An excused absence must be obtained from the course director prior to the seminar. Answers are graded on the honors, pass or fail system. Students are assigned a semester grade based on their cumulative grades for each seminar. Students failing a semester will have to repeat the semester the following year.

## SPRING SELECTIVES

In the second half of the spring semester, doctoral training programs in the College of Graduate Studies offer First Year Curriculum students a choice of discipline- or program-specific courses. These seven-week "Selectives" provide students with more focused studies in their specific fields of interest. Upon registering for the 2008 Spring semester, students are required to enroll in one of the nine Selectives courses listed below. Specific times and locations for each of the Selectives will be announced in advance of the registration deadline.

### **Biochemistry and Molecular Biology**

#### **Mechanisms of Aging and Life Span (BMB 605A)**

Many pathological processes have become amenable to study using the various tools and approaches of biochemistry, molecular biology, genetics, chemistry, and bioinformatics. This is perhaps best illustrated in the study of aging. After decades of little progress, it is now apparent that fundamental processes regulate lifespan of organisms ranging from yeast to *Caenorhabditis elegans*, to drosophila, to mice, and, by extension, to humans. These common mechanisms involve caloric restriction, transcription factors, insulin-like signaling, lipid signaling, and telomerase. Disorders in these pathways result in disturbances in lifespan, and in some cases in human diseases.

This course will provide the students with the necessary foundation in understanding the various models employed for the study of aging and lifespan, such as the yeast (subtopic A) and mammalian (subtopic B) models. The course will then focus on the role of telomerases (subtopic C) and lipids (subtopic D) in the regulation of aging. The course will rely primarily on original literature and in depth discussion of key and foundation papers. The discussion will be led by expert faculty who will introduce each topic and provide the students with the necessary foundations.

Course Directors: Maurizio Del Poeta, M.D. ([delpoeta@musc.edu](mailto:delpoeta@musc.edu)) and Yusuf A. Hannun, M.D. ([hannun@musc.edu](mailto:hannun@musc.edu))

### **Biostatistics, Bioinformatics, and Epidemiology**

#### **Quantitative Methods in Biomedical Research (BMTRY 789X)**

The huge volume of data flowing from biomedical "omics" era high throughput technologies provides great research opportunities, but poses significant challenges for management, analysis and interpretation. This course presents a series of concepts and methods that are fundamental for quantitative inference in biological and medical research. Topics include the importance of "statistical thinking" (recognizing the role of uncertainty in research), experimental and observational study design, data representation, and methods of data analysis selected to highlight key features (independence/dependence, continuous/categorical, dimensionality, etc.) of biomedical data. The implications for studies in comparative and functional genomics, biochemical systems, and proteomics are emphasized. Each topic is complemented by journal articles that students have read prior to class. Students are required to participate in a computer laboratory, and are encouraged to share their interests in specific experimental or observational data sets. Evaluation is based on assignments and participation. Group projects may be assigned and evaluated at discretion of course director.

Course Directors: Elizabeth Slate, Ph.D. ([slateeh@musc.edu](mailto:slateeh@musc.edu)) and Xinghua Lu, M.D., Ph.D. ([lux@musc.edu](mailto:lux@musc.edu))

## **Cell and Molecular Pharmacology and Experimental Therapeutics**

### **Molecular Pharmacology (PCOL 72401)**

In this course, students will be introduced to the process behind the development of new therapeutic agents targeting cell signaling pathways, from the bench to the bedside. This will include what is required to get a newly developed drug approved for human testing and ultimately, therapeutic application. Recently developed agents for the treatment of cancer and cardiovascular disease will be exemplified. This course will also introduce students to the field of Pharmacology and how it integrates the fields of biochemistry, cell biology, physiology and medicine, leading to the understanding of biological problems which serve as the targets for the development of new therapies.

Course Directors: Donald Miller, Ph.D. ([millerdh@musc.edu](mailto:millerdh@musc.edu)) and Steven Rosenzweig, Ph.D. ([rosenzsa@musc.edu](mailto:rosenzsa@musc.edu))

## **Microbiology and Immunology**

### **Emerging Infectious Diseases (pending)**

This course will teach basic immunological and microbiological concepts through in-depth study of six microorganisms responsible for emerging or epidemic infectious diseases. Each week will focus on the biology, natural history, pathology and immunology associated with one pathogen. Pathogens covered will include avian influenza, tuberculosis, Ebola/Marburg virus, methicillin resistant *Staph. aureus*, SARS, and anthrax. Classes will include lecture, primary literature reading and analysis, and some in-class small group work. Student performance will be assessed by weekly quizzes (60%), presentation of an assigned paper (10%), and a final exam (30%). Course Director: Laura Kasman, Ph.D. ([kasmani@musc.edu](mailto:kasmani@musc.edu))

## **Molecular and Cellular Biology and Pathobiology**

### **Advanced Cell Biology (MCBP 723)**

The course builds on student knowledge from the Regulation of Gene Expression, Cellular Functions and Receptors and Signaling Units of the First Year Curriculum. New approaches and technology that are being utilized to identify the molecular mechanism and factors at play in cellular function and disease will be discussed. The course will combine lectures, discussion of papers from the literature, student presentations and a formal paper.

Course Director: Edward L. Krug, Ph.D. ([krugel@musc.edu](mailto:krugel@musc.edu)), Bryan Toole, Ph.D. ([toolebp@musc.edu](mailto:toolebp@musc.edu))

## **Pathology and Laboratory Medicine, and Cell Biology and Anatomy**

### **Graduate Histology and Introduction to Histopathology (PATH 789)**

Students will learn to visualize the microscopic architecture of the human/animal body. A main goal is to teach basic and organ histology as a prerequisite for graduate student participation in a general pathology course. For graduate students in fields other than pathology the course will provide a practical understanding of histology. The primary resource for this course is WebMic, a Virtual Microscope and a Companion Manual of Histology Exercises. Webmic mimics the use of the microscope in learning histology. Emphasis will be placed on guided self-directed learning with ample opportunity for interaction with faculty through direct viewing of specimens with microscopes, the use of dual viewing microscopes, and TV microscopy. This course, including oral and written examinations, will be managed and administered online via WebCT.

Course Directors: Debra Hazen-Martin, Ph.D. ([hazenmad@musc.edu](mailto:hazenmad@musc.edu)) and Robert Ogilvie, Ph.D. ([ogilvieb@musc.edu](mailto:ogilvieb@musc.edu))

## **Pharmaceutical Sciences**

### **Chemical Structure, Transport & Metabolism in Drug Discovery (PHMSC 712)**

This Selective explores the scientific principles underlying targeted drug design. Medicinal chemistry is integrated with molecular biology in the context of identifying tomorrow's best-in-class drugs. The interdependence of pharmacodynamic and pharmacokinetic structure-activity relationships will be discussed as a feature of drug discovery. Merit grades will be based on class participation (25%) and outside assignments (75%). Course Director: Kennerly Patrick, Ph.D. ([patrickk@musc.edu](mailto:patrickk@musc.edu))

## **Neuroscience**

### **Introduction to Neuroscience (PHYSO 604)**

A survey of fundamental knowledge and an introduction to conceptual thinking about structure and function of the nervous system are presented through a series of lectures. Lectures cover brain function and cellular mechanisms of neuronal communication. In addition, the students will be introduced to basic theory/techniques used in neuroscience research in a lecture format. The goal of the course is to prepare beginning researchers in a defined area of neuroscience. Course Director: Sammanda Ramamoorthy, Ph.D. ([rama@musc.edu](mailto:rama@musc.edu))

## **STUDENT EVALUATION OF COURSE EFFECTIVENESS**

A guiding principle behind development and evolution of the First Year Curriculum is that detailed analysis and responsiveness to student opinion promotes excellence in both faculty and curriculum content. Thus, an essential feature of the curriculum is student evaluation of faculty and course effectiveness. Student evaluation of Foundation of Biomedical Sciences is performed on three levels: the Unit level, the Course level, and Outstanding Teacher level.

### **I. Unit Evaluation**

Units in CGS 701/702 are evaluated anonymously by students via WebCT. Online quantitative evaluation forms are open to registered students for one week starting on the last day of each Unit. Students are asked to rate seven Unit statements and four Instructor statements (APPENDIX IV). In addition, after each set of Unit exams, students are asked to offer constructive written criticism of each Unit (content, instructors, etc) in an editable WebCT text box. Unit evaluations are reviewed by the Course Director, and distributed to individual Unit Leaders, the Associate Dean, and the Dean. In March 2008, students with 90% response rates in Unit evaluations will participate in a raffle. The prize will be dinner for two at the Peninsula Grill (\$250 maximum) and a subscription to Science or Nature.

### **II. Course Evaluation**

Semester evaluations are acquired by means of MUSC E\*Value course evaluation software administered by the Office of Enrollment Services and by the College of Graduate Studies E\*Value representative. Students are asked to rate seven course statements (five options ranging from Strongly Agree to Strongly Disagree). In addition, students are asked to make brief comments about the course (content, instructors, etc). Analysis and distribution of the Course E\*Value results and written comments follows standard E\*Value policies.

### III. Student Selection of the Outstanding Teacher

Students elect the recipient of the Dean's Outstanding Teacher of the Year Award. Instructor scores accumulated from course Unit evaluations serve to identify a final list of ten candidates for Award. A vote is held at the end of the second semester, and the winner is announced at the year-end First Year Curriculum Student Luncheon.

#### ENROLLMENT IN THE CURRICULUM

First Year Curriculum courses are shown below for purposes of registration. Most students matriculating into the Ph.D. degree program in August enroll in the full curriculum. Medical Scientist Training Program (M.D.,Ph.D.) students enroll in Essential Scientific Practices I and II (CGS 710 and CGS 711) and selected Units in CGS 701 and 702. Dental Medicine Scientist Training Program (D.M.D., Ph.D.) students enroll in Essential Scientific Practices I (CGS 710). Biometry Ph.D. program students enroll in Essential Scientific Practices I and, depending on their program requirements, may enroll in all or part of the remainder of the curriculum. Students in M.S. degree programs enroll in all or part of the curriculum to satisfy the requirements of their individual M.S. programs. Non-degree students may enroll in all or part of the curriculum on a space-available basis. Students and postdoctoral fellows wishing to audit may do so with the permission of the Unit Leader(s), obtained at least one week prior to start of the Unit.

#### Fall Semester (17 Credit Hours)

| #       | Course                               | Credit Hours | Grading             |
|---------|--------------------------------------|--------------|---------------------|
| CGS 701 | Foundations of Biomedical Sciences I | 10           | Merit               |
| CGS 710 | Essential Scientific Practices I     | 2            | Pass/No Pass/Honors |
| CGS 711 | Diversity in Science                 | 1            | Pass/No Pass/Honors |
| CGS 720 | Laboratory Rotation I and II         | 3            | Pass/No Pass/Honors |
| CGS 760 | Important Unanswered Questions       | 1            | Pass/No Pass/Honors |

#### Spring Semester (15 Credit Hours)

| #       | Course                                | Credit Hours | Grading             |
|---------|---------------------------------------|--------------|---------------------|
| CGS 702 | Foundations of Biomedical Sciences II | 6            | Merit               |
| CGS 721 | Laboratory Rotation III and IV        | 5            | Pass/No Pass/Honors |
| CGS 760 | Important Unanswered Questions        | 1            | Pass/No Pass/Honors |
| various | Spring Selective                      | 3            | Merit               |

#### Summer Semester (15 Credit Hours)

| #       | Course                             | Credit Hours | Grading             |
|---------|------------------------------------|--------------|---------------------|
| CGS 712 | Essential Scientific Practices III | 2            | Pass No Pass/Honors |
| CGS 970 | Research                           | 13           | Pass/No Pass/Honors |

### FIRST YEAR CURRICULUM STEERING COMMITTEE

Adam J. Smolka, Ph.D., Chair ([smolkaaj@musc.edu](mailto:smolkaaj@musc.edu))

The Steering Committee is charged with continued evaluation, revision, and evolution of the First Year Curriculum for the College of Graduate Studies. The committee meets twice in each of the Fall and Spring semesters and once during the Summer semester. The committee may meet more often as deemed necessary by the chair, Associate Dean or Dean. Two weeks prior to a scheduled meeting, the chair solicits agenda items from the Unit leaders, Spring Selectives course directors, FYC student representative, and all other graduate faculty. The transactions of the Steering Committee are reported to the Graduate Council by the chair, who is an *ex officio* member of the Graduate Council. The chair also reports on Steering Committee activities at the Dean's quarterly meetings of the department chairmen.

The Steering Committee is composed of the FYC course director, the Unit leaders, the Spring Selectives course directors, a student representative and an alternate elected by the first year class peers, and others as deemed appropriate by the chair, the Associate Dean, and/or the Dean. The Dean and the Associate Dean serve as *ex officio* members of the committee. Current members of the Steering Committee are:

|                    |                  |                     |                  |
|--------------------|------------------|---------------------|------------------|
| Craig Beeson       | Pharm. Science   | Bob Ogilvie         | Cell Biology     |
| Jim Cook           | Neuroscience     | Ken Patrick         | Pharm. Science   |
| Chris Davies       | Biochemistry     | Denise Quigley      | Pathology        |
| Maurizio Del Poeta | Biochemistry     | Sam Ramamoorthy     | Neuroscience     |
| Linnea Freeman     | Graduate Student | Steve Rosenzweig    | Pharmacology     |
| Paul Gross         | Marine Biomed.   | Sahar Saddoughi     | Graduate Student |
| Debra Hazen-Martin | Pathology        | Kevin Schey         | Pharmacology     |
| Laura Kasman       | Microbiology     | Adam Smolka (Chair) | Medicine         |
| Ed Krug            | Cell Biology     | Bryan Toole         | Cell Biology     |
| Don Menick         | Medicine         | Cynthia Wright      | Diversity Course |
| Don Miller         | Pharmacology     |                     |                  |

### FIRST YEAR CURRICULUM PROGRESS COMMITTEE

Craig Beeson, Ph.D., Chair ([beesonc@musc.edu](mailto:beesonc@musc.edu))

The Progress Committee is charged with monitoring the academic progress of all graduate students enrolled in the First Year Curriculum. Students are required to maintain the academic standards set forth in the MUSC Bulletin and the Biomedical Sciences First Year Curriculum Guide. The Committee may recommend improvements in performance or remediation following thorough review of all relevant material and circumstances presented by the student, the course director, and faculty. In addition, the Progress Committee members consult with students regarding their choices of laboratory rotations and dissertation lab. Students are required to meet with Committee members during orientation, after Unit Exams, at the end of the fall and spring semester, and at any other time requested by the Committee or the student. All Unit grades in CGS 701 and 702 are forwarded to the Progress Committee. Current members of the Progress Committee are:

|                           |                 |              |              |
|---------------------------|-----------------|--------------|--------------|
| Craig Beeson (Chair)      | Pharm. Sciences | Andy Wessels | Cell Biology |
| Christina Voelkel-Johnson | Microbiology    | Jerry Webb   | Pharmacology |

Robin Muise-Helmericks  
Besim Ogretmen  
Joyce Nicholas

Cell Biology  
Biochemistry  
Biostatistics

Harold May  
Antonieta Lavin  
Daohong Zhou

Microbiology  
Neuroscience  
Pathology

### **WEBCT**

*WebCT* is a server-based proprietary software package providing integrated e-learning systems for higher education. The package combines pedagogical tools with content management capabilities, options for personalization and customization of the learning experience, and seamless integration with an institution's existing campus infrastructure. Much of the First Year Curriculum lecture content, most of the PowerPoint presentations, all Unit evaluations, and a wealth of curriculum administrative and scheduling information are accessible through WebCT. Students are automatically registered as WebCT users, and are given overviews of WebCT access and navigation procedures during orientation at the start of the fall semester.

APPENDIX I.

**GRADING SCALE FOR CGS 701/702**

| <b>Percent</b> | <b>GPA</b> | <b>Percent</b> | <b>GPA</b> |
|----------------|------------|----------------|------------|
| >90            | 4.0        | 58             | 2.4        |
| 88             | 3.9        | 56             | 2.3        |
| 86             | 3.8        | 54             | 2.2        |
| 84             | 3.7        | 52             | 2.1        |
| 82             | 3.6        | 50             | 2.0        |
| 80             | 3.5        | 48             | 1.9        |
| 78             | 3.4        | 46             | 1.8        |
| 76             | 3.3        | 44             | 1.7        |
| 74             | 3.2        | 42             | 1.6        |
| 72             | 3.1        | 40             | 1.5        |
| 70             | 3.0        | 38             | 1.4        |
| 68             | 2.9        | 36             | 1.3        |
| 66             | 2.8        | 34             | 1.2        |
| 64             | 2.7        | 32             | 1.1        |
| 62             | 2.6        | 30             | 1.0        |
| 60             | 2.5        | <30            | 0          |
|                |            |                |            |

APPENDIX II.

**LABORATORY ROTATION GRADE REPORT**

**Rotation**    1    2    3    4    (circle one)

Student \_\_\_\_\_

Mentor \_\_\_\_\_

**Objectives of Rotation:**

**Evaluation of Student Performance**

(1=Outstanding, 5=Poor)

|                                |   |   |   |   |   |
|--------------------------------|---|---|---|---|---|
| Enthusiasm                     | 1 | 2 | 3 | 4 | 5 |
| Work ethic                     | 1 | 2 | 3 | 4 | 5 |
| Ability to work with others    | 1 | 2 | 3 | 4 | 5 |
| Scientific curiosity           | 1 | 2 | 3 | 4 | 5 |
| Ability to think independently | 1 | 2 | 3 | 4 | 5 |
| Laboratory skills              | 1 | 2 | 3 | 4 | 5 |
| Communication skills           | 1 | 2 | 3 | 4 | 5 |
| Journal discussion             | 1 | 2 | 3 | 4 | 5 |

Comment on the student's performance and progress.

**Grade for Rotation:**      PASS      NO PASS      HONORS

\_\_\_\_\_  
Mentor Signature

Submit form to College of Graduate Studies (BSB 102) by 5:00 pm on last day of lab rotation

APPENDIX III.

**PH.D. PROGRAM AND MENTOR SELECTION**

---

Name of Student (print or type)

---

Signature of Student

Date

---

Name of Ph.D. Program (print or type)\*

---

Signature of Director of Ph.D. Program\*

Date

---

Name of Mentor (print or type)\*

---

Campus Address and Lab Phone # of Mentor

---

Signature of Mentor\*

Date

\*If mentor or Ph.D. program has not been selected, leave blank

Submit form to College of Graduate Studies (BSB 102) by 5:00 pm on 11 May, 2008

APPENDIX IV.

**CGS 701/702 WEBCT EVALUATION QUESTIONS**

***Unit Statements***

1. The learning objectives of the Unit were adequately explained.
2. The Unit was well organized.
3. There was a sufficient depth and number of lectures.
4. There was adequate time for scientific discussion.
5. Assignments contributed meaningfully to Unit content.
6. Textbooks on reserve in the Library were useful.
7. I had the necessary knowledge and experience for this Unit.

***Instructor Statements***

Instructor (named):

1. was an effective teacher.
2. provided useful feedback on my assignments and/or presentations.
3. was well prepared for this class.
4. was available for student questions in and out of class.