Biochemistry 2EE3
Metabolism and Physiological Chemistry 2015 Course Outline

Instructor: Dr. Boris S. Zhorov. Office: HSC-4H30E
Teaching Assistants: Leticia Gonzales 905-521-2100 x. 40726 gonzalla@mcmaster.ca
Sanchia Miller 905-525-9140 x. 28811 sanchiamiller@gmail.com

Purpose: To provide a brief introduction to proteins, enzymes and gene expression followed by a more detailed treatment of energy and intermediary metabolism with emphasis on physiological chemistry.

Learning objectives: Understanding principles of structure and function of biological macromolecules, energy production and utilization by living organisms, metabolic pathways, and mechanisms of integration and regulation of metabolism.

Evaluation of student performance will be based on two tests and the final examination. Because of the large class, no questions will be answered during the tests/examination. If you suspect an ambiguity in a question, please choose your best guess and E-mail the problem to the instructor after the test/examination. The final grade will be calculated as follows: first test, 29%; second test, 29%; final examination, 42%. No make-up tests will be offered. If you miss a test and your request for relief of the missed Academic work is approved, the final grade will be calculated as follows: a test, 40%; the final examination, 60%. Test marks will be posted on LearnLink via the last five digits of the student #. By attending classes the student is agreeing to this method of grades disclosure.

Percentage grades will be converted to letter grades as follows:

<table>
<thead>
<tr>
<th>%</th>
<th>Letter</th>
<th>%</th>
<th>Letter</th>
<th>%</th>
<th>Letter</th>
<th>%</th>
<th>Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-90</td>
<td>A+</td>
<td>79-77</td>
<td>B+</td>
<td>69-67</td>
<td>C+</td>
<td>59-57</td>
<td>D+</td>
</tr>
<tr>
<td>89-85</td>
<td>A</td>
<td>76-73</td>
<td>B</td>
<td>66-63</td>
<td>C</td>
<td>56-53</td>
<td>D</td>
</tr>
<tr>
<td>84-80</td>
<td>A-</td>
<td>72-70</td>
<td>B-</td>
<td>62-60</td>
<td>C-</td>
<td>52-50</td>
<td>D-</td>
</tr>
</tbody>
</table>

All percentage grades within 0.5% of the next letter grade will be reviewed.

Request for Relief for Missed Academic Term Work: If you are absent from the university for a minor medical reason, lasting fewer than 5 days, you may report your absence, once per term, without documentation, using the McMaster Student Absence Form (MSAF). Absences for a longer duration or for other reasons must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. Please note that the MSAF may not be used for term work worth 30% or more, nor can it be used for the final examination.

Questions: Students are encouraged to ask questions in class and during office hours (Thursdays 16:00-17:00). Because of the large class, the instructor cannot answer E-mails and telephone calls. Students may contact teaching assistants by phone, E-mail, and during office hours (Wednesdays 16:00–17:00 in HSC-4H29).


Lecture notes: http://www.learnlink.mcmaster.ca Lecture notes are not a substitute for the textbook.

Academic ethics: Students are asked to reread two documents provided on registration, the Senate Statement on Academic Ethics and the Senate Resolutions on Academic Dishonesty. Students should be sure that they understand the expectations the University has of its scholars, and the possible consequences when these expectations are not met.

Academic Integrity: You are expected to exhibit honesty and use ethical behavior in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy located at http://www.mcmaster.ca/academicintegrity.

The following illustrates only three forms of academic dishonesty:
1. Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Chapters</th>
<th>Tests and tutorials</th>
</tr>
</thead>
<tbody>
<tr>
<td>M Jan 5</td>
<td>Origin of life. Cell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W Jan 7</td>
<td>Energy and molecular interactions</td>
<td>1, 2, 6</td>
<td></td>
</tr>
<tr>
<td>Th Jan 8</td>
<td>Amino acids</td>
<td>4, 6</td>
<td></td>
</tr>
<tr>
<td>M Jan 12</td>
<td>Structure and function of proteins</td>
<td>6, 7</td>
<td></td>
</tr>
<tr>
<td>W Jan 14</td>
<td>Nucleic acids</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Th Jan 15</td>
<td>Gene expression</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>M Jan 19</td>
<td>Carbohydrates</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>W Jan 21</td>
<td>Lipids and membranes</td>
<td>9, 10</td>
<td></td>
</tr>
<tr>
<td>Th Jan 22</td>
<td>Enzymes</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>M Jan 26</td>
<td>Coenzymes</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>W Jan 28</td>
<td>Neurons and neurotransmitters</td>
<td>10, LN c</td>
<td></td>
</tr>
<tr>
<td>Th Jan 29</td>
<td>Ion channels</td>
<td>10, LN c</td>
<td></td>
</tr>
<tr>
<td>M Feb 2</td>
<td>Hormones and Receptors</td>
<td>13, LN c</td>
<td>E-mail queries</td>
</tr>
<tr>
<td>W Feb 4</td>
<td></td>
<td></td>
<td>Class tutorial</td>
</tr>
<tr>
<td>Th Feb 5</td>
<td></td>
<td></td>
<td>Multiple-choice test</td>
</tr>
<tr>
<td>M Feb 9</td>
<td>Metabolism overview. High-energy compounds</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>W Feb 11</td>
<td>Redox reactions</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Th Feb 12</td>
<td>Glucose catabolism I</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Reading week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M Feb 23</td>
<td>Glucose catabolism II</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>W Feb 25</td>
<td>Glycogen metabolism</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Th Feb 26</td>
<td>Citric acid cycle I</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>M Mar 2</td>
<td>Citric acid cycle II</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>W Mar 4</td>
<td>Mitochondrion and electron transport</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Th Mar 5</td>
<td>Oxidative phosphorylation</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>M Mar 9</td>
<td>ATP. Implications of aerobic metabolism</td>
<td>18</td>
<td>E-mail queries</td>
</tr>
<tr>
<td>W Mar 11</td>
<td></td>
<td></td>
<td>Class tutorial</td>
</tr>
<tr>
<td>Th Mar 12</td>
<td></td>
<td></td>
<td>Multiple-choice test</td>
</tr>
<tr>
<td>M Mar 16</td>
<td>Lipid metabolism I</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>W Mar 18</td>
<td>Lipid metabolism II</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Th Mar 19</td>
<td>Lipid metabolism III</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>M Mar 23</td>
<td>Amino acid metabolism I</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>W Mar 25</td>
<td>Amino acid metabolism II</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Th Mar 26</td>
<td>Nucleotide metabolism</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>M Mar 30</td>
<td>Organ specialization in metabolism</td>
<td>22</td>
<td>E-mail queries</td>
</tr>
<tr>
<td>W Apr 1</td>
<td>Inter-organ metabolic pathways</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Th Apr 2</td>
<td>Hormonal control of metabolism</td>
<td>13, 22</td>
<td>E-mail queries</td>
</tr>
<tr>
<td>M Apr 6</td>
<td></td>
<td></td>
<td>Class tutorial</td>
</tr>
<tr>
<td>TBA</td>
<td></td>
<td></td>
<td>Multiple-choice exam</td>
</tr>
</tbody>
</table>

*aTopics of some lectures may be changed.  
*bMaterial from several chapters.  
*cLN, Lecture Notes

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.