**Metabolic Systems**

**COURSE OUTLINE**

 **Fall 2017**

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| Course Number Course Title  | IST 441 101CRN:2711Metabolic Systems  |
| Semester/Year Credit hours | Fall 20173  |
| Days/Time | M,W and F 1:00 pm-1:50 pm |
| Location | M,W WAEC Rm 1205 ; F BBSC Rm 128 1:00 pm-1:50 pm |
| Instructor | Menashi Cohenford, BSc., MT, Ph. D |
| Office | BBSC Room 241 H |
| Phone | 304-696-2697 |
| E-Mail | Cohenford@marshall.edu |
| \*Office/Hours | To be announced in class |
| University Policies | By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy be going to [www.marshall.edu/academic-affairs](http://www.marshall.edu/academic-affairs) and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to <http://www.marshall.edu/academic-affairs/?page_id=802> Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment.  |

**\***Or by appointments.

**Course Description:** The lectures in this course cover a wide range of topics from structure and metabolism of amino acids and carbohydrates to areas such as enzymes, enzyme kinetics and bioenergetics.

**Prerequisites**: BSC 121 or 250 or CHM 212 or IST 340 or consent of instructor.

**Required Texts and Materials:**

* Biochemistry Lippincott’s Illustrated Reviews 6th  Edition (2013) **ISBN-10:** 8184739141, **ISBN-13:** 978-8184739145.
* Supplemental materials are contained within the Blackboard Learn environment (<http://www.marshall.edu/muonline/>).

**Recommended Texts/Reading Materials:**

* Biochemistry ‘The Molecular Basis of Life’ Fifth Edition Oxford University Press , by Trudy McKee, James R. McKee

ISBN 978-0-19-973084-1

**Grading Policy and Grading System:**

Your grade will be calculated as follows:

Exam 1: 30% Exam II: 30% Quizzes: 30%

Project 10%

Total 100%

Your final grade in the class will be measured as follows:

A: 90-100

B: 80-89

C: 70-79

D: 60-70

F: Below 60

**Exams:** The exams will focus on the materials presented in class. All lectures will be in PowerPoint format. Each exam will be based on multiple choice questions and descriptive essays. These essays may at times be thought provoking and require you to apply learned concepts in simulated situations. *There will be no final exam for the course.*

**Make-up Exams and Penalty***:* Make-up exams will be granted only in cases recognized by the University through an excused absence; the policy on excused absences can be found on pp. 79–81 of the 2010–2011 undergraduate catalog: <http://www.marshall.edu/catalog/undergraduate/ug_10-11_published.pdf>. Students without a valid excuse will receive an F (zero) for the exam.

**Project:** Each student will be assigned a research topic for presentation in class. The date for each presentation will be announced in advance to allow for adequate preparation. Each presentation must **not be less than 25 min** and **must not exceed 40 min.** In addition, each student must submit a written report about his/her presentation. The format for the written report will be discussed in class. Failure to submit the written report will result in a grade of an **F** (Zero total points) for the project.

**Quizzes:** Following each main topic, there will be a 15-20-minute quiz. The quiz dates will be announced to allow for adequate preparation. The quizzes may vary in format and may include both multiple choice and short answer questions.

**Attendance Policy:** Student attendance and participation will be required. Punctual attendance to lectures will be considered in the final grade. For example, if a student with a 68 average has a full attendance record and has actively participated, that student may receive a grade of C for the course.

**Other Policies:** The use of cell phones is prohibited in class. Any student using a cell phone will be asked to leave the lecture hall.

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| **Course Student Learning Outcomes** | **How Practiced in this Course** | **How Assessed in this Course** |
| Students will gain an understanding of:* Water and Its Properties as well as buffers and their properties
* Bioenergetics
* Chemistry and Structure of Amino Acids.
* Chemistry and Reactions of Carbohydrates.
* Metabolic Pathways such as Glycolysis, Gluconeogenesis, Glycogen Synthesis and Breakdown, and the Pentose Pathway.
 | In-class lectures, discussions, video clippings and reading materials provided by instructor. | Announced quizzes, and Exam IExam I covers instructor’s PowerPoint presentations and instructor’s recommended reading materials. |
| Students will learn about:* The metabolism of monosaccharides and disaccharides.
* The role and function of the TCA Cycle.
* The Electron Transport System.
* Enzymes and Enzyme Kinetics
* Metabolism of Amino Acids
* The Urea Cycle
* Lipids and their role in cell membrane.
 | In-class lectures, discussions, videos, student research projects and reading materials provided by instructor.  | Announced quizzes, and Exam IIExam II covers PowerPoint presentations made in class and recommended reading materials provided by instructor.  |

 **†Course Schedule**

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| August 21st -Aug 25th  | Overview of Course |
| Week 1 | PowerPoint Presentations (PPTs): Water and its Properties Part I and Water and Buffers Part II  |
| Aug 28th -September 1st  Week 2 | PPTs: Bioenergetics  Amino Acids Part 1Recommended Reading Materials: Biochemistry 6th Edition Lippincott’s Reviews Chapters entitled “Amino Acids” and “Bioenergetics and Oxidative Phosphorylation”. **Quiz #1** |
| September 4th  | **Labor Day Holiday** |
| September 4th-8th Week 3 | PPTs: Carbohydrates Part 1PPTs: Carbohydrates Part IIRecommended Reading: Biochemistry 6th Edition Lippincott’s ReviewsChapter entitled “ Carbohydrates” |
| September 11th-15h  Week 4 | PPTs: Carbohydrates Part III Carbohydrates Part IV An Overview of GlycolysisRecommended Reading Materials: Biochemistry 6th Edition Lippincott’s Reviews Chapters entitled “Glycolysis”**Quiz #2** |
| September 18th -22nd  Week 5 | PPTs: An Overview of Glycolysis (cont.) An Overview of Gluconeogenesis An Overview of Glycogen Synthesis and BreakdownRecommended Reading Materials: Biochemistry 6th Edition Lippincott’s Reviews Chapters entitled “Gluconeogenesis” and “Glycogen Metabolism” |
| Sept 25h –Sept 29th Week 6 | PPTs: An Overview of Glycogen Synthesis and Breakdown (Cont.)PPTs: An Overview of the Pentose PathwayRecommended Reading Materials: Biochemistry 6th Edition Lippincott’s Reviews Chapter entitled “The Pentose Pathway and NADPH” **Quiz 3** |
| October 2nd -6th Week 7 | PPTs: Metabolism of Monosaccharides and Disaccharide PPTs: The TCA CycleRecommended Reading Materials: Biochemistry 6th Edition Lippincott’s Reviews Chapters entitled “Metabolism of Monosaccharides and Disaccharides” and “Tricarboxylic Acid Cycle”.Exam I: All PowerPoint lectures up to and including the Pentose Pathway. |
| October 9th – 13th Week 8 | PPTs: The Electron Transport System Part IPPTs: The Electron Transport System Part IIRecommended Reading Materials: Biochemistry 6th Edition Lippincott’s Reviews Chapters entitled “Bioenergetics-Bioenergetics and Oxidative Phosphorylation”.  |
| October 16st –20th  Week 9  | Enzymes Part 1Enzymes Part IIRecommended Reading Materials: Biochemistry 6th Edition Lippincott’s Reviews Chapter entitled “Enzymes”. **Quiz 4** |
| October 23rd – Oct 27th   Week 10 | Enzymes Part IIIAmino Acid Disposal of Nitrogen & the Urea Cycle |
| Oct 30st -Nov 3rd  \Week 11 | Amino Acid Disposal of Nitrogen (Cont.)Amino Acid DegradationRecommended Reading Materials: Biochemistry 6th Edition Lippincott’s Reviews Chapters entitled “Amino Acids: Disposal of Nitrogen” and “Amino Acid Degradation and Synthesis”. **Quiz 5** |
| Nov 6th -Nov 10th Week 12 | **Student Project Presentations** |
| Nov 13th-Nov 17th  Week 13 | Video Film Extraordinary Measures: “ Pompeii’s Disease”Video: Lorenzo’s Oil “Adrenoleukodystrophy”A discussion of the biochemistry relating to these diseases |
| **Nov 27th - Dec 1st**  Week 15 | Lipids and Biological Membranes**EXAM II:** Includes all PowerPoints& materials provided by instructor after Exam I. |
| **Dec 4th-8th****Dead Weak****Dec 8th**  | **Review of Exam II** **Last Day of Class**  |

 **‡** The above course schedule is presented as a guide only and may be changed at any time by the instructor.