**Course Title:** Biochemistry II (50:115:404/ 56:115:512:01)

**General Information:**

Instructor: Dr. Jinglin Fu

Office: Science Building (SCI) #306A

Tel: 856-225-6612

E-mail: jinglin.fu@rutgers.edu

Class time and place: Tuesday and Thursday 11:10 am-12:30 pm; CNS202

Office hour: Wednesday free period (12: 45 pm-1:45 pm)

Course pre/co - requisites: Biochem I;

Suggested pre-courses: Physical Chem and Organic Chem

Suggested Text: Voet & Voet, Biochemistry (Wiley) 4th Edition (2010) (ISBN # 978-0-470-57095-1 ).

**Learning goals**: This class will be an advanced overview of general biochemistry. Upon completion of this course, the student should have a fundamental understanding of the principle of metabolism pathway and regulation, cellular signaling transduction and modern biotechnology; be able to calculate the thermal dynamical parameters of biochemical reactions as well as energy input and output; identify the important biochemical reaction intermediates and energy cofactor; understand the membrane transport.

**Course Description:** The biochemistry class is to develop a comprehensive understanding of:

1. The major biochemistry pathways;
2. Membrane transport and signaling
3. Advanced enzyme active-site mechanism and enzymology
4. Bioenergy and synthetic biology
5. DNA transcription and translation;
6. Introduction to modern biotechnology and nanomedicine

**Course Information on the Sakai:** Announcement, syllabus, quiz and lecture PPTs will be posted on the sakai: https://sakai.rutgers.edu/

**PowerPoint Files**: You can view the PowerPoint files that I use in class. These PPTs are under the resources tab on the sakai.

**Assessments and Grading:**

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| --- | --- | --- |
|  | Undergraduates | Graduates |
| Pre-lecture Quiz | 20 % | 20% |
| Mid-term I | 20% | 15% |
| Mid-term II | 20% | 15% |
| Final exam | 40% | 35% |
| Term paper |  | 15 % |
| Total | 100% | 100% |

Grading is on a curve of normalization. Academic warning will be sent out after the Mid-term I and Mid-term II.

**Pre-lecture quizzes** are used to help students to review and prepare the contents that are going to be discussed in the coming week. Quiz question will be posted on the sakai 48 hours prior the lecture. Students are required to complete the quizzes questions and submit the printed copy to the instructor on every **Tuesday** lecture. **Fail to submit the quiz on time will result in the loss of points no matter what is the excuse.**

**Term paper** is required for graduate students. Each graduate student needs to schedule an appointment with the instructor to discuss the topic of the term papers. The term paper is around **6-page, 12-font size, and single space**. It should include: A title, an abstract (less than 300 words), introduction, discussion section, conclusion and future perspective. Figures should be cited appropriately with indicating the original source. At least **25** references should be cited in the term paper. Reference must be formatted carefully, ACS (American Chemical Society) format is recommended. It is highly suggested that the students first submit a draft for instructor’s comments prior to the final submission (at least a week before).

**Cheating is strictly prohibited from the class:** If a cheating case is confirmed (either in exams or term paper), it will be reported to the Dean and result immediate failure of the class.

**Academic Plagiarism:** You cannot copy verbatim from any source, including other individuals in the term paper. Any infractions to this rule are considered as academic plagiarism. You must cite any references that you have used in preparing your term papers.

**Absences from exams:** If student has an emergency that prevent him or her from taking the exam, Dr. Fu must be notified **48-hour in advance**. Valid excuses include medical emergency (physician’s approval of absence), family funeral, and other compelling circumstances. Proofs must be submitted to the instructor for validating the excuse. **Unexcused absence from exams will result in 0 point.**

**Schedule of Topics, Material Covered and Exams:**

Note: Times are ***just an estimate***. The actual pace of the course may be slightly different. **The exams, however, will occur on the dates shown**. Note that the reading and assigned quizzes are due on every Tuesday before the lecture on the subject.

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| **Date** | **Lecture Topic** | **Material Covered** |
| 1/16,1/18 | Course Intro, Metabolism | Lecture 1 |
| 1/23 | Glycolysis | Lecture 2 |
| 1/25 | Glycolysis | Lecture 2 |
| 1/30 | Catabolic fate of pyruvate | Lecture 3 |
| 2/1 | Pyruvate to CO2 | Lecture 4 |
| 2/6 | Electron Transport and Oxidative Phosphorylation | Lecture 5 |
| 2/8 | Electron Transport and Oxidative Phosphorylation | Lecture 5 |
| 2/13 | Spatial organization/ Bionano | Lecture 6 |
| 2/15 | Transport through membrane |  |
| 2/20 | **Midterm I** |  |
| 2/22 | Storage of glucose, glucose to DNA | Lecture 7 |
| 2/27 | glucose to DNA | Lecture 8 |
| 3/1 | The breakdown of fat | Lecture 9 |
| 3/6 | Cancelled due to snow | Lecture 9 |
| 3/8 | Spring Break | Lecture 10 |
| 3/13 | Spring Break |  |
| 3/15 | The storage of fat, Amino acid metabolism |  |
| 3/20 | Nucleotide metabolism | Lecture 11 |
| 3/22 | Enzyme regulation & Biorobots | Lecture 12 |
| 3/27 | Review |  |
| **3/29** | **Midterm II** |  |
| 4/3 | Special Topic in Diagnosis | Lecture 13 |
| 4/5 | Natural solar energy-Photosynthesis | Lecture 14 |
| 4/10 | Fixing and utilizing N2 and CO2 |  |
| 4/12 | Energy Metabolism | Lecture 15 |
| 4/17 | Cancelled | Lecture 16 |
| 4/19 | DNA replication and transcription | Lecture 17 |
| 4/24 | Synthetic Biology and Bioenergy | Lecture 18 |
| 4/26 | Review | Lecture 19 |
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|  |  |  |
| **TBA** | **Final Exam** |  |