



UNIVERSITI TEKNOLOGI MARA

BCM200: BIOCHEMISTRY II

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| Course Name (English) | BIOCHEMISTRY II APPROVED |
| Course Code | BCM200 |
| MQF Credit | 2 |
| Course Description | This course introduces students to the law of thermodynamics, enzyme kinetics and metabolic pathways of carbohydrates, fats, and amino acids. Topics related to the ATP also included where students are taught to show the consumption and production of ATP from all metabolic pathways such as carbohydrates and lipids. The course is supplemented by lectures and presentations by students. This will ensure that students have the necessary skills and understand the metabolism in general. The application of protein purification technique will also be introduced in this course. |
| Transferable Skills | Demonstrate ability to identify and articulate self skills, knowledge, and understanding confidently and in a variety of contexts. |
| Teaching Methodologies | Lectures, Discussion |
| CLO | CLO1 Explain the theories, concepts, and laws of the metabolic processes in biochemistry. CLO2 Discuss the theories, concept and laws of the metabolic processes in biochemistry through presentation CLO3 Explain the techniques of protein purification and enzymes assays in biochemistry through effective application of electronic information. |
| Pre-Requisite Courses | No course recommendations |
| Topics | |
| 1. Bioenergetics 1.1) The flow of energy in the cell 1.2) Laws of thermodynamics, entropy (disorder), endergonic, exergonic, "high energy" bonds of ATP and coupled reactions 1.3) The interrelationship between degradative and biosynthetic pathways. The central role of ATP 1.4) Oxidation-reduction reactions, electron acceptor (NAD and FAD) 1.5) The electron-transport system and oxidative phosphorylation, the role of oxygen in aerobic respiration | |
| 2. Enzyme kinetics 2.1) Michaelis-Menten and Lineweaver-Burke equations 2.2) Factors affecting rate of reaction 2.3) Enzyme inhibition and regulation | |
| 3. Carbohydrate metabolism 3.1) Glycolysis – anaerobic, anaerobic reactions and its significance 3.2) Gluconeogenesis and Cori cycle – reactions and significance 3.3) Krebs cycle – the steps functional significance 3.4) Comparison between aerobic and anaerobic respiration in terms of initial substrates, final products, cellular locations, and the total number of ATP molecules produced per glucose respired 3.5) Glycogen metabolism – reactions and control of blood glucose | |
| 4. Lipid metabolism 4.1) Lipolysis and β -oxidation, the reactions and hormone control 4.2) Ketone bodies formation | |

5. Amino acids catabolism

- 5.1) Oxidative deamination and transamination of amino acids and its contribution to energy production
- 5.2) Fate of carbon skeletons and nitrogen
- 5.3) The urea cycle

6. Metabolic interrelationship

- 6.1) Interconversion between carbohydrates or protein to fat and the metabolic pathways involved
- 6.2) Energy sources of different organs during fasting and exercise

7. Protein and Enzyme Assays

- 7.1) The introduction and methods to purify protein

| Assessment Breakdown | % |
|-----------------------|--------|
| Continuous Assessment | 60.00% |
| Final Assessment | 40.00% |

| Details of Continuous Assessment | Assessment Type | Assessment Description | % of Total Mark | CLO |
|----------------------------------|-----------------|------------------------|-----------------|------|
| | Assignment | Group Assignment | 20% | CLO2 |
| | Presentation | Group presentation | 20% | CLO3 |
| | Test | Chapter 1 to 3 | 20% | CLO1 |

| Reading List | Recommended Text |
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| | <ul style="list-style-type: none"> Rodney Boyer 2006, <i>Concepts in Biochemistry</i>, 3rd Ed., John Wiley & Sons (Asia) [ISBN: 9780471661832] Mary K. Campbell, Shawn O. Farrell, Owen M. McDougal 2016, <i>Biochemistry</i>, 9th Ed., Nelson Education [ISBN: 9781305961135] |

| Article/Paper List |
|---|
| This Course does not have any article/paper resources |

| Other References |
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| This Course does not have any other resources |