LEAD CITY UNIVERSITY, IBADAN
Faculty of Sciences
Department of Biochemistry

COURSE PARTICULARS

Course code: METABOLIC REGULATIONS
Course title: BCH 411
No. of Units:
Status: compulsory/elective

LECTURER DETAILS

Name: Dr Arojojoye O.
Qualifications: B.Sc, M.Sc, Ph.D
Phone: 08055455321
Email: tosyne568@yahoo.com
Area of Specialization: Environmental Toxiology

Name: Mrs. O.O. Nwaechefu
Qualifications: B.Sc, M.Sc
Phone: 08034728112
Email: olajualao@yahoo.co.uk
Area of Specialization: Membrane Biochemistry and Biochemistry

COURSE DESCRIPTION

The course is designed to introduce students to metabolism, anabolism, catabolism, allosteric proteins and the relationships between metabolic pathways

COURSE OBJECTIVES

To ensure that students have a basic understanding of reaction mechanisms and regulation of metabolic pathways using specific examples.

ASSESMENT

Class Attendance	5marks
Test(s) and Assignments	25marks
Final Examination	70marks

LECTURE PLAN

WEEK	TOPIC
1st -3rd week	The relationship of Kreb's cycle to protein, carbohydrates, lipids and nucleic acid metabolism. Integration of metabolic pathways
4th- 6th week	Intermediary metabolism and integration of metabolic pathway.
7th-9th week:	illustration of regulation of linear and branched metabolic pathways using specific examples
10th-13th week	turnover rates and metabolic pools, catabolite repression, end product repression. Lactose and arabinose operons. Identification of different regulatory mechanisms in metabolic pathways,
14th week	Revision.

READING LIST

1. Lehninger, principle of Biochemistry by David L. Nelson and Micheal .M.Cox. (4th edition).
2. Principles of Biochemistry by Horton, Moran, Scrigeour, Perry and Rawn (4th edition)
3. Harper's illustrated Biochemistry by Robert, Darl , Peter, and Victor (twenty-sixty edition).
4. Gareth and Grishan Biochemistry (2nd edition).

TUTORIAL QUESTIONS

SECTION A

1a. Discuss the regulation of the TCA cycle.

b. What is the significance of the TCA cycle

2. List the routes for fatty acid metabolism in the liver.

3. Explain the relationship of Krebs cycle to protein metabolism

4. Discuss the Lac Operon concept

5. Explain intermediary metabolism

b How is the citric acid cycle involved in haem synthesis, purine synthesis and pyrimidine synthesis

6. Describe the arabinose operon

SECTION B

7a. Differentiate between allosteric regulation and covalent modification of enzyme's activity

b. Discuss the role of calcium, tropomyosin, and troponin complex in the regulation of muscle contraction

8. a. Pyruvate dehydrogenase can be regulated through covalent modification and allosterically. Discuss.

b. Explain the mechanism of regulation of the plasma membrane calcium ATpase by calmodulin

9. Discuss the mechanism of regulation of the following enzymes:

a. Glycogen phosphorylase

b. Threonine dehydratase

c. Glutamine synthetase

10. Explain the following:

a. Reversible covalent modification

b. Irreversible covalent modifications

11a. What are zymogens?

b. Explain the steps involved in the conversion of the following zymogens to their active forms: chymotrypsinogen to chymotrypsin; trypsinogen to trypsin

c. Explain the steps involved in the blood clotting pathway

12. Write extensively on the following mechanisms of reversible covalent modification:

a. Phosphorylation

b. ADP- Ribosylation

c. Adenylation