

**THOMAS ADEWUMI UNIVERSITY****COURSE OUTLINE**

Faculty	Computing and Applied Sciences
Department	Biological Science
Course Title	<b>PROTEIN AND AMINO ACID METABOLISM</b>
Year of Study	3
Course Code	BCH 316
Credit Hours	2
Contact Hours	30
Mode of Delivery	Classroom Lectures
Mode of Assessment	Weight%
Continuous Assessment	40%
Final Examination	60%
Total	100%
Course Lecturer and Instructor(s)	Dr A.T. Bamigbade
Course Description	Biochemistry involves the reactions leading to the buildup and breaking down of macromolecules within the cell or living organism. For any student offering biochemistry it is important to understand molecular basis of inborn errors of metabolism, and the urea cycle
Course Objective and	This course would enable the understanding of the following: <ol style="list-style-type: none"><li>1. A detailed biosynthesis and degradation of amino acids</li><li>2. Classification of essential and non-essential amino acids</li><li>3. Molecular basis of inborn errors of metabolism</li><li>4. All the chemical basis of urea cycle</li></ol>
Learning Outcomes	By the end of the course, students will be able to: <ol style="list-style-type: none"><li>1. Highlight all the 20 protein-forming amino acids</li><li>2. Group amino acids into respective classes</li><li>3. Understand and give overview of amino acid biosynthesis and catabolism</li><li>4. Highlight all the reaction steps involved in the urea cycle</li></ol>

	<p>5. Highlight and explain in detail a number of inborn errors of metabolism</p> <p>6. Explain protein purification and steps involved from isolation to protein characterization</p>	
Teaching and Learning	The class will meet for 3 hours each week. Class time will be used for a combination of lecture, classwork and tutorials	
Detailed Course Content	Amino acids as building blocks of protein; covalent backbone of proteins; Amino acid sequence of proteins. Protein isolation, fractionation, purification and characterization of proteins. Biological functions of proteins. Oxidative degradation of amino acids and metabolism of one carbon unit. Biosynthesis of amino acids and some derivatives; the urea cycle; metabolism of inorganic nitrogen. Disorders & Inborn errors of amino acid metabolism. Creatinine and Creatinine metabolism. Protein Catabolism	
<b>Course Content Sequencing</b>		
Weeks	Detailed Course Outline	Allowed Time
Week1	<p><b>1. Introduction to amino acid</b></p> <ol style="list-style-type: none"> <li>1. Define amino acids</li> <li>2. Draw the structure a typical amino acid</li> <li>3. Classify amino acid into essential and non-essential amino acids</li> </ol> <ul style="list-style-type: none"> <li>• Draw all the 20 amino acids</li> </ul>	2 Hours
Week2,3	<p>0. Discuss biosynthesis and catabolism of amino acids</p> <p><b>0. Continuous assessment I</b></p>	4 Hours
Week4,5,6,	0. Urea cycle, ketogenic and glucogenic amino acids, protein catabolism	10 Hours
Weeks7,8,9	1. inborn errors of metabolism of amino acid metabolism and metabolism of one-carbon unit, creatine and creatine metabolism	10 Hours
Week10,11,12	0. Protein isolation, fractionation, purification and characterization of proteins. <b>Continuous Assessment II</b>	4 Hours
After Week 12	0. Examinations	
<b>Recommended Reading Material</b>		

1. Reginald Garrett and Charles Grisham (2010). Biochemistry. Brooks/Cole, Cengage Learning
2. David Nelson and Michael Cox (2016). Principles of Biochemistry. McGrawHill education
3. Victor Rodwell, David Bender, Kathleen Botham, Peter Kennelly, and Anthony Weil (2018). Harper's Illustrated Biochemistry. McGrawHill education lange

**Course Code:** BCH 316

**Course Title:** Protein and Amino Acid Metabolism

**Preamble:** Biochemistry involves the metabolism of macromolecules within the cell or living organism. For a biochemistry student, it is important to be familiar with amino acids biosynthesis and degradation, and inborn errors of metabolism. Again, it is essential to know the basic principles guiding protein isolation, purification and characterization.

### **Specific Course Objective/Learning Outcomes**

This course would enable the understanding of the following:

1. The fundamental meaning of amino acids, peptide bonds joining one amino acid to another and their role in protein formation
2. Classification and chemistry of amino acids, proteins and their derivatives
3. Introductory chemistry of biomacromolecule; isolation, purification and characterization especially that of protein
4. Deep knowledge in inborn errors of metabolism

### **Learning Activities/ Course Delivery Methods**

**Lectures: Detailed content of course are taught in class**

**B. Course Content:** Amino acids as building blocks of protein; covalent backbone of proteins; Amino acid sequence of proteins. Protein isolation, fractionation, purification and characterization of proteins. Biological functions of proteins. Oxidative degradation of amino acids and metabolism of one carbon unit. Biosynthesis of amino acids and some derivatives; the urea cycle; metabolism of inorganic nitrogen. Disorders & Inborn errors of amino acid