

**THOMAS ADEWUMI UNIVERSITY**

**COURSE OUTLINE**

Faculty	Computing and Applied Sciences
Department	Biological Science
Course Title	<b>GENERAL BIOCHEMISTRY II</b>
Year of Study	2
Course Code	BCH 202
Credit Hours	2
Contact Hours	42
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 metabolism of macromolecules within the cell or living organism. For a biochemistry student, it is important to be familiar with pH meter calibration, and buffer preparation. Again, it is essential to know the basic reactions of carbohydrate, lipid, protein and nucleic acids at the introductory stage.
Course Objective and	This course would enable the understanding of the following: <ol style="list-style-type: none"><li>1. The fundamental meaning of buffers, pH and pKa; amino acids and their role in protein formation</li><li>2. Classification and chemistry of amino acids, proteins and their derivatives</li><li>3. Introductory chemistry of biomacromolecules such as carbohydrate, lipids and nucleic acids and proteins.</li></ol>
Learning Outcomes	By the end of the course, students will be able to: <ol style="list-style-type: none"><li>1. Calibrate pH meter and prepare buffer solutions</li><li>2. Highlight all the 20 protein-forming amino acids</li><li>3. Group amino acids into respective classes</li></ol>

	<ol style="list-style-type: none"> <li>4. Understand how amino acids form peptide bonds and polypeptide chain</li> <li>5. Four levels of protein organization</li> <li>6. Highlight some conjugated proteins</li> <li>7. Highlight different types of polar and nonpolar lipiids</li> <li>8. Distinguish between DNA and RNA</li> <li>9. Highlight basic chemistry of simple sugars</li> <li>10. Distinguish between storage and structural polysaccharides</li> </ol>	
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	pH scale, measurement of pH, buffer, acidity and alkalinity; pH and pKa values and their effects on cellular activities. Introductory chemistry of amino acid: properties, reactions, and biological functions. Classification of amino acids: neutral, basic, acidic, polar and non-polar; essential and non-essential amino acids. Introductory chemistry of proteins: primary, secondary, tertiary and quaternary structures of proteins; basic principles of test for proteins and amino acids. Introductory chemistry of carbohydrate, lipids and nucleic acids. Nomenclature of nucleosides and nucleotides: the DNA; effects of acid and alkali on hydrolysis of nucleic acids	
<b>Course Content Sequencing</b>		
Weeks	Detailed Course Outline	Allowed Time
Week1	<ol style="list-style-type: none"> <li>1. Measurement of pH, buffer, acidity and alkalinity; pH and pKa values and their effects on cellular activities. <ul style="list-style-type: none"> <li>• Define the term pH</li> <li>• Highlight pH range</li> <li>• Discuss buffer preparation</li> <li>• Explain pH meter calibration</li> <li>• Discuss relationship between pH and pKa in buffer solution</li> </ul> </li> </ol>	2 Hours
Week2,3	<ol style="list-style-type: none"> <li>0. <b>Classify amino acid</b> <ul style="list-style-type: none"> <li>• Explain the various reactions of amino acid based on classes</li> <li>• Explain peptide bond formation</li> <li>• Describe and Explain isoelectric point of amino acids</li> </ul> </li> <li>0. <b>Explain the term protein</b> <ul style="list-style-type: none"> <li>• Classify protein</li> <li>• Explain conjugated proteins</li> <li>• Discuss the four levels of protein organization</li> </ul> </li> <li>0. <b>Continuous assessment I</b></li> </ol>	8 Hours

Week4,5,6,	0.	Introductory Chemistry of carbohydrates	12 Hours
Weeks7,8,9	0.	Introductory chemistry of lipids	12 Hours
Week10,11,12	0. 0.	Introductory Chemistry of nucleic acid Continuous Assessment II	8 Hours
After Week 12	0.	Examinations	
<p>Recommended Reading Material</p> <ol style="list-style-type: none"> <li>1. Reginald Garrett and Charles Grisham (2010). <u>Biochemistry</u>. Brooks/Cole, Cengage Learning</li> <li>2. David Nelson and Michael Cox (2016). <u>Principles of Biochemistry</u>. McGrawHill education</li> <li>3. Victor Rodwell, David Bender, Kathleen Botham, Peter Kennelly, and Anthony Weil (2018). <u>Harper's Illustrated Biochemistry</u>. McGrawHill Education Lange</li> </ol>			

**Course Code:** BCH 202

**Course Title:** General Biochemistry II

**Preamble:** Biochemistry involves the metabolism of macromolecules within the cell or living organism. For a biochemistry student, it is important to be familiar with pH meter calibration, and buffer preparation. Again, it is essential to know the basic reactions of carbohydrate, lipid, protein and nucleic acids at the introductory stage.

• **Specific Course Objective/Learning Outcomes**

This course would enable the understanding of the following:

1. The fundamental meaning of buffers, pH and pKa; amino acids and their role in protein formation
2. Classification and chemistry of amino acids, proteins and their derivatives
3. Introductory chemistry of biomacromolecules such as carbohydrate, lipids and nucleic acids and proteins.

**B. Learning Activities/ Course Delivery Methods**

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

- C. **Course Content:** pH scale, measurement of pH, buffer, acidity and alkalinity; pH and pKa values and their effects on cellular activities. Introductory chemistry of amino acid: properties, reactions, and biological functions. Classification of amino acids: neutral, basic, acidic, polar and non-polar; essential and non-essential amino acids. Introductory chemistry of proteins: primary, secondary, tertiary and quaternary structures of proteins; basic principles of test for proteins and amino acids. Introductory chemistry of carbohydrate, lipids and nucleic acids. Nomenclature of nucleosides and nucleotides: the DNA; effects of acid and alkali on hydrolysis of nucleic acids.