**Bayero University Kano**

**Faculty of Basic Medical Sciences**

**Department of Biochemistry**

**B Sc. Biochemistry**

**Proposed 30% Addition to the CCMAS Course Structure/Summary**

**100 Level**

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| Course Code | Course Title | Unit(s) | Status | LH | PH |
| BUK-BCH 101 | Introductory Biochemistry I | 1 | C | 15 | - |
| BUK-BCH 102 | Introductory Biochemistry II | 1 | R | 15 | - |
|  | Total | 2 |  |  |  |

**200 Level**

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| Course Code | Course Title | Unit(s) | Status | LH | PH |
| BUK-ANA 202 | Histology of Basic Tissues | 2 | C | 15 | 45 |
| BUK-BCH 204 | Biorisk Management and Biochemical Data Handling | 2 | C | 15 | 45 |
| BUK-BIO 201 | Genetics I | 2 | C | 30 | - |
| BUK-CHM 210 | Physical Chemistry I | 2 | C | 30 | - |
| BUK-CHM 211 | Organic Chemistry I | 2 | C | 30 | - |
| BUK-CHM 212 | Inorganic Chemistry I | 2 | C | 30 | - |
| BUK-MCB 221 | General Microbiology | 2 | C | 15 | 45 |
| BUK-MCB 231 | Basic Techniques in Microbiology | 2 | C | - | 90 |
| BUK-PIO 201 | Introduction to Physiology and Blood | 2 | C | 30 | - |
|  | Total | 18 |  |  |  |

**300 Level**

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| Course Code | Course Title | Unit(s) | Status | LH | PH |
| BUK-BCH 310 | Biochemistry and Molecular Biology of Microorganisms | 2 | C | 30 | - |
| BUK-BCH 312 | Food and Nutritional Biochemistry | 2 | C | 30 | - |
| BUK-CHM 303 | Organic Chemistry II | 2 | C | 30 | - |
|  | Total | 6 |  |  |  |

**400 Level**

| Course Code | Course Title | Unit(s) | Status | LH | PH |
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| BUK-GST 401 | Character Building, Professionalism and Team Work in Healthcare | 2 | R | 30 | - |
| BUK-BCH 409 | Industrial Biochemistry | 2 | C | 30 | - |
| BUK-BCH 410 | Biochemical Pharmacology and Toxicology | 3 | C | 30 | 45 |
| BUK-BCH 411 | Tissue Biochemistry | 1 | C | 15 | - |
| BUK-BCH 412 | Immunology and Immunochemistry | 2 | C | 30 | - |
| BUK-BCH 413 | Research Methods in Biochemistry | 1 | C | 15 | - |
| BUK-BCH 414 | Forensic Biochemistry | 1 | C | 15 | - |
| BUK-BCH 415 | Special Topics and Seminar in Biochemistry | 1 | C | 15 | - |
|  | Total | 13 |  |  |  |

**Total Summary**

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| Levels | 70% Core CCMAS | | 30% Proposed CCMAS | | Total | |
| No of Courses | Credits | No of Courses | Credits | No of Courses | Credits |
| 100 | 17 | 29 | 02 | 02 | 19 | 31 |
| 200 | 06 | 12 | 09 | 18 | 15 | 30 |
| 300 | 12 | 24 | 03 | 06 | 15 | 30 |
| 400 | 08 | 19 | 08 | 13 | 16 | 32 |
| Total | 43 | 84 | 22 | 39 | 65 | 123 |
| **68%** | **32%** | **100%** |

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| **Bayero University, Kano (BUK)** | |  |
| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-BCH 101: Introductory Biochemistry I** | **(1 Units C: LH 15; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  "Introductory Biochemistry I" is an entry-level course that introduces students to the fundamental principles of biochemistry. The course covers the history, scope, and developments of biochemistry, as well as the philosophy and objectives of the field. Students will learn about the skills required to become a biochemist, the significance of biochemistry to other life sciences, and the various career opportunities available in biochemistry and related fields. The course also covers important discoveries in biochemistry, as well as the elementary thermodynamics and kinetics principles and their applications to biological systems.  Overall, the course aims to provide students with a solid foundation in biochemistry, which will help them understand the principles and processes that govern biological systems and prepare them for further studies in the field. | | |
| **Objectives**  The objectives of this course are to**:**   1. learn about the history, scope, and developments of biochemistry and its relationship to other life sciences; 2. discuss the philosophy and objectives of biochemistry and the skills required to become a biochemist; 3. appreciate the significance of biochemistry in research, medicine, and industry; 4. identify the career opportunities available in biochemistry and related fields; 5. learn about important discoveries in biochemistry and their impact on society; 6. describe the principles of elementary thermodynamics and their applications to biological systems; and 7. describe the principles of kinetics and their applications to biological systems. | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. discuss the history, scope, and developments of biochemistry and their significance in the modern world; 2. explain the philosophy and objectives of biochemistry, the skills required to become a biochemist, and the different career opportunities available in the field; 3. evaluate the significance of biochemistry in research, medicine, and industry, and how it relates to other life sciences; 4. identify and explain important discoveries in biochemistry and their impact on society; 5. apply the principles of elementary thermodynamics to biological systems, such as chemical reactions and energy transformations; and 6. apply the principles of kinetics to biological systems, such as enzyme-catalyzed reactions and biochemical pathways. | | |
| **Course Contents**  Introduction to Biochemistry. History, Scope and Developments in Biochemistry; Philosophy and objectives of Biochemistry; Skills to be acquired as a Biochemist; Significance and relationships of Biochemistry to other life sciences; Carrier opportunities in Biochemistry and related disciplines; Important discoveries in Biochemistry. Elementary thermodynamics and their applications to biological systems. Introduction to kinetics. | | |

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| **Bayero University, Kano (BUK)** | |  |
| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-BCH 102: Introductory Biochemistry II** | **(1 Units R: LH 15; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  "Introductory Biochemistry II" is a course that builds upon the foundational principles of biochemistry covered in "Introductory Biochemistry I". The course covers the chemical elements of life, the composition of living matter, and a brief introduction to the major biomolecules, enzymes, and vitamins. The course also covers the physical and chemical basis of molecular interactions, including covalency and electrovalency, as well as isomerism of biological compounds, including geometrical, optical, positional, and chemical isomerism. Finally, the course covers oxidation-reduction reactions in biological systems, including definitions and examples.  Overall, the course aims to deepen students' understanding of biochemistry by covering advanced topics related to the chemical elements of life, the composition of living matter, and the physical and chemical basis of molecular interactions. The course also covers isomerism of biological compounds and oxidation-reduction reactions, which are crucial for understanding the complexity of biological systems. By the end of the course, students should have a solid foundation in advanced biochemistry concepts that will prepare them for further studies in the field. | | |
| **Objective**  The objectives of this course are to**:**   1. discuss the chemical elements of life and their importance in living organisms; 2. describe the composition of living matter and the major biomolecules, enzymes, and vitamins found in living organisms; 3. discuss the physical and chemical basis of molecular interactions in biological systems, including covalency and electrovalency; 4. differentiate between the different types of isomerism of biological compounds and their implications in biochemistry; and 5. describe the principles of oxidation-reduction reactions in biological systems and their importance in metabolism and energy transfer. | | |
| **Learning Outcomes**  At the end of this course, students should be able to   1. identify the various chemical elements and compounds of life; 2. describe role of macromolecules as the building block of life; 3. identify and differentiate classes of molecular interactions; 4. identify different classes of isomerism and their importance to biological systems; and 5. explain the role of oxidation-reduction reactions in biological system. | | |
| **Course Contents**  Chemical elements of life; Composition of living matters; Brief introduction to the major biomolecules, enzymes and vitamins; Physical and chemical basis of molecular interactions, covelency and electrovalency; Isomerism of Biological compounds (geometrical, optical, positional and chemical); Oxidation-reduction reactions in biological systems: definitions and examples. | | |

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| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-ANA 202: Histology of Basic Tissues** | **(2 Units C: LH 15; PH 45)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  "Histology of Basic Tissues" is a 2nd-year level course that covers the basic principles of histology and the microscopic structure of the four basic tissues of the body: epithelial, connective, muscular, and nervous tissue. The course provides an introduction to the methods of study in histology, including histochemistry, cytochemistry, and in situ hybridization histochemistry. The course also covers the microanatomy of the basic tissues and their functional significance in various organ systems of the body.  Overall, the course aims to provide students with a comprehensive understanding of the microanatomy and functional significance of the four basic tissues of the body. The course covers a range of organ systems and introduces students to the basic principles of cytogenetics and recombinant DNA technology. By the end of the course, students should be able to identify and describe the microscopic features of the basic tissues and understand their functions in different organ systems, providing a solid foundation for further studies in histology, anatomy, and related fields. | | |
| **Objective**  The objectives of this course are to**:**   1. describe the basic principles of histology and the methods used to study tissue samples; 2. describe the cellular structure of the four basic tissues and their functions in the body; 3. identify the microanatomy of each basic tissue and its functional significance in different organ systems of the body; 4. identify the structures and functions of various organ systems, including the cardiovascular, respiratory, integumentary, gastrointestinal, urinary, and reproductive systems; and 5. describe the basic principles of cytogenetics and recombinant dna technology. | | |
| **Learning Outcomes**  At the end of this course, students should be able to   1. name common current histological techniques; 2. enumerate the principles, techniques and functional applications of Histology; 3. define and explain the cell in relation to its environment, surface components and content; 4. explain the interrelationship and interdependency between cell structures and functions; and 5. identify the microscopic appearance of tissues such as muscle, cartilage, etc in relation to their staining. | | |
| **Course Contents**  Introduction to histology; Method of study in histology; Cell Membrane, Cellular organelles; Cell dynamics and cell cycle; Cytogenetics; Histochemistry and cytochemistry; Introduction to recombinant DNA; *In situ* hybridisation histochemistry; Cell dynamics and cycle; Basic tissues of the body, the epithelial, connective tissues, muscle and nervous tissue; The microanatomy of the four basic tissues, namely: epithelial tissue, including glandular tissue, connective tissue, muscular tissue, and nervous tissue; Covering and Lining Epithelia; Glandular Epithelia; Connective tissue. Bone, Bone formation and Joints; Blood. Muscle. Nervous tissue (PNS); Nervous tissue (CNS). Cardiovascular system; Respiratory system; Integumentary system; Liver, Gallbladder and Pancreas; Gastro-intestinal system; Lymphatic tissue and the Immune system; Endocrine system; Urinary system; Female reproductive system. Male reproductive system; Eye. | | |

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| **Bayero University, Kano (BUK)** | |  |
| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-BCH 204: Biorisk Management and Biochemical Data Handling** | **(2 Units C: LH 15; PH 45)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  "Biorisk Management and Biochemical Data Handling" is a 2nd-year level course that covers the basic principles of biorisk management, including the definition of common terms such as risk, hazard, threat, biorisk, biosafety, biosecurity, and biorisk management. The course also introduces the assessment, mitigation, and performance (AMP) model and strategies for mitigating biosafety risks. Additionally, the course covers the basics of biochemical data handling and analysis, including data formats, storage, quality control, and validation, as well as statistical analysis techniques, probability, and hypothesis testing, and data visualization techniques.  Overall, the course aims to provide students with a comprehensive understanding of biorisk management and the basics of biochemical data handling and analysis. The course covers common terms and risks associated with biological work, introduces the AMP model, and provides strategies for mitigating biosafety risks. Additionally, the course covers the basics of biochemical data handling and analysis, including data formats, storage, quality control, and validation, as well as statistical analysis techniques, probability, hypothesis testing, and data visualization techniques. By the end of the course, students should be able to apply their knowledge to biorisk management and the interpretation and reporting of biochemical data. | | |
| **Objective**  The objectives of this course are to**:**   1. describe the basic principles of biorisk management and its relevance as part of the global health security framework; 2. define and explain common terms associated with biorisk management, including risk, hazard, threat, biorisk, biosafety, biosecurity, risk assessment, risk characterization, and risk evaluation; 3. identify risks associated with biological work and the basic framework for biorisk management. 4. describe the amp model for risk assessment, mitigation, and performance evaluation; 5. describe basic biosafety and biosecurity risk assessment strategies and the importance of performance evaluation; 6. describe the basics of biochemical data handling and analysis, including data formats, storage, quality control, and validation; 7. identify and apply basic statistical analysis techniques, probability, hypothesis testing, and data visualization techniques; and 8. apply advanced statistical analysis techniques, such as regression analysis and anova, to interpret and report biochemical data. | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. define, identify and interpret terms and concepts associated with biorisk, biosafety and biosecurity management, assessment and evaluation; 2. discuss the relevance of biorisk management (brm) as part of global health security framework; 3. explain the importance of proper data handling and analysis in biochemistry; 4. effectively manage, store and retrieve biochemical data in various formats; 5. have a good understanding of basic statistical analysis techniques and be able to perform basic data analysis; 6. create meaningful visual representations of biochemical data using various data visualization techniques; 7. critically evaluate and validate the quality of biochemical data; and 8. communicate the results of their data analysis effectively through written reports and oral presentations. | | |
| **Course Contents**  Definition of common terms: (Risk, hazard, threat, biorisk, biosafety, biosecurity, biorisk management, valuable biological material, risk assessment, risk characterization and risk evaluation); Risks associated with biological work and introduction to biorisk management framework; Definition and explanation of assessment, mitigation and Performance (AMP) model; Basic biosafety and biosecurity risk assessment; Strategies for mitigating biosafety risks; Performance evaluation and its importance; Relevance of biorisk management (BRM) as part of Global Health Security framework.  Introduction to biochemical data and its importance; Data formats and storage; Quality control and data validation; Basic statistical analysis techniques (mean, median, standard deviation, etc.); Basic probability and hypothesis testing; Data visualization techniques (scatter plots, bar graphs, histograms, etc.); Advanced statistical analysis techniques (regression analysis, ANOVA, etc.); Biochemical data interpretation and reporting | | |

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| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-BIO 201: Genetics I** | **(2 Units C: LH 30; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  This course provides an introduction to the principles of genetics, including heredity, genome structure, variation, and population genetics.  Students will learn the basic concepts of genetics, and will develop skills in data analysis and interpretation. | | |
| **Objectives**  The objectives of this course are to**:**   1. describe the basic principles of genetics and heredity; 2. explain the relationship between DNA and inheritance; 3. analyze and interpret genetic data using probability and statistical tests; 4. evaluate the concept of quantitative inheritance and its application to real-world situations; 5. explain how variations in genome structure can affect genetic traits; and 6. describe the basic principles of population genetics and their applications. | | |
| **Learning Outcomes**  At the end of this course, students should be able to   1. distinguish between heritable and non-heritable characteristics; 2. explain the likelihood of genetic events (probability) and how well those events 3. (results) fit into a set of observation; 4. discuss polygenic variations; and 5. describe concepts in population genetics. | | |
| **Course Contents**  Hereditable and non-hereditable characteristics; Probability and tests of goodness of fit; Quantitative inheritance; Variation in genome structure; Introduction to population genetics. | | |

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| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-CHM 210: Physical Chemistry I** | **(2 Units C: LH 30; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  This course provides an introduction to the principles of physical chemistry, including the kinetic theory of gases, thermodynamics, reactions and phase equilibria, reaction rates, and electrochemistry.  Students will develop an understanding of the basic concepts and principles of physical chemistry, and will learn how to apply these principles to real-world situations. | | |
| **Objectives**  The objectives of this course are to**:**   1. describe the basic principles of physical chemistry, including the kinetic theory of gases and thermodynamics; 2. analyze and interpret thermodynamic data using the laws of thermodynamics, entropy, and free energy; 3. express the principles of reactions and phase equilibria; 4. calculate and interpret reaction rates and rate laws; 5. explain the mechanism and theories of elementary processes and photochemical reactions; and 6. evaluate the principles of basic electrochemistry. | | |
| **Learning Outcomes**  At the end of this course, students should be able to   1. state the kinetic theory of gases and solve problems related to ideal and real gases; 2. derive the formula for molecular velocity of gases and use the derived formula to solve problems; 3. describe and explain the fundamental concepts of physical chemistry including those of statistical mechanics, chemical Kinetics, quantum mechanics and spectroscopy; 4. apply simple models to predict properties of chemical systems; 5. define and state type of solutions; define different concentration terms which include molarity, normality etc. explain vapour pressure lowering of the solvent, boiling point elevation of solutions, freezing point depression of solution and measurement of osmotic pressure; 6. apply numerical or computational methods to calculate physical properties of Chemical systems and assess the appropriateness of different computational techniques and numerical approximations for solving chemistry problems; 7. design and plan an investigation by selecting and applying appropriate practical, theoretical, and/or computational techniques or tools; and 8. states Ohms law and describe the electrolytic conduction, states the Faraday’s Law and Conductance Law of solution and calculation on electrical conductance on different electrolyte solution. | | |
| **Course Contents**  Kinetic theory of gases; Science of real gases; The laws of thermodynamics; Entropy and free energy; Reactions and phase equilibria; Reaction rates; Rate laws; Mechanism and theories of elementary processes; Photochemical reactions; Basic electrochemistry. | | |

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| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-CHM 211: Organic Chemistry I** | **(2 Units C: LH 30; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  This course provides an introduction to the chemistry of organic molecules with a focus on the reactions and properties of common functional groups.  Topics include the structures and reactions of aliphatic and aromatic compounds, carbohydrates, peptides and proteins, stereochemistry, and the investigation of reaction mechanisms. | | |
| **Objectives**  The objectives of this course are to**:**   1. demonstrate an understanding of the structures and properties of organic compounds, including their functional groups; 2. explain the various mechanisms of organic reactions and their stereochemistry; 3. analyze and interpret organic reactions using energetics and kinetics; 4. identify the various named organic reactions e.g., Grignard reaction, Aldol and related reactions; and 5. demonstrate the synthesis of alicyclic carbon compounds and their properties. | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. describe and solve problems in chemistry of aromatic compounds; 2. describe the structures of simple sugars, starch and cellulose, peptides and proteins and show the difference in their conformation structure; 3. describe and solve problems in chemistry of bifunctional compounds; 4. explain he mechanisms of substitution, elimination, addition and rearrangement reactions; 5. describe stereochemistry and its application; 6. describe condition and pathways of the following organic reactions - Grignard reaction, Aldol and related reactions; and 7. describe simple alicyclic carbon compounds and their synthesis. | | |
| **Course Contents**  Chemistry of aromatic compounds; Structures of simple sugars, starch and cellulose, peptides, and proteins; Chemistry of bifunctional compounds; Energetics, kinetics, and the investigation of reaction mechanisms; Mechanisms of substitution, elimination, addition, and rearrangement reactions; Stereochemistry; Examples of various named organic reactions e.g., Grignard reaction, Aldol and related reactions; Simple alicyclic carbon compounds and their synthesis. | | |

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| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-CHM 212: Inorganic Chemistry I** | **(2 Units C: LH 30; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  This course will introduce students to the chemistry of first-row transition metals, coordination chemistry, and the comparative chemistry of several elements.  Additionally, students will learn about the role of metals in biochemical systems, oxidation-reduction reactions, and the concept of hard and soft acids and bases. | | |
| **Objectives**  The objectives of this course are to**:**   1. identify the properties of first-row transition metals, their chemical reactions, and their role in catalysis; 2. describe the principles of coordination chemistry, including the structure and bonding in coordination compounds; 3. learn the comparative chemistry of several elements and the relationship between their properties and reactivity; 4. comprehend the basic principles of organometallic chemistry and its applications in catalysis; 5. learn about the role of metals in biochemical systems; 6. describe the concept of oxidation-reduction reactions and their applications in inorganic chemistry; and 7. differentiate the concept of hard and soft acids and bases and their application in coordination chemistry. | | |
| **Learning Outcomes**  At the end of this course, students should be able to   1. list the first-row transition elements and explain their characteristics and properties; 2. explain crystal field theory (CFT) and draw the diagram to illustrate with examples of coordination compounds; 3. state the advantages of CFT over other bonding theories; 4. discuss the comparative Chemistry of the following elements. ( I) Ga, In, Tl (II). Ge, Sn, Pb (III). As, Sb, Bi (IV). Se, Te, Po; 5. define organometallic chemistry; 6. give relevant examples with illustrations; 7. classify organometallic compounds with examples; 8. list the roles of metals in biochemical systems; 9. discuss the concepts of hard and soft acids and bases. 10. list examples of item 9 above; 11. explain oxidation and reduction reaction; and 12. illustrate the above (11) with appropriate reactions. | | |
| **Course Contents**  Chemistry of first row transition metals; Introduction to coordination chemistry including elementary treatment of crystal field theory; Comparative chemistry of the following elements: (a) Ga, In, TI, (b) Ge, Sn, Pb, (c) As, Sb, Bi (d) Se, Te, Po.  Elementary introduction to organometallic chemistry; Role of metals in biochemical systems; Concepts of hard and soft acids and bases; Oxidation and reduction reactions. | | |

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| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-MCB 221: General Microbiology** | **(2 Units C: LH 15; PH 45)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  The course "General Microbiology" is an introduction to the fundamental principles and concepts of microbiology.  The course will cover the classification of organisms, bacterial and fungal anatomy, viral structure, sterilization and disinfection, microbial culture and isolation, microbial nutrition and metabolism, and the identification and economic importance of selected microbial groups. | | |
| **Objectives**  The objectives of this course are to**:**   1. introduce students to the history of the science of microbiology and the classification of microorganisms; 2. provide an understanding of bacterial and fungal anatomy, and viral structure; 3. familiarize students with sterilization and disinfection techniques; 4. provide an understanding of microbial culture and isolation, microbial nutrition and metabolism; 5. introduce students to the identification and economic importance of selected microbial groups; and 6. develop laboratory skills for the isolation and identification of microorganisms. | | |
| **Learning Outcomes**  At the end of this course, students should be able to   1. explain the basic concepts and scope of microbiology; 2. describe the structure of bacteria, fungi and virus anatomy; 3. describe the layout of a microbiology laboratory, equipment and reagents in a microbiology laboratory; 4. describe the microbial culture and isolation, microbial nutrition and metabolism; and 5. discuss the theory behind basic protocols in a microbiology laboratory | | |
| **Course Contents**  History of the Science of Microbiology; Classification of organisms into prokaryotes and eukaryotes; Classification of prokaryotes into Archaea and eubacteria anatomy and cytochemistry of bacteria and fungi; Shapes, groupings and colonial morphology of bacteria and fungi; Structure of viruses; Sterilization and disinfection; Structure, ecology and reproduction of representative microbial genera; Culture of micro-organisms: Isolation of micro-organisms: bacteria, viruses and fungi (yeasts and moulds); Nutrition and biochemical activities of micro-organisms; Antigens and antibodies; Identification and economic importance of selected microbial groups; Microbial variation and heredity; Study of laboratory equipment; Introduction to microbiology of air food, milk, dairy products, water and soil; Staining techniques, antibiotic sensitivity tests, serological tests and antimicrobial agents. | | |

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| **Bayero University, Kano (BUK)** | |  |
| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-MCB 231: Basic Techniques in Microbiology** | **(2 Units C: LH -; PH 90)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  "Basic Techniques in Microbiology" is a practical course designed to introduce students to the fundamental techniques used in microbiology.  The course covers the cultivation, isolation, staining, and identification of microorganisms, as well as preservation techniques. Students will gain hands-on experience in the lab and develop essential laboratory skills. | | |
| **Objectives**  The objectives of this course are to**:**   1. provide students with a basic understanding of microbial growth and the factors that influence it; 2. familiarize students with the common media and techniques used to culture microorganisms; 3. train students in the isolation and identification of pure cultures of microorganisms; 4. introduce students to basic staining techniques for microbial differentiation; 5. enumerate microorganisms using both direct and indirect methods; 6. develop the skills necessary for identifying microorganisms based on their colonial and cellular morphology and biochemical properties; and 7. instruct students on the various preservation techniques used to maintain microbial cultures. | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. use the techniques for the isolation of bacteria from soil, water, food and air; 2. process for obtaining pure cultures of bacteria and fungi; 3. techniques for the characterization and identification of bacterial isolates; 4. methods of bacteria enumeration; and 5. methods for the preservation of isolates and methods for culturing anaerobic bacteria | | |
| **Course Contents**  Culturing of micro-organisms; Preparation of media for microbial growth; Isolation of pure culture: streaking, pour plates etc. and Sub-culturing procedures; Staining techniques for differentiation of micro-organisms; Enumeration of micro-organisms, direct and indirect procedures; Identification of micro-organisms to include colonial and cellular morphology and biochemical procedures; Identification of bacteria should also include the use of serological techniques, antibiotic sensitivity discs and agar-in well methods; The use of anaerobic jar for growth of anaerobic organisms; Methods of preservation (agar slants, frequent sub-culturing, refrigeration and use of deep freezers, lyophilisation, storage in liquid nitrogen) of microbial cultures. | | |

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| **Bayero University, Kano (BUK)** | |  |
| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-PIO 201: Introduction to Physiology and Blood** | **(2 Units C: LH 30; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  This course is an introductory level course that covers the fundamental principles of physiology and the role of blood in the body. Students will learn about the structure and function of cell membranes, transport processes, homeostasis, and control systems.  Students will also study the composition and functions of blood, haemopoiesis, WBC and differential count, plasma proteins, coagulation fibrinolysis, and platelet functions. The course will also cover blood groups, the reticulo-endothelial system, immunity and immunodeficiency diseases, and HIV. | | |
| **Objectives**  The objectives of this course are to**:**   1. introduce students to the fundamental principles of physiology and the role of blood in the body; 2. provide students with an understanding of cell membrane structure and function, transport processes, homeostasis, and control systems; 3. instruct students about the composition and functions of blood, including haemopoiesis, WBC and differential count, plasma proteins, coagulation fibrinolysis, and platelet functions; 4. provide students with an understanding of blood groups and the reticulo-endothelial system; and 5. train students about immunity and immunodeficiency diseases, and HIV. | | |
| **Learning Outcomes**  At the end of this course, students should be able to   1. describe the composition of a cell membrane; 2. explain how a potential difference across a membrane will influence the distribution of a cation and an anion; 3. describe how transport rates of certain molecules and ions are accelerated by specific membrane transport proteins; 4. distinguish between active (primary and secondary) transport, facilitated diffusion, and passive diffusion based on energy source and carrier protein involvement; 5. identify the mechanisms and role of selective transporters for amino acids, neurotransmitters, nutrients, etc; 6. describe the general concepts of homeostasis and the principles of positive and negative feedback in physiological systems; 7. identify the site of erythropoietin production, the stimulus for its release, and the target tissue for erythropoietin action; 8. discuss the normal balance of red blood cell synthesis and destruction, including how imbalances in each lead to anemia or polycythemia; 9. list and differentiate the various types of leukocytes; 10. describe the role of thrombocytes in haemostasis; and 11. list clotting factors and the discuss the mechanism of anti-coagulants. | | |
| **Course Contents**  Introduction and history of physiology; Structure and functions of cell membranes; Transport process, special transport mechanism in amphibian bladder, kidney, gall bladder, intestine, astrocytes and exocrine glands; Biophysical principles; Homeostasis and control systems including temperature regulation; biological rhythms, composition and functions of blood haemopoiesis; WBC and differential count, plasma proteins, coagulation fibrinolysis and platelet functions; Blood groups –ABO system – Rh system – blood transfusion – indication for collection and storage of blood, hazards of blood transfusions; Reticulo-endothelial system; Immunity and immunodeficiency disease and HIV. | | |

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| **Bayero University, Kano (BUK)** | |  |
| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-BCH 310: Biochemistry and Molecular Biology of Microorganisms** | **(2 Units C: LH 30; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  This course is designed to provide students with an in-depth understanding of the biochemistry and molecular biology of microorganisms. The course will cover topics such as genetic materials, prokaryotic genomes, genetic exchanges in bacteria, plasmids, DNA damage and repair mechanisms, and molecular mechanisms of gene regulation in prokaryotes.  The course will also cover bacteriophage genetics, including Benzer's fine structure of genes in bacteriophage T4 and genetic recombination in the lytic cycle. | | |
| **Objectives**  The objectives of this course are to**:**   1. discuss the biochemistry and molecular biology of microorganisms; 2. gain knowledge of genetic materials, prokaryotic genomes, and genetic exchanges in bacteria; 3. explain plasmids and their role in cloning; 4. learn about DNA damage and repair mechanisms; 5. gain knowledge of molecular mechanisms of gene regulation in prokaryotes; and 6. discuss the basics of bacteriophage genetics, including genetic recombination in the lytic cycle. | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. describe the genetic materials of microorganisms, including DNA, RNA, and proteins; 2. explain the physical organization of bacterial genomes and the structure of the bacterial nucleoid; 3. describe the replication and partitioning of the bacterial genome; 4. discuss the basics of DNA replication, supercoiling, transcription, and translation; 5. describe the mechanisms of genetic exchange in bacteria, including transformation, conjugation, and transduction; 6. explain the biology of plasmids, including plasmid replication and conjugation, and their use as vectors in cloning; 7. differentiate the mechanisms of dna damage and repair in microorganisms; 8. describe the molecular mechanisms of gene regulation in prokaryotes, including transcriptional regulation, operon organization, and transcriptional attenuation; and 9. evaluate the basics of bacteriophage genetics, including benzer's fine structure of genes in bacteriophage t4, plaque formation, and genetic recombination in the lytic cycle. | | |
| **Course Contents**  General introduction to genetic materials: DNA, RNA, protein, gene, loci, intron, exons, etc.; Prokaryotic Genomes - Physical organization of bacterial genomes; Structure of the bacterial nucleoid; Replication and partitioning of the bacterial genome; Genome of Archaea: A review of central dogma; DNA replication, supercoiling, transcription, translation; Genetic exchanges in bacteria - Mechanisms of genetic exchange: transformation, conjugation, and transduction; Plasmids **–** Plasmids and plasmid biology, plasmid replication and conjugation, plasmids as vectors in cloning; DNA damage and repair mechanisms: Molecular mechanism of gene regulation in prokaryotes: Transcriptional regulation in prokaryotes (inducible and repressible system, positive regulation and negative regulation); Operon concept and organization – lac, trp, Ara operons; Transcriptional attenuation; Phages, Bacteriophage Genetics: - Benzer’s fine structure of gene in bacteriophage T4: Plaque Formation, and Phage Mutants; Genetic recombination in the lytic cycle, (concept of recon, muton, cistron). | | |

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| **Bayero University, Kano (BUK)** | |  |
| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-BCH 312: Food and Nutritional Biochemistry** | **(2 Units C: LH 30; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  The "Food and Nutritional Biochemistry" course focuses on the principles of food chemistry and nutritional biochemistry. The course covers various topics such as food processing, preservation, storage, and analysis of food constituents.  The course also explores food poisoning and intoxication, as well as the prevention and cure of these issues. In addition, students will learn about the nutrient composition of food and how it relates to energy values and nutritional requirements. The course also covers nutritional disorders, assessment of nutritional status, and the use of functional foods, nutraceuticals, and supplements. | | |
| **Objectives**  The objectives of this course are to**:**   1. introduce students to the principles of food chemistry and nutritional biochemistry; 2. provide an understanding of food processing, preservation, storage, and analysis of food constituents; 3. explore the issues of food poisoning and intoxication, and the prevention and cure of these issues; 4. describe the nutrient composition of food and how it relates to energy values and nutritional requirements; and 5. provide knowledge on nutritional disorders, assessment of nutritional status, and the use of functional foods, nutraceuticals, and supplements. | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. describe the principles of food chemistry and nutritional biochemistry; 2. analyze and understand the composition of food and its nutritional value; 3. evaluate food processing, preservation, and storage methods, and their effects on food constituents; 4. identify food poisoning and intoxication, and the prevention and cure of these issues; 5. analyze the energy values of foods and energy expenditure by mammalians; 6. identify the different types of nutrients and their roles in the body; 7. assess nutritional requirements and recommended dietary allowances; 8. evaluate nutritional status and identify nutritional disorders; and 9. apply the use of functional foods, nutraceuticals, and supplements, and their potential benefits and drawbacks. | | |
| **Course Contents**  An introduction to the theory and application of physical and chemical methods for determining the constituents of food; Food processing, preservation and storage of traditional foods – root and stem tubers, fruits and fruit drinks, seeds and grains, greens and vegetables; Food poisoning and intoxication: prevention and cure; Food nutrients; Energy values of foods and energy expenditure by mammalians; Nutritive value of foods - carbohydrates, fats, proteins, vitamins, mineral elements and water; Nutritional disorders, prevention and therapy; Nutritional status and nutritional requirements; Recommended dietary allowances; Assessment of nutritional status; Nutrient requirements in relation to physical activity and ageing, diet and disease, obesity and under nutrition; Functional foods, nutraceuticals and supplements | | |

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| **Bayero University, Kano (BUK)** | |  |
| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-CHM 303: Organic Chemistry II** | **(2 Units C: LH 30; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  Organic Chemistry II is a 3rd-year course designed to provide an in-depth understanding of the chemistry of aromatic and alicyclic compounds, as well as heterocyclic chemistry and reactive intermediates.  The course also covers selected rearrangement reactions and their mechanisms, and introduces students to forensic analysis techniques for various samples. | | |
| **Objectives**  The objectives of this course are to**:**   1. develop an advanced understanding of the chemistry of aromatic and alicyclic compounds, and the reactions they undergo; 2. gain a comprehensive knowledge of heterocyclic chemistry, including the synthesis and reactivity of various heterocyclic compounds; 3. describe the nature of reactive intermediates and their role in organic reactions; 4. explore selected rearrangement reactions and their mechanisms, and understand the types of reactions they represent; and 5. introduce students to forensic analysis techniques for biological samples, pharmaceutical samples, organic analytes, and macromolecular samples. | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. recognize and distinguish between aromatic and Alicyclic compounds by their structures; 2. identify the properties of aromatic and Alicyclic compounds, and the chemical consequences of aromaticity; 3. recognize and be able to write the mechanism of electrophilic aromatic and Alicyclic substitution; 4. outline the completed electrophilic aromatic substitution reactions of the following types: halogenation, nitration, sulfonation, and Friedel-Crafts acylation & alkylation; 5. explain the chemistry of heterocyclic Chemistry (3,4,5 and 6-membered ring of O, N, S heterocyclic compounds); 6. describe the Reactive intermediates – carbocations, carbanions, carbenes, nitrenes; 7. express the rearrangement reactions e.g., Beckmann, Baeyer-Villiger etc. 8. illustrate with various reaction mechanisms and types; and 9. organize Forensic analysis of biological samples, pharmaceutical samples, organic analytes and macromolecular samples. | | |
| **Course Contents**  Aromatic and alicyclic chemistry; Survey of representative polycyclic compounds; Heterocyclic Chemistry (3,4,5 and 6-membered ring of O, N, S heterocyclic compounds); Reactive intermediates – carbocations, carbanions, carbenes, nitrenes etc.; Selected rearrangement reactions such as, Beckmann, Baeyer-Villiger, and many others to illustrate various reaction mechanisms and types; Forensic analysis of biological samples, pharmaceutical samples, organic analytes and macromolecular samples; Forensic analysis of biological samples, pharmaceutical samples, organic analytes and macromolecular samples. | | |

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| **Bayero University, Kano (BUK)** | |  |
| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-GST 401: Character Building, Professionalism and Team Work in Healthcare** | **(2 Units R: LH 30; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of the Bayero University, Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned healthcare services to society devoid of exploitation. The character, professional outlook as well as the work ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduates to work as a team in the health sector to achieve the desired objectives. It should encourage individual members’ professional development through appropriate mentorship and character building. The course will discourage the development of the barrage of emerging 21st century societal vices inclusive of, but not limited to drug and substance abuse. In essence the course would entrench the humane and professional aspects of the graduates as they serve the society equipped with knowledge and skills consistent with the vision and mission of the Bayero University, Kano. | | |
| **Overview**  A major life expectation of the graduates from this programme is the deployment of their services to a variety of clients including students, colleagues and vulnerable groups in the Nigerian milieu and beyond. Graduates of this programme, working with others, would also be expected to research into, propose, design and implement programmes, working with others, would research into, propose, design and implement policies and legislations in many areas of need to enhance better societal outcomes in health and education.  Accordingly, this course would prepare graduates from this programme to deploy their expertise in knowledge, skills, professionalism and work ethics in a culturally accepted manner, in the various services they offer to a variety of clients in healthcare, academia and other fields of endeavor.  In addition, the students will be exposed to communication and counselling skills that are consistent with the various cultural milieus of practice that they are likely to encounter. Furthermore, it will enhance the collaborative nature of the work they would be involved in post-qualification. The students would be exposed to nature of successful team work, appropriate leadership styles, mentorship and character building skills and ways of refraining from societal vices such as drug and substance abuse. | | |
| **Objectives**  The objectives of this course are to**:**   1. describe various types of leadership styles applicable in clinical and academic settings; 2. equip students with various skills of mentoring in clinical and academic settings; 3. enumerate the characteristics of a successful team in achieving team objectives; 4. describe the roles of professionalism in various fields of healthcare delivery; 5. describe the principles and practice of psychology in healthcare settings; 6. describe the principles of effective communication for the patients, healthcare team and the general public; 7. discuss the essentials of successful character building for various personality traits; 8. describe the general principles of ethics in medicine and health care research; and 9. identify the risk factors and preventive strategies for substance abuse. | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. identify at least three common types of leadership styles with two merits and demerits of eac;. 2. discuss any two theories of leadership that could be applied in healthcare; 3. identify at least three mentoring skills needed by all healthcare professional;. 4. enumerate four attributes of a successful team; 5. mention five circumstances where professionalism is required to meet client needs and expectations; 6. discuss human behaviour and its application in health counselling; 7. conduct three counselling sessions in three recognised clinical scenarios; 8. to demonstrate effective communication skills in dealing with clients, and the general public in recognised clinical scenario; 9. enumerate four forms of character traits each for three personality types; 10. mention four ethical challenges and four appropriate ethical principles to address them in a clinical practice and research; and 11. enumerate four preventive strategies to address three forms of drug abuse. | | |
| **Course Contents**  Concept of leadership and meaning of leaders; Theories, principles and styles of leadership; Methods of developing team wisdom; Team work as a personal skill; Creating powerful partnership in mentoring; Mentoring and mentoring skills: Stages of formal mentoring relationships; Introduction to professionalism in healthcare practice; Communication and interpersonal skills; Introduction to general psychology and medical psychology.  Counselling psychology in applied psychology; Definition, principles and application of effective communication skills in healthcare settings; The principles of Character Building and types personality traits; Philosophical concepts of Character Building; Code of ethics and principles for various health professions; Case scenarios in health care and their ethical implications; Introduction to psychoactive substances and their clinical manifestations; Cultural perspectives and management strategies in psychoactive substance abuse. | | |

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| **Bayero University, Kano (BUK)** | |  |
| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-BCH 409: Industrial Biochemistry** | **(2 Units C: LH 30; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  The course "Industrial Biochemistry" is designed to provide students with a comprehensive understanding of the use of microbial physiology and genetics in industrial processes. The course will cover important metabolic pathways and fermentation processes used in the production of various industrial products.  Students will also learn about methods for selecting and enhancing microorganisms to increase their production of useful metabolites. The course will emphasize the principles and applications of continuous culture methods, process evaluation, and development. | | |
| **Objectives**  The objectives of this course are to**:**   1. provide an overview of microbial physiology and genetics and their application in industrial processes; 2. develop a fundamental understanding of the general metabolic pathways and their application in industrial fermentations; 3. describe the principles and applications of continuous culture methods, including the chemostat; 4. discuss the concepts of primary and secondary metabolism in industrial biochemistry; 5. learn the methods for screening and selecting micro-organisms of industrial importance; 6. describe the principles and methods for strain selection/development and enhancement, and induction of mutation in micro-organism and plants for over production; 7. describe the concept of gene dosage and its application in industrial processes; and 8. develop skills in process evaluation and development. | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. describe the fundamental concepts of microbial physiology and genetics as they apply to industrial biochemistry; 2. identify the metabolic pathways and fermentation processes used in the production of industrial products; 3. describe the principles and applications of continuous culture methods and the chemostat; 4. discuss the concepts of primary and secondary metabolism in industrial biochemistry; 5. identify the methods for screening and selecting microorganisms of industrial importance; 6. develop an understanding of strain selection/development and enhancement, and induction of mutation in micro-organism and plants for overproduction; 7. describe the concept of gene dosage and its application in industrial processes; and 8. develop skills in process evaluation and development. | | |
| **Course Contents**  A short review of microbial physiology and genetics; A review of general metabolic pathways and application in industrial processes; Continuous culture methods, principles and applications; The chemostat and its application in industrial fermentations; Primary and secondary metabolism as applied to Industrial Biochemistry; Process evaluation and development; Over production of metabolites - amino acids, taste enhancers, vitamins, toxin etc.; Methods for screening and selecting micro-organisms of industrial importance; Induction of mutation in micro-organism and plants for the purpose of over production; Strain selection/development and enhancement; Gene dosage and its application in industrial processes. | | |

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| **Bayero University, Kano (BUK)** | |  |
| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-BCH 410: Biochemical Pharmacology and Toxicology** | **(3 Units C: LH 30; PH 45)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  The Biochemical Pharmacology and Toxicology course aims to provide students with a detailed understanding of the principles of pharmacology and toxicology, including the effects of drugs and xenobiotics on the body, as well as the mechanisms of drug action, biotransformation, and toxicity.  The course will also cover traditional and modern methods of drug discovery, as well as the bioprospecting of plant metabolites. | | |
| **Objectives**  The objectives of this course are to**:**   1. provide students with a comprehensive understanding of the mechanisms of drug action, biotransformation, and toxicity; 2. explore the different routes of drug and xenobiotic exposure, and how they affect the body; 3. equip students with knowledge of the basic principles of toxicology, including absorption and distribution of toxicants, toxicokinetics, and elimination of toxicants and their metabolites; 4. provide students with an understanding of the different methods of drug discovery and bioprospecting of plant metabolites; and 5. explore the biochemistry of drug addiction and the effects of drug abuse on the body. | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. differentiate various routes of drug and xenobiotic exposure, their absorption and distribution, and how they affect the body; 2. explain the mechanisms of drug action, biotransformation, and toxicity; 3. describe the basic principles of toxicology, including toxicokinetics and the metabolism and elimination of toxicants and their metabolites; 4. identify the physiological and biochemical actions of some selected drugs, and evaluate their effectiveness and toxicity; 5. describe the different methods of drug discovery and bioprospecting of plant metabolites; and 6. describe the biochemistry of drug addiction and the effects of drug abuse on the body. | | |
| **Course Contents**  Xenobiotics - Types and exposure; Xenobiotics/drug absorption, routes of exposure, metabolism (phase I and II), excretion, biotransformation and toxicity/adverse reactions; Mechanism of drug action; Metabolic factors affecting chemotherapeutic agents; Drug resistances and other factors affecting drug efficacy; The physiological and biochemical action of some selected drugs; Drug abuse and effects; Drug discovery - classic and modern methods, bioprospecting of plant metabolites, *in silico* methods. Traditional/ethnomedicine of some diseases (fieldwork and seminar).  Basic principles of toxicology, definition and scope; Absorption and distribution of toxicants; Toxicokinetics, metabolism of toxicants; Comparative toxicology; Elimination of toxicants and their metabolites, toxicant-receptor interactions, genetic poisons, chemical carcinogenesis, trace element toxicity, hepatotoxicity. Biological effects of toxic substances in living organisms; Metabolism, cellular and tissue targets, mechanisms of action, and pathological effects; Resistance and tolerance of toxicants, natural toxicants, chronic testing in animals; Tests for mutagenicity in toxicological evaluation of chemicals; Isolation and structural elucidation of toxicants; Enzymatic detoxification. Biochemistry of drug addiction | | |

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| **Bayero University, Kano (BUK)** | |  |
| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-BCH 411: Tissue Biochemistry** | **(1 Units C: LH 15; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  This course provides an in-depth study of the biochemistry of several important tissues in the human body, including muscles, kidney, liver, adipose tissues, brain, and reproductive tissues.  Students will learn about the metabolic pathways, regulation, and functions of these tissues, as well as their roles in detoxification and excretion. | | |
| **Objectives**  The objectives of this course are to**:**   1. discuss the metabolic pathways and regulation of biochemistry of muscles, kidney, liver, adipose tissues, brain, and reproductive tissues; 2. discuss (1) above under feed, fasting and starved conditions; 3. describe the roles of these tissues in detoxification and excretion; 4. discuss the molecular basis of tissue-specific metabolic disorders; and 5. apply biochemistry knowledge to the study of human tissues. | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. explain the metabolic pathways and regulation of biochemistry of muscles, kidney, liver, adipose tissues, brain, and reproductive tissues; 2. analyze the role of these tissues in detoxification and excretion; 3. apply biochemistry knowledge to the study of human tissues, and discuss the molecular basis of tissue-specific metabolic disorders; 4. develop critical thinking skills and apply problem-solving strategies to real-world biochemistry problems; and 5. effectively communicate scientific concepts and ideas, both verbally and in writing. | | |
| **Course Contents**  Biochemistry of muscles, kidney, liver, and adipose tissues; General metabolism of the brain and neuronal biochemistry; Biochemistry of reproductive tissues; Detoxification and excretion in tissues. | | |

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| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-BCH 412: Immunology and immunochemistry** | **(2 Units C: LH 30; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  This course will provide students with an understanding of the basic concepts of immunology and immunochemistry, including the structure of antigens and antibodies, cellular and humoral immune responses, and the genetics of the immune response.  The course will also cover immunological anomalies such as hypersensitivity and autoimmunity, as well as the use of diagnostic immunology and immuno-prophylaxis. | | |
| **Objectives**  The objectives of this course are to**:**   1. define the basic concepts of immunology and immunochemistry; 2. describe the structure and function of antigens and antibodies; 3. illustrate the cellular and humoral immune responses; 4. demonstrate the genetics of the immune response; 5. explain immunological anomalies such as hypersensitivity and autoimmunity; and 6. describe the use of diagnostic immunology and immuno-prophylaxis. | | |
| **Learning Outcomes**  At the end of this course, students should be able to   1. describe the basic concepts of immunology and immunochemistry; 2. describe the structure and function of antigens and antibodies; 3. explain the cellular and humoral immune responses; 4. discuss the genetics of the immune response; 5. analyze immunological anomalies such as hypersensitivity and autoimmunity; 6. explain the use of diagnostic immunology and immuno-prophylaxis; 7. interpret and evaluate data from immunoassays such as elisa and immunochromatographic assays; 8. evaluate the use of vaccines and antivenom in immuno-prophylaxis; and 9. discuss the ethical issues surrounding the use of immune-based therapies. | | |
| **Course Contents**  Blood chemistry and composition; Preparation of serum and plasma; Protein components of plasma; Basic concept of immunology; Innate and acquired immunity; Structure antigen and antigenic determinants, antibodies, cellular immunity, layered defence; Structure classification of immunoglobulin; Antigen-antibody interactions, genetics of response to antigenic stimulation; Immunological tolerance and suppression; Combining sites of antibodies; The antigen binding site; Domains of antibody molecules-gene duplication and diversification; Generation of diverse antibody specificities, clonal selection theory of antibody formation; Biological significance of clonal selection; Tumour and transplant immunology; Myeloma and hybridoma immunoglobulin; Immunological anomalies (hypersensitivity, autoimmunity) immune evasion; Diagnostic immunology: ELISA, immunochromatographic assays, etc.; Therapeutic immunology: Immuno-prophylaxis and serotherapy, vaccines, anitvenom. | | |

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| **Faculty of Basic Medical Sciences** | | |  |
| **Department of Biochemistry** | | |  |
| **B Sc. Biochemistry** | | |  |
| **BUK-BCH 413: Research Methods in Biochemistry** | | **(1 Units C: LH 15; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | | |
| **Overview**  The "Research Methods in Biochemistry" course is designed to provide students with an understanding of the principles and practices of research in biochemistry. Students will learn the meaning, objectives, types, and approaches to research.  Students will be introduced to the research process, research designs, statistical analysis, and the use of computer-based analytical tools. The course will also focus on hypothesis formulation and testing, data handling, interpretation, and reporting of research results. | | | |
| **Objectives**  The objectives of this course are to**:**   1. describe the principles and practices of research in biochemistry; 2. learn the meaning, objectives, types, and approaches to research; 3. become familiar with the research process and criteria of good research; 4. describe the importance of research designs and features of good designs; 5. learn basic concepts in statistics and sampling techniques; 6. become proficient in the use of computer-based analytical tools for research; and 7. develop skills in hypothesis formulation and testing, data handling, interpretation, and reporting of research results. | | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. describe the principles and practices of research in biochemistry; 2. identify the meaning, objectives, types, and approaches to research; 3. evaluate the research process and criteria of good research; 4. design and implement research designs with appropriate features; 5. apply basic concepts in statistics and sampling techniques for research; 6. use computer-based analytical tools for data handling and analysis; 7. formulate hypotheses and test them using appropriate statistical methods; and 8. interpret and report research results in a clear and concise manner. | | | |
| **Course Contents**  Meaning, objectives, types, approaches and significance of research; Research methods versus methodology, research process and criteria of good research; Research designs: Meaning of research designs, need for research designs, features of good designs, important concepts of good designs, differential research designs, and Basic principles of Experimental design and sample size determination; Use of computer in research (Internet Access).  Concepts in Statistics:Terms and Definitions in Statistics; Sampling techniques and sample size determination; Types of variables; Nature of variables: outcome and predictor variables; Data handling and cleaning; Concept of hypothesis formulation and testing; Assumptions of parametric variables; Descriptive statistics (data summary): display of data; Inferential statistics (t-test, ANOVA, chi-square); Use of computer based analytical packages such as Microsoft’s Word, Excel, PowerPoint, g-power, SPSS, Instat, etc. Interpretation, discussion and reporting of results. | | | |
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| **Faculty of Basic Medical Sciences** | | |  |
| **Department of Biochemistry** | | |  |
| **B Sc. Biochemistry** | | |  |
| **BUK-BCH 414: Forensic Biochemistry** | **(1 Units C: LH 15; PH -)** | | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | | |
| **Overview**  The "Forensic Biochemistry" course provides students with an understanding of the fundamental principles of forensic science and the role of biochemistry in forensic investigations.  This course covers the procedure for the extraction of contaminants of forensic interest from tissues, collection and preservation techniques for materials of forensic interest, and analytical procedures in forensic science. Additionally, it covers the interface between law, science, and medicine in forensic practices. | | | |
| **Objectives**  The objectives of this course are to**:**   1. describe the role of biochemistry in forensic science and the various techniques used for the analysis of forensic samples; 2. learn the extraction and collection techniques for forensic samples from tissues and other materials; 3. gain knowledge of the analytical procedures used in forensic science; 4. recognized the legal, ethical, and moral aspects of forensic investigations; and 5. discuss the impact of forensic findings on legal proceedings. | | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. demonstrate an understanding of the fundamental principles of forensic science and the role of biochemistry in forensic investigations; 2. explain the procedure for the extraction of contaminants of forensic interest from tissues and the collection and preservation techniques of materials of forensic interest; 3. identify and use various analytical procedures in forensic biochemistry; 4. analyze and interpret forensic biochemistry findings and their impact on legal proceedings; 5. evaluate the interface between law, science, and medicine in forensic practices and the legal, ethical, and moral aspects of forensic investigations; and 6. familiar with the types of evidence of relevance to forensic biochemistry. | | | |
| **Course Contents**  Introduction to forensic science: history, scope and relevance; Forensic toxicology (biochemistry of metals, drugs, poisons and toxins); Forensic DNA analysis and fingerprinting (extraction, amplification and genotyping); Forensic biochemistry sample handling: Collection and preservation techniques for materials of forensic interest; Analytical procedures in forensic biochemistry; Law, science and medicine in forensic practices; Case studies in forensic biochemistry (analysis of real world cases and the application of forensic biochemistry in solving crimes). | | | |

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| **Faculty of Basic Medical Sciences** | |  |
| **Department of Biochemistry** | |  |
| **B Sc. Biochemistry** | |  |
| **BUK-BCH 415: Special Topics and Seminar in Biochemistry** | **(1 Units R: LH 15; PH -)** | |
| **Senate approved relevance**  This course is designed in line with the vision and mission of Bayero University Kano to produce graduates that are highly qualified with excellent knowledge and high proficiency in skills capable of delivering excellent, respectful, empathic and culturally attuned scientific, educational and healthcare services to society devoid of exploitation. The character, professional outlook as well as the works ethics of the graduates would be sharpened by the course to achieve this goal.  This course would further strengthen the graduate to work as a team with others in the scientific, educational and health sectors to achieve desired set-out team objectives while at the same time encouraging individual members’ professional development through appropriate mentorship and character building that would discourage the development of the barrage of emerging 21st century societal character vices inclusive of, but not limited to drug and substance abuse. In essence this course would enshrine the humane and professional aspects of the graduates as they serve society armed with knowledge and skills consistent with the vision and mission of Bayero University Kano. | | |
| **Overview**  The "Special Topics and Seminar in Biochemistry" course is designed to expose students to emerging and contemporary issues in different areas of biochemistry. This course will provide an in-depth understanding of current research in various areas of biochemistry, including clinical biochemistry, biochemical endocrinology, biosynthesis of macromolecules, environmental biochemistry, climate change and biochemistry, parasite biochemistry, biochemical entomology, and viral biochemistry.  The course will involve seminars and discussions on recent research in these areas, as well as presentations by students on selected topics. | | |
| **Objectives**  The objectives of this course are to**:**   1. expose students to the latest developments in biochemistry research; 2. enhance students' critical thinking and analytical skills; 3. encourage students to actively engage in discussions and debates on contemporary issues in biochemistry; 4. develop students' presentation skills; and 5. foster an appreciation for the relevance of biochemistry research to current societal issues. | | |
| **Learning Outcomes**  At the end of this course, students should be able to:   1. analyze and evaluate recent research in various areas of biochemistry; 2. discuss and debate contemporary issues in biochemistry; 3. develop and deliver effective oral presentations on selected topics in biochemistry; 4. demonstrate an understanding of the relevance of biochemistry research to current societal issues; and 5. apply critical thinking skills to analyze and interpret biochemistry research data. | | |
| **Course Contents**  Emerging and contemporary issues in different areas of Biochemistry: Clinical Biochemistry, Biochemical Endocrinology, Macromolecules, Environmental Biochemistry, Climate Change and Biochemistry, Parasite Biochemistry, Biochemical Entomology, etc. | | |