



Course Specification

— (Bachelor)

Course Title: Biochemistry

Course Code: CHEM 26228

Program: B.Sc. of Chemistry

Department: Chemistry Department

College: Faculty of Science

Institution: University of Bisha

Version: 2

Last Revision Date: 5 September 2023

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A. General information about the course:

1. Course Identification

1. Credit hours: 3hours (2+1)

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: 4th level / 2^{se} year

4. Course general Description:

By the end of this course the students will be able to, Review and emphasize skills in Biochemical calculations, pH, buffers and water biochemistry, differentiate between macromolecules like Carbohydrates, proteins and lipids, biochemical activity of molecules inside the cells.

5. Pre-requirements for this course (if any):

6. Pre-requirements for this course (if any):

7. Course Main Objective(s):

understanding of the core principles and topics of Biochemistry and their experimental basis, identifying the structures and functions of biomolecules in the biological systems

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		
4	Distance learning		
5	Other (Lab)		



3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Define biochemical macromolecules of the cells.	K1	Lectures Scientific discussion	Midterm and final exams quizzes
1.2	Outline the properties of carbohydrate, lipids, amino acids, proteins and nucleic acid.	K4	Practical	Practical exams
1.3	Identify the structure of some biological compounds such as vitamins and enzymes.	K4	Lectures Scientific discussion	Midterm and final exams quizzes
2.0	Skills			
2.1	Compare macromolecules like carbohydrates,	S2 S3	Lectures	Midterm and final exams





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	proteins and lipids.		Group discussions Case study.	quizzes Group discussion
2.2	Use of instruments of macromolecules identification.		homework assignment containing problem thinking	
2.3	Design metabolic pathways.			
3.0	Values, autonomy, and responsibility			
3.2	Works in teamwork with a group of people to achieve a shared.	V2	E-Learning Systems for the communication with lecturer through the course work Research activities	Evaluating the activities of the students for their activities on the E-learning system

C. Course Content

No	List of Topics	Contact Hours
1	Theory: Introduction to biochemistry, importance of water and the bonds formed between macromolecules, pH, and biological buffers. Lab: Safety precautions and handling of glass ware in lab.	3 3
2	Theory: Carbohydrates (structure, nomenclature, classification, properties); Monosaccharides (glucose and fructose); Disaccharides and polysaccharides (Lactose, Maltose, cellulose, Glycogen). Lab: Identification of carbohydrates- part 1(Molisch test, Benedict test)	3 3
3	Lipids (structure, nomenclature, classification, properties); Conjugated Lipids (phospholipids, Glycolipids, Lipoproteins); Derived Lipids (Cholesterol, Steroids). Lab: Identification of carbohydrates- part 2 (Barfoed's Test, Bial's Test, Seliwanoff's Test)	3 3





4	Theory: Amino acids: α -amino acids (structure nomenclature, Classification and properties), synthesis, reactions and functions of amino acids.	3
	Lab: Identification of Fatty acids and lipids- part 1 (Solubility test, Saponification test)	3
5	Theory: Peptides and proteins: structure of peptides - peptide synthesis- Levels of protein structure- denaturation and classification of proteins.	3
	Lab: Identification of Fatty acids and lipids- part 2 (Separation of soap from the solution by salting out, Formation of insoluble soap)	3
6	Theory: Nucleic acids (DNA and RNA Structure, Replication of DNA, Transcription of RNA in prokaryotic, Translation of prokaryotic).	3
	Lab: Identification Amino Acids- part 1 (Solubility test, Ninhydrin test, Xanthoproteic test).	3
7	Theory: Carbohydrate and Lipid Metabolism (Glycolysis, Krebs cycle, beta oxidation...).	3
	Lab: Identification of Amino Acids- part 2 (Millon's test, Sakaguchi Test, Lead Sulfite Test).	3
8	Theory: Amino acids and nucleic acids Metabolism (urea cycle...).	3
	Lab: Identification of Proteins- part 1 (Effect of salt concentration on the protein solubility, Precipitation of proteins by acids).	3
9	Theory: Vitamins (Definition, importance and classification); Lipid soluble Vitamins (A, K, D, E, C); Water-soluble vitamins (BR1R, BR2R, BR3R, BR5R and BR6).	3
	Lab: Identification of Proteins- part 2 (Precipitation of protein by salts of heavy metals, Protein denaturation).	3
10	Theory: Enzymes (Nomenclature, classification, properties, Active site, Catalytic efficiency, Specificity); Factors affecting enzyme activity.	3
	Lab: General Scheme of Unknown.	3
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	First periodic Exam.	7-8	10%
2.	Second periodic Exam.	12-13	10%
3.	Class activities, homework and online quiz	weekly	5%
4.	First periodic Practical Exam.	7-8	10%
5.	Second periodic Practical Exam.	15	10%



No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
6.	Practical class activities	weekly	5%
7.	Final exam	16	50%
8.	Total		100%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	<ul style="list-style-type: none"> -Nelson, David and Michael Cox, Lehninger Principles of Biochemistry, 5th ed., 2006, NY: W.H. Freeman Publishers, Inc. ISBN: 0-7167-7108-X. -Recommended Books and Reference Material John and Tadhg Begley, The Organic Chemistry of Biological Pathways, 2007, Greenwood Village, CO, USA: Roberts & Company Publishers, 512pp, http://www.roberts-publishers.com, ISBN: 0-9747077-1-6.
Supportive References	<ul style="list-style-type: none"> -P. W. Atkins "Organic Chemistry", 6th edition, Oxford university press, 2000. -P. C. Champ, R. A. Harvey "Biochemistry" Lippincott Company, Philadelphia, 3rd edition 1998. -L. Finar Organic Chemistry 6th edition, Longman, 2001. -R.K. Murray, D. K. Graner, V. W. "Harper's illustrated biochemistry" 27th Ed., McGraw Hill Lang 2009. L. Lehninger "Biochemistry" 4th ed. McGraw Hill Lang 2000.
Electronic Materials	<ul style="list-style-type: none"> -http://www.sciencedirect.com -http://www.chem-books.com/
Other Learning Materials	<ul style="list-style-type: none"> -Handouts. -Data show presentations

2. Required Facilities and equipment



Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	-Lecture room (30 seats) equipped with smart board, overhead projector and data show. -Organic chemistry Lab.
Technology equipment (projector, smart board, software)	Data show – smart board
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Teacher / Students/Peer reviewer	Direct / Indirect
Effectiveness of Students' assessment	Teacher / Program leader/Academic committee	Direct / Indirect
Quality of learning resources	Teacher / Students/ Academic committee	Direct / Indirect
The extent to which CLOs have been achieved	Teacher / Program Leader	Direct / Indirect
Other	-	-

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	College of Science
REFERENCE NO.	1
DATE	5 September 2023

