TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmer specification.

1. Teaching Institution	Al-Hilla University
2. University Department/Centre	College of Dentistry
3. Course title/code	Biochemistry – 2nd stage
4. Modes of Attendance offered	Theory and Practical
5. Semester/Year	2024-2025
6. Number of hours tuition (total)	60 hours theory-60 hours practical
7. Date of production/revision of this specification	18/10/2024
8. Aims of the Course	

- Understanding Molecular Components of Life: Introduce students to the structure, function, and interactions of biomolecules such as proteins, carbohydrates, lipids, and nucleic acids.
- Mechanisms of Enzyme Action: Explain the principles of enzymatic activity, kinetics, and regulation, emphasizing the role enzymes play in catalyzing biochemical reactions.
- Metabolic Pathways and Energy Production: Study metabolic pathways, including glycolysis, the citric acid cycle, oxidative phosphorylation, and their regulation, highlighting how cells produce and utilize energy.
- Familiarize students with laboratory techniques such as spectroscopy, and enzyme assays used to study biochemical processes.

- Application in Health and Disease: Examine how biochemical processes relate to human health and disease, including topics such as metabolic disorders, cancer, and drug development.
- Integration of Biochemistry with Other Disciplines: Highlight the interdisciplinary nature of biochemistry and its connections with fields like genetics, molecular biology, pharmacology, and bioinformatics.
- Critical Thinking and Problem-Solving: Encourage the development of critical thinking skills to analyze experimental data, interpret biochemical research, and solve complex biological problems.

9· Learning Outcomes, Teaching, Learning and Assessment Methods

A- Cognitive objectives

- Explanation of theoretical and practical lectures
- Knowing the components of materials and the method of manipulation.

B-The skills goals special to the course.

- Know the shape of each material
- Know the methods of mixing of each material

10. Teaching and Learning Methods

A. Theoretical and practical Lectures
B. Practical Labs. lecture.
C. Videos for each theoretical lecture.
D. Pictures for each type of materials.
E. method of manipulation of material.

11. Assessment methods

A. Quizzes.
B. 1st course theory
C. 1st course practical
D. Midyear Exam theory
E. Midyear exam practical
F. 2nd course theory
G. 2nd course practical
H. Final exam practical
I. Final exam theory

12. Affective and value goals

1. Appreciation for the Role of Biochemistry in Life:
   Goal: Develop an appreciation for how biochemistry explains the molecular basis of life and its relevance to understanding health, disease, and the environment.
   Impact: Cultivates a sense of wonder and respect for the complexity of life at the molecular level.
2. Ethical Awareness in Biochemical Research:
   Goal: Promote ethical decision-making and responsibility in scientific practices, including research, data analysis, and the application of biochemical knowledge.
   Impact: Encourages integrity and respect for ethical guidelines in the handling of living organisms, data manipulation, and the treatment of human subjects in research.
3. Responsibility for Lifelong Learning:
   Goal: Inspire students to recognize the importance of staying current with advancements in biochemistry and related fields throughout their careers.
   Impact: Fosters a mindset of continuous education, encouraging curiosity and a commitment to professional development.
4. Appreciation for Collaborative Science:
   Goal: Encourage collaboration and teamwork in scientific inquiry and research, valuing diverse perspectives and interdisciplinary approaches.
   Impact: Prepares students for working in teams, recognizing the value of cooperation in solving complex biochemical problems.
5. Respect for Environmental and Public Health Issues:
   Goal: Develop a sense of responsibility toward the environmental impact of biochemical processes and applications, as well as public health implications of biochemical research.
   Impact: Encourages students to consider the broader societal implications of their work and to make responsible choices that benefit public and environmental health.
6. Empathy and Compassion in Healthcare and Biochemical Applications:
   Goal: Foster empathy towards patients and a sense of compassion in applying biochemical knowledge to medicine, pharmacology, and healthcare settings.
   Impact: Promotes a humane approach to science, encouraging students o see the human side of biochemical research and its applications.
7. Commitment to Scientific Integrity and Objectivity:
   Goal: Instill the value of honesty, objectivity, and transparency in conducting and reporting biochemical research.
   Impact: Strengthens the scientific community by encouraging rigor and transparency in experiments and publications, which is vital for the advancement of knowledge.

8. Cultural and Global Awareness in Biochemistry:

Goal: Raise awareness of how biochemistry intersects with global issues, including biotechnology, health disparities, and access to scientific advances across different cultures.

Impact: Promotes inclusivity and global thinking, encouraging students to appreciate the international implications of biochemistry in addressing worldwide challenges like disease and hunger.

12. Teaching and Learning Methods

Through lectures, laboratories, field observations, using available means of illustration, scientific films, accessing the Internet, and visiting libraries.

General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- The teacher uses modern methods in teaching.
- Using advanced electronic methods to calculate exam grades.
- Use modern methods in student tests.
- Using the student's classroom activities through which grades are calculated for the student.

13. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	The student should understand the meaning of amino acids, their properties and types.	Amino acids	Lectures and discussion	Oral and written tests
2	2	The student should understand the meaning of amino acids, their properties and types.	Amino acids	Lectures and discussion	Oral and written tests
3	2	The student should understand the meaning of proteins, their structures, classification and types.	proteins	Lectures and discussion	Oral and written tests
4	2	The student should understand the meaning of proteins, their structures, classification and types.	proteins	Lectures and discussion	Oral and written tests
5	2	The student should know enzymes, their working principle, theories, types, and their links to the substrate	Enzymes	Lectures and discussion	Oral and written tests
6	2	The student should know enzymes, their working principle, theories, types, and their links to the substrate	Enzymes	Lectures and discussion	Oral and written tests
7	2	The student should know enzymes, their working principle, theories, types, and their links to the substrate	Enzymes	Lectures and discussion	Oral and written tests
8	2	The student should know the meaning of nucleotide, its composition, and its difference from nucleoside	Nucleotides	Lectures and discussion	Oral and written tests

9	2	The student should know the meaning of nucleic acids and their types.	Nucleic acids	Lectures and discussion	Oral and written tests
10	2	The student should know the meaning of nucleic acids and their types.	Nucleic acids	Lectures and discussion	Oral and written tests
11	2	The student should know the meaning of vitamins and their classifications.	Vitamins	Lectures and discussion	Oral and written tests
12	2	The student should know the meaning of vitamins A, D, E, and K.	Vitamins	Lectures and discussion	Oral and written tests
13	2	The student should know the meaning of non-B-complex vitamins.	Vitamins	Lectures and discussion	Oral and written tests
14	2	The student should know the meaning of B-complex vitamins.	Vitamins	Lectures and discussion	Oral and written tests
15	2	The student should know the introduction of metabolism,	Metabolism,	Lectures and discussion	Oral and written tests
16	2	The student should know the meaning of anabolism and catabolism.	Metabolism,	Lectures and discussion	Oral and written tests
17	2	The student should know the breakdown of carbohydrates inside the body.	Metabolism,	Lectures and discussion	Oral and written tests
18	2	The student should know the breakdown of carbohydrates inside the body.	Metabolism,	Lectures and discussion	Oral and written tests
19	2	The student should know the process of glucose entering cells as an energy source.	Metabolism,	Lectures and discussion	Oral and written tests
20	2	The student should know the process of glucose entering cells as an energy source.	Metabolism,	Lectures and discussion	Oral and written tests
21	2	The student should know the process of glucose synthesis from non-carbohydrates.	Metabolism of carbohydrates	Lectures and discussion	Oral and written tests

22	2	The student should know the process of glucose synthesis from non-carbohydrates.	Metabolism of carbohydrates	Lectures and discussion	Oral and written tests
23	2	The student should know the cycle of converting glucose to acetyl CoA and its entry into the Krebs cycle.	Metabolism of carbohydrates	Lectures and discussion	Oral and written tests
24	2	The student should know the cycle of converting glucose to acetyl CoA and its entry into the Krebs cycle.	Metabolism of carbohydrates	Lectures and discussion	Oral and written tests
25	2	The student should know the process of protein breakdown inside the body and its sources.	Metabolism of proteins	Lectures and discussion	Oral and written tests
26	2	The student should know the pathways of protein interactions.	Metabolism of proteins	Lectures and discussion	Oral and written tests
27	2	The student should know the reactions of the waste products of protein metabolic reactions and their disposal.	Metabolism of proteins	Lectures and discussion	Oral and written tests
28	2	The student should know the structures of lipids and their pathways.	Metabolism of lipids	Lectures and discussion	Oral and written tests
29	2	The student should know the structures of lipids and their pathways.	Metabolism of lipids	Lectures and discussion	Oral and written tests
30	2	The student should know the reactions of the products of lipids metabolic reactions	Metabolism of lipids	Lectures and discussion	Oral and written tests

14. Infrastructure	
1. Books Required reading:	Biochemistry, Basics of Biochemistry and Clinical Chemistry
2. Main references (sources)	Lippincott' s Illustrated Reviews Biochemistry
A- Recommended books and references (scientific journals, reports…).	https://www.bjbabs.org/index.php/bjbabs/issue/view/5 جامعة بابل | المجلة العراقية الوطنية لعلوم الكيمياء (uobabylon.edu.iq) Arabian Journal of Chemistry | ScienceDirect.com by Elsevier
B-Electronic references, Internet sites…	Home Feed | ResearchGate Khan Academy | Free Online Courses, Lessons & Practice Ali Abdulhasan AL-Karaawi - YouTube

15. The development of the curriculum plan
1. Needs Assessment and Goal Setting Identify Learning Needs: Assess the needs of students (based on their academic level and professional goals), the demands of the scientific field, and industry or societal needs (such as public health or pharmaceutical development). Define Goals and Learning Outcomes: Set clear, measurable goals for what students should know and be able to do by the end of the course. Include both cognitive objectives (knowledge and skills) and affective/value goals (ethical understanding, professional attitudes). 2. Content Selection and Organization Core Topics: Determine the foundational content areas that must be covered, such as biomolecules (proteins, lipids, carbohydrates, nucleic acids), enzymology, metabolism and biochemical techniques. Sequence of Content: Organize the topics in a logical progression, ensuring that earlier material builds a foundation for more complex concepts.Typically, this follows a structure moving from molecular basics, to advanced applications like metabolic processes or clinical biochemistry. Incorporating Interdisciplinary Concepts: Introduce concepts from related disciplines (e.g., chemistry, molecular biology, genetics, and bioinformatics) to show the interdisciplinary nature of biochemistry. 3. Teaching Strategies and Instructional Methods Lectures and Discussions: Plan how traditional lectures can introduce and explain core concepts.

Use interactive discussions to foster critical thinking and application of biochemical principles.
Lab Work and Hands-on Learning: Design laboratory experiences that allow students to apply theoretical knowledge through experimentation. Include modern techniques such as spectrophotometer and enzyme assays.
Problem-Based Learning: Incorporate case studies or problem-based learning where students solve real-world biochemical problems (e.g., disease mechanisms, metabolic disorders).
Technology and Digital Tools: Use bioinformatics tools and simulation software to teach complex molecular interactions and metabolic pathways. Incorporate online resources and databases like protein or gene databases for research activities.

4. Incorporating Ethics and Societal Impact
Ethical Issues in Biochemistry: Include modules or discussions around ethical issues such as, research misconduct, and environmental impacts of biochemical processes.
Global Health and Environmental Topics: Address biochemistry's role in tackling global challenges, such as infectious diseases, drug development, and environmental sustainability.

5. Assessment and Evaluation Methods
Formative Assessments: Plan quizzes, assignments, and lab reports to continuously evaluate student progress and understanding.
Summative Assessments: Use midterms, final exams, or comprehensive projects to assess overall knowledge and skills acquired throughout the course.
Practical Exams: Evaluate laboratory skills through hands-on assessments where students demonstrate their ability to perform experiments and interpret data.
Research Projects or Presentations: Include opportunities for students to engage in independent or group research, culminating in presentations or reports on biochemistry topics.

6. Integration of Research and Current Advances
Incorporating Recent Research: Ensure that the curriculum includes the latest discoveries and research in biochemistry, such as advances in drug discovery, proteomics, or personalized medicine.
Encouraging Research Participation: Promote student involvement in research projects, internships, or collaborations with faculty on current biochemical research topics.

7. Feedback and Continuous Improvement
Gathering Feedback from Stakeholders: Collect feedback from students, faculty, and industry professionals to assess the effectiveness of the curriculum.
Curriculum Revision and Updates: Based on feedback and advancements in the field, regularly review and update the curriculum to ensure it remains relevant and up-to-date.
8. Alignment with Accreditation and Standards
Accreditation Requirements: Ensure that the curriculum meets the standards of accreditation bodies for biochemistry programs, such as ensuring a balance of theory, practical experience, and interdisciplinary learning.

Alignment with National or International Guidelines: Align the curriculum with national education standards, industry expectations, or international benchmarks for biochemistry education

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