Course Specifications

General Information

Course name	Metabolic Biochemistry
Course number	MDCN2321
Faculty	
Department	
Course type	College Needs
Course level	2
Credit hours (theoretical)	2
Credit hours (practical)	1
Course Prerequisites	

Course Objectives

1 - To provide a comprehensive understanding of the fundamental principles and concepts of metabolic biochemistry.
2 - To explore the biochemical pathways involved in the metabolism of carbohydrates, lipids, and proteins.
3 - To examine the interconnections and regulation of metabolic pathways.
4 - To understand the role of vitamins and minerals in metabolism.
5 - To analyze metabolic disorders and their underlying biochemical mechanisms.
6 - To foster an appreciation for the clinical relevance of metabolic biochemistry.

Intended Learning Outcomes

Knowledge and Understanding	* Knowledge: Demonstrating a solid understanding of the major metabolic pathways, including carbohydrate, lipid, and protein metabolism. * Comprehension: Explaining the interconnections and regulation of metabolic pathways and the role of vitamins and minerals in metabolism.
Intellectual Skills	* Analysis: Critically evaluating scientific literature and experimental data related to metabolic biochemistry and drawing meaningful conclusions. * Synthesis: Integrating knowledge from different metabolic pathways and applying it to complex scenarios or case studies. * Evaluation: Assessing the clinical relevance of metabolic biochemistry and its implications for disease diagnosis, treatment, and prevention.
Professional Skills	* 7. Communication: Effectively communicating scientific concepts related to metabolic biochemistry, both orally and in written form.
General Skill	* Critical Thinking: Developing critical thinking skills to analyze and evaluate information related to metabolic biochemistry. * Problem-Solving: Applying problem-solving skills to address complex issues and challenges in metabolic biochemistry.

Course Contents

1 - Introduction to Metabolic Biochemistry
2 - Carbohydrate Metabolism
3 - Lipid Metabolism
4 - Protein Metabolism
5 - Metabolism of Nucleotides and Nucleic Acids
6 - Vitamins and Coenzymes
7 - Metabolic Regulation and Hormonal Control
8 - Metabolic Integration and Interorgan Coordination
9 - Metabolic Diseases and Disorders
10 - Metabolic Biochemistry and Aging
11 - Metabolic Biochemistry and Cancer
12 - Metabolic Biochemistry and Exercise Physiology
13 - Metabolic Biochemistry and Drug Metabolism
14 - Emerging Topics in Metabolic Biochemistry

Teaching and Learning Methods

1 - Lectures: Delivering traditional lectures to provide essential concepts, explanations, and foundational knowledge. Use visual aids, such as slides or diagrams, to support learning.

2 - Interactive Discussions: Engage students in discussions on specific topics, encouraging them to ask questions, share their perspectives, and critically analyze metabolic processes. This can be done through small group discussions, case studies, or debates.

3 - Problem-Based Learning (PBL): Present real-world scenarios or case studies that require students to apply their knowledge of metabolic biochemistry to solve problems. PBL promotes critical thinking, problem-solving skills, and the integration of knowledge from multiple sources.

4 - Laboratory Sessions: Conduct hands-on laboratory experiments related to metabolic biochemistry, such as enzyme assays or metabolic pathway analysis. This provides students with practical experience and reinforces theoretical concepts.

5 - Virtual Simulations: Utilize virtual simulations or online platforms that allow students to explore metabolic pathways and manipulate variables to observe the effects. Virtual simulations can enhance understanding and provide opportunities for self-paced learning.

6 - Multimedia Resources: Incorporate multimedia resources, such as videos, animations, and online interactive modules, to illustrate complex biochemical processes, enhance visual learning, and provide additional explanations.

7 - Guest Speakers: Invite experts or professionals from the field of metabolic biochemistry to deliver guest lectures or share their experiences. This exposes students to real-world applications and provides valuable insights.

Teaching and Learning Methods for the Disabled Students

1 - Provide Accessibility: Ensure that the learning environment is physically accessible, with appropriate accommodations for students with mobility disabilities. This may include wheelchair-accessible desks, ramps, and elevators.

2 - Use Assistive Technologies: Explore and utilize assistive technologies that can aid students with disabilities in accessing the course materials. This can include screen readers, speech-to-text software, magnification tools, or adaptive keyboards.

3 - Provide Captioning and Transcripts: Provide captions for videos and audio materials to assist students with hearing impairments. Additionally, provide transcripts for audio content to facilitate access for students with hearing impairments or those who prefer written text.

4 - Flexible Course Materials: Provide course materials, such as lecture slides or handouts, in accessible formats. This may include providing materials in electronic formats that can be enlarged, converted to braille, or accessed with screen readers.

5 - Clear Communication: Use clear and concise language when delivering lectures or providing instructions. Repeat important points and allow time for questions and clarification. Consider providing lecture outlines or summaries to assist students with cognitive disabilities.

6 - Break Down Complex Concepts: Break down complex concepts into smaller, more manageable parts. Use visual aids, diagrams, and real-life examples to enhance understanding. This can benefit students with cognitive disabilities or learning differences.

Students Assessment

Assessment Method	TIME	MARKS
Quizzes	each week	30
midterm	the 7th week	30
final	the 14th week	30

Books and References

Course note	https://www.biochemden.com/
Essential books	"Harpers Illustrated Biochemistry" by Victor W. Rodwell, David A. Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil. "Lippincotts Illustrated Reviews: Biochemistry" by Denise R. Ferrier
Recommended books	"Biochemical Pathways: An Atlas of Biochemistry and Molecular Biology" by Gerhard Michal, Dietmar Schomburg, and Andreas B. Hofmeyr. "Metabolic Regulation: A Human Perspective" by Keith N. Frayn.
Other References (Periodical, web sites, ... etc.)	"Biochemistry," "Journal of Biological Chemistry," "Annual Review of Biochemistry," and "Trends in Biochemical Sciences." https://www.asbmb.org/