



University of Management & Technology
School of Science
Department of Life Science

BC-202 Carbohydrates and Lipids

Lecture Schedule	Tuesday and Friday 09:30 AM – 10:45 AM	Semester	Fall 2020
Pre-requisite	---	Credit Hours	4
Instructor	Ms Hina Batool	Contact Moodle link	hina.batool@umt.edu.pk
Office	3S-37	Office Hours	See office window
Course Description	<p>To demonstrate the in-depth knowledge on occurrence, classification, chemical structure, physical properties and biological importance of different types of carbohydrates and lipids.</p> <p>To impart practical knowledge of different methods for qualitative and quantitative analysis of carbohydrates and lipids</p> <p>The description of contents is as below;</p> <p>Introduction, occurrence and biological significance of carbohydrates;</p> <ul style="list-style-type: none"> • Nomenclature and classification of carbohydrates • Structures and properties of monosaccharides, oligosaccharides and polysaccharides • Complex polysaccharides including glycosamino glycans, proteoglycans, glycoproteins glycolipids etc. • Carbohydrate binding proteins Lectins and selectins and their significance. • Introduction, classification and biological functions of lipids • Classification, nomenclature, structures and properties of fatty acids • Structure and properties of simple and mixed triglycerides and waxes • Structure, properties and functions of phospholipids, sphingolipids and glycolipids • Chemical structures and functions of Prostaglandins, thromboxanes and leukotrienes • Structure and biological significance of cholesterol, bile salts, bile acids and other steroids • Lipoprotein system: Chylomicrons, HDL, LDL, IDL and VLDL and their role in distribution of lipids 		
Expected Outcomes	<p>At the end of this course the students will be able to:</p> <ul style="list-style-type: none"> • Acquire detailed knowledge of structures, properties and involvement of different types of carbohydrates and lipids in different parts of biological system • Analyze different types of carbohydrates and lipids • Use different instruments and equipment for analysis of biomolecules 		

Textbook(s)	Mary K. Campbell, Shawn O. Farrell, "Biochemistry" 5 th ed David L. Nelson, Michael M. Cox, "Lehninger Principles of Biochemistry" 5 th ed
Grading Policy	<ul style="list-style-type: none"> • Quizzes 10% • Assignment 05% • Presentation/Projects 05% • Midterm: 25% • Lab 20% • Final Exam: 35%

Course Schedule

Week	Lecture #	TOPICS	Chapter Name
1	1	Introduction of the carbohydrates	Lehninger Principles of Biochemistry
	2	Monosaccharides and concepts of enantiomers, isomers, Fischer projection	Ch.7. Carbohydrates and Glycobiology
2	1	Linear and cyclic structure of sugars	Ch.7. Carbohydrates and Glycobiology
	2	General reactions and reducing properties of monosaccharides	
3	1	Disaccharides, linkages in disaccharides and reducing and non-reducing disaccharides.	Ch.7. Carbohydrates and Glycobiology
	2	Homo and heteropolysaccharides	
4	1	Storage and structural polysaccharides	Ch.7. Carbohydrates and Glycobiology
	2	Glycosaminoglycans	
5	1	Proteoglycans	Ch.7. Carbohydrates and Glycobiology
	2	Biological significance of proteoglycans	
6	1	Glycoproteins	Ch.7. Carbohydrates and Glycobiology
	2	Significance of glycosylation of proteins	
7	1	Glycolipids	Ch.7. Carbohydrates and Glycobiology
	2	Lipopolysaccharides	
8	1	Carbohydrate binding proteins (Lectins)	Ch.7. Carbohydrates and Glycobiology
	2	Significance of lectins	
9	1	<u>Midterm Exam</u>	
	2	<u>Review</u>	
10	1	Introduction of lipids	Ch.10. Lipids
	2	Fatty acids and their types	
11	1	Nomenclature and structures of fatty acids	Ch.10. Lipids
	2	Triacylglyceroids (simple and mixed)	

12	1	Waxes	Ch.10. Lipids
	2	Structural lipids membrane phospholipids and their types	
13	1	Ether linked lipids (Plasmalogens and platelet activating factors)	Ch.10. Lipids
	2	Sterols and their significance (Cholesterol), steroid hormones	
14	1	Lipids as intracellular signals (IP3 signaling)	Ch.10. Lipids
	2	Lipids as intercellular signal molecules (prostaglandins, thromboxanes and leukotrienes)	
15	1	Fat soluble vitamins	Ch.10. Lipids
	2	Lipids as carriers, pigments and secondary metabolites.	