CHEM 1152 - Survey of Organic Chemistry and Biochemistry (version 201003)

Posted: 02/09/2010

☑ Standard ☐ Institutionally Developed College: N/A

EDGE Compatible: No

Pre-requisites

Co-requisites

CHEM 1152L - Survey of Organic Chemistry and Biochemistry Lab (201203)

Course Description

Provides an introduction to organic chemistry and biochemistry. This survey will include an overview of the properties, structure, nomenclature, reactions of hydrocarbons, alcohols, phenols, ethers, halides, aldehydes, ketones, carboxylic acids, esters, amines, amides; the properties, structure, and function of carbohydrates, lipids, proteins, and enzymes, as well as, intermediary metabolism. Topics include basic principles, hydrocarbons, hydrocarbon derivatives, heterocyclic rings and alkaloids, carbohydrates, lipids and fats, proteins, nucleic acids, and intermediary metabolism.

Course Length

	Minutes	Contact Unit
Lecture:	2250	
Lab 2:	0	
Lab 3:	0	
Practicum/Internship:	0	
Clinical:	0	
Total:	2250	3
Semester Credit Hours:		3

Competencies

Order	Description	Lecture	Lab2	Lab3	Practicum/ Internship	Clinical	Total Minutes	Semester Credit Hrs
1	Basic Principles	225	0	0	0	0	225	
2	Hydrocarbons	338	0	0	0	0	338	
3	Hydrocarbon Derivatives	337	0	0	0	0	337	
4	Heterocyclic Rings and Alkaloids	225	0	0	0	0	225	
5	Carbohydrates	225	0	0	0	0	225	
6	Lipids and Fats	225	0	0	0	0	225	

Order	Description	Lecture	Lab2	Lab3	Practicum/ Internship	Clinical	Total Minutes	Semester Credit Hrs
8	Nucleic Acids	225	0	0	0	0	225	
9	Intermediary Metabolism	225	0	0	0	0	225	
	Totals for Course CHEM 1152 - Survey of Organic Chemistry and Biochemistry (version 201003):	**2250**	**0**	**0**	**0**	**0**	**2250**	**3**

Learning Outcomes

Basic Principles

Order	Description	Learning Domain	Level of Learning
1	Describe molecular and structural formulas of simple organic compounds.	Cognitive	Knowledge
2	Distinguish between structural isomers, diastereomers, and enantiomers of simple organic compounds.	Cognitive	Analysis

Hydrocarbons

Order	Description	Learning Domain	Level of Learning
1	Identify trivial and IUPAC names and structural formulas for alkanes, alkenes, alkynes, aromatics, and alkyl halides.	Cognitive	Knowledge
2	Identify reactivities of alkanes, alkenes, alkynes, aromatics, and alkyl halides.	Cognitive	Knowledge
3	Describe the concept of aromaticity and orbital hybridization.	Cognitive	Knowledge
4	Describe a polymerization reaction for an alkene.	Cognitive	Knowledge

Hydrocarbon Derivatives

Order	Description	Learning Domain	Level of Learning
1	Identify trival and IUPAC names and structures for simple aliphatic compounds containing the following functional groups: alcohols, aldehydes, ketones, carboxylic acids, esters, ethers, amines, amides, hemiacetals, and acetals.	Cognitive	Knowledge
2	Discuss reactivities and synthesis of the functional groups listed above.	Cognitive	Comprehension
3	Describe reactions of the functional groups listed above including dehydration and hydrolysis, oxidation and reduction, condensation reactions, and saponification reactions.	Cognitive	Knowledge
4	Describe and analyze Tollens test.	Cognitive	Knowledge
5	Describe and analyze Benedict's test.	Cognitive	Knowledge

Heterocyclic Rings and Alkaloids

Order	Description	Learning Domain	Level of Learning
1	Describe trivial nomenclature and structure of common organic solvents and drugs comprised of a heterocyclic ring structures.	Cognitive	Knowledge
2	Describe common biological chemical reactions occurring with drugs that contain heterocyclic ring structures.	Cognitive	Knowledge

Carbohydrates

Order	Description	Learning Domain	Level of Learning
1	Describe trivial nomenclature and structure of common monosaccharides, disaccharides, and complex polysaccharides.	Cognitive	Knowledge
2	Discuss the physical and chemical properties of carbohydrates.	Cognitive	Comprehension

Lipids and Fats

Order	Description	Learning	Level of
1	Describe the trivial nomenclature and structure of neutral fats, phospholipids, and steroids.	Cognitive	Knowledge
2	Describe the physical and chemical properties of lipids.	Cognitive	Knowledge
3	Describe the structure, physical properties and physiological function of basic membrane bilayers.	Cognitive	Knowledge

Proteins

Order	Description	Learning Domain	Level of Learning
1	Describe the primary, secondary, tertiary and quarternary structure and basic physiological functions of amino acids and proteins.	Cognitive	Knowledge
2	Discuss peptide and protein synthesis from amino acids by the cell.	Cognitive	Comprehension
3	Explain enzymes as chemical catalysts.	Cognitive	Comprehension

Nucleic Acids

Order	Description	Learning Domain	Level of Learning
1	Describe structure of DNA and RNA.	Cognitive	Knowledge
2	Describe DNA replication, transcription, and translation.	Cognitive	Knowledge
3	Discuss the reactivity of nucleic acids.	Cognitive	Comprehension

Intermediary Metabolism

Order	Description	Learning Domain	Level of Learning
1	Define anabolic and catabolic metabolism.	Cognitive	Knowledge
2	Explain the role of ATP in cellular energy storage.	Cognitive	Comprehension

Order	Description	Learning Domain	Level of Learning
3	Describe glycolysis, the tricarboxylic acid cycle, and oxidative phosphorylation.	Cognitive	Knowledge
4	Understand the pathways involved in the digestion and absorption of Dietary Nutrients: Carbohydrates, Fats, and Protein.	Cognitive	Comprehension
5	Recognize the role of acetyl CoA in fatty acid and lipid metabolism.	Cognitive	Analysis
6	Describe the major differences between -oxidation and fatty acid biosynthesis.	Cognitive	Knowledge
7	Describe the major pathways regarding protein synthesis and protein and amino acid degradation.	Cognitive	Knowledge

References

Order	Reference Type	Description
1	Essays or Chapters in Edited Books - One Author	Bettelheim, Brown & March. (2007). Introduction to general, organic and biochemistry. 8th. pp. 864 Belmont, CA: Brooks Cole
2	Essays or Chapters in Edited Books - One Author	CRC. (?). CRC handbook of chemistry and physics. ?. pp. 2688 ?: CRC Online Press
3	Essays or Chapters in Edited Books - One Author	Denniston, Katherine J., et al.. (2007). General, organic, and biochemistry. 6th. pp. 968 New York, NY: McGraw Hill
4	Book with Author(s) Listed	Hein, M., Pattison, S., Arena, S. & Best, L.. (2008). Introduction to general, organic, and biochemistry. (9th). New York, NY: John Wiley & Sons.
5	Essays or Chapters in Edited Books - One Author	Wilcox, F. & Wilcox, M.. (1994). Experimental organic chemistry: A small scale approach. 2nd. pp. 528 Englewood Cliffs, NJ: Prentice Hall
6	Essays or Chapters in Edited Books - One Author	Zubrick, J.. (2007). Organic chem lab survival manual: A student's guide to techniques. 7th. pp. 368 New York, NY: Wiley & Sons