COURSE OUTLINE : CHEM 121
D Credit – Degree Applicable
COURSE ID 004018
Cyclical Review: October 2020

COURSE DISCIPLINE : CHEM

COURSE NUMBER : 121

COURSE TITLE (FULL) : Fundamentals of College Chemistry (Organic and Biochemistry)

COURSE TITLE (SHORT) : Fund of Col Chem

CATALOG DESCRIPTION

CHEM 121 is the second half of the year sequence and covers the fundamentals of organic and biochemistry.

CATALOG NOTES

Note: This course is not for science majors.

Total Lecture Units: 4.00

Total Laboratory Units: 1.00

Total Course Units: 5.00

Total Lecture Hours: 72.00

Total Laboratory Hours: 54.00

Total Laboratory Hours To Be Arranged: 0.00

Total Contact Hours: 126.00

Total Out-of-Class Hours: 144.00

Prerequisite: CHEM 120.

ENTRY STANDARDS

	Subject	Number	Title	Description	Include
1	CHEM	120	Fundamentals Of College Chemistry (Inorganic)	use the dimensional analysis method of problem solving	Yes
2	CHEM	120	Fundamentals Of College Chemistry (Inorganic)	analyze supposed scientific reasoning as logical or not	Yes
3	CHEM	120	Fundamentals Of College Chemistry (Inorganic)	evaluate scientific statements and develop an opinion as to their validity	Yes
4	CHEM	120	Fundamentals Of College Chemistry (Inorganic)	know and understand basic chemical data, rules, and laws.	Yes
5				describe the scientific method and apply it to the development of the science of chemistry;	Yes
6				utilize bonding theories to describe the chemical nature of ions and molecules;	Yes
7				demonstrate an understanding of intermolecular forces and apply those forces to the nature of solids and liquids;	Yes
8				the proper use of laboratory equipment and techniques, and the ability to handle chemicals safely.	Yes

EXIT STANDARDS

1 Identify basic equipment and know its function or use, know and perform basic organic laboratory techniques such as filtration, crystallization, extraction, and TLC in laboratory.
2 identify or draw the structural formulas and for the reaction, predict products, provide organic structures and their IUPAC names, given the IUPAC names for organic reactants
3 differentiate physical and chemical properties of organic functional families and correlate them with the structure.
4 construct models of organic molecules using ball and stick models,
5 differentiate composition, properties, and chemical reactions of the biologically important compounds: carbohydrates, lipids, proteins, and nucleic acids,
6 identify the functions of biomolecules in biological systems and their metabolic pathways.

STUDENT LEARNING OUTCOMES

1 practice safe and effective organic laboratory skills
2 given the IUPAC names for organic reactants, identify or draw the structural formulas and for the reaction, predict products, provide molecular structures and their IUPAC names
3 Identify and explain the major metabolic pathways within the scope of coverage

COURSE CONTENT WITH INSTRUCTIONAL HOURS

	Description	Lecture	Lab	Total Hours
1	Introduction • Overview • Geometry of molecules • Bonding • Structure	2	0	2
2	Alkanes • IUPAC nomenclature • Structure • Physical and Chemical Properties • Cycloalkanes • Alkyl Halides	3	0	3
3	Unsaturated Hydrocarbons • Alkenes • Alkynes • Aromatic Compounds	3	0	3
4	Functional Groups I • Alcohols • Phenols • Ethers • Thiols	4	0	4
5	Functional Groups II • Aldehydes • Ketones	4	0	4

6	Functional Groups III • Carboxylic Acids • Esters • Acyl Chlorides • Polymers and Polymerization Reactions	10	0	10
7	Functional Groups IV • Amines • Amides	6	0	6
8	Carbohydrates • Classification • Simple Carbohydrates • Disaccharides • Polysaccharides	5	0	5
9	Lipids • Classification • Hydrolyzable Lipids • Non-Hydrolyzable Lipids • Hormones • Biological Membranes	4	0	4
10	Proteins • Amino Acids • Polypeptides • Structure of Proteins • Classification of Proteins	3	0	3

11	Enzymes • Classification of Enzymes • Enzyme Mechanisms • Vitamins and Coenzymes • Enzyme Regulation	3	0	3
12	Nucleic Acids • Classification • Structure of Nucleotides • Nucleic Acids • Replication, Translation, and Transcription of Nucleic Acids	5	0	5
13	Metabolism • Carbohydrate Metabolism • Lipid Metabolism • Protein Metabolism	12	0	12
14	Nutrition • Nutritional Requirements • Macronutrients and Micronutrients • Energy Carriers	4	0	4
15	Body Fluids • Classification of Body Fluids • Chemical Transport • Buffer Control of Blood pH	4	0	4
16	Lab	0	54	54
				126

OUT OF CLASS ASSIGNMENTS

1 Supplementary readings from handouts

METHODS OF EVALUATION

1 Four or five one-hour examinations
2 Quizzes and laboratory reports
3 Group PowerPoint Presentations on given assignments
4 Final examination of 2.5 hours that contains multiple-choice questions

METHODS OF INSTRUCTION

- [x] Lecture
- [x] Laboratory
- [ ] Studio
- [ ] Discussion
- [ ] Multimedia
- [ ] Tutorial
- [ ] Independent Study
- [ ] Collaboratory Learning
- [x] Demonstration
- [ ] Field Activities (Trips)
- [ ] Guest Speakers
- [ ] Presentations

TEXTBOOKS

Title	Type	Publisher	Edition	Medium	Author	IBSN	Date
Chemistry for Today: General, Organic, & Biochemistry	Required	Cengage		Print	Spencer L. Seager	978-1-305-96006-0	2018
Laboratory Experiments for Introduction to General, Organic, & Biochemistry	Required	Cengage		Print	Frederick A. Bettelheim	978-1-133-10602-9	2013