INDUSTRIAL CHEMISTRY II						
Program	BSc in Chemistry					
Module Name	Applied Chemistry					
Module code	Chem-M3111					
Module Number	11					
Course Title	Industrial Chemistry II					
Course Code	Chem3112					
Pre-requisite	Chem3111					
Module coordinator name and addresses	TBA					
Instructor(s) name and addresses	TBA					
Lecture days, Hours & room	TBA					
Cr. Hrs/ECTS	3/5					
Work load	Lecture	Tutorial	Lab.	Assessment	Home study	Total
	48	16	----	5	66	135
Target group	3rd year chemistry students					
Semester	Semester II					
Mode of delivery	Semester based					
Status of the course	Core Compulsory					

Course Description

Basic organic industrial processes (coal petroleum, main petrochemicals, basic organic products, plastics, rubber and fibers; sugar; oils and fats, detergents, paper; foodstuff, pharmaceuticals, agrochemicals; dye stuff,; leather).

Learning Outcomes

By the end of this course students should be able to:

- discuss the processing of coal and petroleum into value added products
- describe the industrial organic synthesis and manufacture and properties of plastics, rubber, fibers
- highlight the chemistry of oils, fats, soaps, detergents, pharmaceuticals, dyestuffs and insecticides Sucrose, Paper, Leather and Food processing Industries

Course Outline and Schedule

Week	Contents	Teaching method	Acitivies	Reading/ assignments

1	1. Coal and Petroleum Processing • Origin of coal and its ranking 1.1. Carbonisation of coal 1.2. Gasification of coal 1.3. Hydrogenation of coal 1.4. Petroleum – origin, Classification	• Gapped Lecture • Question and answer • Small group discussion • Reading Assignment	• Listen to a lecture and take notes on the	B.K. Sharma
2	1.5. and mining 1.6. Distillation of petroleum 1.7. Rating of Petrol and Diesel 1.8. Cracking, Alkylation, Hydrotreating and Reforming	• Gapped Lecture • Question and answer • Small group discussion • Reading Assignment	• Listen to a lecture and take notes on the	B.K. Sharma
3	2. Main Petrochemicals 2.1. Introduction to petrochemicals 2.2. Chemical conversions for manufacture of petrochemicals 2.3. Petrochemicals from Methane, Ethylene, Propylene, Butylenes and BTX • Manufacture of Acetylene, Ethylene oxide, Acrylonitile, Dimethyl terephthalate	• Gapped Lecture • Question and answer • Small group discussion • Reflection	• lesson treated, • Ask questions on unclear ideas, • Active participation in discussion	B.K. Sharma
	Test 1 (10%)			
4	3. Basic Organic Products 3.1. Introduction to Industrial organic synthesis 3.2. Manufacture of Methanol and Isopropanol 3.3. Manufacture of Formaldehyde and Acetaldehyde 3.4. Manufacture of Acetic acid 3.5. Manufacture of Acetone 3.6. Manufacture of Phenol and Styrene	• Gapped Lecture • Question and answer • Small group discussion • Reflection	• lesson treated, • Ask questions on unclear ideas, • Active participation in discussion	B.K. Sharma
5	4. Plastics, Rubber and Fibers 4.1. Introduction to polymers 4.2. Nomenclature of polymers 4.3. Addition and condensation polymerization 4.4. Methods of Polymerisation 4.5. Effect of polymer structure on properties	• Gapped Lecture • Question and answer • Small group discussion • Reflection	• lesson treated, • Ask questions on unclear ideas, • Active participation in discussion	B.K. Sharma

6	4.6. Plastics-Properties and classification 4.7. Moulding constituents of plastics 4.8. Moulding of plastics into articles 4.9. Preparation, properties and uses of PE, PVC and Bakelite 4.10. Rubber – properties 4.11. Natural and synthetic rubber	• Gapped Lecture • Question and answer • Small group discussion • Reflection	• lesson treated, • Ask questions on unclear ideas, • Active participation in discussion	B.K. Sharma
7	5. Sucrose Industry 5.1. Manufacture of cane sugar 5.2. Manufacture of sucrose from Beet Root 5.3. Testing of sugar	• Gapped Lecture • Question and answer • Small group discussion • Reflection	• lesson treated, • Ask questions on unclear ideas, • Active participation in discussion	B.K. Sharma
	Assignment 1 (10%)			
8	6. Oils, Fats and Detergents 6.1. Introduction to oils and fats 6.2. Properties of oils and fats 6.3. Classification of oils 6.4. Manufacture of vegetable oils 6.5. Animal fats and oils	• Gapped Lecture • Question and answer • Small group discussion • Reflection	• lesson treated, • Ask questions on unclear ideas, • Active participation in discussion	B.K. Sharma
9	6.6. Analysis of oils and fats 6.7. Hydrogenation of oils 6.8. Manufacture of soap • Introduction to detergents	• Gapped Lecture • Question and answer • Small group discussion • Reflection	• lesson treated, • Ask questions on unclear ideas, • Active participation in discussion	B.K. Sharma
10	7. Paper Industry 7.1. Manufacture of pulp by mechanical and chemical process 7.2. Refining of pulp 7.3. . Manufacture of paper	• Gapped Lecture • Question and answer • Small group discussion • Reflection	• lesson treated, • Ask questions on unclear ideas, • Active participation in discussion	B.K. Sharma
	Test 2 (10%)			

11	**8. Chemical foodstuff processing** 8.1. Introduction to fermentation 8.2. Alcohol Beverages 8.3. Manufacture of Beer, Spirit and wines.	• Gapped Lecture • Question and answer • Small group discussion • Reflection	• lesson treated, • Ask questions on unclear ideas, • Active participation in discussion	B.K. Sharma
12	9. Pharmaceuticals 9.1. Sulfonamide drugs 9.2. Antimalarial, antibacterial and antiviral agents Antibiotics	• Gapped Lecture • Question and answer • Small group discussion • Reflection	• lesson treated, • Ask questions on unclear ideas, • Active participation in discussion	B.K. Sharma
13	10. Chemicals for agriculture 10.1. Introduction to Insecticides 10.2. DDT, BHC and Parathion 10.3. Fungicides – Baygon and 2,4,6-Trichloro Phenol 10.4. Herbicides–2,4-D and 2,4,5–T 10.5. Pesticides pollution	• Gapped Lecture • Question and answer • Small group discussion • Reflection	• lesson treated, • Ask questions on unclear ideas, • Active participation in discussion	B.K. Sharma
14	11. Dyestuff 11.1. Introduction to dyes 11.2. Colour and constitution 11.3. Methods of dyeing 11.4. Classification of dyes	• Gapped Lecture • Question and answer • Small group discussion • Reflection	• lesson treated, • Ask questions on unclear ideas, • Active participation in discussion	B.K. Sharma
	Quiz (10%)			
15	12. Leather Industry 12.1. Animals skin 12.2. Preparation of skin for tanning 12.3. Vegetable tanning 12.4. Chrome tanning 12.5. Leather finishing	• Gapped Lecture • Question and answer • Small group discussion • Reflection	• lesson treated, • Ask questions on unclear ideas, • Active participation in discussion	B.K. Sharma
	Report submission on industry visit (10%) and presentation (10%)			

16	Final exam (50%)

Mode of Assessment

Assessment Breakdown	**%**
continuous assessment (not more than 10% for each)	**50**
End of Semester Examination	**50**

Course policy

Beside the university's policy on course delivery and evaluation, students are expected to actively participate in learning process by obeying the following course policies:

- Coming class on time (punctuality)
- Attend all class sessions
- Be prepared to learn and actively participate during class discussion
- Do all assignments, group works, project works, and presentations on time
- All students are expected to complete their own work to the best of their ability and cheating is strictly forbidden
- Do not miss quizzes, assignments, and exams unless you are forced due to health and other reasonable problems
- Cite all sources consulted to any extent (including material from the internet), whether or not assigned and whether or not quoted directly. It is strictly forbidden to take others work and present as own.
- Make-up class shall be conducted if classes are missed due to national holidays and/or when unpredicted conditions result in class dismissal

Reference

1. P.C. Jain and M. Jain, Engineering Chemistry by; Dhanpatrai & sons, 11th ed, 1996.
2. B.K. Sharma, Industrial Chemistry, Goel publishing house; 11th ed, 2004.
3. J.N. Delgado and W.A. Remers, Text book of organic medicinal and pharmaceutical chemistry