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| **logo University of Management & Technology**  School of Science  Department of Chemistry | | | | |
| CH-311 (INDUSTRIAL CHEMISTRY-I) | | | | |
| **Pre-requisite** | Nil | **Credit Hours** | | 3 |
| **Course Description** | The majority of graduate chemists work in industrial chemistry environments. Therefore, it is critical to have an understanding of chemistry in this context. This course covers the main basic aspects of Industrial chemistry in a context especially designed for BS Chemistry students. The course is covering the production of important compounds of inorganic chemistry and organic chemistry. The chemical reactions will be illustrated to assist the understanding of processes taking place in the industrial production of chemicals. It will cover important reactions of Glass Industry, Cement Industry Ceramics Industry, Photographic product Industry, Surface Coating Industry and Soap Industry. | | | |
| **Expected Outcomes** | This course aims to provide students with an understanding of chemistry as it applies to industrial processes, as well as an understanding of some basic concepts that are relevant in the industrial world. Specific areas include industrial organic chemistry and industrial inorganic chemistry. On successful completion of this course, students will be able to develop an understanding of the range and uses of chemistry methods in industry, the role of chemistry in industrial processing and an understanding of the chemist problem solving for industry. | | | |
| **Textbook**  **&**  **Reference Book** | Handbook of Industrial Chemistry  Published in: 2005, By M. Farhat Ali,  Bassam El Ali and James G.S.  Publisher: McGraw-Hill Professional | | Shreve's Chemical Process Industries Professional, Fifth Edition (2010) By: George T. Austin, Professor Washington State University Publisher: McGraw-Hill | |
| **Grading Policy** | Quizzes 15%  Presentation 05 %  Assignments 05%  Midterm Exam 25%  Final Exam: 50% | | All quizzes will be announced well before time.  No make-ups will be offered for missed quizzes. | |

**CH-311 (INDUSTRIAL CHEMISTRY-I)**

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| **Week** | **Lectures** | **TOPICS** | **CH** |
| 1 | 1  2 | Chemical Process Industry, Development and Characteristics of Industry.  Raw Material, Manufacturing and Environmental Aspects of Industry. | 1 |
| 2 | 1  2 | Safety Considerations in Process Industries, Types of Industrial Hazards Introduction of OSHA. Hazard Analysis and Risk Assessment (HARA). | 2 |
| 3 | 1  2 | Heat & Temperature, Pressure Hazards, Electrical & Mechanical Hazards.  Toxic Materials, Fire & Explosion, Accelerator, Confined Space, Radiation | 2 |
| 4 | 1  2 | Industrial Pollution Prevention, Industrial Waste, Types of Industrial Waste  Waste Management Process, Concept of Recycling of Industrial Waste | 3 |
| 5 | 1  2 | Physical, Chemical & Biological Waste Treatment Processes , Incineration  Introduction of Edible Oils, Fats and Waxes, Fatty Acids and Glycerides | 3  4 |
| 6 | 1  2 | Physical and Chemical Properties of Triglycerides, Fats and oil stability  Sources of oils Processing or Refining of oils and fats, , Methods of analysis, | 4 |
| 7 | 1  2 | Raw material, Chemistry, Types & Manufacturing of different types Soaps Manufacture and Types of Detergents, Surfactants, Inorganic Builders | 5 |
| 8 | 1  2 | Organic Builders, Additives Emissions and Controls, Wastewater and the Environment, Biodegradation Environmental and Economic Aspects | 5 |
| 9 | 1  2 | **DISCUSSION & REVISION**  **MID TERM EXAM** |  |
| 10 | 1  2 | Cement Industry Introduction and Raw materials, Types of Cement and Manufacturing of Portland Cement Composition and Formation of Clinkers, | 10 |
| 11 | 1  2 | Reactions and Heat Change during Clinker formation for Cement, Setting & Hardening of Cement, Formation of Gypsum & its importance in Cement | 10 |
| 12 | 1  2 | Glass Industry Introduction and Importance, Different Types of Glass and Applications Glass Industry: Glass Composition types of Commercial glasses, | 11 |
| 13 | 1  2 | Methods of Manufacturing of Commercial Glasses, Manufacturing Methods of Special Glasses, Glass as raw material for different Composites Materials | 11 |
| 14 | 1  2 | Introduction of Petroleum and Petrochemical Industry: Desalting, Distillation Evaluation, Dewatering, Cracking, Hydrocracking & Reforming | 13 |
| 15 | 1  2 | Treating Processes, Petroleum Products, Fuel & Liquefied Petroleum Gases  Gasoline, Solvents, Fuel, Lubricating Oil, Petroleum Wax & Petrochemicals | 13 |