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| **logo University of Management & Technology**  School of Science  Department of Chemistry | | | | |
| CH-315 (INDUSTRIAL CHEMISTRY-II) | | | | |
| **Lecture Schedule** | **Sec N** (Tuesday and Friday) | **Semester** | | Fall 2020 |
| **Pre-requisite** | (CH- 311) Industrial Chemistry-I | **Credit Hours** | | 3 |
| **Instructor** | Hamid Raza | **Contact** | | [hamid.raza@.umt.edu.pk](mailto:hamid.raza@.umt.edu.pk) |
| **Moodle Link** | |  |
| **Office** | Chemistry Lab | **Office Hours** | | See office window |
| **Course Description** | Industrial chemists are applied scientists, some of whom are engaged in solving problems in forefront research areas, while others are responsible for the successful operations of Pakistan's chemical industry. 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 sugar, paints, pigments, industrial coatings and dyes industries. The brief overview of safety considerations and industrial pollution prevention will also be discussed in this course. | | | |
| **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 Introduction of Industrial Chemistry  Published in: 2005, By M. Farhat Ali, Third Edition (1996) By: Alan Heaton  Bassam El Ali & James G.S. School of Pharmacy and Chemistry, LJMU  Publisher: McGraw-Hill Professional Publisher: Chapman and Hall | | | |
| **Grading Policy** | Quiz, Assignment & Presentation 25%  Midterm Exam 25%  Final Exam: 50% | | All quizzes will be announced well before time.  No make-ups will be offered for missed quizzes. | |

**CH-315 (INDUSTRIAL CHEMISTRY-II)**

**Lecture plan (Fall 2020)**

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| **Week** | **Lectures** | **TOPICS** | **CH** | **SEC** |
| 1 | 1  2 | The importance and characteristics of the chemical industry, Major sectors and their products, Turning chemicals in useful products, Quality and safety | 1 | 1.1-1.4  1.5-1.7 |
| 2 | 1  2 | Sources of organic chemicals. Organic chemicals from oil and natural gas  Organic chemicals from coal, and chemicals from carbohydrates (biomass) | 2 | 2.1  2.2 |
| 3 | 1  2 | Organic chemicals from animal and vegetable oils and fats, major sources consumption and uses of inorganic chemicals, Recycling of materials | 2 | 2.3  2.4 |
| 4 | 1  2 | Research and development, General introduction, Research and development activities, Importance and types of industrial research and development | 3 | 3.1-3.2  3.3 |
| 4 | 1  2 | Sugar Industry-Chemistry of Saccharides, Properties of Sucrose  Cane Sugar- Raw Sugar Manufacturing and Refining Processes in Industry | 6 | 6.1-6.3  6.5.1-2 |
| 5 | 1  2 | Beet Sugar, Other Sugar and By-Product of Sugar Industry, Sweeteners  Introduction of Paints, Pigments & Industrial Coatings, Paint Constituents. | 6  7 | 6.6-6.9  7.1-7.2 |
| 6 | 1  2 | Description of Pigments, Inorganic Pigments & Organic Pigments  Concept of Binders, Solvents and Additives in the Paint-Pigment Industry | 7 | 7.2.1-3  7.2.4-6 |
| 7 | 1  2 | Paint Manufacturing, Paint Dispersion & Industrial Processing Operations  Classification of Paint, Applications of Paint Varnishes and Lacquers. | 7 | 7.4.1-3  7.4.4-5 |
| 8 | 1  2 | Dyes: Chemistry and Applications – Introduction & Concept of Colorants  Revision of Industrial Hazards, Safety Measures, Sugar and Paint Industries | 8 | 8.1  8.2 |
| 9 | 1  2 | **MID TERM EXAM**  Classification of Dyes- Acidic Dyes, Basic Dyes, Azoic Dyes, Direct Dyes | 8 | 8.3 |
| 10 | 1  2 | Vat Dyes, Sulphur Dyes, Solvent Dyes, Mordant Dyes, & Oxidation Dyes.  Different types of Textile Fibers & Applications of Dyes in Textile Industry | 8 | 8.4  8.5 |
| 11 | 1  2 | Manufacture of Dyes, Intermediates and Miscellaneous Reactions of Dyes  Industrial Fermentation Overview, Microorganisms & Culture Development | 8  9 | 8.6-8.7  9.1-9.2 |
| 12 | 1  2 | Animal and Plant Cell Cultures, Downstream Processing and Bioreactors  Industrial and Pharmaceutical Products by Fermentation, Biopolymers | 9 | 9.2.3-7  9.3-9.5 |
| 14 | 1  2 | Introduction and History, Chemical Pest Control, Herbicides, Insecticides, Fungicides, Chemical Synthesis of Pesticides, Formulated Products, Toxicity | 11 | 11.1-11.2  11.3-11.4 |
| 15 | 1  2 | Biological Pest Control, Testing Requirements for New Pesticides, Residues  in Food, Human Safety and Risk Assessment, Environmental Toxicology | 11 | 11.5-11.6 |