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| **logo University of Management & Technology**  School of Science  Department of Chemistry | | | | |
| CH-208 (APPLIED CHEMISTRY) | | | | |
| **Lecture Schedule** |  | **Semester** | |  |
| **Pre-requisite** | Nil | **Credit Hours** | | 3 |
| **Instructor** | Dr. Abdul Rauf | **Contact** | |  |
| **Office** |  | **Office Hours** | |  |
| **Course Description** | The applied chemistry course is designed to develop an understanding of the applications of chemistry to various processes, focusing on their practical applications, problem solving, and key skills in order to progress in their prospective career. The majority of graduate chemists work in industrial sector. Therefore, it is critical to have an understanding of chemistry in this context. This course covers the significant fundamental aspects of applied chemistry and the production of important inorganic compounds which are essential for BS chemistry students. | | | |
| **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 Books** | * Industrial Inorganic chemistry, K.H. Buchel, H.-H.Moretto, P. Woditsch, 2nd Eidition, WILEY-VCH, 2003 * Industrial Inorganic Chemistry by Mark Anthony Benevento, Industrial Chemistry by Rodgers, 1st Eidition. 2015 * Chemical Engineering process by Dadyer and McCabe McGre Hill, New York * Shreve’s Chemical Process Industries by [Randolph Norris Shreve](https://b-ok.asia/g/Randolph%20Norris%20Shreve), [George T Austin](https://b-ok.asia/g/George%20T%20Austin), 5th Eidtion, McGraw-Hill, 1984. * Applied chemistry: a textbook for engineers and technologists. By Gesser, Hyman D., Kluwer Academic/Plenum Publishers, Second Edition, 2002 | | | |
| **Grading Policy** | Quizzes 15%  Assignments 20%  Midterm Exam 25%  Final Exam: 40% | | All quizzes will be announced well before time.  No make-ups will be offered for missed quizzes. | |

**CH-208 (APPLIED CHEMISTRY)**

**Lecture plan (Fall 2020)**

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| **Week** | **Lectures** | **TOPICS** | **CH** |
| 1 | 1  2 | Overview and Introduction of Applied chemistry and industrial process  Materials that are mined, Materials from water, Inorganics extracted from organic sources, Materials from air | 1 |
| 2 | 1  2 | Sulfuric Acid Production, Introduction, Sulfur sourcing, Sulfuric acid, methods of production  Sulfuric acid, annual volume of production, Sulfuric acid uses, Derivatives, Recycling | 2 |
| 3 | 1  2 | Sulfuric acid uses, Derivatives, Recycling  Industrial Gases, Isolation, and Uses, | 2  3 |
| 4 | 1  2 | Nitrogen-Based Inorganic Compounds, Ammonia  Ammonium nitrate, Nitric acid, Urea, | 4 |
| 5 | 1  2 | Ammonium sulfate, Nitrogen Pollution  Fertilizers, Introduction, Nitrogen based, Phosphorus based, | 4  5 |
| 6 | 1  2 | Potassium-containing, Mixed Fertilizers and the NPK Rating System, Calcium and Limestone-Based Products, Introduction, Lime and its uses | 5  6 |
| 7 | 1  2 | Sodium Carbonate (or: Soda Ash), Calcium chloride, Limestone-based construction materials  Sodium Chloride, Sodium Chloride Recovery and Production, | 6  7 |
| 8 | 1  2 | Major Chemicals Produced from Salt, The Mercury Cell, The Diaphragm Cell, The Membrane Cell, Hydrochloric acid,  Fluorine, Fluorite, and Fluorine-Based Materials, | 7  8 |
| 9 | 1  2 | Metspar and acidspar,  **MID TERM EXAM** |  |
| 10 | 1  2 | Hydrofluoric acid, Teflon, Perfluorooctanoic Acid**,**  Borderline Inorganics–Organics, Carbon Black (or: Channel Black, Colloidal Black, Furnace Black, and Thermal Black) , Sodium tri-poly-phosphate, | 8  9 |
| 11 | 1  2 | Borax and Borates, Asphalt  Iron and Steel, Current iron production, By-product Production, | 9  11 |
| 12 | 1  2 | Recycling, Aluminum,  Copper, Ore sources, Production methods, | 11  12 |
| 13 | 1  2 | Major industrial uses, Other copper alloys  Other Major metals for industrial use, Titanium, Chromium, | 13  14 |
| 14 | 1  2 | Mercury, Gold , Rare Earth Elements, Isolation and production,  Rare Earth Element Purification, Rare Earth Element Uses, | 14  15 |
| 15 | 1  2 | Lightweight Materials, Lightweight alloys, Metal foams, Titanium alloys, Magnesium alloys, Beryllium and beryllium alloys, Metal-Organic Frameworks (MOFs) | 18 |
| 16 | 1  2 | Hard Materials, Introduction, Diamond, Diamond Synthesis, Silicon Carbide, Boron and carbon nitrides, Metal borides, Recycling, | 20 |

**This syllabus is tentative and subject to change at the instructor’s discretion.**