**ACADEMIC LESSON PLAN FOR I SEMESTER 2017-2018**

**SUBJECT: APPLIED CHEMISTRY –I**

**SEMESTER: FIRST SUBJECT CODE: ETCH-113**

TOTAL TEACHING WEEKS: 15 WEEKS L T CREDITS

TOTAL LECTURE CLASSES: 30 2 1 3

TOTAL TUTORIAL CLASSES: 15

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| S. No. | **Topics to be covered** | No. of Lectures | No. of Tutorials |
| **Unit: 1 FUELS (9 hrs)** | | | |
| 1  2 | Definition, Classification, calorific value of fuels , (gross and net) Determination of calorific value of fuels, bomb calorimeter, (Related Numericals ) | 1  1 | 1 |
| 3  4 | Boy’s Gas calorimeter, Dulong’s Formula, (Related Numericals) Solid fuels – Proximate and ultimate analysis, Related numericals | 1  1 | 1 |
| 5  6  7 | High & Low temperature carbonization, Manufacture of coke (Otto Hoffmann oven)  Combustion of Fuels (Related Numericals)  Numericals related to Flue Gas Analysis (dry product estimation) | 1  1  1 | 1 |
| 8  9 | Cracking – thermal & catalytic cracking.  Knocking, Octane &Cetane No. and its significance. | 1  1 | 1 |
| **UnitII - CATALYSIS(4 hrs)** | | | |
| 10  11 | Catalyst and its characteristics, types of catalysts, Concept of Promoters, inhibitors and poisons.  Application of catalysts for industrially important processes Theories of Catalysis: Intermediate compound formation theory, adsorption of contact theory | 1  1 | 1 |
| 12  13 | Types, Kinetics and Mechanisms of acid -base catalysis. Autocatalysis  Types, Kinetics and Mechanisms of Enzyme catalysis (Michaelis- Menten Equation). Catalysis by metal salts (Wilkinson’s Catalyst), Heterogeneous catalysis (Langmuir –Hinshelwood mechanism) | 1  1 | 1 |
| **THE PHASE RULE (3 hrs)** | | | |
| 14 | Definition of different Terms.  Gibb’s phase Rule and derivation | 1 |  |
| 15  16 | Application of phase rule to one component system -The water system  Application of phase rule to two component system-Lead –Silver System (Pattison’s Process) | 1  1 | 1 |
| **Unit: III WATER (8 hrs)** | | | |
| 17  18 | Introduction and specifications of water  Hardness and its determination (EDTA) method only), Related Numericals | 1  1 | 1 |
| 19  20 | Alkalinity and its determination, Related Numericals  Boiler feed water, Boiler Problem: Scale, Sludge, Priming and Foaming , Caustic Embrittlement and Corrosion: Causes and Prevention | 1  1 | 1 |
| 21  22 | Water softening by Internal Treatment; Carbonate & Phosphate Conditioning, Colloidal and Calgon Conditioning,  Water Softening by External Treatment : Lime Soda Process and related numerical | 1  1 | 1+1 |
| 23  24 | Zeolite & Ion –Exchange Process.  Reverse Osmosis, Electrodialysis , Disinfection by break-point chlorination | 1  1 | 1 |
| **Unit: IV CORROSION AND ITS CONTROL (6 hrs)** | | | |
| 25 | Causes, effects & consequences; Chemical or Dry corrosion & its mechanism (Pilling – Bedworth Rule)  Electrochemical or Wet Corrosion & its mechanism | 1 | 1 |
|  | | | |
| 26 | Rusting of Iron Passivity, Galvanic series Galvanic Corrosion  Soil Corrosion Pitting Corrosion, Concentration Cell or Differential Aeration Corrosion, Stress Corrosion | 1 |  |
| 27  28 | Factors Influencing Corrosion: Nature of metal and nature of corroding environment  Protective measures: Galvanization, Tinning | 1  1 | 1 |
| 29  30 | Cathodic Protection, Sacrificial Anodic protection, Electroplating Electroless plating  Prevention of Corrosion by Material selection & Design | 1  1 | 1 |

**Note: Unit I & II will be covered before Sessional Exams.**

**In respect of Text and Reference Books, the approved Scheme and Syllabus of 1st Semester of B. Tech Programme may be referred**