**COURSE CODE : CH1C01**

**COURSE TITLE** : **ENGINEERING CHEMISTRY I**

**UNIVERSITY : DIBRUGARH UNIVERSITY**

**SEMESTER : FIRST SEMESTER**

**CREDIT : 04**

**L:T:P : 3:1:0**

**End sem. Examination for this course will carry 100 marks**

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| Module | Details of module | No. of Lectures |
| 1 | Water covering Types of hardness, units. Determination of hardness by EDTA method. Softening methods and numerical problems based on these methods, membrane based processes. Problems with boiler feed water and its treatments. Specifications of drinking water (BIS and who standards). Chlorination of water , sources and quality of drinking water .concepts of water harvesting , storage and recycling .toxicity of water , sources of water pollutants . Water pollution from analytical laboratories in schools, colleges and universities. Measures for minimization and recycling of laboratory waste water. | 10 |
| 2 | Polymers and composites covering basics of polymer chemistry , molecular weight molecular shape , crystallinity, glass transition temperature and melting point, visco-elasticity , structure property relationship . Methods of polymerization , thermoplastics and thermo – sets , copolymerization , elastomers - structure , applications , curing techniques. Advanced polymeric materials; conducting polymers, liquid crystal properties. Synthesis , properties and uses of pe, pvc, pmma, formaldehyde resin , melamine – formaldehyde resin , adhesives and their adhesive mechanism. Composites – basics of composites, composition and characteristic properties of composites. Types of composites – particle, fiber, reinforced – structural and their applications. | 10 |
| 3 | Surfactants and lubricants covering Surface active agents, methods of preparation of soaps. Cleaning mechanism, limitations of soap as cleaning agents. Types and advantages of detergents; critical miceller concentration, hydrophilic and hydrophobic interaction. Fricoohesty of surfactant solutions, hlb values . Lubricants types of lubricants and mechanism of lubrications. Physical and chemical properties of lubricants, | 06 |
| 4 | Biotechnology covering Significance and application of biotechnology, bioreactors. Biotechnology processes; fermentation, production of ethanol. Brief idea of vitamins, bio fuels, biosensors, bio -fertilizers, bio- surfactants. Application of biochips, inter – molecular multiple force theory (immft ) of bio surfactants. | 06 |
| 5 | Green chemistry covering Introduction, significance, principles of green chemistry. R4m4 ( reduce , reuse , recycle , redesign , multipurpose , multidimensional , multitasking , multi -tracking ) models with special reference of survismeter , econoburette Concept of molecular and atomic economy and its use in green chemistry. Brief idea of alternative solvents-- water , ionic --liquids , supercritical fluid system ( carbon di- oxide ). Advances and applications of green chemistry. (few examples. ) | 06 |
| 6 | Instrumental techniques covering Fundamentals of spectroscopy, principles and applications of uv – visible spectroscopy. Application of ir ,aas , mass , nmr , spectroscopy. Principle and applications of chromatographic techniques , including tlc, column , gas , hplc , | 07 |