Syllabus for Pre-Ph.D. Courses in Chemical Sciences.

Paper-I

Unit-1 Research Methods:

Selection, Formulation and designing of a research plan, research survey, materials & documentations of data, sampling, field studies, chemical structure drawing programme, graph plotting, literature search techniques with respect to subject, Substance, Author, chemical formula. Paper writing and submission technique.

Unit-2 Research Ethics:-

Basic principals, significance, validity of scientific investigation, ethical guideline, Anti-plagiarism.

Unit-3 Scientometrics:

Standard National and International Journals, Tools for citing and referencing using Journal Indexed in Scopus, Google Scholar, Web of Science, Indian Citation Index, Scientific citation Index, Single and Double Blind Peer review, IF, H-index.

Unit-4 Quantitative data analysis:

Standard deviation, Standard error, Data comparing by test analysis of variance, T' test, F' test, Chi Square test, Least square, Correlation and Regression analysis.

Unit-5 Computer application:

Introduction to computer components, Hard ware, Software, (MS-Word, Power Point), Conversion of PDF format to word, JPG, Application of computer in chemistry. Idea of Internet & World Wide Web, website & Emails

Paper-II

Advance course in Chemistry

Unit-1
a) Study of kinetics of reactions including fast reactions, Hydrolysis of salt and ester in acid / base, condoctrometic and Potentiometric titration.
b) Solvation & Solvent effect, Techniques of measurement of entropy, enthalpy, free energy changes.
c) Separation methods- chromatography- Gas, HPLC, thin layer & column chromatography.

Unit-2 a) Synthesis and Characterization of Inorganic and complex molecules by IR., Electronic, NMR, ESR, Mossbauer spectral technique . Derivation of various parameters like Dq, B, β, Dt, Ds, etc.

b) Basic principle of thermal analysis, TG, DTA, DSC & their applications.

Unit-3 a) Extraction and characterization of main constituents of Natural product by FTIR, uv, nmr, mass spectral studies.

b) Synthesis and characterization of organic molecules using different spectral studies like above.

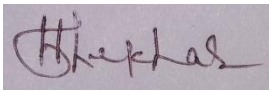
c) Microbes and microbial processes (Fermentation technology)

Unit-4 Study of Pollution in hydrosphere & atmosphere.

Different Pollution parameters like pH, alkalinity, hardness, D.O, B.O.D, COD,CO_2, NO_2, SO_2, Heavy metals (Pb, Hg, AS,Cr), Fluoride, Chloride, TDS, Pesticides etc. Concept of parameters for the analysis of water.

Unit-5 Nanomaterials:

Synthesis, Characterization and Properties of different types of Nanomaterials.



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