JIWAJI UNIVERSITY, GWALIOR

Ph.D. COURSE WORK

PAPER : RESEARCH METHODOLOGY

1. **Introduction & Research design**
   Nature and objectives of research. Methods of Research: historical, descriptive and experimental, research process, research approaches, criteria for good research.
   Meaning of research design, need of research design, features of good design, different research designs. and basic principles of experimental designs, design of experiments.
2. **Data collection & Analysis**
   Types of data, methods and techniques of data collection, primary and secondary data, meta analysis, historical methods, content analysis, devices used in data collection, pilot study and pretest of tools, choice of data collection methods.
3. **Processing and analysis of data**
   Measures of Central Tendency, Measures of Dispersion, Measures of Variation, Measures of Central Tendency vs. Measures of Dispersion, Normal distribution, Measures of Skewness and Interpretation, Correlation and Regression : Types & applications, Chi-square test: its purpose and use.
4. **Paper writing and report generation**
   Basic concept of Paper / thesis writing and report generation, writing Research Abstract, Introduction, review of literature, Result, Conclusion, Concepts of Bibliography and References, significance of report writing, steps of report writing, Types of Research reports, Methods of presentation of report. Formats of publication in research general.
5. **Computer Applications**
   Application of computer in research, Generating charts/ graph in Microsoft Excel , Power point presentation ,Web Search: Introduction to Internet, Use of Internet and WWW, Using search engine like Google, Yahoo etc.

Reference Books: Latest Editions of following Books

1. Kothari, C.R., Research Methodology (Methods and Techniques), New Age Publisher.
2. Donald R. Cooper, Pamela S. Schindler, Business Research Methods, 8/e, Tata McGraw-Hill Co. Ltd.
3. Bendat and Piersol, Random data: Analysis and Measurement Procedures, Wiley Interscience,
4. Raymond Greenlaw, In'line/Online: Fundamentals of the Internet and the World Wide Web, Tata McGraw-Hill Co. Ltd.
5. John W. Creswell, Research Design, SAGE publications, INC.
6. Trivedi RN & Shukla D.P.; Research Methodology, College book depo, Jaipur
7. Bill Taylor, Gautam Sinha & Tapash Ghoshal, Research Methodology, Prentice Hall of India private limited, New Delhi

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Ph.D. Course work syllabus (April – September, 2016)

Paper : Computer Application (3 credits 50 marks)

Unit-1 Computer Fundamentals	Computer terminology and Basics, Block diagram of computers, Input / Output Units: input devices- Keyboard, mouse, touch screen; output devices- printers & its type, Scanner, Computer memory, Computer Generation and Classification, types of software's, OS, Types of OS, Some basic terms related to Windows O.S., Computer Networks, LAN, MAN, WAN.
Unit-2 Introduction to Word processing	Research publishing tool-MS Word, Some basic terms - toolbar, format bar, status Bar, Creating, Editing and saving a word document, creating a research paper, Use of Auto-text, Autocorrect, Spelling and Grammar Tool, creating a cover letter, table related operation, adding graphics, Mail Merge.
Unit-3 Introduction to Spreadsheet	Ms-Excel- Introduction to excel, Use (Features and functions) of spreadsheet in research, creating spreadsheet and enter data, data storing, Various Data Types, format worksheets- Inserting, Removing & Resizing of Columns & Rows, Column Freezing, Labels, Hiding, Splitting etc., printing, Use Formulas and Functions, Calculate, manipulate and analyses data, preparing charts, performing what - if analysis
Unit-4 Introduction to Presentation	Presentation tool-MS Power point, Features and functions, Creating presentation, master page, Putting Animations, transition, Inserting Animated Pictures, Customizing presentation, showing presentation, Insert- Image, sounds, Video, Chart, Table, Seminar presentations.
Unit-5 Introduction to Internet	Introduction to internet and WWW, Searching on the internet, E-mail & its functions, Literature survey using web, website, handling search engines, Anti-Plagiarism software, Virus and its types.

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Syllabus for Ph.D. Course Work - Chemistry

Atomic structure and bonding in material: Crystal structure of materials, crystal systems, unit cells and space lattices, determination of structures of simple crystals by x-ray diffraction, Concept of amorphous, single and polycrystalline structures and their effect on properties of materials. Crystal growth techniques.

Polymers: Classification, polymerization, structure and properties, additives for polymer products, processing and applications.

Composites: Properties and applications of various composites.

Advanced Materials and Tools: Smart materials, nanomaterials, synthesis, properties and applications. Materials characterization techniques such as, scanning electron microscopy, transmission electron microscopy, atomic force microscopy.

Mechanical Properties: Stress-strain diagrams of metallic, ceramic and polymeric materials, tensile strength, toughness, elongation, plastic deformation, viscoelasticity, hardness, impact strength, creep, fatigue, ductile and brittle fracture.

Electronic Properties: Concept of energy band diagram for materials - conductors, semiconductors and insulators, electrical conductivity effect of temperature on conductility, intrinsic and extrinsic semiconductors, dielectric properties.

Environmental Degradation: Corrosion and oxidation of materials, prevention.

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Chemistry of metal –Chelate Equilibria: Types of complex equilibria in solution, Equilibrium constant, Equilibrium constant involving concentration and activities. The complex formation function. Methods for calculation of complex stability constant, Effect of external factors on the stability constants, Relationship between the properties of central metal ions and the stability constants, Correlation between the properties of a ligand and the stability of its metal complexes. Role of metal ions and complexes in various biochemical processes, Use of chelating agents.

Important Terminology in Medicinal Chemistry, Routes of drug administration. Adverse effects of drugs. Concept of SAR and QSAR. Relation between chemical structure and biological activity. Difference between Hansch analysis and Free & Wilson analysis. Enzyme inhibition, Biotrans formation Xenobiotics.

Classification Chemistry and mode of action of following drugs:-

a) Sulpha drugs:- Sulphanilamide, Sulphadiazine, Sulphaacetamide and Sulphaguinidire.
b) β- lactam antibiotics:- penicillin-G, Amoxicillin and Ampicillin Cloxacillin
c) Antipyretic and analysis:- Paracetamol, aspirin and Ibuprofen

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