JIWAJI UNIVERSITY, GWALIOR
CBCS Scheme of Examination
M.Phil. (CHEMISTRY) First Semester Examination
M.Phil. (CHEMISTRY) First Semester December 2018

Course Code	Course Name	Total Marks	Min pass Marks	Credit C(i)	End Semester Examination Marks			Internal Assessment Marks			Total Obtained Marks	Grade Points G(i)	Letter grade	SGPA S(1)= $\frac{\sum C(i)G(i)}{\sum C(i)}$
					Max	Min	Obtained	Max	Min	Obtained				
101	Research Methodology	100	55	4	60	21		40	14					
102	Computer applications	100	55	4	60	21		40	14					
103	Advance topic in Chemistry	100	55	4	60	21		40	14					
104	Review of published research in the relevant field	100	55	4	x	x		100	55					
105	Synopsis submission	100	55	4	x	x		100	55					
106	Comprehensive viva-voce	100	55	4	x	x		100	55					
	$\sum\limits_{i=0}^{6}(C_i)$			24										

M.Phil. (CHEMISTRY) Second Semester June 2019

Course Code	Course Name	Total Marks	Min pass Marks	Credit C(i)	Internal Assessment/dissertation presentation Marks			Total Obtained Marks	Grade Points G(i)	Letter grade	SGPA S(2)= $\frac{\sum C(i)G(i)}{\sum C(i)}$
					Max	Min	Obtained				
201	Seminar	100	55	4	100	55					
202	Term paper/ Assignment	100	55	4	100	55					
203	Comprehensive viva-voce	100	55	4	100	55					
204	Final Dissertation/Project Presentation	100	55	12	100	55					
	$\sum\limits_{i=0}^{4}(C_i)$			24							

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Sem. I		Sem. II		$CGPA = \dfrac{\sum SC(i).S(i)}{\sum SC(i)}$	Result
SC(1)	S(1)	SC(2)	S(2)		
24		24			

$SC(j) = \sum C(i)$, $SGPA = S(j)$, $j = j^{th}$ Semester; $SGPA$ = Semester Grade Point Average. $CGPA$ = Cumulative Grade Point Average

NB :

A student has to acquire minimum 55% marks. In end semester examination minimum 21 out of 60 and in internal assessment minimum 14 out of 40. But Sum of both should be 55 or more.

Grades will be decided by the marks obtained out of 100.

Description of grade letter and grade points:

Letter Grade	Grade Points	Description	Range of Marks (%)
O	10	Outstanding	90-100
A+	9	Excellent	80-89
A	8	Very good	70-79
B+	7	Good	60-69
B	6	Above Average	50-59
C	5	Average	40-49
P	4	Pass	35-39
F	0	Fail	0-34
Ab	0	Absent	Absent

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M.Phil. Course work syllabus (2018-19)

Paper 102: Computer Application

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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M.Phil. COURSE WORK (2018-19)

PAPER 101: 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 Micrisoft 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, Inline/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 & Taposh Ghoshal, Research Methodology, Prentice Hall of India private limited, New Delhi

ADVANCED TOPIC IN CHEMISTRY

M.PHIL I SEMESTER (2018-19)

Any one paper out of 103 (A), 103 (B), & 103 (C)

Co-ordination Chemistry

PAPER – 103 (A)

UNIT- I

Chemistry of metal- Chelate Equilibria. Types of complex Equilibria in solution. Equibrium constant. Equilibrium constant involving concentration and activities. The complex formation function. Method for calculation of complex stability constant.

UINT- II

Experimental methods for the determination of stability constant optical method (method of continuous variation. molar ratio method); pH-metric. Calculation of thermodynamics parameters. ΔA. ΔH and ΔS from equilibrium constant data.

UNIT-III

Computer evaluation of equilibrium measurement data. calculation of equilibrium concentrations. Calculations of equilibrium concentrations when the stability constant is known. Calculations of Formation constants. Selections of functions to be minimized. Checking and evolution of goodness of fitting

UNIT- IV

Protonation of complexes. Mixed ligand complexes and determination of formation constant. Kinetic importance of mixed ligand complexes Analytical applications of mixed ligand complexes.

UNIT-V

Factors influencing the stability constants of metal complexes effect of external factors on the stability constants. Relationship between the properties of central metal ions and the stability of complexes. Correlation between the properties of a ligand and the stability of its metal complexes. Role of metal ions and complexes in various types of biochemical processes. Use of chelating agents.

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DRUG DESIGN AND PHARMACOLOGY

PAPER- 103 (B)

UNIT- I

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.

UNIT- II

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

UNIT- III

Classification synthesis and physiological activity of following drugs.

a) Anesthetics :- Procaine and Benzocaine
b) Antihypertensive drugs :- Hydrazine and Methyldopa
c) Diuretics :- Chlorothiazide and Chloromerodrim

UNIT- IV

General chemistry and mode of action of following drugs :-

a) Bronchodilators :- Ephedrine and Theophillire
b) Antitubercular drugs :- Isonazid and Rifampicin
c) Cardic glycosides :- Digoxin and Digitoxin

UNIT- V

Synthesis and chemistry of following drugs :-

a) Hypnotics and Sedatives :- Phenobarbitine and Thiopental sodium
b) Antimalarides :- Choloquine and Primaquine
c) Antifungal drugs :- Fluconazole and Econazole.

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CHEMICAL KINETICS & REACTION MECHANISM
PAPER – 103 (C)

UNIT –I

Basic concept of kinetics. reaction mechanism. kinetics of Fast and very fast reactions, General Techniques such as Flow and Stopped Flow method, Relaxation method , pressure jump method, Temperature jump method, Stock tube method , pulse method, flash photolysis method.

UNIT-II

STATISTICAL TREATMENT OF REACTION RATES
Elementary Treatment of statistical mechanics. Concept of partition function and its determinations. Translational. Rotational, Vibrations and electronic partition functions. Calculations of thermodynamics properties in terms of partition functions. Mechanistic significance of Entropy. Enthalpy and Gibbs free energy. Arrhenius Equation. Absolute reactions rate theory exemplified with & Bimolecule reactions. Thermodynamics formulations of reaction rates.Iso-Kinetic Temperature and calculations of reactions rates from thermodynamics parameters of reactions.

UNIT-III

Rate determining step in solution. Ionic strength and its effect on rates. Linear free energy relationship. Hammet equations. Substitutions constants. Theories of substitutions effects. Interpretations of σ & ρ values. Reactions constants. deviations from Hammett equations.

UNIT-IV

Arrhenius equation, Transition state theory, Uses of Activation Parameters. Marcus theory of electron. Theory of isotopic effects. Primary and secondary kinetic isotopic effects. Heavy atoms isotope effects. Solvent effects.

UNIT-V

Electrode kinetics theory technique and its applications for system, static and dynamic electrode potential, kinetics of polymerization, polymer reactions. kinetics of branched chain reactions exemplified, with hydrogen oxygen reactions, Acid-Base catalyzed reactions. Kinetics of hydrolysis of organic phosphate ester in Acid and catalyzed, Basic and aqueous media, Enzyme kinetics in biochemical reactions.

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