AISECT UNIVERSITY

A STATUTORY UNIVERSITY UNDER SECTION 2(f) OF THE UGC ACT

SCHEME OF EXAMINATION
&
DETAILED SYLLABUS

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COURSE STRUCTURE OF M.PHIL. (COMMERCE)					
Sem	**Paper**	**Marks**			**Total Marks**
		Term End Examination	**Internal Assessment (Seminar, Test)**	**Viva**	
I	Theory Paper 1 (Research Methodology) Common To All	80	20	_	100
	Theory Paper 2 (One Subject Specific paper)	80	20	_	100
	Computer Skill	80	_	20	100
II	Dissertation	SCRIPT 150	_	50	200
TOTAL					**500**

PAPER I - RESEARCH METHODOLOGY (COMMON TO ALL SUBJECT)

PAPER 2 - ONE PAPER FROM THE OPTIONS GIVEN (AS PER SUBJECT)

CHEMISTRY

- Advanced Environmental Chemistry
- Organic Chemistry
- Spectroscopy & Medicinal Chemistry
- Inorganic Chemistry
- Physical Chemistry

PAPER 3 - COMPUTER SKILL (COMMON TO ALL)

THESIS / DISSERTATION –

To be prepared by all students individually under a supervisor.

M.PHIL SYLLABUS

COMMON PAPER (APPLY TO ALL)

PAPER I - RESEARCH METHODLOGY

UNIT-I

Research- Definition, Importance and Meaning of Research, Characteristics of Research, Types of research, Steps in research, Selection and Formulation of research problem, Sources of research problems, criteria / characteristics of a good research problem, errors in selecting a research problem.

UNIT-II

Hypotheses- meaning and characteristics of working hypotheses, problem in formulating hypotheses, sources of Hypotheses, Origin of hypotheses, types and significance of Hypotheses.

UNIT-III

Research Design- Meaning, Objectives and contents of Research, Types of experimental Research Design, Collection of Primary data-Observation Methods, questionnaire method and schedule methods.

UNIT-IV

Case study Methods-Its Characteristics Advantages and limitation, Sampling techniques: Sampling Theory, types of sampling, Steps in sampling, Sampling and Advantages and Limitations of Sampling, Calculation of standard error's T - test and Z - Test, Chi-square tests, ANOVA-One-way / Two- way and analysis of variance.

UNIT-V

Research Reports- Types of reports- contents- Format & Styles of reporting- steps in drafting reports- Editing the final draft-Evaluating the final draft. Analysis and Interpretation of Data and Report Writing, References and Bibliography.

REFERENCE BOOKS:

(i)	Research Methodology	:	C.R. Kothati
(ii)	Research Methodology	:	H.K. Kapil
(iii)	Statistics (Theory & Practice)	:	B. N. Gupta
(iv)	Social Research & Statistical	:	R.N. Mukhargi
(v)	Social Research	:	D.S. Baghel
(vi)	Statistical Methods	:	S. P. Gupta

PAPER III - COMPUTER SKILL (PRACTICAL)

(COMMERCE, MATHS, CHEMISTRY, PHYSICS, EDUCATION, PHYSICAL EDUCATION, ZOOLOGY, BOTANY, MICROBIOLOGY, LIBRARY SCIENCE)

UNIT - I

WINDOWS OPERATING SYSTEM:
Introduction to Windows, Various Versions of Windows, Working with Windows O.S., Managing Files and Folders, Managing Windows and Desktop, Installing and Using Windows Applications.

UNIT - II

WORD PROCESSING USING MS WORD:
Word Processing - Concepts and Using, Using MS Word for Windows, Inserting & Editing text, Formatting Texts & Paragraphs, Page Layout, Refining a document, Print a Document. Working with Columns and Tables, Using Images in Word Document, Mail-Merge, and Desktop Publishing with Word.

UNIT-III

MS-EXCEL:
Introduction to Spreadsheet, Spreadsheets & Worksheets, Working with MS Excel, Gathering data for simple calculations, Formatting data, Using Numbers, and Texts, Formulas and Functions in MS- Excel, Creating Charts & Graphs.

UNIT - IV

MS-POWER POINT:
Introduction to Multimedia, Using MS-Power Point, Creating Presentation with MS-PowerPoint, Insert Graphics, Images, Charts and Tables in PowerPoint, Add Special effects and animation in PowerPoint, Print Slides and Handouts.

UNIT - V

INTRODUCTION TO STATISTICAL PACKAGES:
Usage of to Statistical Packages for analysis in research - Lotus and Excel, SPSS; SYSTEM.

THESIS / DISSERTATION

To be prepared by all students individually under a supervisor. A synopsis should be submitted and approved by the DRC of the concerned department.

M.PHIL. PAPER II (SUBJECT SPECIFIC)

CHOOSE ANY ONE OPTIONAL PAPERS FROM THE FOLLOWING GIVEN OPTIONS

CHEMISTRY

ADVANCED ENVIRONMENTAL CHEMISTRY

UNIT-I

CHEMISTRY OF AIR POLLUTION:

Introduction to environmental pollution; Concept, nomenclature and segments; Composition of atmosphere; Pollution of atmosphere; Types of air pollutants; Oxides of Carbon, Sulfur, Nitrogen and Hydrocarbons etc; Effect on health and environment; Green house effect, Acid Rain and Photochemical smog. Effect of Ozone on Health & Environment; Chlorofluorocarbons; Effect of Gasoline on air pollution; Presence of lead in the atmosphere;

UNIT-II

CHEMISTRY OF POLLUTION:

Soil pollution; Classification of Soil Pollutants; Source and Classification of Solid Waste; Disposal of Solid Waste on land and Sea; Techniques of recycling of Solid Waste.

UNIT-III

TREATMENT METHODS FOR WATER AND WASTE:

Treatment methods for water and waste: Basic Processes of treatment: Pretreatment - Primary Treatment - Sedimentation - Flotation - Secondary - Design of Conventional biological treatment - Activates Sludge - Trickling Filters - Sludge digestion - Disposal of treated effluent and sludge. Tertiary Treatment systems - Removal of Dissolved Solids - Nitrogen, Phosphorous.

UNIT-IV

HEAVY METAL TOXICOLOGY:

Concept, heavy metals in environment i.e. Arsenic, Selenium, Cadmium, Mercury, Thallium, Lead, sources, toxicity, transformation, and biochemical effects. Organic Pollutants Toxicology: introduction potential, limitation of pesticides uses, toxicology of major pesticides, environmental impacts of pesticides, pesticides persistence. Radiation Hazard: introduction atomic radiation, natural radiation, effects of radiations radioactivity and effects on man, impacts of radioactive radiation, radioactive waste.

UNIT-V

INDUSTRIAL AND SLUDGE WASTE MANAGEMENT:

Municipal sediment steel plant, cement plant and thermal power plant. Biogeochemical cycles of C,N,P,S and O. Bio distribution of elements. Composition, micro and macro nutrients.

RECOMMENDED BOOKS:

1. "Engineering Chemistry". 15th Edition. by P.C.Jain and Monika Jain, Dhanpat Rai Publishing Company. New Delhi(2005)
2. "Environmental Chemistry". by V.P. Kudesia. Pragathi Prakashan. Meerut.(2003)
3. "Fundamental Concepts of Environmental Chemistry". by G.S.Sodhi. Narosa Publishing House Pvt. Ltd.
4. "A Text Book in Environmental Science". by V. Subramanian, Narosa Publishing House Pvt. Ltd. New Delhi,(2002)
5. "Environmental Chemistry", by A.K. De, New Age International Publishers, New Delhi,(2003).
6. "An Introduction to Environmental Pollution', by B.K. Sharma and H.Kaur, Goel Publishing House, Meerut.(1999).
7. " Environmental Chemistry", by S.K. Banerji, Prentice - Hall of India, New Delhi.(1999)

ORGANIC CHEMISTRY

UNIT-I

AROMATICITY- (BENZENOIDAL AROMATIC HYDROCARBONS):

Aromaticity- Huckel's 2 (4n + 2 Electron rule) and limitations- Classification of cyclic conjugated hydrocarbons as alternant and non-alternant, Benzenoida hydrocarbons- Aromatic properties and general methods of synthesis of Naphthalene, Phenantrene and Anthracence. Homo-aromatic and Anti-aromatic systems- Steric inhibition of resonance and Valency isomers.

UNIT -II

ELECTROPHILIC AROMATIC SUBSTITUTION :

Electrophilic aromatic substitution in benzene formation of and complexes Orientation and Reactivity id benzene ring containing more than one substituent: Directing effect of substituent already on benzene ring. Effect of electrophile. Effect of leaving group Orientation and Reactivity in naphthalene in activated benzene benzene derivatives. Riemer - Tiemann reaction, Vilsmere Haack formaylation Houben Hoesch reaction, Diazo - Coupling. Hofmann - Martius rearrangement.

UNIT- III

NUCLEOPHILIC AROMATIC SUBSTITUTION:

Definition and Classification: Aryl halides Low reactivity of aryl and vinyl halides. SN1 SN2 and benzyne mechanisms: Reactivity and orientation in nucleophilic aromatic substitution; Nucleophilic substitution- aliphatic aromatic; Von - Richter rearrangement and Sommelet- Hauser rearrangement.

UNIT-IV

REACTIVE INTERMEDIATES:

Classical and Non-Classical carbocation. Structure, stability, shape & Reactivity of Carbonium ions; Stability, shape & generation of Carbaniouns; use of Carbanions in organic synthesis; Acetoacetic ester & Malonic ester synthesis; Free radicals-stability, shape & Detection of free radicals. Radical anions- Radical cations-Carbenes-Nitrenes and Arynes - Their general methods of generation.

UNIT-V

CONDESATION REACTIONS OF CARBONYL COMPOUNDS:

Aldol condensation Canizzaro reaction: Dieckmann condensation Benzoin condensation: Reformatsky reaction: Knovenegal condensation: Addition of Grignard reagents to aldehydes and ketones.

RECOMMENDED BOOKS:

1. "Organic Chemistry"', by R.T. Morison and R.N. Boyd Allyn & Bacon Inc. (Printed in Singapore) (2001)
2. "University Chemistry" Vols II & III by C.P. Murthy, S.F. Mehidi Ali and P.K. Dubey New Age International. (P) Ltd. New Delhi, Hyderabad (1996)
3. "Organic Chemistry" Vol. I by S.M. Mukherji, S.P. Singh and H.P. Kapoor. Wiley Eastern Ltd. New Delhi, Hyderabad (1985)
4. "Organic Reaction Mechanism" by Raj K.Bansal Tata Mc-Graw Hill Co.New Delhi (1998).
5. "Mechanism and Theory in Organic Chemistry" by Lowry and K.S. Richardson, Harper & Row Publishers,London (1988).
6. "Advanced Organic Chemistry" by Maya Shankar Singh.Pearson Education (Singapore) (P) Ltd.,Delhi (2005)
7. "A Text Book of Organic Chemistry"' by Arun Bahl, S. Chand & Company, New Delhi (2005).

(C) SPECTORSCOPY & MEDICINAL CHEMISTRY

UNIT-I

VISIBLE SPECTROSCOPY:

Introduction; Absorption Laws; Formation of Absorption bands: Theory of Electronic Spectroscopy; Theory of Electronic Transitions: Chromosphore concept, Auxochrome; Type of Absorption bands: Solvent effect: Instrumentation:

UNIT-II

NMR SPECTROSCOPY:

Principles and methods: Definition of nuclear angular momentum and the nuclear magnetic moment: idea about the rotating axis. The quantum mechanical description of the NMR experiment transition probabilities relaxation effects. Fourier transform NMR-measurement of 11 and 12.

UNIT-III

ELECTRON SPIN RESONANCE SPECTROSCOPY:

Introduction: Instrumentation: Quantitative analysis: Study of free radicals: Structure determination: Analytical applications.

UNIT-IV

THE ARCHITECTURE OF THE CELL:

The cell wall, the cell membrane, membrane lipid structure, glycerol. Phospholipids. Glycoplipids, sphingolipids. Membrane carbohydrates, Transport of molecule through membrane. The internal structure of the cell the golgi apparatus.

UNIT-V

PHARMACOKINETICS AND ANTIBIOTICS:

Introduction to drug absorption, disposition, elimination using pharmacokinetics, important pharmacokinetic parameters in defining drugs. Synthesis of penicillin G, penicillin V, chloramphenicol, tetracylin and streptomycin.

1. “Analytical Chemistry - Problem & Solution”, by S.M. Khopkar, New Age International Pvt. Ltd. New Delhi (2002)
2. “Analytical Chemistry”, by G.L. David Krupadanam. D. Vijaya Prasad, K. Varaprasada Rao, K.L.N. Reddy and C.Sudhakar, University Press (India) Ltd. Hyderabad (2001)

(D) INORGANIC CHEMISTRY

UNIT-I

CHEMISTRY OF NON -TRANSITION ELEMENTS:

General discussion on the properties (Size, Ionization energies, Electronegativity, electron affinity,electro-positive character etc.) of the non-transition elements; Electronic structure and Oxidation states of Halogens; Interhalogen Compounds (AX, AX3, AX5,AX7); Pseudohalogens and Pseudohalides; Chemistry of Xenon; Structure and Bonding in Xenon compounds.

UNIT-II

CHEMISTRY OF TRANSITION ELEMENTS:

Co-ordination chemistry of Transition elements (Theories dealing with the formation of Coordination Compounds); Coordination Theory, Sidgwick's EAN rule, Valence Bond Theory, Crystal Field Theory, Splitting of d-orbitals, Jahn - Teller Effect; Magnetic Properties of Transition elements (Dia-, Para-, Ferro- & Anti-Ferro Magnetism); Interpretation of electronic spectra of Transition metal complexes: Charge Transfer spectra with reference to Tetrahedral and Octahedral complexes.

UNIT-III

CHEMISTRY OF LANTHANIDES AND ACTINIDES:

Position of Lanthanides & Actinides in the Periodic Table; General Properties (Size, Atomic Size, Electronegativity, Electropositive Character etc); Lanthanide Contraction -Consequences of Lanthanide Contraction; Magnetic Properties (Dia-, Para-, Ferro- & Anti-Ferro Magnetism) & Spectral Characteristics of Lanthanide and Actinide Complexes; Use of Lanthanide elements as Shift reagents in NMR Spectroscopy.

UNIT-IV

ORGANOMETALLIC COMPOUNDS :

Classification of Organometallics based on hapticity; Classification of Organometallics based on Polarity; c bonded organometallics and n bonded organometallics; General methods for the preparation of Main-group and Transition metal organometallics.

UNIT-V

BIO-INORGANIC CHEMISTRY:

Meta! ions in biological systems (Macro & Micro elements); Importance of Na, K, Mg, Ca in Biological Processes; Photosynthesis: Light Reaction (Cyclic & Non-Cyclic Photo-hosphorylation) & Dark Reaction (C3 Cycle). Nitrogen Fixation: Mechanism of reduction of N2;

BOOKS RECOMMENDED:

1. "Advanced Inorganic Chemistry', F.A. Cotton, G. Wilkinson, C.A. Murillo and M. Bochmann, 6th Edition, Wiley-Interscience, New York (1999).
2. "Bio-inorganic Chemistry, Inorganic Elements in the Chemistry of Life, W. Kaim and B. Schwederski, John Wiley & Sons, NY (1999).
3. "Selected Topics in Inorganic Chemistry, W.U. Malik, G.D. Tuli & Madan, S. Chand & Co., Delhi (2002).

(E) PHYSICAL CHEMISTRY

UNIT-I

THERMODYNAMICS-I& II:

Introduction to the laws of thermodynamics (first, second & third); Free energy and Entropy of mixing; Partial Molar Properties - Partial Molar Energy, Partial Molar Volume, Partial Molar Heat Content (P.M.H.C); Chemical potential and its physical significance; Variation of chemical potential with temp & pressure; Gibbs -Duhem equation; Concept of Fugacity of gases; Determination of Fugacity by Graphical method and Approximate calculation method; Change of fugacity with temperature and pressure.

UNIT-II

PHOTOCHEMISTRY:

Types of Photochemical reactions; Laws of Absorption (Grothuss-Draper law & Einstein's law);

Quantum yield; Primary & Secondary Photochemical processes; Joblonski Diagram: Fluorescence, Phosphorescence, Delayed Fluorescence, Inter-System Crossing; Internal Conversion-Vibrational Cascade and Chemiluminescence.

UNIT-III

CHEMICAL KINETICS-I & II:

Fast reactions; Rate constants of fast reactions; Their determination by Stopped flow method, Relaxation method, Flash photolysis and Nuclear Magnetic Resonance methods. Ionic reactions; Influence of solvent on the rate of reactions (single & double sphere A.C. model); Primary salt effect; Secondary salt effect; Influence of frequency factor; Influence of ionic strength.

UNIT-IV

SURFACE CHEMISTRY:

Adsorption; Factors influencing adsorption; Surface tension and its measurements; Adsorption isotherm curves; Langmuir's adsorption isotherm- its limitations; B.E.T. Adsorption isotherm-its applications; Negative adsorption; Positive adsorption; Chemisorptions; Physisorption and Determination of surface area.

UNIT-V

CATALYSIS & ENZYME CATALYSIS:

Types of Catalytic Reagents; Types of Catalysis (Homogeneous and Heterogeneous catalysis); Catalytic Coefficient; Acidity Functions; Specificity in Enzyme Catalyzed reactions; Michaelis- Menten mechanism; Influence of Concentration on Enzyme-Catalyzed reactions; Influence of Temperature on Enzyme Catalyzed reactions; Acid-base catalysis.

RECOMMENDED BOOKS:

1. "Advanced Physical Chemistry" by Gurudeep Raj; Goel Publishing House, Meerut (24th Edition, 1999).
2. "Physical Chemistry' by Peter Atkins and J.D.Paula; ELBS, Low Price Edition (7th, Edition, 2002).
3. "Chemical Kinetics" by K.J.Laidler; Tata Mc Graw- Hill Publishing Company Ltd, New Delhi (2nd Edition, 1984).
4. "Principles of Physical Chemistry by Maron and Prutton; Oxford and IBH Publishing Co Pvt Ltd (New Delhi) and Calcutta (4th Edition, 1966).
5. "Catalysis Principles and Applications" by B.Vishwanathan, S.Sivasanker; Narosa Publications, New Delhi (2002).
6. "Physical Chemistry through problems" by S.K.Dogra and S.Dogra; New Age International Pvt Ltd, New Delhi and Hyderabad (4th Edition, 1996).
7. "Physical Chemistry" by Bahl, Tuli and Arun bahl; S. Chand and Company Ltd. New Delhi (23rd Edition, 1995).

DISSERTATION

Students individually will carry out a detail study on a topic and implement a related system. The study must include literature survey, methodology and proposed work, experimental details and results, modifications to be included and future directions, applications etc. A report is to be prepared and submitted under the guidance of a supervisor. The report should contain design, implementation and experimental details. The topics involved in the work should be related to the courses undertaken by the student till this portion of progression under the programme and have contemporary relevance. It can involve research and development oriented works and be carried out with an eye on the needs of the industry. The work must be defended through a presentation in front of a panel constituted by selected experts. The quality of the work should be reflected by at least one publication in conference proceedings/ journals etc.

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