ST. JOSEPH'S COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)

CUDDALORE-1

PG & RESEARCH DEPARTMENT OF CHEMISTRY

M.Phil - SYLLABUS 2016-2017

M.Phil. CHEMISTRY

CURRICULUM DESIGN TEMPLATE FROM 2016-2017

Semester	Code	Part	Course Title	Hours	Credit
I	MPCH101	III	Research Methodology	7	5
	MPCH102	III	Advanced Chemistry	7	5
		III	Elective Paper (Guide Paper)	7	5
		III	Science-6 (Library)+6(Lab)	12	-
			Total	**33**	**15**
II	JCH201	III	Dissertation and Viva Voice		21
			Total		**21**
			Grand Total	**33**	**36**

M.Phil (CH)	RESEARCH METHODOLOGY	MPCH101
SEMESTER - I		HRS/WK – 7
CORE - I		CREDIT- 5

Objective:

- To impart knowledge on research methodology.
- To gain an in depth knowledge in statistical analysis.

UNIT- I: RESEARCH METHODOLOGY [12 Hrs]

Meaning of research – objective of research – motivation of research – approaches and significance – methods versus methodology – research in scientific methods – research process – criteria for good research – problem encounters by research in India – funding agencies.

UNIT – II: RESEARCH DESIGN [12 Hrs]

Research problem: selecting the problem – necessity of defining the problem – techniques involved in defining the problem – research design – needs and features of good design – different research design – basic principles of experimental designs.

UNIT – III: DATA COLLECTION AND DOCUMENTATION [12 Hrs]

Data collection methods – data types – processing and presentation of data- techniques of ordering data – meaning of primary and secondary data – the uses of computers in research – the library and internet – uses of search engines – virtual libraries – common software for documentation and presentation.

UNIT – IV: DATA AND ERROR ANALYSIS [12 Hrs]

Statistical analysis of data – standard deviation – correlation – comparison of sets of data – chi squared analysis for data – characteristics of probability distribution – binomial, poisson and normal distribution – principle of least square fittings – curve fitting – measurement of errors – types and sources of errors – determination of control errors.

UNIT – V: RESEARCH COMMUNICATION [12 Hrs]

Meaning of research report – logical format for writing and paper – essential of scientific report: abstract- introduction, review of literature – materials and methods and discussion – write up steps in drafting report – effective illustrations: tables and figures – reference styles: Harvard and Vancouver systems.

Text books:

1. Research Methodology, methods and techniques-C.R.Kothari-Wishwa Prakasam publications, II Edition.
2. Research: An Introduction-Robert Ross-Harper and Row Publications.
3. Research methodology-P.Saravanavel-Kitlab Mahal, Sixth edition.
4. A Hand Book of Methodology of Research-Rajammal P.A.Devadass-Vidyalaya press.
5. N.Subramanian, Introduction to Computer.

Reference books:

1. G.W.Secdecor and W.Cocharan, Statistical methodsOxford and IBH, New Delhi.

2. Santosh Guptha, Research methodology methods and statistical technique-.
3. S.P.Gupta, Statistical Methods-
4. Scientific social surveys and research-P.Young-Asia publishers, Bombay.
5. How to write and publish a scientific paper –R.A. Day Cambridge University Press.
6. Thesis and assignment writing-Anderson-Wiley Eastern Ltd.

M.Phil (CH)	ADVANCED CHEMISTRY	MPCH102
SEMESTER – I		HRS/WK – 7
CORE - II		CREDIT- 5

Objective:

- To study the applications of spectroscopy and to apply it in practice.
- To provide hands on experience in instrumental methods.

UNIT – I: INSTRUMENTAL METHODS OF ANALYSIS [12 Hrs]

Atomic absorption and emission spectroscopy, chromatography: GC - HPLC, electro analytical methods: coulometry cyclic voltametry, polarography, amperometry and ion selective electrodes.

UNIT – II: SPECTROSCOPY [12 Hrs]

Principles and applications in structural elucidation

Rotational – diatomic molecules – isotopic substitution and rotational constants. Vibrational – diatomic molecules – linear triatomic amolecules – specific frequencies of functional groups in polyatomic molecules. Electronic – singlet and triplet states – np* and pp*transitions – application to conjugated double bonds and conjugated carbonyls – Woodward-Fieser rules – charge transfer spectra.nuclear magnetic resonance – basic principle – chemical shift – spin-spin interaction and coupling constant. Mass spectroscopy – parent peak, base peak – metastable peak – MCLafferty rearrangement.

UNIT – III [12 Hrs]

Applications of UV-Visible, IR, NMR – COSY, NOESY, HMBC, HSQC and mass spectrometry in the determination of structures of organic molecules.

UNIT – IV [12 Hrs]

Applications of UV-Visible, IR, NMR, Mossbauer and ESR spectrometry in the determination of structures of inorganic molecules – variation of optical activity with wave length – optical rotatory dispersion and circular dichorism curves and their application in determining the configuration and conformation of different inorganic compounds and conformational analysis.

UNIT – V [12 Hrs]

Symmetry elements – point groups – optical activity – its origin – atomic and conformation asymmetry – variation of optical activity with wavelength. Reterosynthesis – synthons – synthetic equivalents – GI – target molecules – retrosynthesis of molecules (cubane, ciprofloxin)

Text books:

1. H.H.Willand, L.L. Merrit and J.A.Dean, Instrumental Methods of Analysis-D.Ven. Nostround & Co.
2. H.A. Stobel, Chemical Instrumentation, Addition-Wesley publishing & Co.
3. R.S.Drago, Physical Methods in Inorganic Chemistry
4. R.S.Drago, Physical Methods in Chemistry.

Reference books:

1. C.N.Banwell, Fundamentals of Molecular Spectroscopy, 1996, McGraw Hill.
2. William Kemp, Organic Spectroscopy, Macmillan Ltd, 1994.
3. R.M.Silverstein, G.C.Basler and T.C.Morril Spectrometric Identification of Organic Compounds, - John Wiley-1997.
4. Stuart Warren -Designing Organic Synthesis.

Question paper pattern for M.Phil

THEORY EXAMINATION

Internal Examination **(25 marks)**

Two Internal Examinations	15 marks
Assignment / Seminar	10 marks
Total	**25 marks**

External Examination **(75 marks)**

Question Pattern

M. Phil. CHEMISTRY

Time: 3 Hours **Max. Marks: 75**

Section A (5 × 6 = 30 marks)

ANSWER ALL FIVE QUESTIONS

Internal Choice (Either or Pattern)

Section B (3 × 15 = 45 marks)

ANSWER ANY THREE QUESTIONS

Out of Six Questions (Open Choice)

TOTAL (30+45=75)

NOTE: Equal weightage will be given for all units.