

பாரதியார் பல்கலைக்கழகம் : கோயம்புத்தூர் - 641 046

எம்.ஃபில் - தமிழ்

(2018-2019Mk; fy;tpahz;L Kjy; Nrh;Nthh;f;FhpaJ)

தாள் 1 : ஆய்வியல் நெறிமுறைகள்

**அலகு : 1 - ஆய்வுப் பொருள் தேர்வும் :**

ஆய்வு என்பதன் விளக்கம் - ஆய்வாளனுக்குக்குரிய தகுதிகளும் உள்பாங்கும் - ஆய்வுக்குரிய களம் - ஆய்வு நோக்கினைச் சுட்டல் - ஆய்வுச் சிக்கல் - ஆராயும் பொருள் பற்றித் தெளிதல் - ஆய்வுப் பொருள் பற்றி அதுவரை செய்யப்பட்ட ஆய்வுகள் பற்றிய தொகுப்புகளும் மதிப்பீடும்.

**அலகு : 2 - ஆய்வுப் பகுப்பும் தொகுப்பும்/கள ஆய்வு :**

முதன்மைக் கூறுகள் (Primary Sources), துணை நிலைக் கூறுகள் (Secondary Sources) இவற்றைத் தொகுத்தலும் பகுத்தலும் - பல்வேறு தொகுப்பு முறைகள் - நேர்காணல் - வினாத்தொகுதி (Questionnaire), மாதிரிகள் (Samples) முதலியவை பற்றிய விளக்கம்.

கள ஆய்வு வகைகள் - மக்கள் இன, பண்பாட்டு ஆய்வு - கள ஆய்வுக்குத் தேவையான பொருட்கள் - கள ஆய்வில் ஈடுபடுவோர் தகுதிகள் - களக்குறிப்புகள் - உள இயலும் கள ஆய்வும் - நேர்காணல், வினா நிரல் ஆகியவற்றின் விளக்கம் - நேர்காணலின் வகைகள் - உற்று நோக்கல் - உற்று நோக்குவோரின் அணுகுமுறைகள் - எழுத்து, பட ஆதாரம் - புகைப்படம், திரைப்படம், நாடா ஒலிப்பதிவு, ஒவியம், அரும்பொருள்கள் - இணையம் - இதழ்கள் ஆகியவற்றைப் பயன்படுத்தும் முறைகள்.

**அலகு : 3 - ஆய்வு அணுகுமுறைகள் :**

ஆய்வுநெறிமுறைகளின் வகைகள் - அளவையியல் முறை(Logical Method)>அறிவியல் முறை (Scientific Method), அமைப்பு முறை (Systems Method), வரலாற்று முறை (Historical Method).ஒவ்வொரு குறிப்பிட்ட துறை,பொருளுக்கேற்ற ஆய்வு நெறிமுறையை அமைத்தல்.

**அலகு : 4 - ஆய்வேட்டின் உருவாக்கம் :**

ஆய்வேட்டை உருவாக்கும் பல்வகை நிலைகள், மாதிரி வரைவு - பொறியாளர், அறிஞர்களின் கருத்தறிதல் - கலந்துரையாடல், மாதிரி வரைவை மறுபார்வை செய்தல் - திருத்தல் - செம்மையாக்கல் - ஆய்வேட்டின் அமைப்பு - பகுதிகள் - இயல் பிரிப்பு - சுருக்கக் குறியீடு, அடிக்குறிப்புகள், அட்டவணை, விளக்கப் படங்கள், பின்னிணைப்பு முதலியன - ஆய்வேட்டின் கட்டமைப்பும் புறத்தோற்றமும்.

**அலகு : 5 - தற்கால தமிழாய்வுப் போக்குகள் :**

உருவவியல் -அமைப்பியல் - குறியியல் - தொல் படிமவியல் - இலக்கிய வகை நிலையியல் - தத்துவவியல் - நவீனத்துவம் - மார்க்சியம் - பெண்ணியம் - தலித்தியம் முதலான தற்கால ஆய்வுப் போக்குகள்.

**ஆழ்ந்து கற்க வேண்டிய நூல்கள் :**

- 1) ஆய்வியல் அறிமுகம் - டாக்டர் தமிழண்ணல், டாக்டர் எம்.எஸ். இலக்குமணன்.
- 2) இலக்கிய ஆராய்ச்சி முறைகள் - டாக்டர் முத்துச் சண்முகம், டாக்டர் சு. வேங்கடராமன்.
- 3) ஆய்வியல் நெறிகள் - கு.வெ. பாலசுப்பிரமணியம்.

**பார்வை நூல்கள் :**

- 1) ஆய்வுக் கட்டுரை எழுதும் முறை - டாக்டர் முத்துச் சண்முகம், டாக்டர் சு. வேங்கடராமன்.
- 2) நாட்டார் வழக்காற்றியல் கள ஆய்வு - தே. லூர்து
- 3) கள ஆய்வில் சில அனுபவங்கள் - டாக்டர் சரசுவதி வேணுகோபால்
- 4) Thesis and Assignment Writing - Anderson and other Willey Eastern Pvt. Ltd., New Delhi.
- 5) Form and Style in Thesis writing - Comp bell & N.G. London, European Limited.
- 6) Literary thesis a guide to Research - Watson, George Horlowlonmans.
- 7) Introduction to Research Theory - K M P Variar, Madras.
- 8) திறனாய்வுக்கலை : தி.சு. நடராஜன் (என்.சி.பி.எச். வெளியீடு)
- 9) ஆராய்ச்சி முறைமைகள் - முனைவர் எச்.சித்திரபுத்திரன், முனைவர் ஆ.சண்முகம்.
- 10) நாட்டுப்புறவியல் - கள ஆய்வு - முனைவர் இரா. சந்திரசேகரன் மற்றும் பலர்.
- 11) இலக்கியமும் திறனாய்வு கோட்பாடுகளும் - க. பஞ்சாங்கம்.

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**BHARATHIAR UNIVERSITY – COIMBATORE – 641 046**

**M.Phil./Ph.D. – ENGLISH**

**PART I – SYLLABUS**

**(For the candidates admitted from the academic year 2018-19 onwards)**

**PAPER I – RESEARCH METHODOLOGY**

**Objectives**

1. To initiate scientific approach to research
2. To develop historical perspectives on research
3. To enhance learners' understanding of the methods and mechanics of Research Writing

**Unit I** Identification of a research problem and the choice of subject, norms, conventions and format of Thesis.

**Unit II** Introduction- Research Methods for English Studies – Gabriel Griffin- 1- 18  
Chapter 5- Visual Methodologies- 69-92  
Chapter 7- The Uses of Ethnographic, Methods in English Studies 113- 132

**Unit III** The Mechanics of Writing

**Unit IV** Documentation – works cited

**Unit V** Presentation of research

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The Mechanics of Writing, Proof Reading, Citation Parenthetical Referencing, Title, aim, objectives, e-resources quoting and in-text citations using standard research findings and style sheet.

**Prescribed Text**

Gibaldi, Joseph. MLA Handbook for writers of Research Papers, New Delhi: EWP, 2016 (8<sup>th</sup> edition).

Research Methods for English Studies – Gabriel Griffin- Eduiburg Press.

**Suggested Readings**

1. Parsons C.J. Thesis and Project Work.
2. Anderson, Jonathan, B.H. Durston and M.Pcole. Thesis and Assignment Writing, New Delhi: Wiley Eastern, 1970.
3. Thorpe, ed. Aims and Methods of Scholarship.
4. Watson, G. The Literary Thesis.
5. Bateson, F.W. The Scholar Critic.
6. Ananda Kumar Raju. ABC of Literature.
7. Kothari, C.R. Research Methodology: Methods and Techniques, Delhi: New Age International Ltd.1985.
8. Rengachari, S. & Rengachari, Sulochna. Research Methodology for English Literature, Bareilly: Prakash Book Depot,
9. Sinha, M.P. Research Methods in English.
10. Winkler, Anthony C. & Accuen, Jo Roy. Writing the Research Paper: Thomson Heinle, 2003.

**BHARATHIARUNIVERSITY, COIMBATORE - 641 046**  
**M.Phil ./ Ph.D. - PHYSICS**

**PART - 1 SYLLABUS**

**(For the candidates admitted from the academic year 2018-19 onwards)**

- PAPER – I** - **Research Methodology**
- PAPER - II** - **Advanced Physics**
- PAPER – III** -
- 1. Physics of Nanomaterials and device**
  - 2. Plasma Physics**
  - 3. Thin Film Technology**
  - 4. Molecular quantum mechanics**
  - 5. Nuclear Physics**
  - 6. Principles and Methods of Crystal Growth**
  - 7. Nonlinear Dynamics**
  - 8. Solar Energy and its Utilization**
  - 9. Electrochemical Energy Devices**
  - 10. Computational fluid dynamics**
  - 11. Atmospheric Physics**
  - 12. Astronomy, Astrophysics and Cosmology**

## PAPER – I RESEARCH METHODOLOGY

### Unit - 1 Data Analysis

Approximate numbers and Significant Figures – Rounding of Numbers – Absolute, Relative and Percentage errors – Relation between Relative error and the significant figures – The general formula for errors – Formulas to the fundamental operations of arithmetic and logarithms – Accuracy in the evaluation of a Formula – Accuracy in the Determination of arguments from a tabulated functions – Accuracy of Series approximations – Errors in Determinants - Errors of Observations and Measurement – The law of accidental errors – Examples and exercises for data analysis

### Unit – 2 Monte Carlo Method

Random variables – Discrete random variables - Tossing of a coin, Throwing of a die – Continuous random variables - normal random variables – The central limit theorem – General scheme of Monte Carlo method – generating random variables on a computer – tables of random numbers – generators of random numbers – Pseudorandom numbers – transformation of random variables – modelling of discrete random variable – modelling of continuous random variable – von Neumann’s method for modelling a continuous random variable – modelling normal variables – evaluating a definite integral - method of computation – sampling – numerical examples – error estimates

### Unit – 3 (Theory and Problems)

**Least squares approximation of functions:** Linear regression – Polynomial regression – Fitting exponential and trigonometric functions

**Interpolation:** Newton’s method for equal and unequal intervals - Cubic spline (CS) methods – Minimizing property – Error in CS and its derivatives – Surface fitting by CS - Inverse interpolation - Double difference - Double interpolation

**Numerical optimization:** Minimization of a function - finding extreme values of a function – minimization using derivatives – steepest descent method (gradient method)

**Integration:** Gauss quadrature – double integration

### Unit – 4 (Theory and Problems)

#### Ordinary Differential equation:

Predictor – Corrector method: Adams–Moulton method – Milne’s method - Boundary value problem; Finite difference method – shooting method

**Solution of Partial differential equations:** Types of equations – Derivation of difference equation – Solving of elliptic, parabolic and hyperbolic equations – Explicit, Implicit, Crank Nicholson methods - Boundary conditions: Dirichlet, Neumann, conditions

**Finite element method:** Introduction – functional – base functions - methods of approximation – Galerkin method – Finite element method for one dimensional problems

**BHARATHIAR UNIVERSITY: COIMBATORE – 641 046**

**M.Phil. /Ph.D. - BOTANY**

**PART I: SYLLABUS**

**(For the candidates admitted from the academic year 2018-19 onwards)**

**PAPER I – RESEARCH METHODOLOGY**

**UNIT 1:**

Principals and methodology of spectrophotometer, dialysis and Lyophilization, centrifugation, (high speed and ultra), Microscopy (SEM, TEM and Fluorescent).

**UNIT II:**

Principles and methodology of chromatography- GC, HPLC, & GCMS. Electrophoresis - Agarose, SDS – PAGE, Western blot. Phytochemistry – extraction, isolation, characterization and identification of alkaloids and flavanoids.

**UNIT III:**

Nucleic acids - Isolation and purification of DNA, PCR & RTPCR. Genome mapping; molecular markers – RFLP, AFLP, RAPD. Southern and Northern hybridization techniques, Colony hybridization. ,

**UNIT IV:**

Culture techniques – Media preparation; (PDA, Nutrient Agar, CHU-10); Isolation, purification and maintenance of microorganisms, Plant tissue culture – MS medium, Gamborg medium; Sterilization techniques- (physical and chemical). Cytological techniques – pretreatment, fixatives and stains. Microtomy.

**UNIT V:**

Field Techniques – Herbarium preparation Vegetation analysis (floristic, physiognomic and phytosociology (transect, quadrat, point or pointless and loop); Forest mapping and change detection using remote sensing and GIS. Thesis writing-Manuscript preparation, Citation style: Introduction to SPSS. (Statistical package for social science).

**References:**

1. Bhattacharyya, 2006, D. K, Research Methodology, Excel Books India, PP 1-414
2. Gupta, P.K., 1994, Elements of Biotechnology, Rastogi, Meerut
3. Kothari C. R., 2004, Research Methodology: Methods and Techniques, New Age International, pp- 1- 401
4. N. Gurumani, 2006, Research Methodology: For Biological Sciences, MJP Publishers, ISBN 9788180940163, PP 1- 753
5. Sam Daniel P., Aroma G. Sam, 2011, Research Methodology, Gyan Publishing House, PP 1-254
6. Trease G.E. and Evans W.C. 1978 – Pharmacognosy Bailliere Tindal, London

**BHARATHIAR UNIVERSITY – COIMBATORE – 641 046**  
**M.Phil. /Ph.D. - HISTORY**

**PART I- SYLLABUS**  
**(For the candidates admitted from the academic year 2018-19 onwards)**

**PAPER I – RESEARCH METHODOLOGY**

**UNIT I:**

Definition and Meaning of History – Nature and Scope – Values of History – History and other disciplines – Kinds of History.

**UNIT II:**

Positivism – Structuralism – Post – Structuralism – Modernism – Post Modernism – Subaltern Studies – Regionalism.

**UNIT III:**

Pre – requisites of a Research Scholar – Selection of Topic – Review of Literature – Hypothesis – Kinds of Sources: Primary, Secondary and e-Resources.

**UNIT IV:**

Internal and External Criticism – Objectivity and Subjectivity in Historical writing – Foot Notes – Bibliography – Styles of Writing: APA and MLA - Documentation.

**UNIT V:**

Greek and Roman Historiography – Herodotus, Thucydides, Livy, Tacitus – Dialectical Materialism – Hegel & Marx, Indian Historians-Kalhana – AbulFazl – D.D.Kosambi – RomilaThapar.

**REFERENCES:**

1. Historiography in the twentieth Century, Georg or Leggers, Wesleyan University Press.
2. MLA Hand book, Oxford University Press.
3. Burnes H.E: The History of History, London, 1937.
4. Bury. J.B: The Idea of Progress, New York, 1955
5. Butter Field H: History and Human Relations New York, 1951 - 52
6. Carr.E.H: What is History, London, 1961
7. Collingwood R, G: Ideas of History, Oxford, 1946
8. Durand Will and Ariel- The Lessons of History New York, 1968.
9. Phillips C.H.Ed.Historians of India, Bombay, 1968.
10. Rajayyan K, Historiography, Madurai, 1977.

**BHARATHIAR UNIVERSITY: COIMBATORE 641046**  
**M. Phil. / Ph.D. – COMPUTER SCIENCE**

**PART I – SYLLABUS**

**(For the candidates admitted from the academic year 2018-19 onwards)**

**PAPER I - RESEARCH METHODOLOGY**

**PAPER II - ADVANCED TECHNOLOGIES IN COMPUTER SCIENCE**

- PAPER III
1. DATA WAREHOUSING AND MINING.
  2. DIGITAL IMAGE PROCESSING.
  3. ADVANCED NETWORKING.
  4. NATURAL LANGUAGE PROCESSING.
  5. DATA COMPRESSION.
  6. AGENT BASED COMPUTING.
  7. SOFT COMPUTING.
  8. SOFTWARE TESTING AND QUALITY ASSURANCE.
  9. KNOWLEDGE MANAGEMENT AND BUSINESS INTELLIGENCE.
  10. GRID AND CLOUD COMPUTING.
  11. ARTIFICIAL INTELLIGENCE AND ROBOTICS.
  12. BIOINSPIRED COMPUTING.
  13. CONCURRENT ENGINEERING INFORMATION SYSTEM.
  14. SPEECH PROCESSING.
  15. INFORMATION SECURITY.



## **PAPER I - RESEARCH METHODOLOGY**

### **UNIT – I RESEARCH METHODS**

Meaning of Research- Objectives of Research- Motivation in Research- Types of Research- Research Approaches- Significance of Research-research methods versus Methodology-Research and Scientific Method- Importance of Knowing How Research is done- Research Process – Criteria of good Research –Problem Encountered by Researchers in India- What is Research Problem? Selecting the Problem- Necessity of Defining the Problem- Technique involved in Defining the Problem- Meaning of Research Design- Need for Research Design- Features of a Good Design- Important Concepts Relating to Research Design- Different research design- Basic principles of Experimental Designs- Significance of Report Writing- Different Steps in writing Report- Layout of the Research Report- Types of Reports- Oral Presentation Mechanics of Writing a Research Report- Precautions for Writing Research Reports.

### **UNIT – II ALGORITHMS AND ANALYSIS**

Elementary data Structures, Greedy method: Knapsack problem-job sequencing with deadlines- Optimal merge patterns, Dynamic Programming: Multistage graphs-Optimal binary search trees- 0/1 knapsack- Reliability design- The traveling salesperson problem- Flow shop scheduling, Basics search and traversal techniques: The techniques Code Optimization- Biconnected components and depth- first search. Backtracking: The 8 – Queen s problem- Sum of subsets – Hamiltonian cycles-Knapsack Problem.

### **UNIT – III COMPILER DESIGN**

Introduction to compiling- The Phases of a Compiler- Lexical Analysis- The role of the lexical analyser-Specification &Recognition of tokens- Finite Automata-Conversion of Regular Expression to NFA – Syntax Analysis- The Role of the Parser-Context Free Grammar- Top-Down Parsing: Predictive Parser- Bottom- Up Parsing: SLR Parser Syntax- Directed Translation- Type Checking- Specification of a simple type checker -Type Conversion- An algorithm for Unification- Symbol tables- Intermediate Code Generation-Code Generation- Issues in the design of code generator- Basic Blocks and Flow Graphs- Code Optimization- The Principal sources of optimization-optimization of basic blocks.

### **UNIT – IV OBJECT ORIENTED ANALYSIS, DESIGN AND DEVELOPMENT**

Object Oriented Design Fundamentals: The Object Model - Classes and Objects - Complexity - Classification - Notation - Process - Pragmatics – binary and entity relationship - object types - object state - OOSD life cycle. Object Oriented Analysis: Overview of object analysis - Shatter/Mellor, Coad/Yourdon, Rumbaugh, Booch - UML – Use case model– Conceptual model - behavior - class - analysis patterns - overview - diagrams - aggregation. Object Oriented Design Methods: UML - diagrams - collaboration - sequence - class - design patterns and frameworks - comparison with other design methods. Managing Object Oriented Development: Managing analysis and design - Evaluation testing - coding - Maintenance - Metrics. Object Oriented Development: Design of Foundation class libraries - Object Oriented Databases - Client/Server Computing - Middleware.

## **UNIT – V SOFTWARE ENGINEERING**

Software Engineering Process paradigms - Project management - Process and Project Metrics – software estimation - Empirical estimation models - planning - Risk analysis - Software project scheduling. Requirements Analysis and Design: Prototyping - Specification - Analysis modeling - Software design - Abstraction - Modularity - Software Architecture - Effective modular design - Cohesion and Coupling - Architecture design and Procedural design - Data flow oriented design-design patterns. User interface design - Human Computer Interface design - Interface design - Interface standards. Programming languages and coding - Language classes - Code documentation – Code efficiency - Software Configuration Management – real time systems-Reverse Engineering and Re-engineering-CASE tools - Projects management, tools - analysis and design tools - Programming tools - integration and testing tools – clean room software engineering.

### **REFERENCE BOOKS:**

1. C.R.Kothari,"Research Methodology Methods & Techniques" 2nd Edition, Wishwa Prakashan Publishers.
2. Dr.Rajammal P. Devadas,"A. Handbook on Methodology of Research-Sri Ramakrishna Mission Vidyalyaya College of Rural Higher Education".
3. Alfre V. Aho, John E. Hcpcroft, Jeffrey D. Ullman," Data structures and Algorithms", Addison- Wesley Publishing Company, 1987.
4. Ellis Harowitz, Sartaj Sahini, "Compute Algorithms", Galgotia Publications (P) Ltd., 1993.
5. Alfre V. Aho, Ravi Sethi and Jeffrey D. Ullman," Compiler Principles, Techniques and Tools", Addison Wesley Publishing Co,1986.
6. Jean Paul, Tremblay, Paul G. Sorenson, "The Theory and Practices of Compiler Writing" Mc. GrawHill Inc, International Student Edition, 1985.
7. Craig Larman, "Applying UML and patterns ", Addison Wesley, 2000.
8. Grady Booch, James Rumbaugh, Ivar Jacobson," The Unified Modeling Language
9. User Guide ", Addison-Wesley Long man, 1999.
10. Ali Bahrami, "Object Oriented System Development ", McGraw Hill International Edition, 1999.
11. Erich Gamma, "Design Patterns ", Addison Wesley, 1994.
12. Roger Pressman.S., " Software Engineering : A Practitioner's Approach ", 3rd Edition, McGraw Hill, 1997.
13. P Fleeger, "Software Engineering ", Prentice Hall, 1999.
14. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli "Fundamental of Software Engineering ", Prentice Hall of India 1991.

**BHARATHIAR UNIVERSITY: COIMBATORE - 641 046.**  
**M.Phil / Ph.D. - COMMERCE (FT / PT)**

**PART - I –SYLLABUS**

**(For the candidates admitted from the academic year 2018-19 onwards)**

**PAPER - I RESEARCH METHODOLOGY**

**UNTT - I**

Nature and Scope of Research in Business- Types of Research - Significance - Research Process- Characteristics of Good Research- Problems faced by researchers in India.

**UNIT - II**

Problem Identification and Selection – Review of Literature – Need for review of Literature - Research Design - Meaning, Need, Features of Good Design - Different types of Research Design - Developing a Research Plan -Hypothesis-Meaning-Significance-Testing-Types-Type I/ II Errors.

**UNIT - III**

Sampling Design, Procedures, Types - Errors - Scaling Techniques, Rating Scales – attitude scales- Likert, Thurstone and Guttman Scales.

**UNIT - IV**

Methods of Data Collection - Primary and Secondary Data - Sources: Questionnaire, Interview, Observation, Mail and E-Mail Surveys - Pilot Study and Pre-testing- Role of Computers in Research -Role and Functions of SPSS in Research – Internet Sources - Data Base - Web Sites available for Data Collection.

**UNIT - V**

Analysis and Interpretation- Significance – Points to be noted in Analysis and Interpretation - Report Writing - Layout of the Report - Types of Report - Steps in writing the Report – Foot Note – Bibliography.

**Note:** The Question Paper shall cover 100% theory.

**Reference Books:**

1. Emory, Business Research Methods, Home Wood, R.D. Irwin; Georgetown,
2. C.R.Kothari, Research Methodology - Methods and Techniques, New Age International Publishers
3. Wilkinson & Bhandekar, Research Methodology in Social Sciences, Himalaya Publishing House.
4. Rummel & Ballaine: Business Research Methods, Joanna Cotler Books.
5. Bajabai- Business Research Methods, Pearson Education, Second Edition.
6. Dr. Amarchand - Research Methods, Emerald Publishers.
7. Saravanavel – Research methodology, Kitab Mahal Publishers.
8. O.R.Krishnasamy- Methodology of Research in Social Sciences, Himalaya Publishers.
9. Young, Pauline V. Scientific Social Surveys in Research, Prentice Hall, Englewood Cliffs, NF.
10. Anderson –Thesis and Assignment Writing, Johan Willex & Sons inc;

**BHARATHIAR UNIVERSITY: COIMBATORE-641046**  
**M.Phil. /Ph.D. - FOOD AND NUTRITION**

**PART-I SYLLABUS**  
**(For the candidates admitted from the academic year 2018-19 onwards)**

**Paper-I - RESEARCH METHODS IN NUTRITION**

**Unit-I**

Types of nutrition research and studies- longitudinal, cross sectional, epidemiological, surveillance, retrospective, in-vivo, in-vitro and experimental.

Animal nutrition experiments- principles, selection of animal, comparative feeding trails, design, applications and ethics. Human nutrition experiments- Ethical clearance and consent.

Problem selection- factors to be considered.

Experimental designs- examples of nutrition research using the following experimental designs: single group, pre and post design, case study, cohort study, ex-post facto study, time series experiments and factorials designs.

**Unit-II**

Data collection- principles, definition and examples in nutrition and health for the following:

1. Quantitative tools
  - i Direct parameters- Application of anthropometry, dietary survey, clinical, biochemical and growth monitoring tests, body composition tests and physical fitness tests.
  - ii. Indirect parameters – vital statistics, population tests, socio economic indices, KAP surveys.
2. Qualitative research tools
  - i. Types of interviews
  - ii. Focus group discussions
  - iii. Free listing and pile sorting
  - iv. Narrative
  - v. Case studies
  - vi. Participatory methods
3. Integrating qualitative and quantitative methods.
4. Planning and implementation of a nutritional assessment survey.

**UNIT- III**

Indices and methods to assess the requirement and quality of the following in body and food: proteins, carbohydrates, lipids, energy, vitamins, minerals, trace elements and water.

Product development- need, scope and methods.

Subjective and objective methods for evaluation of food products- principles, methods and recent trends. Use of food and nutrition software tools- calculation of BMI and nutrients.

#### UNIT- IV

Sampling methods, testing hypothesis.

Data analysis- uses of the following with example of and health data;

1. Descriptive statistics- mean median, mode and standard deviation percentile, T-test, chi-square test, F-test, correlation and regression.
2. Non- parametric statistics in nutrition research
3. Uncertainties in nutrition and health research- source, measurement (probability) and methods to minimize impact.
4. Organizing the results and report writing.
5. Use of SPSS Package for consolidation and statistical analysis.

#### UNIT- V

Introduction of nutrition and health management- definition, objectives and components of planning, implementation and evaluation.

Operations research and contribution to nutrition and health management.

Planning, implementation and evaluation of a nutrition project or programme from proposal development to report writing.

Critique of research of recent research studies- strengths and weakness, interdisciplinary perspectives.

#### References

1. **Ghai. O.P, Gupta. P,**(1999), Essential Preventive Medicine- A Clinical And Applied Approach.
2. **Hendrick. T.E, Bickmath and Rog. D.J,** (1993), Applied Research Design- A Practical guide, California, Sage publication, Inc.
3. **Miles M.B, Huberman A.M,** (1994), Qualitative Data Analysis- An Expanded Source Book, 2<sup>nd</sup> Edition, California, Sage publication, Inc.
4. **Wilson. K, Goulding. K.M,** A Biologist's Guide To Principle And Techniques In Practical Biochemistry.
5. Proceeding of N & I, 1993, No 40
6. **Suitor. C.W, and Crowley. H.F,** Nutrition- Principles And Application In Health Promotion.
7. **Pelleff. C.D and Young. V.R,** Nutritional Evaluation of Protein Foods.
8. **Harrison Clacke,** Application Of Measurements To Health and physical education ,5<sup>th</sup> edition ,Prentice Hall.
9. **Keith Wilson and John Walker,** Practical Biochemistry- Principles And Techniques.
10. **George. E,** Nutritional Bioavailability Of Zinc.
11. **Earl. B,** (1984), Practice Of Social Research, Wordsworth publishing, California.
12. **David. G.Alms, Basy. H, Katano Witz. Henry. L, Rcodiger,** (1995). Research Methods In Psychology, West publishing company, New York.
13. **Dumm Olive Jean, Virginia. A. Clark,** (1990), Applied Statistics, John Wiley and Sons.
14. **Snedecor. G.W,** (1992), Statistical Methods, The Iowa State University Press, Iowa.
15. **Deldert. C. Miller,** (1991), Handbook Of Research Design And Social Measurement, 5<sup>th</sup> edition, Sage publication, New Delhi.

**BHARATHIAR UNIVERSITY::COIMBATORE – 46**  
**M. Phil / Ph.D. - CHEMISTRY**

**PART I - SYLLABUS**

**(For the candidates admitted from the academic year 2018-19 onwards)**

**PART I: PAPER – I: RESEARCH METHODOLOGY**  
**PAPER – II: PHYSICAL METHODS IN CHEMISTRY**  
**PAPER – III: SPECIAL PAPERS**

1. Environmental Chemistry
2. Polymer Chemistry
3. Organic Chemistry
4. Solid state chemistry.
5. Organometallic chemistry of transition metals.
6. Photochemistry-photophysical studies.
7. Physical organic chemistry
8. ElectroChemistry
9. Chemistry of advanced materials.
10. Organic Synthetic Methodology and Conformational Analysis

**Note:**

1. The syllabus for the above papers (Paper I, II and III Special Paper 6: Environmental Chemistry and Paper 10 : Polymer Chemistry) be the same as prescribed for the academic year 2009-10.
2. The syllabus for Paper I, II and III Special Paper 6: Environmental Chemistry and Paper 10 : Polymer Chemistry is furnished below.

## **PAPER – I: RESEARCH METHODOLOGY**

### **UNIT - I**

Dissertation: Nature and purpose, components and preparation- Writing techniques: Introduction, word processing and page layout, writing and formatting with a computer- Figures: general considerations, line art, drawing with a computer and halftones- Tables: logic behind a table, significance of a table, form of a table, components of a table - Worksheets, lists and databases. Plagiarism.

#### **Collection and Citation of Literature:**

Acquisition of information, building up of own literature collection, citation techniques, forms of citation, web of science, SCI, Scopus, H index and I10 index.

#### **Publication of Journal Articles:**

Concept, electronic publication, types of journals, impact factor, decision prior to publication, components of a journal article, preparation of the manuscript, from manuscript to publication and online submission.

#### **Submission of Research Proposals:**

Leading funding agencies in India, Submission of research project proposals with prescribed formats.

### **UNIT - II Data**

#### **Analysis:**

Errors – classification of errors - precision - accuracy – improving accuracy of analysis – significant figures – mean, standard deviation – comparison of results: “t”test, “f” test and “chi” square test – rejection of results – presentation of data.

Sampling – introduction – definitions – theory of sampling – techniques of sampling – statistical criteria of good sampling and required size – stratified sampling vs random sampling – minimization of variance in stratified sampling –transmission and storage of samples.

### **UNIT - III**

#### **Atomic Spectroscopy and Flame emission**

##### **Spectroscopy**

Types of atomic spectroscopy – emission methods – absorption methods – fluorescence methods – atomizers for atomic spectroscopy: flame atomizers, Electrothermal atomizers – inductively coupled plasma sources of radiation – Instrumentation - Applications of atomic emission spectroscopy – flames and flame spectra.

##### **Fluorometric analysis:**

Types of Fluorescence and phosphorescence – factors affecting fluorescence and Phosphorescence – quenching – relation between intensity of fluorescence and concentration – measurement of fluorescence – applications.

### **UNIT - IV**

#### **Gas Chromatography:**

Theory of chromatography – column efficiency and column equation – sample injection – sampling system for capillary columns and packed columns – detectors – gas flow control system – high resolution gas chromatography/mass spectrometry.

### **HPLC:**

Principles of high performance liquid chromatography – Instrumentation - Pumps: types of pumps - requirements – Column packing : gradient elution, isocratic elution – Detectors for liquid chromatography – the mobile phase in HPLC – solvent degassing – column technology – column selection – quantitative analysis by HPLC-Applications.

### **UNIT-V Electroanalytical methods:**

Redox potentials – definition – Methods of determination – applications – ion selective electrodes. Current – voltage relationships – polarography – instrumentation –Types of polarography– characteristics of DME – diffusion current – half wave potentials. Amperometric titrations - constant current coulometry – constant potential coulometry, cyclic voltammetry – basic principles and applications.

### **REFERENCES:**

1. The art of Scientific Writing – H.F. Ebel, C. Bliefert and W.E. Russey 2nd ed Weinheim; Wiley-VCH (2004) .
2. R.C. Kapoor and B. S. Aggarwal - Principles of polography, 1<sup>st</sup> edition, Wiley (1991).
3. G. W. Ewing -Instrumental methods of chemical analysis, 4<sup>th</sup> edition McGraw-Hill (1975).
4. Analytical electrochemistry- Joseph Wang, 2<sup>nd</sup> edition wiley (2001).
5. Instrumental methods of analysis – H.Willard, L.Merritt Jr.and A. Dean. 4<sup>th</sup> Edn(1996)
6. Instrumental methods of chemical analysis – B.K.Sharma., GOEL PUBLISHERS 28<sup>TH</sup> EDITION (2012).
7. Fundamentals of analytical chemistry – D.A.Skoog and D. M.West. 7<sup>th</sup> Edu, Saunders College Pub (1996)
8. Analytical chemistry – J.D.Dick. American Chemical Society (2007)
9. Basic concepts of analytical chemistry – S.M.Khopkar. New Age International, 1998.
10. Vogel's Textbook of Qualitative chemical analysis-5th edition.
11. Introduction of instrumental analysis (R. D.Braun,)(2009)
12. Principles of fluorescence spectroscopy – Joseph R.Lakowicz., 3<sup>rd</sup> edition Springer(2006).



**BHARATHIAR UNIVERSITY: COIMBATORE – 641 046**  
**M.Phil. / Ph.D. - ZOOLOGY (Full-Time / Part-Time)**

**PART - I: SYLLABUS**

**(For the candidates admitted from the academic year 2018-19 onwards)**

**PAPER I – Research Methodology**

**PAPER II – Recent Advances in Biology**

**PAPER III -**

1. Crustacean Endocrinology and Reproduction
2. Human Genetics
3. Pollution Biology
4. Environmental Physiology
5. Limnology
6. Advances in Insect Biology and Pest Management
7. Insect Pests Control and Toxicology
8. Eco Toxicology
9. Aquaculture and Fisheries
10. Proteomics and Molecular Cell Physiology
11. Conservation Biology
12. Toxicology
13. Vertebrate Endocrinology
14. Advances in Nematology

## **PAPER I: RESEARCH METHODOLOGY**

### **UNIT I: BIOINSTRUMENTATION**

Principle & Applications of pH meter – Ultracentrifuge – UV visible spectrophotometer, FTIR, Atomic absorption spectrophotometer – XRD- NMR – MALDI TOF -Electron microscope (SEM & TEM) – FRET Microscopy.

### **UNIT II: ANALYTICAL TECHNIQUES**

Principles and Procedure of Chromatography: Thin layer chromatography - High performance liquid chromatography, Gas Chromatography, Electrophoresis: Agarose & PAGE. Blotting techniques: Southern, Northern & Western, PCR – ELISA.

### **UNIT III: HISTOLOGICAL TECHNIQUES**

Processing tissue samples for light and electron microscopy, Immunochemical localization- Cryostat Sectioning - Flow cytometry - FISH and GISH - Microarray.

### **UNIT IV: DATA PROCESSING AND ANALYSIS**

**Biostatistics:** Correlation Co-efficient; Simple linear regression, Student's 't' test; Chi -square test, 'F' test; ANOVA – one way; two way – Multiple/Post Hoc comparison in ANOVA

**Bioinformatics:** Generalized and specialized data bases with examples –BLAST - Multiple Sequence Alignments. Molecular Divergence & Phylogenetic trees.

### **UNIT V: RESEARCH METHODS AND THESIS WRITING**

Identification of research problems – Methods of literature collection and review – Planning and execution of investigation – Thesis writing – Preparation of research papers- Ethics in thesis writing.

### **REFERENCES\***

1. Anderson, Durston & Polle 1970: Thesis and assignment, writing Wiley Eastern Limited.
2. Bier, 1959: Electrophoresis, theory, methods and applications, Academic Press, London, New York.
3. Block, R. I. Durram E.K. and Eweig, G, 1956: A manual of paper chromatography and electrophoresis, Academic press, New York.
4. Chayan J & Butcher R.G, 1973: Practical histochemistry, Willey Interscience Publication, London.
5. Clark G.L, 1961: The Encyclopedia of microscopy, Reinhold publishing corporation, New York.
6. Fisher R.A, 1950: Statistical methods of research workers.
7. Freund J E, 1967: Modern elementary statistics, Prentice Hall, Inc. Englewood cliffs, N J.
8. Malter K, 1972: Statistical analysis in Biology, Chapman Hall, London.
9. Campbej R C, 1975: Statistics for Biologists II nd Ed. Cambridge University Press, London.
10. Haftman E, 1967: Chromatography, Reinhold publishing corporation, New York.
11. Jones R M 1966: Basic microscopic techniques University of Chicago Press, Chicago.
12. Lenhoff E, 1966: Tools in Biology, Macmillan Co., New York.

\*Refer recent edition

## **PAPER II - RECENT ADVANCES IN BIOLOGY**

### **UNIT I: MOLECULAR BIOLOGY**

Control of gene expression in Prokaryotes and Eukaryotes. Environmental gene regulation – Mechanism of Hormonal action. Cell Signalling -Molecular basis of apoptosis and cancer.

### **UNIT II: IMMUNOLOGY**

Cells and molecules involved in immunity & immunogenicity. Antigen - Structure and functions of different classes of immunoglobulin – Mechanism of immune response and generation of antibody diversity - T-Cell and B-Cell activation - Monoclonal antibodies - MHC – Complement system – Hypersensitivity –Autoimmunity – Immunodeficiency.

### **UNIT III: ENVIRONMENTAL POLLUTION**

Different types of pollutant – acute and chronic toxicity; Bioassay LC50 and LD50 values- Environmental pollution and their impact on animals – Biomagnification, biodegradation and bioremediation. Environmental Impact Assessment.

### **UNIT IV: MICROBIAL GENETICS**

Methods of genetic transfer – Transformation, Conjugation, Transduction and Sexduction - fine structure analysis of gene. Plasmids and bacteriophage based vectors. DNA and genomic libraries. Microbial fermentation and production of bio-molecules. Waste management & Biogas

### **UNIT V: BIOTECHNOLOGY**

Isolation of DNA and RNA. DNA fingerprinting, Sanger sequencing and NGS. Transgenic animals; Animal cell & Tissue culture – Cell lines – Artificial enzymes – Immobilisation – Cryopreservation - Bioremediation - Genomics in health & agriculture.

### **REFERENCES\***

#### **UNIT I: MOLECULAR BIOLOGY**

1. Dupraw E.J. 1969: Cell and Molecular Biology, Academic press, Oxford & IBH.
2. Kavitha B Ahluwalia 1991: Genetics – Wiley Eastern Ltd., New Delhi.
3. Beyer, A.L. *et al.* 1979: Molecular genetics, part III: Chromosome structure (ed) Taylor, J.H. Academic Press, New York.
4. Freifelder, D-1987: Molecular Biology 2<sup>nd</sup> ed. Jones & Bartlett, Publ. Boston.

#### **UNIT II: IMMUNOLOGY**

1. Capeuter, P.L. 1975, Immunology and serology 3<sup>rd</sup> ed. W.B. Sawnders Co. Philadelphia.
2. Bellanti, J.A. 1971: Immunology, W.B. Sawnders Co. Philadelphia.
3. Eisen., H.N. 1973: Immunology, Harper and Row publishers, Inc., Hagerstown, Maryland.
4. Dutcherlony, O. 1968: Hand Book of Immunodiffusion and Immuno electrophoresis. Ann. Arbor science publishers, Ann. Arbor Michigan.
5. Power, C.B. and H.T. Daginawala 1990; General Microbiology, Vol. I and III Himalaya Publishing House, New Delhi.

#### **UNIT III: ENVIRONMENTAL POLLUTION**

1. Bernard J. Nebel: 1987: Environmental Science. The way world works 2<sup>nd</sup> ed. Prentice Hall Inc. Englewood, Cliffee, New Jersey.
2. Smith, R.L. 1977: Elements Ecology and field biology, Harper and Row publications, New York.
3. Monney H.A. and M. Goddon – 1983: Disturbance and ecosystems. Springer Verlag, New York.
4. Moran, J.M. Moran, M.D. and J.H. Wiersma 1980: Introduction to Environmental Science, H.W. Freeman and Co. Sanfrancisco, U.S.A.

**BHARATHIAR UNIVERSITY : COIMBATORE – 46**

**M.Phil. / Ph.D. - CORPORATE SECRETARYSHIP**

**PART – I - SYLLABUS**

**(For the candidates admitted from the academic year 2018-19 onwards)**

**PAPER I: METHODS OF RESEARCH**

**Unit-1: Meaning types and process of research:**

Meaning purpose types of research Pure Applied Historical Analytical.  
Descriptive and experimental- significance of research in social sciences.

**Unit-2: Planning research:**

Research problem – identification – selection and formulation of research problem –  
Review of literature in the field of corporate management – Hypothesis – Meaning – Sources of  
Hypothesis – Formulation and testing – Research design – Factors affecting research design –  
Evaluation of research design.

**Sample Design:**

Census method and sampling method for investigation – Advantages and disadvantages of sampling –  
principle of sampling – essential of good sampling – methods of sampling – probability and non-  
probability sampling method – selection of a sample – factors affecting the size of the sample –  
based sample – sampling and non-sampling errors.

**Unit 3: Sources and collection of data:**

Sources of data – primary and secondary data – models of data collection – analytical method – case study –  
observation – survey method – interview – effective interview techniques – limitations of interview –  
schedule – its meanings and kinds – essential of good schedule –  
procedure for the formulation of a schedule – Questionnaire – Meaning and types –  
format of a good Questionnaire – Factors affecting the response to a Questionnaire –  
advantages and limitations of schedules and questionnaires presenting and its importance.

**Unit 4: Processing and analyzing of data;**

Meaning – importance – process of data analysis – editing – coding – tabulation – diagrams –  
the process of interpretation – guidelines for making valid interpretation – scaling techniques – meaning –  
importance – methods of their construction.

**Unit 5: Report Writing:**

Role and types of reports – contents of research report – steps involved in drafting reports –  
principles of good report writing – referencing – criteria for evaluating research report – research findings.

**Reference:**

1. Goode & Had - Methods of Social Research, McGraw Hill
2. C.R. Kothari - Research Methodology - Methods and Techniques - New age International Publishers
3. Murdick - Business Research Concept and Practice

**BHARATHIAR UNIVERSITY, COIMBATORE – 641 046**  
**M.Phil./Ph.D. - LIBRARY AND INFORMATION SCIENCE**

**PART - I SYLLABUS**

**(For the candidates admitted from the academic year 2018-19 onwards)**

<b>Subject Code</b>	<b>Papers</b>	<b>Name of the Subjects</b>
18LISRC01	PAPER: I	<b>RESEARCH METHODS IN LIBRARY AND INFORMATION SCIENCE</b>
18LISRC02	PAPER: II	EMERGING TRENDS IN LIBRARY AND INFORMATION SCIENCE
	PAPER: III	SPECIAL PAPERS
18LISRS01		BIBLIOMETRICS AND SCIENTOMETRICS
18LISRS02		USERS STUDIES
18LISRS03		INFORMATION COMMUNICATION TECHNOLOGY APPLICATION IN LIBRARY AND INFORMATION SCIENCE

**PAPER: I RESEARCH METHODS IN LIBRARY AND INFORMATION SCIENCE**

**Subject Code : 18LISRC01**

**Objectives:**

- To identify appropriate research topics
- To select and define appropriate research problem and parameters , and
- To write a research report and thesis

**Unit – I Basic of Research**

Research : Concept, Need & Purpose, Characteristics - Types – Pure and Applied, Action and Inter Disciplinary Research – Historical – Case Study – Experimental etc., - Logic and Scientific method, Literature Search and Review of Literature.

**Unit – II Research Design**

Research Design: Definition, Types and Characteristics, – Identification, Selection and Formulation of a Research Methods and Research Problem, Formulation of Objectives and Hypothesis.

**Unit - III Data Collection Methods**

Data Collection – Definition, Types and Relevance —Sampling –Data Sources –Primary, Secondary and Tertiary Data; Data Collection Methods – Questionnaire / Schedule, Observation, Survey etc.,

**Unit – IV Data Analysis**

Data Analysis : - Data Processing, Analysis and Interpretation– Statistical Tools and Techniques –Measure of Central Tendency, Frequency Distribution, Regression and Correlation; Testing of Hypothesis – ANOVA, Chi-Square and t Test etc., and Statistical packages SPSS etc.

**Unit – V Report Writing**

Research Report Writing – Types, Structure and Presentation – Article, Thesis and Dissertation,– Style Manual – APA, MLA – Application of IT in Research.

**Select Text & References :**

- 1.Busha,C.H. (1990). Research Methods in Librarianship. New York: Academic Press
- 2.Slater, M Ed.(1990). Research Methods in Library and Information Science. London: LAP
- 3.Young, Pauline. (1982). Scientific Social Surveys and Research. New York: PHI
- 4.Kothari, C.(1995). Methodology. New Delhi: Eastern Wiley
- 5.Goswami,K (1995). Research Methodology in LIS. New Delhi: Commonwealth,
- 6.Krishna Kumar.(1999). Research Methods in LIS. New Delhi: Har-Anand Publ.