



## **Inclusion of research ethics in the research methodology**

### **Course work**

The University is at the forefront of higher education in India by balancing its commitment to academic excellence with emphasis on pursuit of ethical practice in academic writing CSJMU has well defined syllabus in different Ph.D. Programme which include research Methodology in their course work. In line with this the list syllabus, programme wise is included here:

# **RESEARCH METHODOLOGY -A**

**FOR**  
**AGRICULTURAL ECONOMICS**  
**AGRICULTURE ENTOMOLOGY**  
**AGRONOMY**  
**BIOCHEMISTRY**  
**BIOTECHNOLOGY**  
**BOTANY**  
**CHEMICAL ENGINEERING**  
**CHEMISTRY**  
**COMPUTER APPLICATION**  
**COMPUTER SCIENCE & ENGINEERING**  
**ELECTRONICS & COMMUNICATION**  
**ENGINEERING**  
**GENETICS & PLANT BREEDING**  
**HORTICULTURE**  
**LIFE SCIENCES**  
**MATHEMATICS**  
**MEDICAL BIOCHEMISTRY**  
**MEDICAL LABORATORY TECHNOLOGY**  
**MICROBIOLOGY**  
**PHARMACY**  
**PHYSICS**  
**PHYSIOTHERAPY**  
**PLANT PATHOLOGY**  
**SOIL CONSERVATION**  
**SOIL SCIENCE & AGRICULTURE CHEMISTRY**  
**ZOOLOGY**

# Detailed Syllabus

**Paper I: Research Methodology (Objectives, Hypothesis, Report writing, and Thesis writing), Quantitative methods, Computer Applications, Research ethics and reviewing of published research in the relevant field and other techniques/methods, specific for the broad subject/area:**

## **1. Foundation of Research**

What is Research? Objectives of Research, Scientific Research, Research and Theory, Conceptual and Theoretical Models, Importance of research methodology in scientific research

## **2. Types and Methods of Research**

Classification of Research, Pure and applied Research, Exploring or Formulative Research, Descriptive Research, Diagnostic Research/Study, Evaluation of Research/Studies, Action Research, Experimental Research.

## **3. Literature Survey and Problem Definition**

Need for Reviewing Literature, what to review and for what purpose, Literature Search Procedure, Sources of Literature, Planning of Review work, Note Taking, Libraries and Documentation.

## **4. Planning of Research**

Selection of a Problem for Research, Formulation of the Selected Problems, Hypothesis formation, Measurements, Research Design/Plan.

## **5. Sampling**

Sampling Methods, Choice of sampling methods, Sample size, Sampling and Non-Sampling errors, Estimation of Population Proportion and Population Mean, Estimation of Standard Error and Confidence Interval.

## **6. Methods of Data Collection**

Meaning and Importance of Data, Design of Experiments, Experimentation, Sources of Data, Methods of Collecting Primary Data, Observation Methods, Experimentation, Design of Experiments, Simulation.

## **7. Processing of Data**

Editing, Classification and Coding, Transcription, Tabulation, and Graphical Representation, Measures of Relationship, Simple Regression Analysis, Multiple Correlation and Regression, Partial Correlation, Introduction to Statistical Software: MINITAB.

## **8. Statistical Analysis of Data**

Statistical Analysis, Measures of Central Tendency, Measures of Dispersion, Measures of Association/Relationship, Probability distributions: Binomial, Poisson, Uniform, Normal and Exponential, Hypothesis Testing, Confidence Interval, Test of Significance, Comparison of Two Proportions, Comparison of Means (z test, t test, two sample t test, paired-t test), ANOVA, Non-parametric Methods.

## **9. Report Writing**

Types of Reports, Planning of Report Writing, Research Report Format, Principles of Writing, Documentation, Data and Data Analysis Reporting in a Thesis, Writing of Report, Typing of Report, Briefing.

## **10. Fundamentals of Computer**

Computer Fundamentals, Hardware and Software, Different Operating Systems, Application programming Language concepts.

## **11. Word Processing**

Introduction to word processing, MS-Word, creation of files in folders, Save Documents as files, Print, Formatting, Insert Page Layout, Reference (citation and bibliography), Review (comments, tracking compare), Converting to PDF, Writing Scientific Documents with latex, Graphics and visualization, Gnu plot, Introduction to other useful software tools e.g. Mathematics and Mat lab etc.

## **12. Spreadsheet Tools**

Introduction to spreadsheet application, Features and functions, Data storing, features for statistical mathematical data analysis, generating chart/graphs and other features, Tools used may be Microsoft Excel, Open Office or Similar tool, Mathematical Computing.

## **13. Presentation Tool**

Introduction to presentation tool, Features and function, creating presentation, Customizing presentation, showing presentation, Tools used may be Microsoft Power Point, Open Office or Similar tools.

## **14. Web Search**

Introduction to internet, Use of internet and search engine like Google, Yahoo etc., Use of internet in Research activities, Submission of paper in Archive Electronic Mail System, Cyber law, working knowledge of Math SciNet, JSTOR, Sodhganga, EBSCOhost and other online journals.

## **Suggested Reference Books for Research Methodology -A**

1. Research Methodology: Methods & Techniques by C.R. Kothari, New Age International Publishers.
2. Statistical Methods for Research Workers by Fisher R.A., Cosmo Publications, New Delhi.
3. Design and Analysis of Experiments by Montgomery D.C. (2001), John Wiley.
4. Research Methodology: A step by step for beginners by Ramjet Kumar, Sage Publication.
5. Mathematical Economics by R.G.D. Allen.
6. Mathematics for Economics by Mehta & Madanami.
7. Quantitative application to Management by Levis and Kirkpatrick.

## **List of Experiments & Assignments:**

1. To write a short note on evaluation of Windows Operating system.
2. To prepare a list of different system and application software with their uses.
3. To prepare a word document of the Ph.D. synopsis with proper formatting.
4. To prepare a word document of 20 references related to your Research work in a standard format.
5. To prepare a worksheet to calculate the salary of employees of your department using MS-Excel.
6. To prepare a chart of any organization to present the production with respect to time using MS-Excel (based on assumed data)
7. To prepare a Power Point presentation of Ph.D. synopsis having Animation, Graphics, Sound etc.
8. To write a short note on the importance of e-journals in research work using internet.
9. To prepare a list of 10 popular websites imparting education with their uses

# **RESEARCH METHODOLOGY -B**

**FOR**  
**BUSINESS MANAGEMENT**  
**COMMERCE**  
**DEFENCE & STRATEGIC STUDIES**  
**DRAWING & PAINTING**  
**ECONOMICS**  
**EDUCATION**  
**EDUCATION TRAINING**  
**GEOGRAPHY**  
**HISTORY**  
**HOME SCIENCE**  
**JOURNALISM & MASS COMMUNICATION**  
**LAW**  
**LIFE LONG LEARNING & EXTENSION**  
**MUSIC**  
**PHILOSOPHY**  
**PHYSICAL EDUCATION/YOGA**  
**POLITICAL SCIENCE**  
**PSYCHOLOGY**  
**SOCIOLOGY**

# Detailed Syllabus

**Paper I: Research Methodology (Objectives, Hypothesis, Report writing, and Thesis writing), Quantitative methods, Computer Applications, Research ethics and reviewing of published research in the relevant field and other techniques/methods, specific for the broad subject/area:**

## **1. Foundations of Research**

- Objectives
- Characteristics of a good research.
- Meaning and Scope
- Limitations

## **2. Types of Research**

- Classification of Research:
  - Qualitative and Quantitative research
  - Basic/Pure and Applied, Evaluation & Action Research
  - Non Experimental Research-Descriptive, Explanatory and Exploratory
  - Comparative, Correlational, Surveys, Ex-post Facto
  - Experimental research- True, Quasi, Single Subject research
  - Research Process and Design.

## **3. Review of Literature**

- Need and Significance of Reviewing Literature
- Literature Search procedure:
  - Sources of Literature
  - Planning of Review work

## **4. Planning of Research**

- Selection of Research Problem
- Hypothesis Formation
- Research Variables: Types and Control

## **5. Sampling**

- Population and Sample
- Sampling Techniques
- Sampling and Non-Sampling Errors

## **6. Tools and Methods of data collection**

- Meaning and Importance of Data
- Sources of Data-Primary and Secondary
- Construction of a tool for data collection.
- Methods of Collecting Data using following tools:
  - Observation Method
  - Experimentation
  - Interview
  - Panel Method
  - Mail Survey
  - Sociometry
  - Questionnaire Schedule

## **7. Data Analysis (Not Applicable for Music Subject)**

- Editing, Coding and Tabulation of Data
- Measures of Central Tendency
- Measures of Dispersion
- Measures of Association /Relationship
- Regression and Correlation Analysis
- Test of Significance
- Parametric Test and Non Parametric Test

## **8. Documentation and Mechanics of Writing:**

- Research and legal issues
- Originality of Research
- Integrity of the researcher
- Ethical issues in Research
- UGC Regulation on Plagiarism
- Citation format for print and non-print sources
- Paper margin, spacing, heading and titles
- Page numbers
- Spelling, punctuation, italics and abbreviations
- Electronic submission
- Power-point presentation
- Tips for question-answer session:
  - Key concerns and central focus of the thesis under consideration.
  - New venues of further research opened by the thesis under consideration.
- Research Terminology:  
Synopsis, abstract, hypothesis, annotated bibliography, review, review article, citation, peer review, referred publication, archives, call number, corporate author, database, blog, listserv, Boolean operators, full-text search, wiki, etc.
- Preliminary section:  
Cover pages (Front, Back, Side) Dedications, Certificates, Declarations, Acknowledgements, Contents, List of abbreviations, List of Tables & Figures
- Main Body:  
Chapterizations, Documentation Format, Tabulations and Graphical Analysis
- Referencing Style MLA, APA and Chicago
- Bibliography
- Appendices

## **9. Use of Computer Software for Data Analysis and Reporting**

- Computer fundamentals
- Hardware and Software (Operating & Application)
- Software for data Analysis viz SPSS

## **10. Word processing**

- Introduction to word processing
- Ms-Word
  - Creation of files
  - Arrange files in folders
  - Save document as files
  - Print
  - Formatting
  - Insert Page layout
  - Converting to PDF

## **11. Spreadsheet tools**

- Introduction to spreadsheet application
- Features and functions
- Data storing
- Features for statistical mathematical data analysis
- Generating chart/graphs and other features
- Tools used may be Microsoft Excel, Open Office or Similar tool.

## **12. Presentation Tool**

- Introduction to presentation tool
- Features and functions
- Creating presentation, Customizing presentation, Showing presentation
- Tools used may be Microsoft Power Point, Open Office or Similar tool.

## **13. Web Search**

- Introduction to internet
- Use of internet and search engine like Google, Yahoo etc.
- Using advance search techniques: JSTOR and Other online journals.
- Submission of Paper in Archive Electronic Mail System.
- Sodhganga, EBSCOhost

## **List of Assignments**

### **Research:**

To critically review a research paper/Ph.D. thesis and to identify research problems along with its need and importance of respective area of interest.

### **Computer application:**

To prepare a word document of the Ph.D. synopsis and to make a power point presentation on it.

## **Suggested reference Books for Research Methodology - B**

1. Social science Research principles method and practices by Anol Bhattacharjee
2. Qualitative enquiry and Research design by John W Chres Well Chery and Poth
3. Constructing grounded theory A practical guide Charmas K. (2006)
4. Research methodology, methods and techniques by C.R. Kothari
5. Research Methodology handbook by R P Mishra
6. Research Methodology and scientific writing by C .George Thomas.
7. Research Methodology and applied statistics by D. N. Sansanwal.
8. Research Methods Foundations of Behavioural Research. Kerlinger
9. Research Methodology by S Sachdeva
10. Scientific Social Surveys and Research by PV Young
11. Theory and Practice in Social Research Dr. Hansraj



# **RESEARCH METHODOLOGY -C**

**FOR  
ENGLISH LITERATURE  
HINDI LITERATURE  
SANSKRIT  
URDU**

**PRE PhD COURSEWORK**  
**C.S.J.M.UNIVERSITY,KANPUR**  
**RESEARCH METHODOLOGY**  
**SYLLABUS**  
**LANGUAGE AND LITERATURE**

**UNIT – 1 FOUNDATION OF RESEARCH**

- Objectives
- Characteristics of a good research
- Meaning and scope
- Limitations

**UNIT – 2 TYPES OF RESEARCH**

- Classification of research
  - Qualitative and quantitative research
  - Basic/pure and applied research, Evaluation and action research
  - Non-experimental research – Descriptive, Explanatory, Exploratory, Comparative, Correlational, Surveys, Ex post facto
  - Experimental research – True, Quasi, Single subject research process and design

**UNIT – 3 REVIEW OF LITERATURE**

- Need and significance Of reviewing literature
- Literature search procedure
- Sources of literature
- Planning of review work

**UNIT – 4 PLANNING OF RESEARCH**

- Selection of research problem
- Hypothesis formation
- Research Variables : types and control

## **UNIT – 5 SAMPLING**

- Population and sample
- Sampling techniques
- Sampling and non sampling errors

## **UNIT – 6 TEXTUAL CRITICISM**

- Sources of text
- Determination of text
- Principles

## **UNIT -7 LANGUAGE RESEARCH**

- Introduction
- Types of language research
- Methodology
- Techniques : survey etc.

## **UNIT – 8 DOCUMENTATION AND MECHANICS OF WRITING**

- Research and legal issues
- Originality of research
- Integrity of researcher
- Ethical issues in research
- UGC regulation on plagiarism
- Citation format for print and non print resources
- Paper margin, spacing , headings and titles
- Page numbers
- Spelling, punctuation, italics and abbreviations
- Electronic submission
- PowerPoint presentation
- Tips for question-answer sessions
- Research Terminology
- Preliminary session
- Main body
- Bibliography
- Appendices

## UNIT – 9 WORD PROCESSING

- Introduction to word processing
- MS word

## UNIT – 10 PRESENTATION TOOLS

- Introduction to presentation tools
- Features and functions
- Creating presentation, customizing presentation, Showing presentation
- Tools may be used microsoft powerpoint, Open office and similar tools

## UNIT -11 WEB SEARCH

- Introduction to internet
- Use of internet and search engine like google, yahoo etc
- Use of advance search techniques JSOTR and other online journals
- Submission of paper on archive electronic mail system

भाषा की शोध प्रविधि की संदर्भ पुस्तकें।

1. हिंदी अनुसंधान - पारसनाथ सिंह
2. शोध प्रविधि - डॉक्टर विनय मोहन शर्मा
3. शोध प्रविधि - डॉ मधु खराटे
4. अनुसंधान की प्रक्रिया - डॉक्टर सावित्री सिन्हा
5. शोध प्रविधि - डॉक्टर एनके शर्मा
6. अनुसंधान और आलोचना - डॉ नगेंद्र, नेशनल पब्लिशिंग हाउस, दिल्ली
7. अनुसंधान प्रविधि सिद्धांत और प्रक्रिया - एसएन गणेशन
8. शोध प्रविधि - हरीश कुमार खत्री, कैलाश पुस्तक सदन, भोपाल
9. रिसर्च मेथाडोलॉजी - लक्ष्मीनारायण कोली, वाई के पब्लिकेशन, आगरा
10. शोध कार्य प्रणाली - रंजीत कुमार, एस ए जी ई
11. शोध और समीक्षा - डॉ परमेश्वरी लाल गुप्त, विश्वविद्यालय प्रकाशन, वाराणसी
12. शैक्षिक अनुसंधान की कार्यप्रणाली - लोकेश कॉल, विकास प्रकाशन
13. Research Methods by Ram Ahuja
14. Research Methodology - C.R.Kothari, New Age PublicationLtd

### Suggested Readings:

- Allison, B. *The Students' Guide to Preparing Dissertations and Thesis*. London: Kogan Page, 1997.
- Altick, Richard D. and John J. Fenstermaker. *The Art of Literary Research* New York: Norton, 1993.
- Berg, B. L. *Qualitative Research Methods for Social Sciences*, Allyn & Bacon\* 2001.
- Booth, W.C., Colomb, G.G. & Williams, J. M. *The Craft of Research*. Chicago: The University of Chicago Press, 2003.
- Burton, S. & Steane, *Surviving Your Thesis*. London: Routledge, 2004.
- Comer, Douglas E., *The Internet Book*. New Delhi, PHI Learning Private Limited, 2009.
- George, Darren & Mallery Paul, *SPSS Windows Step by Step: A Simple Guide and Reference 17.0 Update*. Delhi: Allyn & Bacon, 2010.
- Gibaldi, Joseph. *MLA Handbook for Writers of Research Papers*. 7<sup>th</sup> ed. New Delhi: East-West Press, 2009.
- Gray, C. & Malins, J. *Visualising Research: A Guide to the Research Papers in Art and Design\** England: Ashgate Publishing Limited, 2004.
- Kothari, C.R. *Research Methodology: Methods and Techniques*. New Delhi: New Age International Ltd., 1985.
- Mauch, J.E. & Park, N. *Guide to the Successful Thesis and Dissertation: A Handbook for students and Faculty*. New York: Marcel Dekker Inc., 2003.
- Rahim, F. Abdul. *Thesis Writing: A Manual for Researchers*. New Delhi: New Age International Pvt Ltd., 1996.
- Ritchie, J. & Lewis, J. (eds.) *Qualitative Research Practice: A Guide for Social Science Students and Researchers*. London: Sage Publications, 2003.
- Turbin, Kate L. *A Manual for Writers of Term Papers, Theses and Dissertations* Chicago, Chicago University Press, 1996.
- Wayne, C. Booth, Gregory G. Colomb, Joseph, M. Williams and William C. Booth. *The Craft of Research: From Planning to Reporting*. Chicago: Chicago University Press, 2008.
- YadaVj D, S. *Foundation of Information Technology* New Delhi, New Age International (p) Limited, Publishers, 2008.
- Allison, B. *The Students' Guide to Preparing Dissertation and Theses*. London: Kogan Page, 1997. Print
- Altick, Richard D. and John J. Fenstermaker. *The Art of Literary Research*. 4<sup>th</sup> ed. New Delhi: East-West Press, 2009.
- Gibaldi, Joseph. *MLA Handbook for Writers of Research Papers*. 7<sup>th</sup> ed. New Delhi: East-West Press, 2009.
- Kothari, C.R. *Research Methodology. Methods and Techniques*. New Delhi: New Age International Ltd, 1985.
- Rahim, F. Abdul. *Thesis Writing: A Manual for Researchers*. New Delhi: New Age International Pvt Ltd, 1996.
- Turbin, Kate. *A Manual for Writers of Term Papers, Theses and Dissertation*. 6<sup>th</sup> ed. Chicago: Chicago UP, 1996.
- Wayne C. Booth, Gregory G. Colomb, Joseph M. Williams and William C. Booth. *The Craft of Research: From Planning to Reporting*. Chicago: Chicago University Press, 2008.

# AGRICULTURAL ECONOMICS

# **Syllabus for Pre-Ph.D. Course Work**

## **AGRICULTURAL ECONOMICS**

### **Paper II: Advance level theory and Research Methods**

#### **PREAMBLE**

The main objective of this paper is to impart knowledge on advanced economic theory, production economics, agricultural marketing, agricultural finance and project management, econometrics. The course will also in a comprehensive way help the research student.

**UNIT 1:** Economic theory: Indifference curve- nature, marginal rate of substitution, properties - Consumer's Surplus- Elasticity of demand-measurement of elasticity, – Perfect competition – Monopoly, monopolistic competition and oligopoly- Theory of consumption function.

**UNIT 2:** Production economics: Production functions, components, assumptions, properties and their economic interpretation- nature, properties, limitations, estimation and interpretation linear, Spillman, Cobb Douglas, quadratic, power functional forms, Principle of cost curve- Cost concept and their measurement- –measurement Yield gaps analysis – concepts and measurement- nature and sources of risk, coping strategies.

**UNIT 3:** Agricultural marketing: Importance of market analysis in the agricultural system- types of marketing advantages and disadvantages – estimation of marketing cost, marketing margin, marketing efficiency- study of marketing channel, market functionaries, marketing functions and price spread.

**UNIT 4:** Agricultural finance and project management: Role and Importance of Agricultural Finance, The concept of 3 R's, and 3 C's of credit, Preparation of financial statements - Balance Sheet, Cash Flow Statement and Profit and Loss Account. Project Appraisal techniques - Undiscounted measures. Time value of money- Use of discounted measures - B-C ratio, NPV and IRR.

**UNIT 5:** Econometrics: Review of classical regression model- Ordinary least squares- Estimation of multiple regression model- Testing and Managing multicollinearity, heteroscedasticity and autocorrelation.

#### **Basic Reading List:**

1. Devitt K.K. Modern economic theory. Sultan Chand & company.
2. Sankayan PL. Introduction to Farm Management. Tata Mc Graw Hill.
3. Singhal AK. Agricultural Marketing in India. Annual Publication. New Delhi.
4. Reddy SS. And Ram PR. Agricultural Finance and Management. Oxford & IBH Publishing Company, New Delhi.
5. Koutsoyianis A. Theory of Econometrics. Barner and Nobel.

# **BOTANY**



## **Paper II: Advance level theory and Research Methods**

### **Experimental /Instrumental Techniques:**

- i) Micrometry, Centrifugation techniques, Chromatographic techniques, Spectroscopic techniques, Microtomy and slide preparation.
- ii) Preparation of standard solutions: Molar, Molal, Normal and percent (%) solutions. pH of solutions, role of buffers and their preparation.
- iii) Isolation and Culture of algae - General requirement, common media such as, Knop's (Modified) medium, Pringsheim's medium (1930), Czurdas's medium, Chu's (1942) No.10 medium, Modified Chu's 10 medium, Bold's basal medium (1963), Beijerinck's (1898) medium, Allen and Arnon's Medium, Modified ASM-1 medium, Pringsheim's biphasic soil water medium, Isolation of algae, Bacteria free cultures, Continuous cultures, Synchronous culture and mass culture.
- iv) Isolation and culture of fungi from air, water and soil- general requirement, Media, Screening of fungi for production of antibiotics, organic acids and enzymes.
- v) Cell and tissue culture in plants, totipotency, Callus culture, Micropropagation, Embryo culture, Secondary metabolites
- vi) Physicochemical properties and analysis of water and effluents
- vii) Hybridization and selection in self and cross pollination crops, mass and pure line selection, pedigree and bulk methods applied in improvement of crops.
- viii) Experimental taxonomic procedure: comparative morphology- shape and size of leaf, stipule, bract, bracteole, calyx, corolla, morphology of stamen and ovary; vessel variation, stomatal variation, trichomes, storage protein bands, phenolics and alkaloids, saponins.
- ix) Electrophoresis: Agarose gel, Native and SDS-PAGE, 2D-Gel Electrophoresis, Isoelectric focusing.
- x) Microscope: Light microscope, Fluorescence microscope, Phase contrast microscope, Electron Microscope (SEM, TEM and STEM)
- xi) X-Ray Crystallography.
- xii) Principles and applications of radioactive tracer technique in research.
- xiii) Qualitative and Quantitative study of Biodiversity.
- xiv) Environmental pollution- Air, Water and Soil
- xv) Palynology-Structural and Functional
- xvi) Ethnobotany- Modern and its place in modern system of medicine
- xvii) Stress Physiology

### **2. International code and Botanical nomenclature:**

Principles, major rules, revisions and recommendations, effective and valid publications, typification, rejection of names of taxa, starting date point, priority and authority.

### **Recommended Books:**

1. Naik, V.N. (1985) Taxonomy of Angiosperms. Tata McGraw-Hill Co. New Delhi, India
2. Mondal, A.K. (2005) Advanced Plant Taxonomy. New Central Book Agency, Kolkata, India.
3. Sivarajan, V.V. (1985) Introduction to principles of Plant Taxonomy. Oxford & IBH Publishing Co., New Delhi, India.
4. Aneja, K.R. (2004) Experiments in Microbiology, Plant Pathology and Biotechnology (4<sup>th</sup> Ed.), New Age International Publishers, New Delhi, India.

5. Dwivedi, J.N. and R.B. Singh (1990) Essentials of Plant Techniques. Scientific Publishers, Jodhpur, India.
6. Purohit, S.S. (1999) Biotechnology: Fundamental and Applications, Agrobios, India.
7. Razdan, M.K. (1995) An Introduction to Plant Tissue Culture. Oxford and IBH publishing co, New Delhi, India.
8. Trivedi, R.R. and Goel D.K. (1984) Chemical and Biological Methods for water Pollution studies, Environmental Publication, Karad (MS), India.
9. Gupta, P.K. (2007) Cytogenetics. Rastogi Publishers, Meerut, India.
10. Verma, P.S. and V.K. Agrawal (2004 ) Cell Biology, Genetics, Molecular Biology and Ecology. S. Chand and Co., New Delhi, India.
11. Abbosi, S.A. (1958) Water Quality Sampling and Analysis. Discovery Publishing House, New Delhi, India.
12. APH (1975) Standard Methods for Examination of Water and Waste Water (14<sup>th</sup> Ed.) American Public Health Association, New York, USA.
13. Trivedi, R.C. (2001) Algal Biotechnology. Pointer Publisher, Jaipur, India
14. Bhojwani, S.S. (1990) Plant Tissue Culture: Applications and Limitations, Elsevier Science Publishers, New York, USA.
15. Fahn, A. (1982) Plant Anatomy (3rd Ed.) Pergamum Press, New York, USA.
16. Pandey, B.P. (2007) Plant Anatomy. S. Chand and Co. New Delhi, India.

# **BUSINESS MANAGEMENT**

## **Paper II: Advance level theory and Research Methods**

### **Contemporary Issues in Management**

Trends and developments in Economic, political, social, legal and technological environment and their impact on society and business.

Managerial Decision making, problems due to information asymmetry, adverse selection and moral hazard and their resulting effects.

Management of creativity and innovation, managing change in organizations, issues in performance management.

Introduction to E-business and E-commerce, issues in technology transformation, Emerging E-business models, security issues in digital environment.

Sustainability issues and models of sustainable development.

Strategic Analysis models- SWOT, PLC, value chain, analysis of competition, Drivers of competitive advantage of nations/organizations.

Review of selected assigned research papers or management best sellers to provide exposure to current issues and practices in management/management research.

#### **Recommended Books for Review**

1. Contemporary Issues in Management-Lindsay Hamilton etal
2. HBR's 10 must Reads-The Essentials
3. The Mind of the Strategist- Kenichi Ohmae
4. Harvard Business Reviews on Strategies for Growth
5. In Search of Excellence- Thomas J. Peters and Robert H. Waterman
6. The World is Flat- Thomas L. Freidman
7. Jugad Innovation - Navi Radjou etal
8. Zero to One - Peter Thiel
9. The Knowing Doing Gap- Jeffrey Pfeffer and Robert Sutton
10. Cracking the Value Code -Richard Boulton

# CHEMISTRY

## Paper II: Advance level theory and Research Methods

### Unit I

Thermodynamic and Statistical Mechanics

Ideal solution and Non-ideal Solutions, Chemical Potential, Partial Quantities, Regular Solution Theory, Thermodynamic of Polymer Solution, Flory and Mayer-McMillan Solution Theory, Partition Function and Thermodynamic Properties Quantum Statistic, Application to equilibrium constant and Conduction in Metals, Derivation of plank Equation

### Unit II

Kinetics of Reaction, Fast Reaction, Reaction in Solution, Photochemistry, Surface Reaction, Electrode at Interface, Electrodynamics

### Unit III

- a) Chirality in Transition Metal Chemistry, Organotransition compounds, -18 and -16 electron rules.
- b) Bioinorganic Chemistry- Role of Metal Ions in Biology, Biological Selection of elements Viz. Co, Ni, Cu, Zn, enzymes, metal imbalances, diseases and toxicity.

### Unit IV

- a) Supramolecular Chemistry- Host Guest Chemistry, Cation, Anion, Neutral guest Binding, Physicochemical methods of investigation of supramolecular associations.
- b) ESR of free radicals and Metal Complexes.

### Unit V

Designing in Organic Synthesis by Disconnection Approaches (By using Modern Synthetic Reagents and Catalyst)

### Unit VI

Structure Illustration of organic Compounds by Using UV, IR,  $^1\text{H}$ -NMR,  $^{13}\text{C}$ -NMR and Mass Spectroscopic Techniques

### Unit VII

Introduction to Analytical Separations Extraction, Ion Exchange Chromatography, Gas Chromatography, HPLC (method development and validation), Electrophoresis, Supercritical Fluid Chromatography.

### Unit VIII

Hyphenated Techniques GC-MS-MS, LC-MS-MS, Modern Instrumentation and Fragmentation Pattern. Current Research trends in chemistry.

### References:

- 1 Physical Chemistry - P.W. Atkins
2. Chemical Kinetics - K.J. Laidler
3. Modern Electrochemistry Vol-I, II and III – J.O.M. Bockers and A.K.N. Reddy
4. Analytical Chemistry - D.A. Skoog, D.M. West, F.J. Holler, S.J.R. Crouch
5. Analytical Chemistry - Day and Underwood
6. Physical Methods for Chemists - R.S. Drago
7. Chirality in Transition Metal Chemistry - Hani Amouri and Michel G. Cruselle
8. Principles of Bioinorganic Chemistry- S.J. Lippard
9. Supramolecular Chemistry - Jonathan W. Steed, J. L. Atwood
10. Supramolecular Chemistry - Jean- Marie Lehn
11. Spectrometry identification of organic compounds by T.C. Morrill, R.S. Silverstein, G.C. Bessler 4<sup>th</sup> Edition
12. Organic synthesis - *The disconnection approach* by Stuart Warren

## COMMERCE

## **Paper II: Advance level theory and Research Methods**

### **1. ORGANISATION AND MANAGEMENT**

#### **Management- An Overview**

##### **Concept of Management, Management and Administration:**

A Terminological Conflict; Importance of Management, Nature of Management. Professionalism in Management in India, Application of Management Theories in Practice. Role of Management. Principles of Effective Management.

Management functions, Nature of Management Functions, Function at Various Levels of Management - Top Management functions, Functions of Chief Executive, Middle Management Supervisory Management Functions. Functional Areas of Management, Management Skills, Top Management Skills.

##### **Communication and Control**

Communication- Importance, Types of Communication, Lines of Communication, Importance of effective communication. Reporting System and Report Writing. Control Functions- Need for Control, Importance of Control. Methods and Techniques of Control- Inventory Control, Receivables Control.

##### **Human Resource Management**

Meaning and Objectives; Human Resource Planning. Human Resource Development- Concept and Importance. HRD tools, Training objective and Training Methods.

### **2. FINANCIAL ACCOUNTANCY**

Elementary Study of Accounting Standards- Introduction, Objectives, Advantages, and Applicability of Accounting Standards.

#### **Elementary Study of**

- i. AS - 1- Disclosure of Accounting Policies
- ii. AS -2 –Valuation of Inventories
- iii. AS-6 –Depreciation Accounting
- iv. AS -10 - Accounting for Fixed Assets
- v. AS-4- Contingencies & Event Occurring after the Balance Sheet dates

#### **Developments in Accounting**

##### **Elementary study of**

Human Resources Accounting, Inflation Accounting, Value Added Statement Corporate social reporting, Interim reporting.

##### **Accounting for Amalgamation**

##### **Amalgamation of Companies**

Concepts of Amalgamation, Types of Amalgamation, Amalgamation in the nature of Merger and Amalgamation in nature of Purchase.

##### **Determination of Purchase Consideration**

Accounting for Amalgamation as per AS 14.



### **3. COST AND MANAGEMENT ACCOUNTANCY**

**Cost Accountancy-** Cost Concepts and Classification of Cost. Costing, Cost Accounting and Cost Accountancy. Objectives, Scope, Advantages and Limitations of Cost Accountancy. Features of a Good Cost Accounting System, Essentials for Installing a Cost Accounting System. Relationship between Cost Accounting, Financial Accounting, and Management Accounting.

#### **Marginal Costing & Break – Even -Analysis**

Marginal Costing – Concepts of Marginal, Advantages and Limitations of Marginal costing. Marginal Costing Vs. Absorption Costing. Basic Equation of Marginal Costing, Role of and Importance of Contribution.

Cost-Volume-Profit Analysis- Uses and Importance, Break-Even Chart. Calculation of Break-Even point, P/V Ratio, Margin of safety, Indifference Point. Key Factor Analysis. Application of the Technique in Different Decision Making Situations.

#### **Budget, Budgeting and Budgetary Control**

Concept of Budget, Classification of Budget, Fixed, Flexible and Master Budget. Budgetary Control- Concept, Importance, and Limitations. Zero Based Budgeting (ZBB)- Nature, Procedure, Advantages and Limitation.

### **4. FINANCIAL MANAGEMENT**

#### **Analysis and Interpretations of Financial Statements**

Financial Statements- Meaning, Types and Nature. Tools of Analysis. Ratio Analysis- Types of Ratios, Uses and Calculations. Understanding Profit Statement and Balance-Sheet, Stock Market Analysis. Mutual Fund Market Study.

#### **Risk- Return Analysis**

Relationship between Risk and Return, Types of Returns, Present Value Concept, Calculating Return on Various investment instruments.

#### **Cost of Capital and Capital Structure**

Cost of Capital- Concept and Importance of Cost of Capital in Capital Budgeting, Types of Cost of Capital, Calculation of different types of cost of Capital. Capital Structure Designing, Impact of Capital Structure on Profitability, Capital Structure Theories. Designing Capital Structure, Overall Cost of Capital Calculations. Leverages- Meaning, Types, Importance and Calculations.

#### **Portfolio Management**

Meaning and Types of Portfolio. Portfolio Management- Theories and Portfolio designing.

### **5. MARKETING MANAGEMENT**

#### **Marketing Concepts and Functions**

Traditional Vs. Modern Concepts, Approaches to Study of Marketing, Functions and Process of Marketing.

## **Issues in Marketing**

Marketing Mix, Product Life Cycle, Product Planning, Concept of P 5. Market Research, Digital Marketing- Methods, Platforms and Problems.

## **Service Marketing**

Service Marketing Vs. Product Marketing, Reasons for Growth of Service Sector in India, Need for Service Marketing, Types and Characteristics of Service Marketing, Obstacles in Service Marketing.

## **International Marketing Practices and Problems**

Characteristics of International Marketing, Domestic Marketing Vs. International Marketing. International Marketing Environment- WTO, Tariff and Non-Tariff Barriers, Problems in International Marketing. Export Documents and Procedure.

## **Reference Books-**

1. Principles and Practice of Management by L. M. Prashad. Published by S. Chand & co., New Delhi.
2. The Discipline of Business Management- by Kamal Bhattacharya. Global India Publications, New Delhi.
3. Personnel and Human Resource Management by P. Subba Rao, Himalaya Publishing House, Mumbai.
4. Financial Accounting & Analysis by Dr. Narendra Ahuja Dr. Varun Dawar. Published by Taxmann India, New Delhi.
5. Corporate Accounting by S. N. Maheshwari, Vikas Publishing House, New Delhi.
6. Advanced Accountancy, Vol. I & II by R. L. Gupta and M. Radhaswami. Sultan Chand & Sons, New Delhi.
7. Accounting Theory by R. K. Lele and Jawahar Lal. Himalaya Publishers, Mumbai.
8. Cost and management Accounting by M. E. Thukaram Rao. Published by New age International Publishers, New Delhi.
9. Cost Accounting by Jawahar Lal. Tata McGraw Hill Publishing Co., New Delhi.
10. Cost and Management Accounting by Ravi M. Kishore. Taxmann India, New Delhi.
11. Financial Management by Dr. Anil Kumar Dhagat. Publisher: Dreamtech Press, New Delhi.
12. Financial Management Ravi M. Kishore. Published by Taxmann India. New Delhi.
13. Financial Management by I. M. Pandey. Published by Vikas Publishing House, New Delhi.
14. Marketing Management by Priyanka Goel. Published by Atlantic Publisher, New Delhi.
15. Kotler on Marketing by Philp Kotler. Published by Simon and Schuster, New York, United States.
16. A Practical Approach to Marketing Management by Kujnish Vashisth. Published by Atlantic Publisher, New Delhi.
17. Services Marketing by Dr. Chetan G. Chaudhari. Success Publications, Pune.

# **DEFENCE & STRATEGIC STUDIES**

## **Paper II: Advance level theory and Research Methods**

### **1. Strategic Studies**

- a. Strategic Thoughts
  - i) Clauswitz
  - ii) Machiavelli
  - iii) Kautilya
- b. Strategic Doctrine
  - i) No First Use
  - ii) Limited War
  - iii) Total war
- c. Nuclear Strategy
  - i) American Strategy
  - ii) Russian Strategy
  - iii) Indian Strategy
  - iv) Pakistan Strategy
  - v) China and Israel Strategy

### **2. India's National Security**

- a) Security Problems of India
  - i) Insurgency in North East
  - ii) Naxalist Movement.
- b) Challenges to India's Security
  - i) Poverty
  - ii) Corruption
  - iii) Regionalism
  - iv) Communalism
  - v) Unemployment.

### **3. Maratha Art of War**

- a) Background in Maharashtra before Emergence of Shivaji.
- b) Strategy & Tactics of Maratha.

#### **4. Indian Armed Forces and Wars with Neighbor**

- a) Wars with Pakistan 1947, 1965, 1971, 1999 and Surgical Strike
- b) War with China 1962
- c) Higher Defence Organisation of India.

#### **5. Global Security**

- a) National Security
- b) New World Order.
- c) World Peace and Security
  - i) WMD (Weapons of Mass Destruction)
  - ii) Missile Defence
  - iii) Land Mines
  - iv) Proliferation of Small Arms
  - v) Migration and Refugees
- d) Environmental Security
  - i) Climate Change
  - ii) Pollution
  - iii) Water Security
- e) Organised Crime
  - i) Terrorism
  - ii) Money Laundering
  - iii) Cyber Crime
  - iv) Human Trafficking

#### **6. International Relations & Security**

- a) Determinants of International relations.
  - i) Power, National power
  - ii) Balance of power, Force
  - iii) Order, Global Order
- b) Diplomacy and Foreign Policy in International Relations
  - i) America, Russia
  - ii) India, Pakistan
  - iii) China, Japan

- c) India's Relations with her Neighbors
  - i) Pakistan, Nepal
  - ii) China, Myanmar
  - iii) Shri Lanka, Bangla Desh

## **7. International Organisation**

- a) U.N.O.
- b) Human Rights
- c) Arms Control and Disarmament

## **8. Defence Economics and Production**

- a) Importance of Defence budget
- b) Defence Budget of India since – 1947
- c) Defence and Development
- d) Issues of Mobilization of Resources during war & peace
- e) D.R.D.O.
- f) Defence Production Industries in India

## **9. Disaster Management and Security**

- a) Disaster Management  
Concept, Objective, Characteristics, Types
- b) Role of Military, Civil and Media in Disaster
- c) Planning and Process of Disaster Management
- d) India's policy for Disaster Management  
National Disaster Council, Framework of Disaster Management,  
Remedies to Disaster Management.

## **10. Unconventional security**

- a) Energy Security.
- b) Food Security

## **References :**

1. Paret Peter (Ed), Makers of Modern Strategy from Mechiavelli to Nuclear Age, Oxford, 1996.
2. Palmer Perkins, International Relations, In Edn, Scientific Book Agency, Calcutta, 1990.
3. Peter Calvocores, World Politics since 1945, Coxman, London, 2000.
4. Gilian Youngs, International Relations in Global Age, Polity Press, London, 1999.
5. Bobbit Philip and Others (ed), US Nuclear Strategy: Aredere, Newyork University Press, Newyork, 1989.
6. Balylis John, Garnet John, Cotemporary Strategy-Theories and Concept, Vol. I, Groom Helm, London, 1987.
7. Ciausewitz, On War (ed) Antol Rapoport, London, 1968.
8. Kangle KB, Kautiyas Arthashastra Bombay University Press, Bombay, 1972.
9. Kadian Rajesh, India and its Army, Vision Publication, Delhi, 1970.
10. Pawel KC, The Indian Army After Independence, 1965.
11. Palit DK, The Lightning Campaign: The Indo Pak War, 1975.
12. Venkteshwaran AL, Defence Organisation in India, India Publication Division, Delhi, 1967.
13. Singh Nagendra. Defence Mechanism of Modern States, India Publication Division, Delhi, 1967.
14. Abyankar M G, Bhartiya Shashtra sena ugarn ani vikas, Pune, 1971.

15. Sinha Amarnath, Bhartiya sena Parmpara aur Swarup, Vol. 1,2 Bihar Hindi Granth Academy, Patna, 1980.
16. Akbar KK, Kargil, Mitali Publication, Delhi, 1999.
17. Juneja VP, Indo Pak War, A New Light Publication, Delhi, 1971-72.
18. Maxwell Neville, India China War, Jaico Publication House, Bombay, 1970.
19. Deopujari MB, Shivaji and the Maratha Art of War,
20. Sarkar Jadunath, Military History of Maratha,
21. Sen SN, Military System of the Maratha,
22. Kern Margaret P Karen A Mingst, International Organisation: The Political Process of Global Governance, Delhi, 2005.
23. Mishra Brijlaxmi, United Nations and Security Challenges in New Millennium. Author Press, Delhi. 2004.
24. Shastri MN, Introduction to Environment, Concept, Murnbai
25. www. World Water Council.Org
26. Human Development Report.
27. Report of International Narco Control.
28. SIPRY, Yearbook.
29. Balan K, The Millennium Thoughts Challenges to Service. Authors Press, Delhi. 2001.
30. Morgenthau Hens, Politics Among Nations. III ed, Scientific Book Agency. Calcutta, 1963.
31. Robert H Allen, Enhancing United Nations. Peace keeping, Chadok F Alger (ed), 'The Future of the UN System: Potential for the Twenty First Century. United Nations University Press, Tokyo, 1998.
32. Singh Jagjit, India: The Six State With Nuclear Weapons, Asean Strategic review 1997-98, IDSA, Delhi, 1998.
33. Singh Jagjit, United Nations Peacekeeping Operation: The Challenges of Change in Regan M S (ed) UN 50 and beyond, Lancer Publication, Delhi, 1996.
34. Paranjpe Shrikant, Samrik Shastra, Continental Prakashan, Pune, 1994.
35. Willium Moore, International Relations in 20th Century, MacMillan, Delhi.
36. Sali ML, India China Border Dispute, Ashish Publishing Corporation, Delhi, 1997.
37. Ghosh PA, Ethnic Conflict in Shri Lanka & Role of TPK, Ashish Publishing Corporation, Delhi, 1998.
38. Raghwan VK, Comprehensive Security in South Asia, Delhi Policy Group, Delhi, 2001.
39. Sundeeji K, Prepare and Perish - A Study of National Security of India, Lancer Publication, Delhi, 1992.
40. Bajaj K.anti and Maffo Amitahh (ed) Securing India: Strategic Thoughts and Practice, Manohar, Delhi, 1996.
41. Thakkar Usha and Kulkarni, India in World Affair Toward 21St Century, Himalaya Publication, Delhi, 1999.
42. John Garnett (Ed), Theories of Peace and Security, Reader Contemporary Strategy, Macmillan Delhi, 1979.
43. Jadhav VY & Patil, Jagtik Surksha, Prashant Publication, Jalgaon, 2005.
44. Jadhav VY, Bharat Ki Rashtriya Surksha, Snehvardhan Publication, Pune, 2011.
45. Annual Report, Ministry of Defence, Govt. of India.
46. Thomas Raju, The Defence of India, A budgetary Perspective and Strategy and lo[itics, Macmillan, Delhi, 1978.
47. Narain Pratap (Ivlaj Ceo), Indian Arms Buzar, Shilpa Publication, Delhi, 1998.
48. Singh Jasjit, India's Defence Spending, Knowledge World, Delhi, 2001.
49. Ron Mathuw, Defence Production in India, ADS Publication, Delhi, 1988.
50. Sapru RK, Environmental Management of Indin (various Vol.). Ashish publishing House. Delhi. 1987.
51. Ghosh Ameya, India's Defence Budget and Expenditure Management. Lancer Pub], Delhi. 1996.
52. Kar HK, Silent Warfare, Manas Publication. Delhi. 2005.
53. Singh Sarthak, Disaster Management, Oxford Book Co.. Delhi, 2010.
54. Trivedi PR, Gurudeep Raj, Encyclopedia of Environmental Science. Abshdeep Publishing House, Delhi, 1992.
55. Agrawal SK, Environment issues and Themes (111 ed), APH Publishing Corporaion, Delhi, 1984.

# **DRAWING & PAINTING**



## **Paper II: Advance level theory and Research Methods**

**Unit I-** Art Technique and Methods, Survey to Art galleries/ Art centers/Museums/ Libraries/Art studios/Artists etc.

**Unit II-** Art History (Indian and Western) and Art criticism/ Data collection, Data analysis, Description on Art-works.

**Unit III** – Art schools/ Traditional and Contemporary Artists/ Contemporary/ New trends of Art practices (Indian and Western).

### **Unit IV- Project**

During the entire course at least one paper published in any reputed journal bearing ISSN Number by the student is desirable.

# ECONOMICS

## **Paper II: Advance level theory and Research Methods**

### **PREAMBLE**

**The main objective of this paper is to include discussion on various exogenous and endogenous factors responsible for India's economic growth in the competitive global era.**

**UNIT 1:** Profile of Indian Economy: Developing economy, Problems concerning human capital, Sectoral composition, Problems of poverty and unemployment.

**UNIT 2:** Agrarian Economy: Green revolution and its impact, Role of technology and prices, Diversification in Rural Economy.

**UNIT 3:** Industrial Economy: Development in different phases, Major issues related to Growth, Productivity, Finance, Infrastructure and Competition.

**UNIT 4:** India's Economic Reforms: Consequences for domestic and external sector, Banking sector reforms.

**UNIT 5:** Foreign trade: Composition, Direction and other issues, Policies and Balance of Payments, Regional trade blocks and India's participation.

**UNIT 6:** India's Public Finance: Tax-Expenditure and Debt Policies, Issues in Federal Finance, Finance Commissions: Vertical and Horizontal imbalance and Federal resource transfer.

### **Basic Reading List:**

1. Ahluwalia, I. J. and I.M.D. Little (Eds.), India's Economic Reforms and Development
2. Bawa, R. S. and P.S. Raikhy (Ed.), Structural Changes in Indian Economy
3. Chakravarty S., Development Planning: The Indian Experience.
4. Dantwala, M. L., Dilemmas of Growth: The Indian Experience
5. Byres, T. J. (Ed.), The Indian Economy: Major Debates Since Independence
6. Ahluwalia, I. J., Industrial Growth in India
7. Rangarajan, C., Indian Economy: Essays on Money and Finance
8. Gupta, S. P., Post-Reform India: Emerging Trends

### **Additional Reading List:**

1. Brahmananda, P. R. and V. R Panchmukhi (Eds.), Development Experience in the Indian Economy.
2. Man, B., India's Economic Policy-Preparing for the Twenty First Century
3. Chelliah, Raja J. and R. Sudarshan, Income, Poverty and Beyond: Human Development in India
4. Alternative Economics Survey (Annual Issue), Daanish Books, New Delhi

EDUCATION  
&  
EDUCATION TRAINING

## **Paper II: Advance level theory and Research Methods**

### **1. Philosophical Foundations of Education**

- Indian Philosophical Thoughts and their practices to education  
Vedant Darshan  
Buddhism and Jainism  
Islam
- Western Philosophical Thoughts and their practices to education  
Idealism  
Realism  
Naturalism  
Pragmatism  
Humanism  
Existentialism  
Marxism

### **2. Sociological Foundations of Education**

- Relationship of Education with Sociology, Politics, Economy, Modernization, Culture, Democracy, Religion.
- Education as a social sub system.
- Education as related to Social Equity and Equality of Educational Opportunities,
- Constraints on Social Change in India.
- Education of the socially and economically disadvantaged sections with special reference to scheduled castes and scheduled tribes, other backward caste, women and rural population.

### **3. Psychological Foundations of Education**

- Motivation and Learning; Theories of Thorndike, Pavlov and Skinner. Maslow's theory of motivation.
- Intelligence; Nature, types and major theories, Measurement of Intelligence.
- Personality-Nature, Definition and types. Personality assessment; Projective and Non- Projective Techniques
- Basic concept of Inclusive Education

### **4. Educational Technology**

- Bloom's Taxonomy of instructional objectives
- Multimedia Approach in teaching and Learning
- Multimedia; concept and meaning- text, graphics, animation, audio, video and their applications.
- Instructional System Design- Designing instructional strategies such as lecture, team teaching, discussion, seminar and tutorials.

### **5. Teacher Education**

- Innovations in Teacher Education- Performance Appraisal of teachers.
- Quality Management in Teacher Education.
- Scenario of Teacher education in India

### **6. Emerging Learning Resources**

- MOOC
- SWAYAM
- OER

### **7. Emerging Research trends and issues in Education**

## **Assignments**

- Review of any one of the Policy document with a view to identify the contribution in the field of Education.
- Preparation and power point presentation on any one of the topic of your choice from above content.

# **ENGLISH LITERATURE**

## **Paper II: Advance level theory and Research Methods**

### **Critical Theories: Study of Seminal Essays**

#### **Text and Reader**

- Roland Barthes. "The Death of the Author", David Lodge ed. *Modern Criticism and Theory: A Reader*. London: Longman, pp. 166-172.

#### **Dialogism**

- Mikhail Bakhtin. "Dostoevsky's Polyphonic Novel and Its Treatment in Critical Literature". Mikhail Bakhtin. *Problems of Dostoevsky's Poetics*. Trans. Caryl Emerson. Manchester: Manchester Univ. Press, pp. 5-46.

#### **Discourse and Power**

- Michel Foucault. "Introduction". (by Paul Robinow) and "What is Enlightenment". Foucault, *The Foucault Reader*. Ed. Paul Robinow, Penguin Books. pp. 3-50.

#### **Frankfurt School**

- Theodor Adorno and Max Horkheimer. "The Culture Industry" Simon During, Ed. *Cultural Studies: A Reader*. Routledge. pp. 31-45.

#### **New Historicism**

- Stephen Greenblatt. "Resonance and Wonder". *Bulletin of the American Academy of Arts and Sciences*, Vol. 43, No. 4 (Jan., 1990), pp. 11-34.

#### **Postmodernism**

- Frederic Jameson. "The Cultural Logic of Late Capitalism." *Postmodernism and the Contemporary Novel: A Reader*. Ed. Bran Nicol, pp. 20-39.

#### **Development of Cultural Studies**

- Ben Agger. "What is Cultural Studies?" *Cultural Studies Critical Theory*. The Palmer Press. pp. 1-24

#### **Theory of Cultural Studies**

- Stuart Hall. "Cultural Studies and Its Theoretical Legacies." *Cultural Studies: Reader*. Ed. Simon During. Routledge. pp. 97-112.

#### **Marxist Theory of Literature**

- Terry Eagleton. "Ideology and its Vicissitudes in Western Marxism from Lukacs to Gramsci." *Mapping Ideology*. ed. Slavoj Zizek. London: Verso. pp. 179-226.

#### **Postcolonial Studies**

- Frantz Fanon. "On National Culture." *The Wretched of the Earth*. Penguin Books, pp. 166-99.

#### **Gender Discourse**

- Judith Butler. 'Subject of Sex/Gender/Desire.' *The Cultural Studies: Reader*. Ed. Simon During. Routledge. pp. 340-353.

#### **Subaltern Studies**

- Gyan Prakash. "Subaltern Studies as Postcolonial Criticism." *The American Historical Review*, Vol. 99, No. 5 (Dec., 1994), pp. 1475-1490.

#### **Indian Theory**

- A.K. Ramanujan. "Is there an Indian Way of Thinking?" *Collected Essays of A.K. Ramanujan*. Ed. Vinay Dharwadkar. Delhi: Oxford University Press 1999 pp. 34- 42.

### **Suggested Readings**

Agger, Ben. *Cultural Studies as Critical Theory*. London: The Palmer Press, 1992.

Barker, Chris. *Cultural Studies: Theory and Practice*. London: Sage, 2011.

Dharwadkar, Vinay, ed. *Collected Essays of A. K. Ramanujan*. Delhi: Oxford University Press, 1999. During, Simon, ed. *The Cultural Studies: Reader*. London: Routledge, 1993.

Fanon, Frantz. *The Wretched of the Earth*. London: Penguin Books, 1963.

Foucault, Michel. *The Foucault Reader*. Ed. Paul Robinow, London: Penguin Books, 1991.

Lodge, David, ed. *Modern Criticism and Theory: A Reader*. London: Longman, 1988. Bulletin of the American Academy of Arts and Sciences, Vol. 43, No. 4 (Jan., 1990), pp. 11-34

Mikhail Bakhtin. *Problems of Dostoevsky's Poetics*. Trans. Caryl Emerson, Manchester: Manchester Univ. Press, 1984.

*The American Historical Review*, Vol. 99, No. 5 (Dec., 1994), pp. 1475-1490.

Nicol, Bran, ed. *Postmodernism and the Contemporary Novel: A Reader*. Edinburg: Edinburg Univ Press, 1992.

Zizek, Slavoj. *Mapping Ideology*. London: Verso, 1994.



# **GENETICS & PLANT BREEDING**

# **Pre-Ph.D Course work Syllabus C.S.J.M. University KANPUR**

## **GENETICS & PLANT BREEDING**

## **Paper II**

### **UNIT I:**

#### **Genetics and Plant breeding:**

Mendelian inheritance. Cell structure and division, Linkage, its detection and estimation. Gene concept, allelism and fine structure of gene. DNA- structure, function, replication and repair. Transcription and translation, Gene regulation in prokaryotes and eukaryotes. Mutation and its types. Crop domestication, Evaluation of crop and centre of diversity. Emergence of scientific Plant breeding. Mode of sexual and asexual reproduction in relation to plant breeding methodology. Apomixes, self incompatibility, male sterility and their uses. Breeding method of self and cross pollinated crops. Breeding method of vegetatively propagated crops. Hybrid breeding. Genetic basis: breeding approaches for biotic (disease and insect) and abiotic (heat, frost, flood, drought, acid and salt) stress. Intellectual property rights (IPR). Plant variety protection and farmers rights act (PPVFR act. 2001).

### **UNIT II**

#### **Breeding of field crops and plant genetic resources:**

Origin, distribution, classification and description of cereals (wheat, rice, maize, sorghum and pearl millet), pulses (pea, chickpea, lentil, soybean, black gram, green gram), oilseed (mustard, groundnut, sunflower), fiber crop (cotton), sugar (sugarcane), fodder (berseem). Plant exploration, Germplasm introduction, exchange, conservation, evaluation and utilization of plant genetic resources conservation. Seed production and seed certification. Systems of variety release and notification. Important quality parameters in various crops.

### **UNIT III**

#### **Cytogenetics of crop plant:**

Cell structure and division. Chromosome structure, function, replication, recombination and crossing over. Structural changes (deletion, duplication, inversion, translocation), numerical changes (haploid, polypoid, aneupoloid) and their utility. Wide hybridization. Genome organization and cytogenetics of important crop species like wheat, rice, maize, Brassica, cotton, potato and sugarcane. Molecular marker (MAS, MARS and MABB) and its significance in biotic and abiotic stress breeding approaches.

### **UNIT IV**

#### **Quantitative and biometrical genetics:**

Quantitative character, multiple inheritance, genetic control of polygenic character. Hardy -Weinberg law. Linkage disequilibrium, genetic load, maternal effect. Variability, heritability, genetic advance. Genotype- environment interaction and stability models. Correlation and path analysis. Diallele and line x tester analysis, combining ability analysis. NC1, NC2, NC3 design. Experimental design (CRD, RBD, LSD, split plot design, augmented design). Measurement of central tendency. Probability theory and and its application in genetics.

### **UNIT V**

#### **Plant biotechnology and genetic engineering:**

Micro-propagation, Somatic hybridization, somaclonal variation in *vitro* mutagenesis. DNA libraries, DNA finger printing, DNA sequencing and recombinant DNA technology. Gene cloning strategies. Genetic transformation and transgenics. Antisense RNA, RNAi and micro RNA techniques in crop improvement. Gene tagging, OTL mapping and marker assisted selection.

# **GEOGRAPHY**

## Paper II: Advance level theory and Research Methods Unit-1:

### RECENT TRENDS IN GEOGRAPHY

Recent Trends in Geography, Geography as a study of spatial organization, Concept of space, Region and basis of regionalisation.

Kuhn's Paradigms in Geography, Areal Differentiation, Spatial & Locational Analysis. Cause and Effect Analysis, Temporal Analysis, Functional and Ecological Analysis.

Postmodernism, Globalization, Behaviouralism in Geography, need and significance of models in Geographical Research.

### Suggested Readings

1. Chorley, R. J. and Haggett, P (eds) (1967): Models in Geography, Methuen, London.(U.K.)
2. Fainstein, Susan S and Compbel, Scot (2002): Readings in Urban Geography (2<sup>nd</sup> Ed.) Blackwell Publishing, Malden, USA. (Social Justice, Postmodernism and the city - David Harugs.)
3. Haggett, P. ( 1965) :Locational Analysis in Human Geography, Edward Arnold, London.(U.K.)
4. Halt- Jenson, Arild (1988 ) : Geography: History of Concepts, Sage Publications, New Delhi.
5. Hartshorn, Richard ( 1939): The Nature of Geography, the Association of American Geographers, USA and Rawat Publications, Jaipur.
6. Hartshorne, R ( 1955): "Exceptionalism in Geography- Re- examined," Annals Association of American Geographers, 45 205 - 44.
7. Hartshorne, R ( 1958): " The Concept of Geography as a Science of Space from Kant and Humboldt to Hettner," Annals Association of American Geographers, 48 (2): 97-108.
8. Hartshorne, Richard (1959): Perspective on Nature of Geography, Rand McNally, Chicago, USA.
9. Harvey, D (1985) : The Urbanization of Capital, Basil Blackwell, Oxford. (U.K)
10. Harvey, D (1989) : The Condition of Post Modernity : An Enquiry into the Origins of Cultural Change, Basil Blackwell, Oxford.(U.K.)
11. Harvey, David (1969): Explanations in Geography, Edward Arnold, London, UK.
12. Harvey, David (1973) : Social Justice and the City, Edward Arnold, London, UK.
13. Hempel, C. G. (1965) :Aspects of Scientific Explanation and Other Essays on the Philosophy of Science, Free Press, New York.
14. Husain Majid ( 2007): Models in Geography, Rawat Publication, Jaipur.
15. Husain, Majid (2001): Evolution of Geographical Thought ( Fourth en.), Rawat Publications, Jaipur.
16. Johnston, R. J. (1985): Geography and Geographers Anglo- American Human Geography Since 1945, Edward Arnold (2nd en.) London,
17. Pect, Richard & Thrift, N. (eds) (1989): New Models in Geography: The Political Economic Perspective, Vol.1, Unwin Hyman, And London.
18. Pect, Richard (ed.)(1977): Radical Geography: Alternative Viewpoints on Contemporary Social Issues, McThuen, London.
19. Singh, L.R. (2008) Fundamentals of Human Geography, Sharda Pustak Bhawan, Allahabad.
20. Soja, Edward W.(1997) : Postmodern Geographies: The Reassertation of Space in Critical Social Theory (Indian en.) Rawat Publications, Jaipur.
21. Unwin, Tim (1992): The Place of Geography Longman Scientific & Technical, New York.

## Unit-2

### REMOTE SENSING AND GIS

Electromagnetic Radiation, Interactions EMR with atmosphere and matter, Remote Sensing Platforms and Sensors, Interpretation of Satellite imageries and Survey of India Toposheets, Application in research.

Development of GIS, Components of GIS, Coordinate Systems, Raster and Vector, Preparation of Thematic Maps, Georeferencing, Creation of Shape Files, On-Screen Digitization of Polygons, Points and Lines and adding Attributes, Map Preparation.

Application of Remote Sensing and GIS in various Geographical Studies.

#### Suggested Readings

1. Burrough, P.A. and McDonnell, R. 1998. Principles of Geographic Information Systems. Oxford University Press, Oxford.
2. Campell, J. B. 2003. Introduction to Remote Sensing. 4<sup>th</sup> ed. Taylor and Francis, London.
3. Chang, K.T. 2003. Introduction to Geographic Information Systems. Tata McGraw Hill Publications Company, New Delhi.
4. Chauniyal, D. D. 2004. Remote Sensing and Geographic Information Systems. in Hindi). Sharda Pustak Bhawan, Allahabad.
5. Demers, M. N. 2000. Fundamentals of Geographic Information Systems. John Wiley and Sons, Singapore.
6. Gautam, N.C. and Raghavswamy, V. 2004. Land Use/ Land Cover and Management Practices in India. B.S. Publications., Hyderabad.
7. Girard, M. C. and Girard, C. M. 2003. Processing of Remote Sensing Data. Oxford and IBH, New Delhi.
8. Goodchild, M.F., Park, B. O. and Steyaert, L. T. (eds.) 1993. Environmental Modelling with GIS. Oxford University Press, Oxford.
9. Heywood, I. 2003. An Introduction to Geographical Information Systems. 2<sup>nd</sup> edition, Pearson Publishing Company, Singapore.
10. Jensen, J.R. 2004. Remote Sensing of the Environment: An Earth Resource Perspective. Prentice-Hall, Englewood Cliffs, New Jersey. Indian reprint available.
11. Lillesand, T.M. and Kiefer, R.W. 2000. Remote Sensing and Image Interpretation. John Wiley and Sons, New York.
12. Lo, C.P. and Yeung, A. K. W. 2002. Concepts and Techniques of Geographic Information Systems. Prentice Hall of India, New Delhi.
13. Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. 1999. Geographic Information Systems. Principles, Techniques, Management, Applications. John Wiley and Sons, New York.
14. Maguirre, D. J., Michael, F. G. and David, W. R. 1999. Geographical Information Systems: Principles and Application. Geo Information International, Vol.2, Longman Publication., New York.
15. Martin, D. 1996. Geographic Information Systems: Socioeconomic Implications. Routledge, London.
16. Reddy, M. A. 2001. Textbook of Remote Sensing and Geographic Information Systems. S. Publications., Hyderabad.
17. Siddiqui, M.A. 2005. Introduction to Geographical Information Systems, Sharda Pustak Bhawan, Allahabad.

## Unit-3 Research sub fields in Geography

**Note: Select any one of the following sub fields.**

### Unit-3 (A)

#### GEOMORPHOLOGICAL STUDIES

Fundamental concepts in Geomorphology, Relief and slope analysis, Drainage analysis, Fluvial geomorphology, Demarcation and analysis of Watershed, Urban Geomorphology, Glacial Geomorphology, Coastal Geomorphology, Plateau Geomorphology, Mapping Techniques in Geomorphology studies, Geomorphology in Ground water studies, Geomorphology and regional Planning, Geomorphology and hazard management, Geomorphology in Engineering Construction.

#### Suggested Readings

1. Ahmed, E. 1985. *Geomorphology*. Kalyani Publishers, New Delhi.
2. Allison, Robert J. (ed.) 2002. *Applied Geomorphology: Theory and Practice*. John Wiley, Chichester UK.
3. Bloom, A. L. 1998/ 2001. *Geomorphology*. 3<sup>rd</sup> edition. Prentice Hall of India, New Delhi.
4. Chorley, R.J., Schumm, S. A. and Sugden, D. E. 1984. *Geomorphology*. Methuen and Company Ltd., London.
5. Fairbridge, R.W. (ed.) 1968. *Encyclopaedia of Geomorphology*. Reinhold Book Corporation., New York
6. Goudie, Andrew (ed.) 2004. *Encyclopedia of Geomorphology*. Volume 2. Routledge, London.
7. Gregory, K.J. and Walling, D.E. 1973. *Drainage Basin Form and Process*. Edward Arnold, London.
8. Jog, S. R. (ed.) 1995. *Indian Geomorphology* (2 vols.). Rawat Publications, Jaipur
9. Kale, V. and Gupta, A. 2001. *Introduction to Geomorphology*. Orient Longman, Hyderabad.
10. King, C.A.M. 1966. *Techniques in Geomorphology*. Edward Arnold, London.
11. Kondolf, G. Mathias and Piegay, Herve (eds.) 2003. *Tools in Fluvial Geomorphology*. John Wiley, Chichester UK.
12. Marchetti, Mauro and Rivas, Victoria (eds.) 2001. *Geomorphology and Environmental Impact Assessment*. Swets & Zeitlinger, the Netherlands.
13. Pethick, J. 1984. *An Introduction to Coastal Geomorphology*. Arnold, London. Indian reprint 2000.
14. Sparks, B.W. 1986. *Geomorphology*. Longmans, London.
15. Thornbury, W.D. 2005. *Principles of Geomorphology*. John Wiley, New York. Rev. Ed.
16. Wooldridge, S.W. and Morgan, R.S. 1959. *The Physical Basis of Geography: An Outline of Geomorphology*. Longman, London.

### Unit-3 (B)

#### Environmental Studies

Concept of Environment, Environmental crisis, Environmentalism and green movements, Major global environmental issues. Environmental Impact Assessment (EIA); EIA practices around the world, EIA procedure in India, Adaptation to Climate Change. Issues related to disasters management, Environmental degradation. Globalisation and environment, Environmental management strategies at sub-national level, Integrated watershed and eco-region management, Management at local level: Municipal water supply management; Conservation and restoration of forest cover and organic farming.

#### Suggested Readings

1. Anjaneyulu, Y. 2002. *Environmental Impact Assessment Methodology*, B.S Publications, Hyderabad
2. Blodgett, J. 2000. *Environmental Protection: New Approaches*, CRS Report, National Council for Science and the Environment
3. Commoner, B. 1988. *Rapid Population Growth and Environmental Stress in Developing Countries*. Proceedings of the United Nations Expert Group meeting, 23-26th August 1988, United Nations, New York.
4. Hardoy, J. E. et al. 1997. *Environmental Problems in Third World Cities*, Earthscan Publications limited, London
5. Inhaber, H. et. al. 1976. *Environmental Indices*, A Wiley-Inter Science Publication

6. Jain, R.K. et.al. 1977. Environmental Impact Analysis A New Dimension in Decision making, Van Nostrand Reinhold Company, New York
7. Lohani, Bindu N. 1984. Environmental Quality Management, South Asian Publisher, New Delhi
8. Manners Ian R. and Mikesell Marvin W. 1974. Perspectives on Environment, edited by Association of American Geographers
9. Nag, P., Kumra, V.K. and Singh, J. 1997. Geography and Environment: National, Regional and Local Issues (3 Volumes), Concept Publishing Company, New Delhi
10. Singh, D.N., Singh, J., and Raju, K.N.P. ed. 2003. Water Crisis and Sustainable Management, Tara Book Agency, Varanasi.
11. Singh, M.B. et.al. (ed.) 2005. Sustainable Management of Natural Resources (Land, Water and Forest), Tara Book Agency, Varanasi
12. Singh, O.; Kumra, V.K. and Singh, J. 1993. Frontiers in Environmental Geography, Concept Publishing Company, New Delhi
13. Singh, S.K. et. al. 2010. Strategic Management of Energy, Environment and Disaster for Sustainable Management, Proceedings of the International Conference on Strategic Management of Energy, Environment and Disaster for Sustainable Management, Faculty of Management Studies, BHU, Varanasi, January 11-15 2010.
14. Southgate, D. 1988. The Economics of Land Degradation in the Third World. World Bank Environment Department Working Paper No. 2. Washington, DC: the World Bank.
15. Tolba, M.K. et al. 1992. The World Environment, 1972-1992: Two Decades of Challenges, Chapman and Hall, London

### Unit-3 (C)

Population, Settlement and Urban Studies
<p>Sources of population data, Geographical factors of population growth and distribution, Population dynamics and population theories.</p> <p>Population problems of India, Population Planning and Human Resource Management, Basic Concepts of Urbanisation, Urban Sprawl, Approaches to the study of Urban Geography,</p> <p>Urban Problems and Environmental Degradation in India, Micro Climate of Cities, Urban Pollution and Health Impacts.</p> <p>Techniques of Town Planning, Urban Transport Planning, Concept of Urban Sustainability, Urban Poverty and Slums, Use of Remote Sensing Data for Urban Land uses and Change Detection, GPS and GIS for Urban Mapping, Socio-economic and Environmental Surveys for Urban Themes.</p>

#### Suggested Readings

1. Behura, Nab Kishore and Mohanty, Ramesh P. 2005. *Family Welfare in India: A Cross- Cultural Study*. Discovery Publs. House, New Delhi.
2. Birdsall, Nancy; Kelley, Allen C. and Sinding, Steven W. (eds.) 2001. *Population Matters: Demographic Change, Economic Growth, and Poverty in the Developing World*. Oxford University Press, Oxford.
3. Cassen, R. (ed.) 1994. *Population and Development: Old Debates, New Conclusions*. Transaction Publishers. New Brunswick and Oxford.
4. Chandra, Shanta Kohli 1987. *Family Planning Programme in India: Its Impact in Rural and Urban Areas*. Mittal Publs., New Delhi.
5. Chu, C.Y. Cyrus 1998. *Population Dynamics: A New Economic Approach*. Oxford University Press, New York.
6. Dyson, Tim (ed.) 1989. *India's Historical Demography: Studies in Famine, Disease and Society*. Curzon Press. London.
7. Dyson, Tim; Cassen, Robert and Visaria, Leela 2005. *Twenty-First Century India: Population, Economy, Human Development, and the Environment*. Oxford University Press, Oxford and New Delhi.
8. Guilmo, Christophe and Rajan, Sebastian I. (eds.) 2005. *Fertility Transition in South India*. Sage, New Delhi and London.
9. Hummel, Diana 2008. *Population Dynamics and Supply Systems: A Transdisciplinary Approach*. Campus Verlag,



- Frankfurt.
10. Hunter, Lori M. 2000. *The Environmental Implications of Population Dynamics*. Rand Corporation, New York.
  11. Kar, Bimal Kumar 2002. *Women Population of North East India: A Study in Gender Geography*. Regency Publications, New Delhi.
  12. Macbeth, Helen M. and Collinson, Paul (eds.) 2002. *Human Population Dynamics: Cross-Disciplinary Perspectives*. Cambridge University Press, Cambridge.
  13. Namboodiri, Narayanan Krishnan 1996. *A Primer of Population Dynamics*. Springer, New York.
  14. Prasad, B.K. 2004. *Population and Family Life Education*. Anmol Pubs., New Delhi.
  15. Ranade, Prabha Shastri 1990. *Population Dynamics in India*. APH Publishing, New Delhi.
  16. Shanthi. K. 2005. *Women in India: Retrospect and Prospect*. Anmol Pubs., New Delhi.
  17. Srinivasan, Venkatesh 2001. *Health and Family Welfare Programmes in Developing Countries: Study of Innovations in an Indian State*. Aalekh Publishers, New Delhi.
  18. Turchin, Peter 2003. *Complex Population Dynamics: A Theoretical/Empirical Synthesis*. Princeton University Press, Princeton.
  19. Unruh, Jon Darrel; Krol, Maarten S. and Kliot Nurit 2004. *Environmental Change and its Implications for Population Migration*. Springer, New York.
  20. Weeks, John R. 2005. *Population: An Introduction to Concepts and Issues*. Wadsworth, Belmont, CA. 9<sup>th</sup> Ed.
  21. Fyfe, Nicholas R. and Kenny, Judith T. (eds.) 2005. *The Urban Geography Reader*. Routledge, London.
  22. Gallien, A.B. and S. Eisner 1963. *Urban Pattern*, New York.
  23. HUDCO-HSMI. 2001. *The States of Indian Cities*, HUDCO HSMI, New Delhi.
  24. Knox, Paul and Pinch, Steven 2006. *Urban Social Geography*. Pearson Prentice-Hall, Englewood Cliffs NJ. 5<sup>th</sup> Ed.
  25. Kumar, B. and R.B. Singh 2003. *Urban Development and Anthropogenic Climatic Change*. Manak Publications, New Delhi.
  26. Kundu, A. 2005. *Urban Development and Urban Research in India*, Khama Publishers, New Delhi.
  27. Mathur, M.P. 2007. *Norms and Standards of Municipal Basic Services in India*, National Institute of Urban Affairs, New Delhi available on [www.niua.org](http://www.niua.org) accessed on 1<sup>st</sup> June 2010.
  28. Pacione, Michael 2005. *Urban Geography: A Global Perspective*. 2<sup>nd</sup> ed. Routledge, London.
  29. Prakasa Rao, V.L.S. 1983. *Urbanisation in India: Spatial Dimensions*, Concept, New Delhi.
  30. Misra. R.P. and Misra, K. (eds.) 1998. *Million Cities of India Vol. I/II* Sustainable Foundation, New Delhi.
  31. Ramachandran, R. 1989. *Urbanisation and Urban System in India*, Oxford University Press, New Delhi.
  32. Singh, R.L. 1955. *Bananas: A Study in Urban Geography*, Nand Kishor and Brothers, Banaras.
  33. Sivaramakrishnan, K.C. et al. 2005. *A Hand Book of Urbanisation in India*, Oxford University Press, New Delhi.
  34. UNCHS-UN HABITAT 2001. *Cities in a Globalising World. Global Report on Human Settlement*, Earthscan, London and Sterling, VA.
  35. UN-HABITAT 2003. *Water and Sanitation in World Cities: Local Action for Global Goals*, Earthscan London.
  36. Vaidya, Chetan 2009. *Urban Issues, Reforms and Way Forward in India* working paper No. 4/2009-DEA available on [www.niua.org](http://www.niua.org) accessed on 1<sup>st</sup> June 2010.

### Unit-3 (D)

#### AGRICULTURAL AND INDUSTRIAL STUDIES

Land use planning and Land capability classification, Agricultural Regionalization, Von Thunen model and its applicability, Impact of green revolution in India and need of second green revolution, Problems of Indian Agriculture, Measures for Agricultural Development, Food security, Crop Combination Regions, Agricultural efficiency and productivity regions, Crop Diversification, Role of remote sensing and GIS in agricultural studies.

Theories and models of industrial location, Factors of localisation of industries, Environmental degradation caused by industries, Industrial hazards and occupational health, Impact of industries on economic development, Role of globalization on industrial sector, Special Economic Zone.

#### Suggested Readings

1. Agrawal, M.K. 1996. *Agriculture- Industry Linkages in the Economy of U.P.* Northern Book center, New Delhi
2. Behari, Bepin, 1976. *Rural Industrialization in India*. Vikas Publishing House Pvt. Ltd. New Delhi,
3. Clark, G. L., Gertler, M. S. and Feldman, M. P. (eds.) 2000. *The Oxford Handbook of Economic Geography*. Oxford University Press, USA.

4. Coe, N. 2007. *Economic Geography: A Contemporary Introduction*. Blackwell Publishers, Inc., Massachusetts.
5. Dicken, P. and Lloyd, P. 1990/1977. *Location in Space*. New York: Harper & Row.
6. Guha, J. S. and Chattoraj, P.R. 2002. : *A New Approach to Economic Geography: A Study of Resources*. The World Press Private Limited, Kolkata.
7. Hudson, R. 2005. *Economic Geographies: Circuits, Flows and Spaces*. Sage Publications, London.
8. Krugman, P. 1995. *Development, Geography, and Economic Theory*. Cambridge: MIT Press.
9. Mackinnon, D. and Cumbers, A. 2007. *Introduction to Economic Geography: Globalization, Uneven Development and Place*. Prentice Hall, Inc., New York
10. Mathur, P. and Kalia, S., 2005. *Fundamentals of Industrial Geography*, Ritu Publications, Jaipur,
11. Misra, R.P (ed.) 1985. *Rural Industrialization in Third World Countries*. Sterling Publishing Co. New Delhi.
12. Riley R. C. 1973. *Industrial Geography*, Chatto and Windus Ltd. London.
13. Roy, P.K. 2005. *Economic Geography, A Study of Resources*. New Central Book Agency P. Ltd, Kolkata.
14. Sharma, V.N. 2001. *Industrial Development and Planning in India*. Radha Publications, New Delhi.
15. Sheppard, E. and Barnes, T.J. (eds.) 2002. *A Companion to Economic Geography*. Blackwell Publishers, Inc., Massachusetts.
16. Singh, M.B. 1983. *Industrial Development Patterns and Potentials in Eastern U.P.*, Lotus Publication, Varanasi.
17. Bhat, L.S. (1976): *Micro Level Planning in India*, K.B. Pub. New Delhi.
18. Bhat, L.S. (1988): *Strategy for Integrated Area Development. Case Study of North Kanara District (Karnataka)*. Concept Publishing. Company, New Delhi.
19. Desai, A. R. (1990): *Rural Development*, Popular Prakashan, Bombay.
20. Gregor, H. P. (1970): *Geography of Agriculture*. Prentice-Hall, New York.
21. Krishnamurthy, J. (2000): *Rural Development. Problems and Prospects*. Rawat Publications, Jaipur.
22. Long, C. (2001): *Participation of the Poor in Development Initiatives: Taking Their Rightful Place*. Earthscan, London.
23. Misra, R. P. and Achyutha, R. N. (1998): *Micro-Level Rural Planning: Principles, Methods and Case Studies*. Concept Publishing. Company, New Delhi.
24. Morgan, W. B. and Norton, R.J.C. (1971): *Agricultural Geography*. Methuen, London.
25. Sen, Sudhir (1975): *Reaping the Green Revolution*. Tata McGraw-Hill, New Delhi
26. Shafi, M. (2006): *Agricultural Geography*, Pearson Education, New Delhi.
27. Singh, B. N. (1988): *Integrated Rural Area Development and Planning*. Anupama Publications., Delhi.
28. Singh, B.B. (1979) : *Krishi Bhugol*. Tara Publications, Varanasi.
29. Singh, J. and Dhillon, S.S. (2000): *Agricultural Geography*. Tata McGraw Hill, New Delhi.
30. Singh, S. (1994): *Agricultural Development in India: A Regional Analysis*, Kaushal Publications, Shillong.
31. UNAPDI (1986): *Local Level Planning and Rural Development: Alternative Strategies*. (United Nations Asian and Pacific Development Institute, Bangkok). Concept Publishing Company, New Delhi.
32. Yugandhar, B. N. and Mukherjee, N. (eds.) (1991): *Studies in Village India: Issues in Rural Development*. Concept Publishing. Company, New Delhi.

## Unit-3 (E)

### REGIONAL DEVELOPMENT AND PLANNING STUDIES

Concept of Regional Planning, Concept and Types of Regions, Concept and Methods of Regionalization, Planning Regions in India, Concepts and Types of Development, sustainable development, Economic Growth and Economic Development: their contrast and indicators of measurement. Types of Economic Systems in the World, Regional Disparities in India, Regional Development in Post-Reform India.

#### Suggested Readings

1. Barkin and King 1970. *Regional Economic Development*, Cambridge University Press.
2. Basu, K. 2000. *Analytical Development Economics: The Less Developed Economy Revisited*. OUP.
3. Behrman, J. and Srinivas, T. N. 1998. *Handbook of Development Economics*, Vol. III
4. Berberoglu, B. 1992. *The Political Economy of Development*, State University of New York Press.
5. Bhat, L.S. 1972. *Regional Planning in India*. Indian Statistical Institute, Calcutta.
6. Bhat, L.S. 2003. *Micro Planning: A Case Study of Karnal Area*. KB Pubs., New Delhi.
7. Crush, J. 1995. *Power of Development*. Routledge, London.
8. Datta, B. 1997. *Indian Planning at Crossroad*, OUP
9. Friedman, J. and Alonse, W. eds. 1968. *Regional Development and Planning*. M.I.T. Press, Cambridge-Massachusetts.
10. Harrish, J 2004. *Depoliticizing Development*, Left World
11. Kuklinski, A.R. ed. 1975. *Regional Development and Planning: International Perspectives*, Sijthoff-Leyder.
12. Misra, R.P. 2002. *Regional Planning, Concepts, Techniques, Policies and Case Studies*. Concept Publishing Company, New Delhi.
13. Munshi, S.K 1984. *India Resource Regions and Regional Disparity*, PPH

## Unit-3 (F)

### Social, Cultural, Tribal, Gender Geography

Approaches to study Social geography, Social well-being and its indicators, Human Development Index (HDI), inclusive growth, social segregation and Ghetto formation. Gender Issues and Social Change, women empowerment, women literacy and health, social change with special reference to caste and tribal groups, Tribal economies, Spatial distribution of tribes, castes and linguistic groups.

Growth and development of gender geography, Status of women in developing and developed countries; Crimes against women and bridging the gender gap.

Concept of culture in Geography, Ethnic, linguistic and religious Groups, Cultural regions, Cultural areas and Cultural landscape, Cultural assimilation, integration and diffusion

#### Suggested Readings

1. & Hunt, Dubuque, Iowa.
2. Abuzar, M., 1988. *Socio-economic Aspects of Population Structure*, Rawat Pub., Jaipur.
3. Agarwal, S.N., 1972. *India's Population Problems*, Tata McGraw Hill, New Delhi.
4. Ahmad, A., 1999. *Social Geography*, Rawat Publications Jaipur.
5. Beajeu-Garneir, J., 1979, *Geography of Population*, Longman, New York.
6. Bogue, D.J., 1969, *Principles of Demography*, John Wiley, New York.
7. Boserup, E. 1989, *Women's Role in Economic Development*, Earthscan, London.
8. Chandna, R.C., 2000 *Geography of Population : Concept, Determinants and Patterns*, Kalyani Publishers, New Delhi.
9. Churye, G.S., 1963. *The Scheduled Tribes*, Popular Prakashan, Bombay.
10. Clarke, J.I., 1973, *Population Geography*, Pregamon Press, Oxford.

11. Coontz, S.H., 1957, Population Theories and the Economic Interpretation, Roulledge & Kegan Paul.
12. Dankelman, I & Davidson, J., 1989. Women and Environment in the Third World, Earthscan, London.
13. Daugherty, H.G. Kenneth, C.W. Kammeyir, 1988. An Introduction to Population (Second edition), The Gulford Press, London.
14. Deblig, H.J., 1996, Human Geography-Culture, Society and Space (5<sup>th</sup> ed.), John Wiley, New York.
15. Dube, S.C. 1991. Indian Societies, National Book Trust of India, New Delhi.
16. Dube, S.C. Tribal Heritage of India, Vikas Publishing Co., New Delhi.
17. Gregory, D. and J. Larry (eds.) 1985. Social Relations and Spatial Structures, McM
18. Johnston, R.J. et. Al (eds.), 1996. The Health of Women - A Global Respective, Westview press, Boulder.
19. Jones, E., & J. Eyles, 1977. An Introduction to Social Geography, Oxford University Press, Oxford.
20. Jones, E., 1976. An Introduction to Social Geography, Oxford University Press, Oxford.
21. Jones, H.R., 1981. A Population Geography, Harper & Row, London.
22. Majumdar, D.N., 1958, Races and Culture of India, Asia Publishing House, Bombay.
23. Momsen, J.H. & Townsend, J. (eds.), 1987. Geography of Gender in the Third World, Albany, New York.
24. Mukherjee, R., 1975, Social Indicators, McMillan, Delhi.
25. Pacione, M., 1987. Social Geography : Progress and Prospects, Croom Helm, London.
26. Smith, D., 1977. Geography : A Welfare Approach, Edward Arnold, London.
27. Sowell, T. 1994. Race and Culture - A World View, Basic Books, New York.
28. UNICEF, 1990. The Lesser Child - the Girl in India, United Nations, Geneva.
29. United Nations, 1991. The World's Women, 1970-1990, United Nations, New York.
30. United Nations, 1995, World Resources 1994-1995, Chapter 3 : Women and Sustainable Development, United Nations, New York.

### Unit-3 (G)

#### Political Geography

Approaches and Schools of thought in Political Geography, Landscape school, Functional school and Morphological school. Geo-political views and International Relationship, Political Geography of India, Federalism, Globalisation, Arab Spring, Issues related to reorganization of State, Electoral Geography, River Disputes in India, Border Studies.

#### Suggested Readings

1. Adhikari, S (2004) : Political Geography, Rawat Publication, New Delhi.
2. Agnew, John AX1987), Place and Politics: The Geographical Mediation of State and Society, Allen and Unwin, Boston
3. Dwivedi R.L.(2004): Fundamentals of Political Geography, Chaitanya Publishing House, Allahabad
4. Ethington, Philip J. and Jason A. Mc Daniel (2007), "Political Places and Institutional Spaces: The Intersection of Political Science and Political Geography", Annual Review of Political Science, 10:127-42
5. Freeman, T. W., (1961): Hundred Years of Geography, Gerald Duckworth and Co., London.
6. Glassner, Martin Ira and Chuck Fahrer (2004), Chapter-8, "Frontiers and Boundaries", *Political Geography*
7. Hartshorne, Richard (1935), "Recent Developments in Political Geography, I", *The American Political Science Review*
8. Hartshorne, Richard (1950), Functional Approach in Political Geography, *Annals of the Association of American Geographer*
9. Joe Painter (1995), Politics, Geography and Political Geography, Arnold, London
10. Jones, Rhys, Martin Jones and Michael Woods (2004), An Introduction to Political Geography: Space, Place and Politics, Routledge, London
11. Mackinder, H.J. (1904), "The Geographical Pivot of History", *The Geographical Journal*, 23: 421-437 Suggested Readings:
12. Mansfield, Becky (2008), Chapter-14, "Global Environment Politics", in Kevin R. Cox, Murray Low and Jennifer

Robinson (eds.), *Sage Handbook of Political Geography*, Sage, London

13. Pound, J : Introduction to Political Geography, Oxford Publication.
14. Ratzel, Friedrich (1898), Studies in Political Areas: The Political Territory in relation to Earth and Continent, *American Journal of Sociology*, 3: 297-313
15. Ratzel, Friedrich(1898), Studies in Political Areas II: Intellectual, Political and Economic Effects of Large Areas, *American Journal of Sociology*, 3: 449-463
16. Spykman, Nicholas C. and Abbie A. Rollins(1939), “ Geographic Objectives in Foreign Policy I, *The American Political Science Review*
17. Toal, Gerard (2003), “Re-asserting the regional: political geography and geopolitics in a world thinly known”, *Political Geography*, 22:653-655

## **Internal Assessment**

- Preparation and presentation of synopsis for research.
- Interpretation of Topographical Sheet and Satellite imagery of any area.
- Preparation of Map using GIS Software or Computer Cartography.

# **HINDI LITERATURE**

C.S.J.M. University, Kanpur

Syllabus for

HINDI

Pre Ph. D. COURSE WORK PAPER – II

पाठ्यक्रम:-

पूर्णांक – 70 अंक

I) हिंदी साहित्य का इतिहास –

(10 अंक)

- I. हिंदी साहित्य का काल विभाजन नामकरण एवं प्रमुख प्रवृत्तियाँ
- II. आदिकाल : पृष्ठभूमि, प्रमुख प्रवृत्तियाँ, विविध साहित्य, प्रमुख रचनाकार और रचनाएँ।
- III. भवित्काल : पृष्ठभूमि, प्रमुख प्रवृत्तियाँ, विविध साहित्य, प्रमुख रचनाकार और रचनाएँ।
- IV. रीतिकाल : पृष्ठभूमि, प्रमुख प्रवृत्तियाँ, विविध साहित्य, प्रमुख रचनाकार और रचनाएँ।

II) आधुनिक काल का इतिहास :

(10 अंक)

- I. आधुनिक काल की विविध गद्य विधाओं का अध्ययन।
- II. आधुनिक काल की विविध गद्य विधाओं की प्रमुख प्रवृत्तियाँ, विविध साहित्य, प्रमुख रचनाकार एवं रचनाएँ।
- III. आधुनिक काल की प्रमुख काव्य धाराओं का अध्ययन।
- IV. आधुनिक काल की विविध काव्य धाराओं की प्रमुख प्रवृत्तियाँ, विविध साहित्य, प्रमुख रचनाकार एवं रचनाएँ।

III) भाषा विज्ञान एवं काव्यशास्त्र :

(10 अंक)

- I. भाषा विज्ञान की परिभाषा, स्वरूप, एवं उपशाखाएँ।
- II. भारतीय काव्यशास्त्र का स्वरूप एवं प्रमुख सिद्धांत।
- III. पाश्चात्य काव्यशास्त्र का स्वरूप एवं प्रमुख सिद्धांत।

IV) राजभाषा एवं राष्ट्रभाषा हिंदी :

(10 अंक)

- I. हिंदी की विकास यात्रा।
- II. हिंदी का संवैधानिक स्वरूप।
- III. देवनागरी लिपि की विशेषताएँ एवं वैज्ञानिकता।
- IV. हिंदी आंदोलन का इतिहास।
- V. हिंदी के प्रचार-प्रसार में प्रमुख संस्थाओं तथा महान विभूतियों का योगदान।
- VI. हिंदी के प्रचार-प्रसार में विश्व हिंदी सम्मेलनों का योगदान।
- VII. हिंदी से सम्बन्धित राष्ट्रीय पुरस्कार एवं सम्मान।

अनुमानेपु  
28.11.19

Ami  
28/11/19

V) हिंदी आलोचना :

(10 अंक)

- i. हिंदी आलोचना का विकास क्रम।
- ii. आलोचना के भेद - सैद्धांतिक, व्याख्यात्मक, मनोवैज्ञानिक, प्रगतिवादी, प्रभाववादी एवं स्वच्छंदतावादी।
- iii. हिंदी आलोचना में अग्रज एवं अनुज पीढ़ी की उपादेयता :- आचार्य रामचंद्र शुक्ल, डॉ. हजारी प्रसाद द्विवेदी, आचार्य नन्ददुलारे वाजपेयी, डॉ. राम विलारस शर्मा, डॉ. नगेन्द्र एवं डॉ. नामवर सिंह का योगदान।

VI) हिंदी साहित्य का समकालीन परिदृश्य :

(10 अंक)

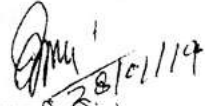
- i. प्रमुख विमर्श : स्त्री विमर्श, दलित विमर्श, आदिवासी विमर्श, उत्तर आधुनिकता तथा किन्नर, विमर्श।
- ii. इक्कीसवीं सदी की प्रमुख एवं चर्चित कृतियों का अध्ययन।

VII) जनसंचार माध्यम एवं हिंदी पत्रकारिता :

(10 अंक)

- i. स्वाधीनता आंदोलन एवं हिंदी पत्रकारिता।
- ii. भारत के प्रमुख जनसंचार माध्यम।
- iii. लोकतंत्र एवं मीडिया।
- iv. सोशल मीडिया एवं हिंदी।

शुभा वाजपेयी  
(डॉ० शुभा वाजपेयी)  
अध्यक्ष हिंदी विभाग  
डी.एस.एन. कालेज, उन्नाव  
संयोजक हिंदी पाठ्य समिति  
छत्रपति शाहू जी महाराज विश्वविद्यालय,  
कानपुर

  
(डॉ० गायत्री सिंह)  
का० प्राचार्या आर्मापुर पी.जी. कालेज, कानपुर  
संयोजक हिंदी पाठ्यक्रम समिति  
छत्रपति शाहू जी महाराज विश्वविद्यालय,  
कानपुर



- संदर्भ ग्रंथ -

- 1) हिंदी साहित्य का इतिहास - आचार्य रामचंद्र शुक्ल
- 2) हिंदी साहित्य की भूमिका : उद्भव, विकास - डॉ. हजारीप्रसाद द्विवेदी
- 3) हिंदी साहित्य का इतिहास - डॉ. लक्ष्मीसागर वाष्पाय
- 4) हिंदी साहित्य की प्रवृत्तियाँ - डॉ. जयकिशन प्रसाद खण्डेलवाल
- 5) हिंदी साहित्य का सुबोध इतिहास - बाबू गुलाबराय
- 6) हिंदी साहित्य का आलोचनात्मक इतिहास - डॉ. रामकुमार वर्मा
- 7) हिंदी रीति साहित्य - डॉ. भगीरथ मिश्र
- 8) हिंदी साहित्य का इतिहास - सं. डॉ. नगेंद्र
- 9) हिंदी साहित्य का आदिकाल - हजारीप्रसाद द्विवेदी
- 10) हिंदी गद्य का उद्भव और विकास - डॉ. उमेश शास्त्री
- 11) हिंदी का गद्य साहित्य - रामचन्द्र तिवारी
- 12) स्वातंत्र्योत्तर हिंदी साहित्य - रामरतन भटनागर
- 13) स्वातंत्र्योत्तर हिंदी नाटक - डॉ. रोता कुमार
- 14) प्रतिनिधि हिंदी निबंधकार - डॉ. विभुराम मिश्रा
- 15) हिंदी के प्रतिनिधि निबंधकार - डॉ. द्वारिकाप्रसाद सक्सेना
- 16) आधुनिक हिंदी साहित्य का विकास - डॉ. श्रीकृष्णलाल
- 17) हिंदी साहित्य का इतिहास - डॉ. राममूर्ति त्रिपाठी
- 18) हिंदी साहित्य का इतिहास - डॉ. देवीशरण रस्तोगी
- 19) हिंदी साहित्य का प्रवृत्तिपरक इतिहास - डॉ. सभापति मिश्रा,  
प्रका. विनय प्रकाशन, कानपुर
- 20) हिंदी साहित्य का समीक्षात्मक इतिहास - डॉ. कृष्णलाल हंस
- 21) आधुनिक साहित्य का इतिहास - डॉ. बच्चनसिंह
- 22) साहित्य यात्रा - डॉ. मनोहर सराफ, प्रा. डॉ. श्रीमती  
रेखा गाजरे, प्रा. डॉ. श्रीमती कांता राठी, प्रका.  
अजिथ एज्युकेशनल सप्लायर्स, भुसावल
- 23) हिंदी साहित्य का इतिहास - डॉ. रमेशचंद्र शर्मा
- 24) आधुनिक भाषा विज्ञान - डॉ. भोलानाथ तिवारी
- 25) हिंदी भाषा का उद्भव और विकास - डॉ. उदयनारायण तिवारी
- 26) हिंदी : उद्भव, विकास और रूप - डॉ. हरदेव बाहरी
- 27) हिंदी भाषा का परिचय - बिन्दु माधव मिश्र,  
राधाकृष्ण प्रकाशन, दिल्ली
- 28) भाषा की हिंदी भाषा तथा भाषा शिक्षण - डॉ. अम्बादास देशमुख,  
अतुल प्रकाशन, कानपुर
- 29) आधुनिक भाषा विज्ञान - डॉ. केशवदत्त रुवाली,  
अल्मोडा बुक डेपॉ, अल्मोडा
- 30) मुग्धबोध भाषा विज्ञान - डॉ. रामेश्वर दयालु अग्रवाल,  
साधना प्रकाशन, मेरठ

शुभावा ज्येष्ठी  
२०.१.१९  
(डॉ. शुभावा ज्येष्ठी)

म  
२०/०१/१९  
(डा. जयजी सिंह)

31) समाज भाषा विज्ञान की भूमिका	-	डॉ. तेजपाल चौधरी, पंचशील प्रकाशन, जयपुर
32) हिंदी भाषा विज्ञान	-	डॉ. डी. शर्मा, अशोक प्रकाशन, नई सड़क, दिल्ली
33) भाषा विज्ञान एवं भाषा शास्त्र	-	डॉ. कपिलदेव त्रिवेदी, विश्वविद्यालय प्रकाशन, वाराणसी
34) भाषा विज्ञान की भूमिका	-	देवेन्द्रनाथ शर्मा, गंधाकृष्ण प्रकाशन, दिल्ली
35) भाषा और भाषा विज्ञान	-	डॉ. तेजपाल चौधरी, विकास प्रकाशन, कानपुर
36) भाषा विज्ञान एवं हिंदी भाषा	-	डॉ. हणमंतराव पाटील, विद्या प्रकाशन, कानपुर
37) भाषा विज्ञान तथा समाज भाषा विज्ञान	-	डॉ. भाऊसाहेब परदेशी, डॉ. गिरीश महाजन, चंद्रलोक प्रकाशन, कानपुर
38) काव्यशास्त्र	-	डॉ. भगीरथ मिश्र
39) रस सिद्धांत : स्वरूप, विश्लेषण	-	डॉ. आनंदप्रकाश दीक्षित
40) भारतीय साहित्यशास्त्र-खंड 1 और 2	-	आचार्य बलदेव उपाध्याय
41) साहित्यशास्त्र के प्रमुख सिद्धांत	-	डॉ. राममूर्ति त्रिपाठी
42) भारतीय काव्यशास्त्र के सिद्धांत	-	डॉ. कृष्णदेव शर्मा
43) रस मौमांसा	-	आचार्य रामचंद्र शुक्ल
44) औचित्य विमर्श	-	डॉ. राममूर्ति त्रिपाठी
45) समीक्षाशास्त्र के भारतीय एवं पाश्चात्य मानदण्ड	-	डॉ. रामसागर त्रिपाठी
46) भारतीय काव्यशास्त्र के सिद्धांत	-	डॉ. सुरेश अग्रवाल
47) काव्य समीक्षा के भारतीय मानदण्ड	-	डॉ. वामंती सालवेकर डॉ. उर्मिला पाटील
48) पाश्चात्य काव्यशास्त्र के सिद्धांत	-	डॉ. कृष्णदेव शर्मा
49) अरस्तू का काव्यशास्त्र	-	डॉ. नगेंद्र
50) पाश्चात्य काव्यशास्त्र	-	देवेन्द्रनाथ शर्मा
51) भारतीय एवं पाश्चात्य साहित्यशास्त्र	-	सत्यदेव चौधरी / शांतिस्वरूप गुप्त
52) रिचर्ड्स के आलोचना सिद्धांत	-	डॉ. शंभूनाथ झा
53) उदात्त के विषय में	-	डॉ. निर्मला जैन
54) पाश्चात्य काव्यशास्त्र : इतिहास, सिद्धांत और वाद	-	डॉ. भगीरथ मिश्र
55) पाश्चात्य साहित्य चिंतन	-	निर्मला जैन / कुसुम बाठिया
56) टी.एस. इलियट के आलोचना सिद्धांत	-	डॉ. शिवमूर्ति पाण्डेय
57) आलोचक और आलोचना	-	डॉ. बच्चनसिंह
58) हिंदी आलोचना : उद्भव और विकास	-	डॉ. भागवतस्वरूप मिश्र
59) आलोचना के बदलते मानदण्ड और हिंदी साहित्य	-	डॉ. शिवचरण सिंह
60) भारतीय एवं पाश्चात्य काव्यशास्त्र के मानदण्ड	-	डॉ. भाऊसाहेब परदेशी

शुभाब्जोपाधी  
28.11.19  
(38 शुभाब्जोपाधी)

शुभाब्जोपाधी  
28.11.19  
(38 शुभाब्जोपाधी)

- 61) भारतीय एवं पाश्चात्य काव्यशास्त्र की रूपरेखा - डॉ. तेजपाल चौधरी
- 62) राष्ट्रभाषा आंदोलन - श्री. गो. प. नेने,  
महाराष्ट्र राष्ट्रभाषा सभा, पुणे
- 63) राष्ट्रभाषा प्रचार का इतिहास - सं. गंगारण सिंह,  
अखिल भारतीय हिंदी संस्था संघ, नई दिल्ली
- 64) भारत का संविधान
- 65) भाषा विज्ञान एवं भाषा विचार - डॉ. कृष्णा पोतदार, डॉ. मधु खराटे  
विद्या प्रकाशन, कानपुर
- 66) रजत जयंती ग्रंथ (1962) - राष्ट्रभाषा प्रचार समिति, वधा
- 67) हिंदी साहित्य प्रश्नोत्तरी - कुमुद शर्मा,  
सत्साहित्य प्रकाशन, दिल्ली
- 68) हिंदी साहित्य : कसौटी - डॉ. शिवकुमार शुक्ल,  
चितन प्रकाशन, कानपुर
- 69) कोणाकं दृष्टि - डॉ. उदय नारायण मिश्र,  
अभय प्रकाशन, कानपुर
- 70) हिंदी वस्तुनिष्ठ प्रश्नोत्तरी - बृजकिशोर प्रसाद सिंह,  
सत्साहित्य प्रकाशन, दिल्ली
- 71) प्रतियोगी परीक्षा नेट / सेट हिंदी - डॉ. कुमुद पाटील,  
चंद्रलोक प्रकाशन, कानपुर
- 72) हिंदी भाषा और साहित्य : वस्तुनिष्ठ अध्ययन - डॉ. सय्यद, प्रा. यशवंतकर, प्रा. शिवशंकर  
साधना पब्लिकेशन्स, परभणी

73) मुमंडलीकर डॉ. सी. डी. - कुमुद शर्मा

74) हिन्दी प्रकाशिता डॉ. साहित्य - शर्मा शर्मा

75) जन्मसमय के लक्षण - सुधाक्षी

शुभा बा. जेपथी

28.1.19

डॉ. शुभा बा. जेपथी

28/1/19

28/1/19


(डा० गायत्री सिंह)

## सन्दर्भ ग्रंथ

1. हिन्दी साहित्य का इतिहास — आचार्य रामचंद्र शुक्ल
2. हिन्दी साहित्य की भूमिका : उद्भव विकास — डा. हजारी प्रसाद द्विवेदी
3. हिन्दी साहित्य का इतिहास — डा. लक्ष्मीसागर वाष्णीय
4. हिन्दी साहित्य का सुबोध इतिहास — बाबू गुलाबराय
5. हिन्दी साहित्य का आलोचनात्मक इतिहास — डा. रामकुमार वर्मा
6. हिन्दी का गद्य साहित्य — रामचन्द्र तिवारी
7. हिन्दी साहित्य का इतिहास — डा. राममूर्ति त्रिपाठी
8. आधुनिक साहित्य का इतिहास — डा. बच्चन सिंह
9. आधुनिक भाषा विज्ञान — डा. भोलानाथ तिवारी
10. हिन्दी : उद्भव, विकास और रूप — डा. हरदेव बाहरी
11. हिन्दी भाषा विज्ञान — डी. डी. शर्मा, अशोक प्रकाशन, नई सड़क, दिल्ली
12. भाषा विज्ञान एवं हिन्दी भाषा — डा. हणमंतराव पाटील, विद्या प्रकाशन, कानपुर
13. काव्यशास्त्र — डा. भगीरथ मिश्र
14. भारतीय साहित्यशास्त्र—खंड 1 और 2 — आचार्य बलदेव उपाध्याय
15. ररा गीमांसा — आचार्य रामचंद्र शुक्ल
16. पाश्चात्य काव्यशास्त्र — देवेंद्रनाथ शर्मा
17. भारतीय एवं पाश्चात्य साहित्यशास्त्र — सत्यदेव चौधरी / शांतिस्वरूप गुप्त
18. पाश्चात्य काव्यशास्त्र: इतिहास, सिद्धान्त और वाद— डा. भगीरथ मिश्र
19. आलोचक और आलोचना — डा. बच्चन सिंह
20. हिन्दी आलोचना : उद्भव और विकास — डा. भागवतस्वरूप मिश्र
21. आलोचना के बदलते मानदण्ड और हिन्दी सहित्य — डा. शिवचरण सिंह
22. भारतीय एवं पाश्चात्य काव्यशास्त्र के मानदण्ड — डा. भाऊसाहेब परदेशी
23. राष्ट्रभाषा आंदोलन — श्री गो. प. नेने, महाराष्ट्र राष्ट्रभाषा सभा, पुणे
24. राष्ट्रभाषा प्रचार का इतिहास — सं. गंगाचरण सिंह, अखिल भारतीय हिंदी संस्था संघ, नई दिल्ली
25. भाषा विज्ञान एवं भाषा विचार — डा. कृष्णा पोतदार, डा. मधु खराटे, विद्या प्रकाशन
26. रजत जयंती ग्रंथ (1962) — राष्ट्रभाषा प्रचार समिति, वर्धा
27. हिन्दी साहित्य प्रश्नोत्तरी — कुमुद शर्मा, सत्साहित्य प्रकाशन, दिल्ली
28. हिन्दी साहित्य : कसौटी — डा. शिवकुमार शुक्ल, चिंतन प्रकाशन, कानपुर
29. हिन्दी वस्तुनिष्ठ प्रश्नोत्तरी — बृजकिशोर प्रसाद सिंह, सत्साहित्य प्रकाशन, दिल्ली
30. प्रतियोगी परीक्षा नेट/सेट हिन्दी — डा. कुमुद पाटील, चंद्रलोक प्रकाशन, कानपुर
31. हिन्दी भाषा और साहित्य : वस्तुनिष्ठ अध्ययन — डा. सय्यद, प्रो. यशवंतकर, प्रो. शिवशेट्टे, साधना पब्लिकेशन, परभणी

32. भूमंडलीकरण और मीडिया
33. हिन्दी पत्रकारिता और साहित्य
34. जनमाध्यम सैद्धांतिकी
35. आज का दलित साहित्य
36. अम्बेदकर वाङ्मय
37. स्त्री पराधीनता
38. परिधि पर स्त्री
39. उपनिवेश में स्त्री
40. नेशन एण्ड नेरेशन

- कुमुद शर्मा, सत्साहित्य प्रकाशन, दिल्ली
- क्षम शर्मा,
- सुधा सिंह
- तेज सिंह
- भीमराव अम्बेडकर
- जान स्टुअर्ट मिल्स अनूदित
- मृणाल पांडेय
- प्रभा खेतान
- (सं.) होमी जे. भाभा

  
(डा. गायत्री सिंह)

संयोजक हिन्दी पाठ्यक्रम समिति  
छत्रपति शाहू जी महाराज वि.वि. कानपुर

## HISTORY

## **Paper II: Advance level theory and Research Methods**

This course aims to introduce students to important issues related to Historical method by giving them a broad overview of significant, including recent, Historiographical trends. The aim is to acquaint students with important Historiographical interventions and issues related to the historian's craft. The themes selected for discussion may include the ones given below, and may vary from year to year; more themes may be added to the list. Detailed readings have been given here;

### **Ancient History;**

- archaeological sources, literary sources for epigraphic records, special study of following inscriptions A. Junagarh inscription B. Prayag Prashasti C. Dhauli edict of Ashoka
- Ancient numismatics
- Harappan Civilization
- Origin, characteristics, decline of Vedic age
- development of Buddhist stupas
- foundation of Mauryan empire,
- development of art age of Guptas
- political achievements administration socio economic condition in ancient India
- art and architecture in Ancient India & World
- Study of Sanskrit texts along with special study in Kalhad's Rajtarangini

### **Mediaeval History**

- archaeological sources with study of medieval monuments
- Sultanate and Mughal numismatics
- Study of Shikashita Nastaliq farmans/ Mansoors of Mughal Court with especial references of Bikaner & Hyderabad Archives
- literary sources Sanskrit, Persian & regional languages with especial study of following texts A. Tarikh i Firuzshahi by Jiauddin Berni B. Ain i Akbari by Abul Faz'l
- foreign Traveler's account by Ibnebatuta, Al Beruni, Abdurrazzak and others
- Vijayanagar and Bahmani primary Sources
- Sources of Maratha History
- Civil and judicial, administrative reforms, military history of the Mughals
- economic aspects, agrarian system, Industries trade and Commerce
- development of Art under Rajputs
- Religion and society under Mughals

### **Modern History**

- Primary sources of the British East India Company
- Military history in Colonial India
- Primary sources of socio religious Reform movements
- Peasant and Tribal Revolts, causes, nature, extended consequences
- political awakening growth of national consciousness

- History of Kanpur, Bundelkhand and Awadh regions with special study of sources of great struggle of 1857
- Historical Sources of Indian National Congress and Muslim League
- national movement under the leadership of Mahatma Gandhi
- Revolutionary ideas and activities
- constitutional development

### **Approaches in Historiography**

- Modern historiography: documents
- Marxism in India
- Gender Studies
- Oral historical tradition
- Intellectual history
- History of emotions
- Connected histories: peoples, regions, commodities

### **Select Readings**

1. Alier, Joan Martinez, Padua, Jose Augusto and Rangarajan, Mahesh eds. Environmental History as if Nature Existed (Delhi, Oxford University Press, 2010)
2. Aymard, Maurice and Mukhia, Harbans eds., French Studies in History, vol. I (Orient Longmans, New Delhi, 1989).
3. Bloch, Marc, The Historian's Craft, with an Introduction by Peter Burke (Manchester University Press, 2004).
4. Burke, Peter, Varieties of Cultural History, Cornell University Press, 1997.
5. Carr, E. H., What is History (also available in Hindi) (Penguin [1961], 2008).
6. Davis, Natalie Zemon The Return of Martin Guerre (Harvard University Press, 1983)
7. Haskell, Francis, History and its images: art and the interpretation of the past (New Haven and London, Yale University Press, [1993] 3rd reprint edn. 1995).
8. Portelli, Alessandro, The Death off Luigo Trastulli and Other Stories: Form and Meaning in Oral History (CUNY Press, 1990, paperback).
9. Colin Renfrew and Paul Bahn, Archaeology: Theories, Methods and Practice (5th edition, Thames and Hudson, 2008).
10. Roberts Alice, The Incredible Human Journey: The story of how we colonized our planet (London, Bloomsbury, 2009)
11. Sarkar, Sumit, Writing Social History (USA, Oxford University Press, 1995).
12. Singh, Purushottam, Bundelkhand me Durg Nirman (in Hindi), 2014, Roli Publishers Kanpur
13. Stern, Fritz ed., Varieties of History: from Voltaire to the Present (2nd edn., New York, Vintage, 1973)
14. Thompson, E.P. Customs in Common: Studies in Traditional Popular Culture (The Free Press, New York, 1991); 'Folklore, Anthropology and History', Indian Historical Review, iii, no. 2, Jan 1977
15. Gupta , R. K. , Revenue History of Kanpur, Kanpur ,1987 reprinted
16. Singh Hemlata, Misra Anil, Singh Purushottam , The role of Kanpur in 1857& Freedom Struggle of India, 2008, New Archaeological & Genological society Kanpur
17. Walach Scott, Joan, Gender and the Politics of History (Columbia, New York, 1988). Parts I-II



# **HOME SCIENCE**

## **HOME SCIENCE**

### **Paper II: Advance level theory and Research Methods**

#### **Unit-I**

##### **Food and Nutrition**

- Assessment of nutritional status. Nutritional education methods and applications.
- Nutrition during different stages of life cycle.
- Recent advances in Food Technology, effect of food processing on nutrient content and health.
- Food safety, food standards, methods of food analysis
- Current nutritional problems and nutritional surveillance, prebiotics.
- **Dietary management in various diseases-Diabetes, Cardiovascular diseases, Kidney diseases etc.**
- **Nutraceuticals**

#### **Unit-II**

##### **Human Development**

- Issues regarding development during different stages of life cycle. Developmental assessment in children.
- Early childhood care and education centers, day care, schools for children with special needs.
- Role and contribution of family in child development, issues related to parenting and child rearing practices.
- Psycho-social problems related to children-gender issues, child abuse, family violence, child labour, Juvenile

delinquency.

- Geriatric issues - problems and coping skills.
- **Prenatal development**
- **Instead of psycho-social problems related to children-gender issues, it should be psycho-social problems related to human.**

### **Unit-III**

#### **Textiles and clothing**

- New trends in textile fibers, Eco-friendly and bio-degradable textiles, recent developments in fabric finishes.
- Functional clothing, traditional and contemporary clothing and decorative techniques.
- Apparel designing and modern pattern development techniques.
- Computer aided textile and fashion designing.
- Entrepreneurship development in textiles and clothing.
- Trends in house hold textiles and furnishing materials.
- **Traditional textile & costumes of India**

### **Unit-IV**

#### **Family Resource Management**

- Demographic challenges to family ecology.
- Housing management problems, rural and urban housing, housing in integrated development.
- Consumer behaviour pattern, consumer laws, problems and challenges.
- Application of Anthropometry in Ergonomics - body posture, innovations in equipment to promote work efficiency.
- **Decision making in management process**

### **Unit-V**

#### **Extension and Communication**

- Home Science as a tool for development of society, changing trends in society with particular reference to status of women.
- Extension Education Programmes related to Home Science. Welfare schemes for women and children.
- Dynamics of communication application in Home Science research. Emerging issues in communication. Role of mass media for rural audience.
- Sustainable development - concept and challenges.
- **Recent advances in communication and extension.**
- **Impactful communication message and material development techniques.**

### **Practical**

1. Prepare a research proposal on a topic related to Home Science.
2. Prepare a research tool for data collection/Paper publication in journal with ISSN No.

# HORTICULTURE

## **Paper II: Advance level theory and Research Methods**

**Objective:** To update knowledge on the recent research trends in the field of, horticulture with special emphasis on fruits, vegetable and ornamental crops and their post-harvest management.

### **Theory-**

#### **Unit-1**

National and International Scenario in fruit production. Recent advances in Propagation- root stocks influence, planting system, High density planting, crop Modeling and Precision farming. Modern approaches in water and nutrient management.

#### **Unit-2**

Recent advance in improvement of fruit crops like Mango, Banana, Papaya, Citrus, Grape, Guava, Papaya, Aonla, Ber, Bael, Pine apple, Apple, Pear, Peach and Straw berry.

#### **Unit-3**

National and International Scenario in Vegetable production. Recent advance in production of crops likes Potato, Tomato, Chilli, Brinjal, Cauliflower, Okra Pea, Bottle guprd, Bitter Gourd, Pumpkin, Musk Melon, Water Melon and Pointed Gourd. Protected Cultivation of Vegetable Crops.

#### **Unit-4**

National and International Scenario of Ornamental crops and flowers. Recent advances in Production of Rose, Gladiolus, Marigold, Crysanthemum, Canna, Bougainvillea, Garbera, Carnetion, Tubrose and Jasmine. Protected cultivation of flowers.

#### **Unit-5**

Recent advances in Post-harvest Technology of fruit, vegetable and flowers. Pre-harvest treatments in relation to post-harvest quality of Horticulture produce. Bio-chemical changes in fruit and Vegetable with special reference to ripening, role of ethylene, respiration and transpiration. Various methods of fruit and vegetables preservation, heat processing, Dehydration, freezing and chemical preservation. Advance in food processing techniques: Microwave, heating vacuum impregnation. Recent methods of packaging, plastic film wrapping, pre-cooling, Packaging and marketing of fruits, vegetables and ornamental Plants. Flower products, essential oil and pigments extraction, purification and marketing.

### **Practical-**

Survey of existing fruit cropping system and development of a model cropping system. Estimating nutrient deficiency. Design of Green house, low cost poly tunnels, net house, Regulation of light in green house, Media in Green House, Visit of Green House Commercial nursery of fruit, Vegetable and ornamental crops. Visit of Preservation industries. Practice of Packaging of fruit, Vegetable and Ornamentals crops.

**LAW**

**PAPER-II**  
**LAW**

**1. Human Rights And Values In Education**

- Meaning and Definition and Concept of Human Rights.
- The Role of NGOs in protection of Human Rights in India.
- Custodial death : Crude Action of Human Rights.
- Human Rights and Women : Problems and Prospects.
- Protection of Refugees in India.

**2. Emerging Regime of New Rights and Remedies Under Constitution of India**

- Fundamental Right of Education, Commercialization of Education and its impact.
- Reading Directive Principles and Fundamental duties in to Fundamental Rights.
- Free Press and Independent Judiciary.
- Right to Information as a Fundamental Human Right : Constitutional, Legislative and Judicial Response.
- Basic Structure of Indian Constitution : Doctrine of Constitutionally Controlled Governance (From *Kesavananda Bharti* to *I.R. Coelho*).

**3. Modern Approach of Legal Philosophy**

- Relevance of following theories in modern Indian Legal System :
  1. Classical Natural Law Theory;
  2. Austinian Philosophy of Law;
  3. Kelsen's Pure Theory of Law;
  4. Doctrine of Social Solidarity;
  5. Doctrine of social Engineering;
  6. Modern American Realist Theory;
  7. Economic Approach of Law;

**4. Modern Challenges to Legal Formalism**

- Recent Legal Theories.
- Critical Legal Studies.
- Feminism.
- Postmodernism.

**5. Criminology and Penology**

- Crime Punishment and Sentencing in Indian Perspectives.
- Criminal Justice in India : Primitivism to Post- Modernism.
- Concept of Death Punishment.

**6. Application of Technology in Law**

- Information Technology Act, 2000.
- Automation and Legal Aspects.
- Biotechnology and Law.

**7. Climate Change and Sustainable Development**

- National Policies and Legislation.
- Environment Protection Measure.
- Measures for Economic and Social Development.

**8. Intellectual Property Rights**

- Right to Personal Freedom in Digital Environment : A Copy Right Perspective.
- Protection of Trade Secrets and Undisclosed Information : Law and Litigation
- Stem Cell Patenting-Law and Policy.
- Protection of Copyright Through Law in Internet Age-New Challenges.



# **LIFE LONG LEARNING & EXTENSION**

## **Paper II: Advance level theory and Research Methods**

### **Unit -1: Conceptual Framework of Adult, Continuing Education and Extension**

- Extension Education: Concept, objective, Component,
- Difference between formal education and extension education
- Approaches and Models of Extension
- Extension in Development: Role of Extension in Development, Development aspects of extension, Characteristics of extension, Role of Extension in developing countries.
- Rural Extension and Methods

### **Unit -2: Current Trends in Adult and Extension Education in India**

- Major Shifts in Policy Approaches to Adult Education
- Saakshar Bharat - Objectives, Target and Approach of Saakshar Bharat
- Teaching-Learning Programmes
- Current Trends: Education for All by 2015, Jan Shikshan Sansthan, Dakar Declaration 2000, Right to Education Act 2010
- Mass Programme for Functional Literacy, National Literacy Mission.
- Illiterates, Neo-literates and Semi-literates.

### **Unit -3: Psychological Foundation of Extension Education**

- Motivation: Concept, Types and theories of motivation
- Personality: nature, Definition and types. Personality assessment; Projective and Non-Projective Techniques.
- Adults Learning: Concept, nature and Theories of adults learning.
- Attitude: Nature, Formation and Measurement.

### **Unit -4: Community Development**

- Changing Concept of Community
- Understanding and working with the Community
- Community development - Origin, meaning, Principles and Models
- Approach and Theories of community development.
- Community Health
- PRA

### **Unit -5: Emerging Learning Resources**

- MOOC
- SWAYAM
- OER

### **Unit -6: Educational Technology Relater to extension education**

- Multimedia approach in Teaching and Learning
- Multimedia: Concept and Meaning- Text, Graphic, Animation, Audio, Video and their applications.

### **Unit -6: Emerging Research Trends and issues in Extension Education**

**BIOCHEMISTRY**  
**BIOTECHNOLOGY**  
**LIFE SCIENCES**  
**MICROBIOLOGY**

## Paper II: Advance level theory and Research Methods

### 1) Separation Techniques:

- (i) **Solvent extraction:** Efficiency of extraction, Selectivity of extraction, Extraction systems. Extraction of uncharged metal chelates. Solvent extraction by flow injection analysis, Methods of extraction and its applications.
- (ii) **Solid phase extraction:** Solid phase sorbents, Extraction formats, Automated Solid Phase Extraction (SPA) and Microextractions (SPME), Applications of SPA and SPME.
- (iii) **Chromatography:** Gel filtration (size exclusion chromatography), TLC, HPTLC, GC and HPLC (Principle, Design and Applications), Examples from basic and applied studies.
- (iv) **Electrophoresis:** Agarose and Polyacrylamide gel electrophoresis (Native and Denatured), Isoelectric Focusing, 2-D Gel electrophoresis, Density gradient electrophoresis, PFGE (Principle, Design and Applications), Examples from basic and applied studies.
- (v) **Centrifugation:** Ultracentrifugation (Principles, Types of rotors, Preparative and analytical), Differential, Density Gradient, Rate zonal and Isopycnic sedimentation and Application examples from Life Sciences.
- (vi) **Membrane techniques:** Ultrafiltration (Tangential flow separation)

### 2) Spectroscopy:

UV-visible spectrophotometry, Fourier Transform Infrared Spectroscopy, Atomic Absorption Spectroscopy, Spectrofluorometry and Liquid Chromatography-Mass Spectroscopy (Principle, instrumentations and applications), Examples from basic and applied studies.

### 3) Immunological methods:

Production of antibodies from laboratory animals. Principle, Methodology and Applications of Radioimmunoassay (RIA), Fluorescent Immunoassay, Immunoelectrophoresis, ELISA (Direct, Indirect, Sandwich).

### 4) Techniques in Molecular Biology:

Southern, Western and Northern Blotting - Hybridization Techniques Polymerase Chain Reaction and its applications, DNA sequencing methods (Sanger, Maxam and Gilbert), Sequencing strategies

### 5) Homogenization techniques:

Methods and applications of Ultrasonication and Homogenization in basic and applied studies

### 6) Advance visualization techniques (Microscopy)

Electron microscopy (TEM, SEM and STM) and Cryoelectron Microscopy. (Transmission Scanning and Scan Tunneling Microscopy) Atomic force Microscopy, X-Ray, Microscopy Scanning Probe Microscopy. Super Resolution Microscopy, Fluorescence Microscopy (including FRAP, FLIP, FRET, FCS)

### 7) Emerging research trends and issues in Life Sciences

Stem cells research, Enzyme Based New Technologies, Biosensor, Immunotherapies, Contract Research Organization, Innovative Management of dreaded diseases (i.e. cancer and HIV AIDS) Transgenics, Molecular farming, Molecular Medicine, Gene silencing etc.

## References:

- Principles & Techniques of Biochemistry & Molecular Biology Seventh Edition by K. Wilson and J. Walker. Cambridge University Press, Cambridge (2010).
- Principles and Practice of Analytical Chemistry, Fifth Edition by F.W. Fifield and D. Kealey. Blackwell Science Ltd., Cambridge, UK (2000).
- Physical Biochemistry: Applications to Biochemistry and Molecular Biology, Second Edition by D. Freifelder. W.H. Freeman and Company, New York (1999).
- Biophysical Chemistry. By Nath, Upadhye and Upadhye. Himalaya Pub Co., Nagpur (2000).
- Biophysical Chemistry. By Kalsi and Mahanta, New Age International (2011).

# **MATHEMATICS**

## Paper II: Advance level theory and Research Methods

### Unit 1

#### 1. Real Analysis.

Cardinal numbers and their arithmetic, Schroeder-Bernstein theorem, Cantor's theorem and the continuum hypothesis, Poset, Axiom of choice, Zorn's lemma, well ordering theorem.

#### 2. Complex Analysis.

Riemann mapping theorem, Univalent functions, Area theorem, Bieberbach theorem, Koebe's 1/4-theorem, Distortion theorems, Convex and starlike functions, Coefficient estimates.

### Unit 2

1. **Topology.** Nets and filters, Topology and convergence of nets, Hausdorffness and nets, Compactness and nets, Filters and their convergence.

2. **Approximation Theory.** Types of approximations, Weierstrass approximation theorem, Jackson theorem, Lagrange's interpolation, Hermite interpolation, Hermite Fejer interpolation, Lacunary interpolation.

### Unit 3

#### 1. Algebra.

Canonical forms, triangular form, Nilpotent transformations, Jordan canonical form, Rational canonical form, Unitary and normal operators, Forms on inner product spaces, Positive form.

#### 2. Special Functions.

Generalised hypergeometric functions and their convergence, Elliptic and theta functions.

### Unit 4

**Choose any two of the following four topics**

1. **Ordinary & Partial Differential Equations.** *System of the First Order Equations* –' Solution of linear system, Basic theory of system of first order linear equations, Linear homogeneous system, Fundamental matrices, Non-homogeneous linear system. *Single First Order Partial Differential Equations:* Semi-linear and quasi-linear equations, Characteristics Cauchy problem, General solutions.

2. **Fluid Dynamics.** *Flow through Porous Medium:* Porous medium, porosity, Effective porosity, Structure and packing, Porosity measurement, Permeability, Seepage velocity, Equation of continuity, Darcy's law, Brinkman equation, Hydrodynamic boundary conditions.

3. **Operations Research.** Linear programming, Inventory control and related models, Queuing theory, Network analysis, CPM and PERT models.

4. **Discrete Mathematics.** Mathematical logic vs. automatic theorem proving, Lattice theory and theorems, Boolean algebra and logic circuits related to real life models. *Graph theory:* Various models like coloring graphs, connectivity, networks and related algorithms.

### Reference Books :

Unit-1: (1) H.L. Royden : Real Analysis

(2) R.R. Gold Berg : Methods of real Analysis, new age international.

(3) A.W. Goldsman : Univalent functions, Vol. I & II, Mainer Publ.Co.

(4) S. Pannusamy : Foundations of complex Analysis, Narasa Pub. Hour.

(5) Z. Nehari : Conformal Mappings, Dover Pub.

Unit-2: (1) K.D. Joshi : Introduction to General Topology, Wiley Eastern Ltd.

(2) J.R. Munkes : Topology, Pearson, 2015.

(3) E.W. Cheney, Jain Iyenger Jain : Introduction to Numerical Analysis.

(4) S.S.Shastri : Numerical Analysis.

Unit-3: (1) Vivek Sehail & Vikas Bisht : Linear Analysis, Narota

(2) I.N. Harstein : Topics in Algebra.

(3) Hoffman & Kunge : Linear Algebra.

(4) E.D. Rainville : Special Functions, Chelses Publishing Co., 1971.

(5) M.A. Pathan, V.B.L. Chaurasia, P.K. Bannerji & M.C. Goyal : Special Functions and calculus of variations, Ramesh Book Depot, New Delhi.

Unit-4: (1) Earl A. Coddington : An Introduction to ordinary Differential Equations, Prantice-Hall of India, 2001.

(2) G.F. Simaons : Differential Equations with Applications, Tata Mecaraw Hill, Pub.Co., 1985.

(3) S.Ahmad & M. Rama Mohana Rao : Theory of ordinary Differential Equations, Affiliated East West Press Pvt. Ltd.

(4) Donald A. Nield & Adriom Begam : Convection in Porous Media, Springer.

(5) Jacob Bear : Dynamics of Fluids in Porous media, Springer.

(6) H.A. Taha : An Introduction to operations Research, Macmillan Pub.Co. Inc, NY.

(7) F.S. Hiller & G.J Lieberman : Introduction to operations Research (VI Edu.), M.C. Graw Hill Pub.Co, 1995.

(8) Uday Singh Rajput : Advance Discrete Mathematics, P.H.I.

(9) Kenneth H. Rosen : Discrete Mathematics & Its Applications,

# **MEDICAL BIOCHEMISTRY**



## **Paper II: Advanced Medical Biochemistry**

- Composition and functions of cell and subcellular organelles. Plasma membrane structure, chemical composition and functions. Transport mechanism across the plasma membrane.
- Organization of eukaryotic genome, nuclear and organelle genes, concept of genome mapping, molecular evolution, cell development and differentiation.
- Prokaryotic and eukaryotic gene regulation, RNA editing, gene transfer in animals, application of genetic engineering in different fields. Site directed mutagenesis, gene targeting and gene therapy, in recombinant DNA Technology.

### **Instrumentation in Medical Biochemistry**

Principles working & applications of colorimetry, spectrophotometry, Ultracentrifugation, Ultracentrifugation, fluorescence, X-ray diffraction, flame Photometer, Auto analyzer, Nuclear Magnetic Resonance, ESR spectroscopy, atomic absorption spectroscopy, Plasma emission spectroscopy, Gas Chromatography High Performance Liquid Chromatography, Electrophoresis Molecular Diagnostics, Immunological and Radioisotope Techniques. Principles, techniques and applications: moving boundary and zone electrophoresis, capillary electrophoresis, paper and gel electrophoresis (PAGE, agarose and pulse field gel electrophoresis) Isoelectric focusing.

### **Techniques in Medical Biochemistry**

- Isolation and purification of protein from blood & tissue source.
- Molecular Diagnostics & Genetic Techniques – DNA hybridization techniques, Southern, Northern & Western blots, Restriction fragment length, polymorphism, polymerase chain reaction (PCR), RT-PCR., ELISA, RIA and Hybridoma technology, autodiography, X-ray crystallography, Flow cytometry, Bio sensors, basic technique, enzymes electrode, microbial bio sensors, effect of radiation on biological systems.

**Books recommended:**

1. Voet D., Voet J.G, Biochemistry 4th Edition. John Wiley and Sons, 2011.
2. Nelson, D. C. and Cox, M.M., Lehninger Principles of Biochemistry, 5th Edition, W. H. Freeman, 2010.
3. Berg J.M., Tymoczko J.L. and Stryer L., Biochemistry. 7th edition, W.H. Freeman and Co. New York, 2011.
4. Molecular biology by Robert F. Weaver McGraw-Hill 4 edition (2007)
5. Advanced molecular biology by R. M. Twyman, (1998)
6. Genes VII by B. Lewin Oxford University Press, Cell Press, London (2000)
7. Gene cloning by TA Brown
8. Molecular Biology of the Gene VI by Watson, J. D., Baker T.A., Bell, S. P., Gann, A., Levine, M., and Losick, R.
9. Principles & Techniques of Biochemistry and Molecular Biology by Keith Wilson and John Walker.
10. Immunohistochemistry: Basics and Methods by Igor B. Buchwalow, Werner Bocker.

# MEDICAL LABORATORY TECHNOLOGY

## **Pre-Ph.D. Course work**

### **Medical Laboratory Technology**

#### **Paper-II**

##### **Unit-I- Lab Safety and Security**

Biomedical Waste Management, Collection of specimens, Healthcare Associated Infections, Hand Hygiene, Vehicles and Vectors, Laboratory Test for Diagnosis of infectious diseases, Opportunistic infections, Oncogenic viruses, Emerging and re-emerging infections.

##### **Unit-II- Sterilization and Disinfection**

Agents used for sterilization/disinfections, physical agents, chemical agents. Testing of disinfectants, Spaulding's classification of Medical devices, Decontamination, Rideal walker Test, Phenol Coefficient, Sterilization of plastic wares, glassware, culture media and culture methods, constituents of culture media, types of culture media, Preservation of microorganism, Methods of culture, isolating bacteria in pure cultures.

##### **Unit-III- Immunological and other techniques**

ELISA-Techniques and application, Immunohistochemistry- Techniques and applications, Spectrometry- Principle and applications, Electrophoresis- Principle and applications, RIA- Principle and applications, Auto analysers-principle, types and applications, Dry chemistry analysers, Minividas analysers, Latest trends in automation

##### **Unit-IV- Applied Microbiology**

Nosocomial infections, Blood stream infections, Respiratory tract infections, Infection Control, Major hospital acquired infection-surveillance and prevention. Needle stick injury- prevention and management. Normal Microbial flora of human body.

##### **Unit-V- Clinical Microbiology**

Acute rheumatic fever, Infective endocarditis, Diarrhoea and dysentery, Enteric fever, Food poisoning, Anaerobic infections, Urinary tract infections, sexually transmitted diseases.

##### **Unit-VI- Haematological disorders**

Anaemia- Definition, types and pathophysiology. Leucocyte disorders- Leukamoid reaction- type of leukamoid & diagnosis, Myelodysplastic Syndrome(MDS)- Definition, Clinical features, peripheral smears & bone marrow findings. Leukemias- Definition & classification.

## MUSIC

## **Paper II: Advance level theory and Research Methods**

### **HINDUSTANI MUSIC**

#### **(a) Research in Music**

1. Importance of the following in research in music:
  - (a) Manuscripts and Books
  - (b) Journals and Magazines
  - (c) Sculpture
  - (d) Paintings & Frescoes
  - (e) Archaeological findings
  - (f) Inscriptions
  - (g) Musical Pillars and Stones
  - (g) Museums
  - (h) Coins
2. Study of the following sources:
  - (a) Musical composition
  - (b) Oral tradition
  - (c) Gramophone records- electronic devices, discs and tapes, computer
  - (d) Media- Print and electronic
  - (e) Academic councils.

#### **(b) Theory of Indian Music**

1. Swara, Shruti, Mela, Raga, Gamak, Sthaya, Kaku, Rasa Theory, Principles and significance of aesthetics in Hindustani Music, Modern Trends in Hindustani Music.
2. Gram - Murchhana, Nibaddha-Anibaddha, Tala, Musical instruments.
3. Schools of vocal (Dhrupad/Khyal) and instrumental music and their styles.
4. Inter-relationship between classical music and folk music.
5. Appreciation and criticism of music.
6. Music as an aided therapy.
7. Other forms of music: Light classical (Thumri, Dadra), Devotional music (Bhajan, Kirtan), Film Music, Fusion music, Light music (Geet, Ghazal)

#### **Recommended Books:**

1. Survey Research Methods - Floyd. J.F., Sage Publications, New Delhi.
2. Methods in Social Research - Goode C.V. & D.E. Scates, McGraw Hill, 1954.
3. The Art Heritage of India - Havell. E.B; D.B Taraporevala Sons and Co. Pvt. Ltd. 1964.
4. Ragamala Paintings, Kaus, Ebling, Kumar gallery, New Delhi, 1973.
5. Research Methodology, Misra R.P, Concept publishing company, New York, 1989.
6. Exploring research, Salkind N.J., Printice Hall, New Jersey, 1997.
7. Advanced Research Methodology, Srivastava, G.N.P. Radha Publications, New Delhi, 1994.
8. The Elements of Research, Whitney F.L., Printice Hall, New York, 1950.
9. Research Methods in Indian Music, Prof. Najma Perveen Ahmad, Manohar Publishers and Distributors, New Delhi.

10. Research Methodology: Methods and techniques, C.R. Kothari, Wiley Eastern Ltd. New Delhi, 1985.
11. Sources of research in Indian Classical Music, Dr. Ms. Reena Gautam, Kanishka Publishers, New Delhi, 2002.
- 12 Research Methodology, Dr. Madan Mohan Lavaniya, College Book House, Jaipur, 1985. (In Hindi)
13. "ShodhPravidhi" Dr. Vinaymohan Sharma, National Publishing House, Delhi, 1980 (In Hindi)
14. Research Methodology, Dr. B.M. Jain, Research Publications, Jaipur, 1987 (In Hindi)
15. Sangeet Ratnakar - Sarangdeva
16. Sangeet Ratnakar - R.K. Shringy & Premlata Sharma
17. Sangeet Parijat - Ahobal
18. Brihaddeshi-Vol.I & II – Matang
19. Natyashastra - Bharat
20. Evolution of Raga and Tala in Music - M.R. Gautam
21. Time measure and compositional types in Indian Music - Dr. Subhadra Chaudhury
22. Bhartiya Sangeet Mein Mela Athawa That Ka Aitihāsik Adhyāyan - Dr. Shobha Mathur (in Hindi)
23. Classical Musical Instruments - Dr. Suneera Kasliwal
24. Bhartiya Sangeet Mein Taal Aur Roopvidhan - Dr. Subhadra Chaudhary (in Hindi)
25. Raga Ki Utpatti Evam Vikas - Dr. Sunanda Pathak (in Hindi)
26. Bhartiya Talon Ka Shastriya Vivechan - A.K. Sen (in Hindi)
27. Bhartiya Shastriya Sangeet Evam Saundarya Shastra - Prof. Anupam Mahajan (in Hindi)
28. Ragas in Indian Classical Music (Conceptual aspects) - Prof. Anupam Mahajan
29. Significance of compositional forms - Prof. Manjushree Tyagi
30. Rasa Siddhanta - Dr. Nagendra
31. Musical Heritage of India - M.R. Gautam
32. Indian Musical Tradition - V.H. Deshpande
33. Rasa Siddhanta - Dr. Prem Lata Sharma
34. Natyashastra - Vol. IV, Gackwad's oriental series, Manmohan Ghosh, Bharat.
35. Brihaddeshi - Vol. I & II - Edited by Dr. Premlata Sharma
36. Sangeet Ratnakar - Vol. I & II - English Translation by Dr. R.K. Shringy & Dr. Premlata Sharma, Sarangdev.
37. Musical Heritage of India - M. R. Gautam
38. Bhartiya Sangeet Me Tala Aur Roopvidhan - Dr. Subhadra Chaudhary (in Hindi).
39. Sangeet Sanchayan - Dr. Subhadra Chaudhary (in Hindi)
40. Time measure and compositional types in Music - Dr. Subhadra Chaudhary.
41. Musical Instruments of India - B.C. Deva
42. Bhartiya Sangeet me Vadya - Lalmani Mishra
43. Classical Musical Instruments - Dr. Suneera Kasliwal
44. Indian Musical Tradition - V.H. Deshpande
45. Gharanedar Gayaki - V.H. Deshpande
46. A history of Musical Instruments - Curt Sachs
47. Journal of the Sangeet Research Academy
48. Dhrupad Annual
49. Journal of the Indian Musicological Society
50. Sangeet ke Gharano Ki Charcha - Sushil Kumar Chaubey
51. Swar aur rago ke vikas me vadyon ka yogdaan - Prof. Indrani Chakraborty
52. Sangeet Manjusha - Prof. Indrani Chakraborty
53. Music, its methods and techniques of teaching - Prof. Indrani Chakraborty.
54. Tan-Tantri, Man-kinnari - Prof. Indrani Chakraborty.

# **PERCUSSION MUSIC (TABLA/ PAKHAWAJ)**

## **(a) Research in Music**

Importance of the following in Research in Music:

1. (a) Manuscripts and Books
  - (b) Journals and Magazines
  - (c) Sculpture
  - (d) Paintings & Frescoes
  - (e) Archaeological findings
  - (f) Inscriptions
  - (g) Musical Pillars and Stones
  - (h) Museums
  - (i) Coins
2. Study of the following sources:
  - (a) Musical composition
  - (b) Oral tradition
  - (c) Gramophone records- electronic devices, discs and tapes, computer
  - (e) Media- Print and electronic
  - (f) Academic councils.

## **Recommended Books**

1. Survey Research Methods -Floyd. J.F., Sage Publications, Canada, 2014.
2. Methods in Social Research- Goode C.V. & D.E. Scates, McGraw Hill, 1954.
3. The Art Heritage of India- Havell. E.B; D.B Taraporevala Sons and Co. Pvt. Ltd. 1964.
4. Ragamala Paintings - Kaus, Ebling, Kumar gallery, New Delhi, 1973.
5. Research Methodology - Misra R.P, Concept publishing company, New York,1989.
6. Exploring research - Salkind N.J., Printice Hall, New Jersey, 1997.
7. Advanced Research Methodology - Srivastava, G.N.P. Radha Publications, New Delhi, 1994.
8. The Elements of Research - Whitney F.L., Printice Hall, New York, 1950.
9. Research Methods in Indian Music - Prof. Najma Perveen Ahmad, Manohar Publishers and Distributors, New Delhi, 2002.
10. Research Methodology - Methods and techniques, C.R. Kothari, Wiley Eastern Ltd. New Delhi, 1985.
11. Sources of research in Indian Classical Music -Dr. Ms. Reena Gautam, Kanishka Publishers, New Delhi, 2002.
12. Research Methodology - Dr. Madan Mohan Lavaniya, College Book House, Jaipur, 1985. (In Hindi)
13. Shodh Pravidhi - Dr. Vinaymohan Sharma, National Publishing House, Delhi, 1980 (In Hindi)
14. Research Methodology - Dr. B.M. Jain, Research Publications, Jaipur, 1987 (In Hindi)

## **(b) Theory of Indian Tala system and historical development of Avanaddha vadyas**

- (1) Detailed study of Margi & Deshi Talas.
- (2) Detail study of Pataksharas from Natyashatra to modern times.
- (3) Detail study of Tala's Dasha Pranas.
- (4) Rasa theory of Natyashstra and its modern context.
- (5) Talas of Medieval and Modern Period with their basic differences.
- (6) Comparative study of Tala system of North & South India.
- (7) Western time signature.
- (8) Detailed study of Layakari.
- (9) Detailed study of Percussion Instruments described in Natya Shastra &Sangeet Ratnakar.
- (10) Detailed study of Origin &Development of Tabla, Pakhawaj & Mridangam.



- (11) Study of playing techniques of Tabla, Pakahwaj, Mridangam & two major folk instruments - Dholak & Naqqara.
- (12) Classification of Instruments - Tat, Avanaddha, Ghana and Shushir.
- (13) Merit and Demerits of Vocalist, Instrumentalist, Percussionist described in Sangeet Ratnakar.
- (14) Main characteristics of Gharanas of Tabla & Pakahawaj with their playing techniques.
- (15) Inter-relationship between classical and folk percussion instruments.

### **Recommended Books**

1. Sangeet Ratnakar - Sarangdeva (Adayar edition), The Theosophical Society, Adyar, Madras-20, 1951
2. Sangeet Ratnakar- R.K. Shringy, Premata Sharma & Shubhadra Chaudhuri, Munshiram Manoharlal Publishers Pvt. Ltd., New Delhi-110055,1989
3. Bhartiya Sangeet Mein Rup Evam Taal Vidhan- Dr.Subhadra Chaudhuri, Krishna Brothers, Ajmer - 305001, 1984
4. Natyashastra - Bharat - Babulal Shukla Shastri, Chaukhamba Sanskrit Sansthan, Varanasi- 221001, RP-2009
5. BhartiyaTaloonaKa Shastriya Vivechan - Dr. Arun Kumar Sen, Madhya Pradesh Hindi Granth Academy, Bhopal, 1973
6. Taal Prabhand - Pt. Chhote Lal Mishra, Kanishka Publishers, Distributors, Darya Ganj, New Delhi- 110002, 2006
7. Bhartiya Sangeet Vadya - Dr.Lalmani Mishra, Bhartiya Jnanpith, Lodhi Road, New Delhi-110003, SE-2002
8. Classical Musical Instruments -Dr. Suneera Kasliwal, Rupa & Co., Ansari Road, Darya Ganj, New Delhi-110002, 2001
9. History of Musical Instruments - Curt Sachs, J.M. Dent & Sons Ltd, London, 1940
10. Musical Instruments of India - B.C. Deva, Munshiram Manoharlal Publishers Pvt. Ltd., New Delhi-110055, 1987
10. Natyashastra - Vol. IV, Gackward's Oriental Series, Manmohan Ghosh, Bharat, Oriental Institute, Baroda, 1964
11. Brihaddeshi Vol I & II Edited by Dr. Premata Sharma, Munshiram Manoharlal Publishers Pvt. Ltd., New Delhi-110055, 1989
12. Sangeet Ratnakar Vol. I & II English translation by Dr. R.K. Shringy & Dr. Premata Sharma, Sarangdev, Munshiram Manoharlal Publishers Pvt. Ltd., New Delhi-110055, 1989
13. Taal Prabandh : Pt. Chhotelal Mishra, Kanishka Publishers, Distributors, Darya Ganj, New Delhi- 110002, 2006
14. Bharat ka Ras Siddhant - K.C.D. Brihaspati, Vanaspati Publication, Munirka, New Delhi, 110067, SE, 1989
15. Sangeet Sanchalan- Subhadra Chaudhury, Krishna Brothers, Ajmer-305001, 1989
16. Musical instruments of Indian - B.C. deva, Munshiram Manoharlal Publishers Pvt. Ltd., New Delhi-110055, Third Edition - 2000
17. Bharatiya Sangeet Vadhya- Lalmani Mishra, Bhartiya Jnanpith, Lodhi Road, New Delhi-3, SE, 2002
18. Classical Musical Instruments- Dr. Suneera Kasliwal, Rupa & Co. Ansari Road, New Delhi- 110002, 2001
19. A History of Musical Instruments- Curt Sachs, J.M. Dent & Sons Ltd., London, 1940
20. Bhartiya Sangeet Mein Rup Evam Taal Vidhan: Dr. Subhadra Chaudhuri, Krishna Brothers, Ajmer - 305001, 1984
21. Tabla vadya Shastra - Author – Bhal Chand Marathe

# **HORTICULTURE**

# C.S.J.M. University, Kanpur

## Pre Ph.D. Course Syllabus

### Paper II Horticulture

#### **Unit-1**

Define horticulture, scope, importance and different branches of horticulture. Principles and elements of landscaping, garden styles and designs.

#### **Unit-2**

Area and production of fruits, climatic and soil requirements, cultivation practices of major fruit crops like mango, citrus, banana, grape, papaya, litchi, guava, pineapple, jackfruit, sapota, cashew nut, coconut, ber, pomegranate, date palm, aonla, underutilized and minor fruit crops, temperate fruits like apple, pear, peach, plum, cherry; Physiology of growth and development of fruit crops; modern methods of propagation including micro propagation and use of growth regulators in fruit crops; Canopy management; rootstocks and high density orcharding; Nutrient and water management; use of bio-fertilizers and bio-agents for safe fruit production.

#### **Unit-3**

Area and production of vegetable crops in India, climatic and soil requirements, seed production techniques in vegetable crops and related problems, origin, classification, cytogenetic, floral biology and breeding behavior of different vegetables; methodology for the improvements of different self-and cross-pollinated vegetable crops including breeding for disease and insect resistance; Role of different nutrients, their deficiency symptoms and remedial measures; improved vegetable production technology.

#### **Unit-4**

Importance and scope of Floriculture and ornamental gardening in India. Study of annuals, shrubs, climbers, trees, foliage plants, cacti, succulents, palms, ferns, bonsai and their suitability in landscaping. Propagation techniques including tissue culture in ornamental plants, turf grass management, origin, floral biology classification of different flower crops, factors affecting growth and flowering of ornamental plants.

Seed production and biotechnology in Flower. Pre and post harvest factors affecting life of flower, post harvest management of flower, value addition in flower crops, flower arrangement. Role of growth regulators in production of flower crops.

#### **Unit-5**

Post harvest management of horticulture produce-maturity indices, handling, packaging, storage-methods and structures; Post harvest treatments (HWT, VHT, irradiation, bioagents); Novel molecules (Salicylic acid, nitric oxide, 1-MCP); Post harvest diseases, disorders and their management; Various methods of fruit and vegetable preservation: heat processing, dehydration, refrigeration, freezing and chemical preservation, hurdle technology etc; Advances in food processing techniques: microwave heating, vacuum impregnation, HPP, PEF, Ultrasonic; Processed horticultural products and packaging; Spoilage of processed products; Food quality evaluation techniques; Food contaminants, Food safety & standards; Utilization of horticultural wastes.

#### **Practical-**

Survey of existing fruit cropping system and development of a model cropping system. Estimating nutrient deficiency. Design of Green house, low cost poly tunnels net house, Regulation of light in green house, Media in Green House. Visit of Green House, Commercial nursery of fruit, Vegetables and ornamental crops. Visit of Preservation industries. Practice of Packaging of fruit, Vegetable and Ornamentals crops.

# C.S.J.M. University, Kanpur

## Pre Ph.D. Course Syllabus

### Paper II Horticulture

**Objective:** To update knowledge on the recent research trends in the field of horticulture with special emphasis on fruits, vegetable and ornamental crops and their post harvest management.

#### **Theory-**

##### **Unit-1**

National and International Scenario in fruit production. Recent advances in Propagation- root stocks influence, planting system, High density planting, crop Modeling and Precision farming. Modern approaches in water and nutrient management.

##### **Unit-2**

Recent advance is improvement of fruit crops like Mango, Banana, Papaya, Citrus, Grape, Guava, Papaya, Aonla, Ber, Beal, Pine apple, Apple, Pear, Peach and Straw berry.

##### **Unit-3**

National and International Scenario in Vegetable production. Recent advance in production of crops like Potato, Tomato, Chilli, Brinjal, Cauliflower, Okra, Pea, Bottle guard, Bitter Guard, Pumpkin, Musk Melon, Water Melon and Pointed Guard. Protected Cultivation of Vegetable Crops.

##### **Unit-4**

National and International Scenario of Ornamental crops and flowers. Recent advances in Production of Rose, Gladiolus, Marigold, Chrysanthemum, Canna, Bougainvillea, Gerbera, Carnation, Tuberose and Jasmine. Protected cultivation of flowers.

##### **Unit-5**

Recent advances in Post-harvest Technology of fruit, vegetable and flowers. Pre-harvest treatments in relation to post harvest quality of Horticulture produce. Bio-chemical changes in fruit and Vegetable with special reference to ripening, role of ethylene, respiration and transpiration. Various methods of fruit and vegetables preservation, heat processing, Dehydration, freezing and chemical preservation. Advance in food processing techniques: Microwave, heating vacuum impregnation. Recent methods of packaging, plastic film wrapping, pre cooling, Packaging and marketing of fruits, vegetables and ornamental Plants. Flower products, essential oil and pigments extraction, purification and marketing.

#### **Practical-**

Survey of existing fruit cropping system and development of a model cropping system. Estimating nutrient deficiency. Design of Green house, low cost poly tunnels net house, Regulation of light in green house, Media in Green House. Visit of Green House, Commercial nursery of fruit, Vegetables and ornamental crops. Visit of Preservation industries. Practice of Packaging of fruit, Vegetable and Ornamentals crops.

# PHARMACY

**PHARMACEUTICAL SCIENCES**

**PAPER II**  
**ADVANCES IN PHARMACEUTICAL SCIENCES**  
**Total Hours : 64 Hrs.**

**Unit I** **12 Hr**

**a) Extraction and isolation Techniques**

Introduction, principle, and applications of different extraction and isolation methods : Extraction Techniques : Soxhlet assisted extraction, ultrasound assisted extraction, super critical fluid extraction, microwave assisted extraction, enzyme assisted extraction.

**b) Introduction to Novel herbal formulations**

Phytosomes, Liposomes, Microspheres, novel vesicular herbal formulation, Nanotechnology based formulations.

**Unit II** **9 Hr**

**a) In-vitro Experimentation Techniques:** Animal cell lines and their uses, radioligand binding assay, patch clamp, ELISA.

**b) Molecular Techniques:** PCR, blotting, immunostaining, RIA

**Unit III** **14Hr**

**a) Oral Controlled drug delivery systems:** Design and fabrication of diffusion controlled, dissolution controlled, osmotic, gastro-retentive delivery systems, biodegradable polymeric delivery systems. Controlled drug delivery polymers, roles of polymers in drug delivery, pharmacokinetic/ pharmacodynamic basis of oral controlled drug delivery.

**Unit IV** **12 Hr**

**a) Determination of LD50, Acute, sub-acute and chronic toxicity studies, Therapeutic index, OECD guidelines.** Cell line toxicity Screening methods for evaluation of anti-inflammatory, analgesic, anticancer, anti-ulcer and anti-diabetic activity.

**Unit V** **17 Hr**

**Chromatographic and Spectroscopic techniques**

**a) HPLC, HPTLC, Gas Chromatography**

**b) Basic concepts of spectroscopy (UV, IR, NMR and Mass) with special focus on interpretation of spectral data**

# PHILOSOPHY

## **Paper II: Advance level theory and Research Methods**

### **Unit-I: Research Methods in Philosophy**

#### **a) Methods in Indian Philosophy**

- Dialogical Method
- Middle way approach
- Method of *Apohvada*
- Method of *Syadvada*
- Method of *Pratyakshavada*

#### **b) Methods in Western Philosophy**

- Method of Rationalism
- Method of Empiricism
- Method of Criticism
- Method of Hermeneutics

### **Unit-II: Indian Epistemological Problems**

- ❖ Nature of knowledge, Source of Knowledge, Justification of Knowledge, Limits of human knowledge (Orthodox and Heterodox systems of Indian Philosophy)

### **Unit - III: Indian Metaphysical Problems**

- ❖ Materialism, Spiritualism, Dualism, Monism, Pluralism, Problem of causality, *Satkaryavada*, *Asatkaryavada*, *Pratityasamutpada*, *Vivartavada*, *Parinamavada*.

### **Unit-IV: Indian Ethical Problems**

- ❖ *Karma* and *Punarjanma*, Idea of Good - with reference to *Nyaya*, *Mimamsa*, and *Vedanta*, *Nishkama Karma yoga* of Gita, Truth and Non-violence of Mahatma Gandhi, Ethics of Jainism and Buddhism.

### **Unit - V: Western Ethical Problems**

- ❖ Nature and object of moral judgment, Ethical standards – Hedonism, Utilitarianism, Intuitionism, Ethics of Kant, Theories of Punishment, Environmental Ethics.

### **Unit - VI: Greek and Medieval Philosophy**

- ❖ Pre Socratic Philosophers and Socrates, Plato and Aristotle, Plotinus, Medieval Philosophy – St. Anselm, St. Thomas Aquinas



## **Unit - VII: Modern Western & Contemporary Philosophy**

Rationalism, Empiricism, Criticism, Logical Positivism, Existentialism, Phenomenology

## **Unit - VIII: Socio-religious Problems**

- ❖ Socialism, Democratic Ideals, Secularism, Constitutionalism, Religious Tolerance, Religious Conversion, Inter-religious dialogue

## **Unit - IX: Systems of Logic**

- a) **Deduction-** Logic and Arguments, Categorical Propositions, Square of opposition, Categorical syllogism, Venn Diagram Technique for Testing syllogisms.
- b) **Induction-** Causal Connections, Mill's Methods of experimental Inquiry, Criticism of Mill's Method.
- c) **Symbolic Logic-** Truth functions, Symbols for Negation, Conjunction, Disjunction, Conditional Statements and Material implication, Tautology, Contradiction and Contingent statement forms, Truth table technique, Logic of relations.

## **Unit-X: Issues in Researches**

- a. Current Research Trends in Philosophy
- b. Ethical Issues in Research and Intellectual Property Rights

## **References:**

1. Introduction to Indian Philosophy - Dutta & Chatterji.
2. A Critical Survey of Indian Philosophy - C. D. Sharma
3. A Critical History of Western Philosophy- Y. Masih
4. Manual of Ethics- J.N. Sinha
5. Social Philosophy- Mackenzie
6. Philosophy of Religion- J. Hick
7. *Darshanik Vimarsh*- Ranjay P. Singh and Nitish Dubey (ed.)
8. Readings in Environmental Ethics- D.C. Srivastava (ed.)
9. Introduction to Logic - I.M. Copi
10. Symbolic Logic- I.M. Copi
11. Indian Philosophy – Volume I&II – Dr. S. Radhakrishnan
12. History of Indian Philosophy – Dr. S. N. Dasgupta

# **PHYSICAL EDUCATION**

**Department of Physical Education and Sports  
C.S.J.M.University, Kanpur**

**Paper-II**

**Subject Specific Syllabus for Ph.D. Course Work**

**Objectives:**

1. To understand the scientific sports training, sports biomechanics, pedagogy in Physical Education and Exercise Physiology & principles and applications
2. To develop attitudes and skills in designing sports training, sports biomechanics, pedagogy in Physical Education, and Exercise Physiology & principles and applications
3. To be better prepared to be a good researcher.
4. To enable student to understand principles of sports training, sports biomechanics, pedagogy in Physical Education, and Exercise Physiology & principles and applications to develop and implement sports training programme and other programmes in the field of Physical Education and Sports Sciences

**Unit 1: Sports Training**

- Introduction and Trends in Sports Training
- Training Methods (Continuous training, Fartlek Training, Circuit Training and Interval Training)
- Training Program (Plyometric Training, Flexibility Training, Weight Training)
- Research Reviews (Minimum Eight) Related to
  - a. Training Methods
  - b. Training Program and Plans
  - c. Talent Identification
  - d. Training Duration

**Unit 2: Sports Biomechanics**

- Introduction and Trends in Biomechanics to Analysis of fundamental Skills and Sports Skills.
- Analysis of Techniques and Training  
Skill Analysis of Various Sports (Athletics Running and Jumping Events), Badminton and Lawn Tennis
- Research Reviews (Minimum Eight) Related to
  - a. Analysis of Techniques and Skills
  - b. Analyzing Methods in Sports
  - c. Sports Equipments and Surfaces
  - d. Videographic analysis in sports

**Unit 3: Pedagogy in Physical Education and Sport**

- Physical Education Curriculum
- The Domains of Developmental Physical Education
- Measuring teaching and its outcomes
- Research Reviews (Minimum Eight) Related to
  - a. Teaching methods/styles
  - b. Curriculum development
  - c. Methods of teaching Physical Education to the people with unique need
  - d. Curriculum Planning

#### **Unit 4 : Exercise Physiology**

- Concept Of Exercise Physiology and New Trends in Exercise Physiology
- Essentials and Energy for Movement
- Environmental Influences Optimizing Performance in Sport
- Research Reviews (Minimum Eight) Related to
  - a. Effect of Different Training Program on Different Systems.
  - b. Effect of Altitude Training on Performance
  - c. Effect of Environmental Training on Performance
  - d. Effect of ergogenic aids on different systems
  - e. Effect of Yoga on Physical and Physiological Variables

#### **Unit 5: Course Related Practical Work, Field Work in Sports Training, Sports Biomechanics, Pedagogy in Physical Education, Exercise Physiology, and Yogic process**

#### **Suggested Readings:**

- Mathew, D. K. and Fox, E. L. (1976). Physiology basis of Physical Education and athletics. Philadelphia: UBS company
- Pearce Evelyn. (1992). Anatomy and physiology for nurces, calcutta: Oxford university press.
- Sedey , Rod R.(1992). Anatomy and physiology. St. louis: Mosby.
- Tortora G. J. (1996). Introduction to Human Body. (4th Ed.)California: Addison Wesley.
- Marieb Elaine N. (1984). Human Anatomy and physiology (3rd Ed.). Cal: The Benjamin Cumming.
- Clarke, H. David exercise physiology.
- William D. Mcardle, Frank I. Katch, and Victor L. Katch Exercise physiology.
- Koley, Shyamal Exercise Physiology.
- Frank J. Corny and Harold .W. Burlon. Exercise physiology for health.
- Hay, J (1981). The Biomechanics of sports techniques. New Jersey: Prentice Hall.
- Bunn, J. W. (1981). Scientific principles of coaching. Englewood: Cliffs. Prentice Hall.
- McGinnis, P. M.(2005).Biomechanics of sports exercises. USA: Human Kinetics.
- Sunderrajan, G.S. Biomechanics of sports and games. Ludhiyana: Tondon Publication.
- Susan, J. H (2003). Basic Biomechanics.(4th Edn.) Mc.Graw Hill Publication.
- Rajlakshmi, D. (2007). Biomechanics for sports and games. Sports Educational Technologies.
- Hoffman, S.J. (2005). Introduction to Kinesiology. Human Kinesiology Publication.
- Uppal. A. K. and Lawrence, M. P. Kinesiology. New Delhi. Friends Publication: India.
- Knudson, D. (2007). Fundamentals of Biomechanics. Chico, USA: Springer Publication.
- Scott, M. G. Analysis of Human Motion. Newyork.
- Siedentop, D. (1991). Developing teaching skills in Physical Education. Ca:Mayfield Publishing company
- Mosston, M., Ashworth, S. (1994). Teaching Physical Education (4th Ed). NY: Macmillan College Publishing Company
- Kelly, L.E., Nelogran, V.J. (2004). Developing the Physical Education curriculum. Champaign, IL: Human Kinetics
- Hopple, C.J. (2005). Elementary Physical Education teaching & assessment- A practical guide. Champaign IL: Human Kinetics
- Singh, H. (1991). Science of sports training. New Delhi: DVS publication
- Uppal. A. K. (2001). Principles of sports training. New Delhi: Friends publication
- Rainer Martens (2005). Successful coaching
- Beachel & Taylor (2006). Essentials of strength training & conditioning

# PHYSICS

## **Paper II: Advance level theory and Research Methods**

### **Unit I**

#### **Elements of computational techniques:**

Solution of Poisson's equation in Cartesian, spherical and cylindrical polar coordinates, Heat and wave equation solution, Numerical differentiation and integration (trapezoidal and Simpson's method), Root finding (bisection and Newton-Raphson method), Interpolation techniques, Solution of ordinary differential equations (Euler and Runge-Kutta methods), Monte Carlo simulation method.

### **Unit II**

#### **Review of Quantum Mechanics:**

Angular momentum formalism, Hydrogen atom problem in spherical coordinates, Angular momentum, addition of angular momentum, Clebsch-Gordon coefficients, Relativistic quantum mechanics, Covariant form of Dirac equation, Dirac gamma-matrices and their properties. Many body problems in quantum mechanics, Spin wave function and exchange interactions and Heisenberg - Dirac Hamiltonian.

### **Unit III**

#### **Condensed Matter Physics:**

Band theory of solids, free electron approximation, tight binding approximation. Quantum theory of magnetism

#### **Laser fundamentals, He-Ne and Nd:**

YAG Lasers, Pockels and Kerr Effects, Electro-optics of an anisotropic media.

Nanoparticles, Size and dimensionality effect, Quantum confinement, Energy levels of electrons in quantum well, quantum wire and quantum dots, Different methods of preparation and characterization of nanomaterials.

### **Unit IV**

#### **Experimental tool and Techniques:**

Need of vacuum, Different pumps for production of low pressure (Rotary, diffusion pumps), Vacuum Gauges (Pirani and Penning), Thermocouples.

Thin film deposition techniques (evaporation, sputtering, MBE, PLD, CVD). Constant voltage and constant current sources, Four probe and two probe method of resistivity measurements.

Principle and applications of powder X-ray Diffractometer, Spectrometer (IR and UV- visible), Fourier transform-infrared (FT-IR) spectrometer, Energy dispersive X-ray analysis, SEM, TEM, AFM and STM.

Emitter follower, DC Differential amplifier, Idea of phase sensitive detection, Lock in amplifier.

Current research trends in physics.

## References:

1. Numerical methods for Scientific and Engineering Computation: M. K. Jain, S. R. K. Iyengar and R. K. Jain (Wiley Eastern Limited)
2. Advanced Engineering Mathematics: Erwin Kreyszig
3. Solid State Physics: Ashcroft and Mermin
4. Quantum Electronics: A. Yariv (Wiley, New York)
5. Quantum Mechanics: N. Zettili (Wiley, New York)
6. Optical Electronics: A. Ghatak & K. Thyagarajan (Cambridge University Press)
7. Elements of X - ray diffraction: B.D. Cullity
8. Handbook of Vacuum Technology: Karl Jousten
9. Materials Science of Thin films: M. Ohring
10. Introduction to Nanoscience and Nanotechnology: K. K. Chattopadhyay and A. N. Banerjee

# **PHYSIOTHERAPY**



# **CSJM University**

## **Syllabus for Pre-Ph.D. Course work**

### **Physiotherapy**

#### **Unit-I**

##### **Equipments used for evaluation in physiotherapy:**

Spiro meter, Dynamometer, Nerve conduction Velocity, Electromyography, Complete electrotherapy unit, Sensory evaluation kit, Audio-visual reaction time, Biofeedback, Bone densitometer, Podia scan, Jumping power board, Skin fold caliper, Sliding caliper

#### **Unit-II**

##### **Clinical assessment tools used for research in physiotherapy**

ADL & IADL, Functional outcome scales, Balance scales, Gait assessment scales, Disability scales, Cognitive assessment scales, Nutritional assessment scales, Spasticity assessment scales, Geriatric assessment tools,

#### **Unit-III**

Manual muscle testing, Aerobic and anaerobic capacity, Sports specific Skills test, Tests used for cardiopulmonary, musculoskeletal and neurological impairments.

#### **Unit –IV**

Recent advancements in rehabilitation of musculoskeletal, neurological, sports and cardiopulmonary physiotherapy (national and international context).

#### **Unit-V**

Women health: Pre & Post-natal rehabilitation program guidelines. Assessment & management for Common women's health issue including Urinary incontinence & menopause.

#### **Unit-VI**

Geriatric physiotherapy: Physiology of Aging, Theories of Aging, and Age related changes in musculoskeletal system, Central Nervous System, Cardio-Vascular system, Respiratory system, Immune system, Metabolic and Temperature related changes, Balance problems.

#### **Unit-VII**

Role of Physiotherapy in a Home for the aged- geriatric care, holistic approach. Role of physiotherapy in palliative care

# **POLITICAL SCIENCE**

## **Paper II: Advance level theory and Research Methods**

**1. Foundation, Approaches and Epistemologies of Political Science Research-** Foundation of political science research, need and purposes of political science research, language of research; philosophy of research; ethics in research in political science. Approaches to research in political science: traditional and behavioral approaches, post-epistemologies: Hermeneutics and Hermeneutics phenomenology (Gadamer and Paul Ricour), Modernity and post modernity (Anthony Giddens, Edward Said, Foucault, Derrida and Spivak), Feminist Methodology.

**2. Political Socio- Geography-** Meaning, Nature and Scope, Political and Political Process, Rise of welfare state, Corporate state, Geographical perspective on nation and nation building.

**3. Political Journalism-** Constitution of India and freedom of press, Mass media and Law, Parliamentary privilege and newspaper, Contempt of court and newspaper.

### **4. Contemporary Political Issues**

**(a) Gender Issues-** Meaning and Nature, Empowerment of Women, Objectives of empowerment of Women, Means of empowerment of Women, Efforts made for empowerment of Women.

**(b) Environmental Issues-** Meaning and Nature, Consequence of Pollution, Environment and Development, Environmental Laws

### **5. Principles of Public Administration**

**(a) Meaning, nature and significance of public Administration**

**(b) Theories of organization, Structural Approach, Humanistic Approach**

**(c) Principles of Organization-** Hierarchy, Span of Control, Unity of Command, Integration v/s Disintegration, Centralization v/s Decentralization

### **6. New phenomena in World Order**

**(a) Globalization-** Meaning and Nature, Characteristics, Globalization of Democracy

**(b) Liberalization-** Meaning and Nature, Principles of Liberalization, Merits and Demerits

### **7. Challenges to Modern Democracy**

**(a) Terrorism-** Meaning and Nature, Objectives of Terrorism, Terrorism v/s Democratic System.

**(b) Human Right Violation-** Human right violation at international and national levels, Role of UNO, Remedies made against human right violation, Political change in Islamic Countries.

### **8. India and International Political Economy**

**(a) Political Economy-** Political economy as a method and approach, evolution and approaches to international political economy: Traditional approaches; Marxian, neo-Marxian, Dependencies. Discourse on comparative economic systems; Economic growth; Development; Backwardness; Reform.

**(b) International and Multilateral Economic Institutions and Developing Countries-** WB,

IMF, GATT to World Trade Organisation (WTO), Political Economy of Regionalism: European Union, Asia Pacific Economic Community (APEC), ASEAN, SAARC.

**(c) Land Reforms in India-** New Agricultural Strategy, Farmers Movements, Rural Indebtedness and landlessness, impact of New Economic policy. Economic reforms, public sector, New industrial policy, Corporate sector, Impact on Labour. Transnational Corporations (TNCs) Non Governmental Organisations (NGOs), Protest Movements.

### **9. Governance and Politics in India**

**(a) Approaches and Perspectives to Indian Political System-** Legal, Historical, Cultural, Rights and Accountability: Rule of Law, Civil and Political Rights, Corruption and Accountability, Institutional Mechanisms.

**(b) Protection for Minorities and Deprived Groups-** Role of Commissions, Special Officer on Linguistic Minorities, National Commission, for Scheduled Castes and Scheduled Tribes, National Human Rights Commission,

Minorities Commission, National Commission for Women. Issues related to ethnic minorities. Politics of Identity. Judicial Review and Judicial Activism in India.

**(c) Party System in India-** Single party of dominant and multi party system, Regional and State Parties, Coalition politics; Party Alliances and Government Formation, Federalism, Regionalism and political parties. Elections in India: Determinations of Voting Behaviour: Caste, Community, Class, Gender and Region. Electoral Reforms.

Problems relating to information of states; Debates on Article 370 and 371; Problems of Union- State relations - Recommendations of the Rajamannar Commission and the Sarkaria Commission; Challenges of diversity, development and separatism.

## **10. Decentralisation and Development in India**

**(a) Conceptualising and Measuring Decentralisation-** Concept of Decentralisation; Theoretical Foundations of Decentralisation (Classical liberal, Development and Neo-liberal theories); Advantages and Disadvantages; Major Dimensions of Decentralisation and their links, Decentralisation and Centralisation, Decentralisation in Developing Countries.

**(b) Decentralisation, Governance and the Structure of Local Political Institution-** Politics of Decentralisation: Evolution, Goal, Dimensions and Challenges; Decentralisation and Citizen Participation: Instruments, Mechanisms and Spaces; Democratic Accountability in Local Governance Institutions (Local election, Transparency & RTI, Media and Civil

r\

**(c) Decentralisation and Community Empowerment-** Decentralised Governance and Right- based Approach; Social and Economic Rights of vulnerable groups in decentralized system of governance; Gender Equity and Women's Participation.

**(d) Participation and Local Development-** People's Participation in (rural) Development; Role of local government in Service Delivery and Poverty Reduction, Decentralised Planning and District Planning Committee.

## **11 Issues in Indian Administration**

**(a) Administration Obligation-** Meaning and Nature, Collective Responsibility, Other Machinery.

**(b) Administrative Corruption-** Lokpal, Central Vigilance Committee. **Reference**

### **Books:-**

- David, McNabb. Research methods for political sciences. Quantitative and Qualitative Methods, (New Delhi: Prentice Hall, 2004).
- Adhikari Sudepta: Political geography, Rawat Publication, Jaipur.
- Amerswar Avasti, Shriram Maheshwari, Lakshmi Narain Agrawal: Public Administration, Educational Publication, Agra.
- C.S.Rayudu, S.B. Nageswar Rao: Mass Media Laws and Regulations, Himalaya Pub. House.
- Chatterjee B.: Environmental Laws, Deep and Deep Publication, New Delhi, 2002.
- D.E. Apter: The Politic of Modernization unit of Cicago.
- David Easton: The Political System, Calcutta, scientific book Agency, 1953.
- Dikshit R.D.: Political Geography, Tata Mc Graw Hill Pub. Co., New Delhi.
- Dixit S.N.: Political Journalism with New Challenges, Pearl Book, Daryaganj, New Delhi.
- Durga Das Basu: Law of the Press, Prentice Hall of India, New Delhi.
- G.A. Almond and Verba: The Civic Culture.
- Jadhav H.V., Bhosale V.M.: Environmental Protection Laws, Himalaya Pub., Bombay, 1995.
- H.J. Laski: The rise of European Liberalism London-Allen and Unwin.
- J.C. Johari: Principles of Modern Political Science (1989): Sterling Publishers Private Limited, New Delhi.
- P.B. Rathod: Hand Book of Political Science (2006); ABD Publisher Jaipur, India.

- Austin, Granville, *Working of a Democratic Constitution*, (New Delhi: Oxford, 2000).
- Austin, Granville, *The Indian Constitution: Cornerstone of a Nation*, (Oxford, 1999).
- Hasan, Zoya (ed.), *Parties and party Politics in India*, (New Delhi: Oxford, 2001).
- Roy, Ramashray and Paul Wallace (eds.), *Indian Politics and the 1998 Election: Regionalism, Hindutva and Stale Politics*, (New Delhi: Sage, 1999).
- Rudolph, L.I. and Sussane H. Rudolph, *In Pursuit of Lakshmi: The Political Economy of the Indian State*, (Delhi: Orient Longman, 1987).
- Sartori, G., *Parties and Party Systems: A framework for Analysis*, (Cambridge: Cambridge University Press, 1976).
- Baran, Paul A., *The Political Economy of Growth*, (New York: Monthly Review Press, 1957).
- Byres, Terence, J., (ed.), *The State and Development Planning in India*, (Delhi: Oxford University Press, 1994).
- Commons, John R., *Institutional Economics: Its Place in Political Economy*, (London: Macmillan, 1986).
- Kohli, Atul, *Democracy and Discontent: India's Growing Crisis of Governability*, (Cambridge: Cambridge University Press, 1990).
- Aziz, Abdul and David D. Arnold (eds.), *Decentralised Governance in Asian Countries*, (New Delhi: Sage, 1996).
- Grindle, M., *Going Local: Decentralization, Democratization, and Promise of Good Governance*. (Princeton and Oxford: Princeton University Press, 2007).
- Maddick, Henry, *Democracy, Decentralisation and Development*, (New Delhi: Asia Publishing, 1963).
- Ranney Austin: *Essays on the Behavioural Studies in Politics*, Urbana Illinois Press.
- Varma S.K.: *Role of Human Rights in India's Foreign Policy*, Manglam Pub. Delhi.

# **PSYCHOLOGY**

**Paper II: Advance level theory and Research Methods**

**Unit I – Cognitive processes.**

Sensory System: Vision & Audition

Human Nervous system: Structure & Functions.

Perceptual approaches Gestalt and physiological Approaches

Perceptual organization Gestalt Figure & ground and law's of perceptual organization.

Perceptual constancy - size, shape, and brightness, Illusion.

Classical conditioning

Instrumental conditioning.

Reinforcement - Basic Variables and schedules.

Verbal learning - Methods and materials.

Memory processes - ESR, model, STM & LTM, Episodic and semantic memory, Forgetting.

**Unit II - Affective processes: Motivation and Emotion**

Basic motivational concept: Instincts, needs, drives & motivational cycle.

Types of motives: - Biological, Social, General motives.

Emotion: - Theories of Emotions James- Lange, Canon - Bard Sahachter & Singer.

Physiological and psychological change in emotion.

Conflicts - Sources & Types, how to solve the motivational conflicts.

**Unit III - Research Methodology**

Research problems hypothesis and variable.

Types of psychological Research - Scientific & Empirical

Methods of Psychological Research - Experimental, Quasi- experimental, Case studies, Field studies.

Methods of data collection Observation, Interview, Questionnaire, Test & Scales.

**Unit IV - Psychological Testing.**

Nature & Definition.

Test standardization - Reliability, Validity & Norms.

Types of the psychological test- personality, Ability, Educational Aptitude.

Uses of psychological test.

**Unit V – Qualitative Research**

Grounded theory, Case study, Ethnography, Phemionology, Narrative analysis

**Unit IV – Quantitative Research**

t-test, Chi square, ANOVA, Correlation, Regression, SPSS, R

**Books for reference**

Buck Ross(1988)	"Human Motivation & Emotion" 2 <sup>nd</sup> Edition, John Wiley & Sons, Inc.
Carlson Nell R (1990)	"Psychology" The Science of Behavior 5 <sup>th</sup> Edition, Allyn & Bacon
Matlin Margaret W (1995)	"Cognition" Prism Books Pvt. Ltd., Bangalore, India
Kerlinger, Fred N	"Foundation of Behavioural Research" 2 <sup>nd</sup> Edition, New York, Holt Rinehart & Winston, 1973
Guilford J P	"Psychometric Methods" New York, Mcgraw Hill, Inc, 1954
Kothari C R	"Research Methodology" Methods & Techniques 2 <sup>nd</sup> Revised Edition, New Age International (p) Ltd. New Delhi
H.S. Asthana & Braj Bhushan(2016)	Statistics for Social Sciences, 2 <sup>nd</sup> edition, PHI learning private Ltd
David Silverman	Qualitative Research, 4 <sup>th</sup> edition, Sage publication.

**SANSKRIT**



Syllabus of Pre Ph.D. Course Work  
Paper II Sanskrit

पूर्णांक— 70 अंक

यूनिट 1	—	वैदिक साहित्यम् ।	अंक—14
यूनिट 2	—	संस्कृत साहित्यम् ।	अंक— 14
यूनिट 3	—	भाषा विज्ञानम् व्याकरणं निरुक्तं च ।	अंक—14
यूनिट 4	—	भारतीय दर्शनम् ।	अंक—14
यूनिट 5	—	काव्यशास्त्रं नाट्यशास्त्रं च ।	अंक—14

**Sanskrit**  
**UNIT-I वैदिक साहित्यम्**  
(वेद-उपनिषद्)

अंक-14

1. ऋक् सूक्तानि

हिरण्यगर्भ-10.121, पृथ्वी 12.1, उषा 1.48

अंक-10

2. ईशावास्योपनिषद्

अंक-4

संदर्भ ग्रन्थः

ऋक् सूक्त संग्रह, साहित्य भण्डार सुभाष बाजार मेरठ

वैदिक साहित्य- आचार्य बलदेव उपाध्याय चौखम्भा प्रकाशन वाराणसी

ईशावास्योपनिषद्- गीता प्रेस गोरखपुर

ईशावास्योपनिषद्- महाकाली प्रकाशन, कानपुर

**UNIT-II संस्कृत साहित्यम्**

अंक-14

1. काव्यानि- रघुवंशम् (त्रयोदश सर्गः), मेघदूतम्(पूर्व मेघ)

अंक-5

2. नाटयम्- अभिज्ञानशाकुन्तलम्, उत्तर रामचरितम्,

अंक-5

3. गद्यम्-बाणभट्ट कादम्बरी(महाश्वेतावृत्तान्तम्)

अंक-4

सन्दर्भ ग्रन्थ- महाश्वेतावृत्तान्तम्-सुधामूर्ति मेहता पब्लिकेशन पुणे

कादम्बरी-बाणभट्ट, चौखम्भा विद्याभवन वाराणसी

अभिज्ञानशाकुन्तलम्- डा० शिवबालक द्विवेदी, ग्रन्थम् कानपुर

अभिज्ञानशाकुन्तलम्- डा० दिनेश प्रसाद तिवारी, महाकाली प्रकाशन कानपुर

उत्तर रामचरितम्- ग्रन्थम् कानपुर

## UNIT-III भाषा विज्ञान व्याकरणं निरुक्तं च अंक-14

1. संज्ञा-सन्धि-कारक, कृदन्त(लघुसिद्धान्तकौमुदीमधिकृत्य) अंक-5
2. भाषा विज्ञानम्-भाषाया परिभाषा, वर्गीकरणम्,  
अर्थ विज्ञानम्, ध्वनिपरिवर्तनम्, भारोपीय भाषापरिवारः। अंक-5
3. निरुवन्तम्- अध्याय 1 व 2 अंक- 4

सन्दर्भ ग्रन्थ- लघु सिद्धान्त कौमुदी, धरानन्द शास्त्री, चौखम्भा विद्याभवन वाराणसी  
लघुसिद्धान्त कौमुदी-महेश सिंह कुशवाहा, चौखम्भा प्रकाशन वाराणसी  
लघु सिद्धान्त कौमुदी संज्ञा-सन्धि प्रकरण-डा० दिनेश प्रसाद तिवारी,  
महाकाली प्रकाशन कानपुर  
संस्कृत का भाषाशास्त्रीय अध्ययन-भोलाशंकर व्यास'-भारतीय ज्ञानपीठ  
प्रकाशन दिल्ली  
संस्कृत भाषाविज्ञान- डॉ० शिव बालक द्विवेदी, ग्रन्थम कानपुर  
निरुक्त- उमाशंकर शर्मा ऋषि, चौखम्भा विद्याभवन वाराणसी

## UNIT-IV भारतीय दर्शनम्

अंक-14

1. वेदान्तसार, सांख्यकारिका अंक-10
2. सांख्य, योग, न्याय-वैशेषिक पूर्व मीमांसा-उत्तर मीमांसा चार्वाक वौद्ध दर्शनम्। अंक-4

सन्दर्भ ग्रन्थ-

भारतीय तत्त्वज्ञान- डॉ० श्रीनिवास दीक्षित  
सर्व दर्शन संग्रह- माधवाचार्य, भण्डारकर प्राच्य विद्या संशोधन पुणे  
सांख्य कारिका- डॉ० आद्या प्रसाद मिश्र, अक्षयवट प्रकाशन इलाहाबाद  
वेदान्तसार- डॉ० कृष्णकान्त त्रिपाठी, साहित्य भण्डार सुभाष बाजार मेरठ  
भारतीय दर्शन-बलदेव उपाध्याय- मोतीलाल बनारसीदास प्रकाशन दिल्ली

1. मम्मटकृत काव्य प्रकाशः- अध्याय- 1,2,10  
अलंकारा दशमोल्लासम् अधिकृत्य अंक 5
2. भरतमुनिकृत नाट्यशास्त्रम् - अध्याय 2,6 अंक 5
3. धनञ्जयविरचितम् दशरूपमकम् प्रकाशन- 1,2 अंक 4

सन्दर्भ ग्रन्थः-

नाट्यशास्त्रम्- चौखम्भा प्रकाशन वाराणसी

काव्य प्रकाशम्- आचार्य विश्वेश्वर, पारडी महाराष्ट्र

दशरूपकम्- डॉ० भोलाशंकर व्यास, चौखम्भा विद्याभवन वाराणसी

नाट्यशास्त्रम्- ओरियण्टल इन्स्टीट्यूट बडौदा

# **SOCIOLOGY**

## **Paper II: Advance level theory and Research Methods**

### **Unit-1 : Indian Society ; Continuity and change**

Sociological debates and studies

Indological perspectives – G.S. Ghuriye, R.K. Mukherjee, Louis Dumont.

Structural and functional – M.N. Srinivas, S.C. Dubey.

Marxian perspectives – D.P. Mukherjee, A.R. Deasai and Ram Krishna Mukherjee.

Subaltern Perspectives – Ranjeet guha, B.R. Ambedkar and David Hardimen.

Tribal society, Urban and Industrial society – Changing pattern of social Institutions, major processes of change in India as globalization and social change, social movements in India.

### **Unit-2 : Contemporary social problems;**

Migration, Poverty, corruption in public sphere, unemployment, health and malnutrition, environmental changes, economic and social exploitation of tribal people, agrarian unrest, Debets on Social exclusion.

### **Unit-3 : Developmental issues; Environment and Development**

**(a)** Sustainable development, Theories of development, Gender and development, Culture and development, Development and displacement, Quality of life; Integrating economy, Equality and Environment.

**(b)** Rural development programmes for mainstream of downtrodden people – SGSY, MNREGA, NRM, UJJAWLA YOJNA, PDS, SHGS, and women empowerment, Deen Dayal Upadhayay gramin kaushal yojna, e-governance and panchayati raj, National social assistance scheme.

**Unit-4:** Recent trends in sociological perspectives; - Social exchange theory, Symbolic interactionism, Phenomenology, Ethnomethodology and post modernism.

**URDU**

**C.S.J.M.UNIVERSITY KANPUR**  
**SYLLABUS FOR**  
**PRE PH.D. COURSE WORK PAPER II**  
**SUBJECT: URDU**

**UNIT -1**

**قدیم اردو نثر و نظم**

- ۱۔ داستان کا آغاز و ارتقا اور اہم داستان گو
- ۲۔ "سب رس" کی زبان اور اسلوب
- ۳۔ "سب رس" کا اردو ادب میں مقام
- ۴۔ "باغ و بہار" کا تنقیدی جائزہ
- ۵۔ "باغ و بہار" کا اردو ادب میں مقام
- ۶۔ قصیدہ کی تعریف آغاز و ارتقا
- ۷۔ سودا اور ذوق بحیثیت قصیدہ نگار
- ۸۔ مرثیہ کی تعریف، آغاز و ارتقا اور اہم مرثیہ نگار۔ (میر ضمیر، میر انیس)
- ۹۔ مثنوی کا آغاز و ارتقا
- ۱۰۔ اردو کے اہم مثنوی نگار۔ (نصرتی، میر حسن)

  
**CONVENOR**  
**(URDU)**  
**C.S.J.M. UNIVERSITY**  
**KANPUR**



## UNIT - 2

## تاریخ زبان اردو

- ۱۔ اردو زبان کا آغاز و ارتقا اور اس کے تعلق سے مختلف نظریات
- ۲۔ ماہر علم لسانیات۔  
ڈاکٹر معین الدین قادری زور  
ڈاکٹر شوکت سبزواری  
مسعود حسین خاں
- ۳۔ اردو ہندی کا لسانی رشتہ

## UNIT - 3

## اردو ادب میں مختلف تحریکات و رجحانات

- ۱۔ ایہام گوئی
- ۲۔ فورٹ ولیم کالج کی ادبی خدمات
- ۳۔ علی گڑھ تحریک
- ۴۔ ترقی پسند تحریک
- ۵۔ حلقہ ارباب ذوق
- ۶۔ رومانی تحریک
- ۷۔ جدیدیت

## UNIT - 4

### اردو ڈراما ، ناول و افسانہ

- ۱۔ ڈراما کافن اور اس کا آغاز و ارتقا
- ۲۔ ناول کافن اور اس کا عہد بعہد ارتقا
- ۳۔ افسانہ کافن اور آغاز و ارتقا

## UNIT - 5

### ادبی تنقید

- ۱۔ تنقید کے معنی و مفہوم اور مغربی و مشرقی نظریات
- ۲۔ اقسام تنقید۔  
جمالیاتی تنقید  
مارکسی تنقید  
رومانی تنقید  
نفسیاتی تنقید
- ۳۔ متن اور متنی تنقید۔  
متن: مفہوم اور اہمیت  
متنی تنقید: تعریف اور اہمیت  
حوالہ اور صحت متن

۴۔ تنقید نگاران۔

محمد حسین آزاد

مولانا الطاف حسین حالی

سید احتشام حسین

کلیم الدین احمد

آل احمد سرور

۵۔ اردو تنقید کے فروغ میں تزکروں کی اہمیت

## UNIT - 6

### ادبی تحقیق۔

۱۔ تحقیق: اصول و طریقہ کار

تعریف مفہوم اور روایت

موضوع کا انتخاب

تدوین متن

مواد کی فراہمی

مواد کی اقسام

حواشی، اشاریہ کتابیات

۲۔ اہم محققین۔

عبدالحق

مالک رام

## UNIT - 7

### جدید اردو نثر اور نظم

- ۱۔ جدید نثر کا آغاز و ارتقا
- ۲۔ اہم نثر نگار (غالب، سرسید ابوالکلام آزاد)
- ۳۔ جدید نظم کے فنی لوازمات
- ۴۔ اہم شعراء (جوش اختر الایمان)

## REFERENCE BOOK

## معاون کتب

- ۱۔ تحقیق کافن گیان چند جین
- ۲۔ باغ و بہار میرامن دہلوی
- ۳۔ باغ و بہار کا تحقیقی و تنقیدی مطالعہ ایجوکیشنل پبلشنگ ہاؤس، نئی دہلی
- ۴۔ سب رس ملا وجہی
- ۵۔ سب رس کا تنقیدی جائزہ منظر اعظمی
- ۶۔ سب رس پر ایک نظر سہیل بخاری
- ۷۔ اردو داستان: تحقیق و تنقید قمر الہدیٰ فریدی
- ۸۔ اردو قصیدہ نگاری کا تنقیدی جائزہ ڈاکٹر محمود الہی
- ۹۔ اصول تحقیق اور ترتیب متن تنویر احمد علوی
- ۱۰۔ اردو مرثیہ کا ارتقا مسیح الزماں
- ۱۱۔ مالک رام حیات و کارنامے ڈاکٹر محمد ارشد
- ۱۲۔ اردو مرثیہ نگاری ام ہانی اشرف
- ۱۳۔ ادبی تحقیق مسائل و تجزیہ رشید حسن خان
- ۱۴۔ اردو کی تین مثنویاں خان رشید
- ۱۵۔ ہماری شاعری مسعود حسین رضوی
- ۱۶۔ اردو کی لسانی تشکیل مرزا خلیل احمد بیگ
- ۱۷۔ تاریخ ادب اردو نور الحسن نقوی

CONVENOR  
(URDU)  
O.S.J.M. UNIVERSITY  
KANPUR

- ۱۸۔ مقدمہ تاریخ زبان اردو  
 ۱۹۔ مثنوی تنقید  
 ۲۰۔ داستان سے افسانے تک  
 ۲۱۔ نیا افسانہ  
 ۲۲۔ اردو ناول کی تاریخ اور تنقید  
 ۲۳۔ اردو نثر کا تنقیدی مطالعہ  
 ۲۴۔ اردو شاعری کا تنقیدی مطالعہ  
 ۲۵۔ اردو ڈرامے کی تاریخ و تنقید  
 ۲۶۔ ادبی تحقیق و تنقید  
 ۲۷۔ اردو شعریات  
 ۲۸۔ اصناف ادب اردو  
 ۲۹۔ کاشف الحقائق  
 ۳۰۔ آب حیات  
 ۳۱۔ مقدمہ شعر و شاعری  
 ۳۲۔ موازنہ انیس و دبیر  
 ۳۳۔ اردو ادب کی تحریکیں  
 ۳۴۔ اردو میں ترقی پسند تحریک  
 ۳۵۔ انتخاب مضامین سرسید
- مسعود حسین خان  
 خلیق انجم  
 وقار عظیم  
 وقار عظیم  
 علی عباس حسینی  
 سنبل نگار  
 سنبل نگار  
 عشرت رحمانی  
 ابو محمد سحر  
 آل احمد سرور  
 خلیق انجم / قمر رئیس  
 سید امداد امام اثر  
 محمد حسین آزاد  
 الطاف حسین حالی  
 شبلی نعمانی  
 انور سدید  
 خلیل الرحمن اعظمی  
 ایجوکیشن بک ہاؤس علی گڑھ

- ۳۶۔ اردو ادب میں تحریکوں اور رجحانوں کا حصہ منظرِ اعظمی
- ۳۷۔ اردو تنقید کا ارتقا ڈاکٹر عبادت بریلوی
- ۳۸۔ جدید اردو تنقید: اصول و نظریات ڈاکٹر شارب ردو لوی
- ۳۹۔ فنِ تنقید اور اردو تنقید نگاری نور الحسن نقوی
- ۴۰۔ فروغِ تنقید عبدالمغنی
- ۴۱۔ غالب: شاعر و مکتوب نگار نور الحسن نقوی
- ۴۲۔ اصول وضع اصطلاحات وحید الدین سلیم

### سوال نامہ

**ہدایت۔** یہ پرچہ سات (۷) یونٹ میں منقسم ہے اور ستر (۷۰) نمبر پر مشتمل ہوگا۔ ہر یونٹ سے دو سوالات پوچھے جائیں گے۔ جن میں سے ایک سوال کا جواب دینا لازمی ہوگا۔ یعنی (۱۴) سوالات پر مشتمل اس پرچہ میں سے طلباء کو سات (۷) سوالات کے جوابات تحریر کرنا ہوں گے۔ ہر سوال کے لئے دس (۱۰) نمبر مقرر ہیں۔

10

**YOGA**



## PAPER TWO

### Introduction to the Research in Yoga

**M.M.: 100**

**Unit – 1 Yogic view in the vedic literature-** Veda, Principal upanishadas, Yogopanishada, Yajnavalkya Smriti, Manu Smriti, Purana – with special reference to Agni Purana, Ramayana (Aranya Kanda)

**Unit – 2 Studies on some Yogic texts and practices in it –** Patanjala Yoga Sutra, Hatha Pradipika, Gheranda Samhita, Goraksha Samhita, Vashishtha Samhita, Siddha Siddhanta Paddhati

**Unit – 3 Yogic aspects in Indian Philosophy and studies in different Yoga streams-** Meaning and definition of Darshana, Categories of Indian Philosophical Schools – Theistic and Atheistic, Introduction to Prasthan Trayi, Purushartha Chatustaya, Yogic practices in different Philosophies- with special reference to Bauddha and Jain

Yoga streams – Raja Yoga, Karma Yoga, Jnana Yoga, Bhakti Yoga, Mantra Yoga, Hatha Yoga practices and aspects of research in it.

**Unit – 4 Modern and contemporary Saint's and Yogi's biographical studies-** Tulsidasa, Kabiradasa, Swami Vivekananda, Rama Krishna Paramhansa, Swami Shivananda, Swami Kuvalyananda, Pt. Shriram Sharma, Maharshi Aurobindo, Maharshi Ramana, Yogini Lalleshwari, Mata Bhagavati Devi Sharma, Ma Anandamayi, Shri Ma, their life sketch and Yogic aspects in it.

**Unit – 5 Research in Yoga- Techniques of Researches in Yoga –** Philosophical & Emperical research studies, textual explorations of Yogic texts, Descriptive studies, Comparative studies, Manuscript explorations, Historical studies

Inter disciplinary studies – Yoga and Psychology, Yoga and Education, Yoga and Human Biology  
Yoga and Health, Yoga therapy, Yoga and life management

PAPER TWO

योग में शोध अध्ययन का परिचय

Max.marks:100

इकाई – 1 वैदिक साहित्य में योग दृष्टि – वेद, प्रमुख उपनिषद, योगोपनिषद, याज्ञवल्क्य स्मृति, मनुस्मृति, पुराण – अग्निपुराण के विशेष सन्दर्भ में, रामायण (अरण्य काण्ड)

इकाई – 2 कुछ प्रमुख योग ग्रन्थों पर दृष्टि एवं उनमें वर्णित अभ्यास— पातंजल योग सूत्र, हठप्रदीपिका, घेरण्ड संहिता, गोरक्ष संहिता, वशिष्ठ संहिता, सिद्ध सिद्धांत पद्धति

इकाई – 3 भारतीय दर्शन में यौगिक दृष्टि एवं योग की विभिन्न धाराओं का अध्ययन – दर्शन का अर्थ, परिभाषा, भारतीय दर्शन के भेद – आस्तिक एवं नास्तिक, प्रस्थान त्रयी का परिचय, पुरुषार्थ चतुष्टय, विभिन्न भारतीय दर्शनों में योग के साधन – बौद्ध एवं जैन दर्शन में यौगिक साधना विधियों के साथ।

योग की विभिन्न धाराएं – राजयोग, कर्मयोग, ज्ञानयोग, भक्तियोग, मन्त्रयोग, हठयोग की साधना पद्धतियों का अन्वेषणात्मक स्वरूप

इकाई – 4 आधुनिक एवं समसामयिक सन्त योगियों के जीवन वृत्त का अध्ययन— तुलसीदास, कबीरदास, स्वामी विवेकानन्द, रामकृष्ण परमहंस, स्वामी शिवानन्द, स्वामी कुवल्यानन्द, पं. श्रीराम शर्मा आचार्य, महर्षि अरविन्द, महर्षि रमण, योगिनी लल्लेश्वरी, माता भगवती देवी शर्मा, मां आनन्दमयी, श्रीमां के जीवन वृत्त में योग दृष्टि।

इकाई – 5 योग में शोध अध्ययन— योग में शोध की विधियां – दार्शनिक एवं प्रयोगात्मक शोध अध्ययन, योग ग्रन्थों का शास्त्रीय अन्वेषण, व्याख्यात्मक विधियां, तुलनात्मक अध्ययन, पाण्डुलिपि अन्वेषण, ऐतिहासिक अध्ययन विधियां

अन्तर्विषयात्मक अध्ययन— योग एवं मनोविज्ञान, योग एवं शिक्षा, योग एवं मानव शारीरिकी, योग एवं स्वास्थ्य, योग चिकित्सा, योग एवं जीवन प्रबंधन।

## **Fundamentals of Yoga and Holistic Health**

### **Reference Books**

<b>S.N.</b>	<b>Books and Authors</b>
1	Hamari Vasiyat Aur Virasaat – Pt. Shriram Sharma Acharya
4	Matru Shakti Ank, Akhand Jyoti Vishesank, Feb. 1995-Dr. Pranav Pandya.
5	Kalyan (Bhakt Ank) – Gita press Gorakhpur
6	Kalyan (Sant Ank) – Gita press Gorakhpur
7	Kalyan (Yogank) – Gita press Gorakhpur
8	Kalyan (Yoga Tattvank) – Gita press Gorakhpur
9	Yoga Vijyan – Swami Vijnananand Saraswati
11	Ancient Yoga and Modern Science – T.N. Anatharaman
12	The Yoga Book – Stephen Sturgess
13	Yoga Immortality and Freedom- Mircea Eliad
15	History of Indian Philosophy (5Vols)- S.N.Dasgupta
16	Yoga Philosophy – S.N. Dasgupta
17	Yoga Sara Samgraha – Gangadhar Jha
18	Upanishad Gyankhand, Sadhana Khand, Brahmvidya Khand – Pt. Sriram Sharma Achary
19	ईशादिनौपनिषद – गीताप्रेस गोरखपुर
20	हठयोग प्रदीपिका – कैवल्यधाम
21	घेरण्ड संहिता – स्वामी निरंजनानन्द सरस्वती, मुंगेर, बिहार
22	गोरक्ष संहिता – संस्कृति संस्थान (वेदनगर), बरेली
23	वशिष्ठ संहिता – कैवल्यधाम
24	सिद्धसिद्धांत पद्धति – चौखम्बा ओरियन्टलिया
25	International Journal of yoga therapy (IAYT)
26	Indian Journal Physiology and Pharmacology
27	International Journal of yoga and Physiotherapy
28	Yoga mimansa
29	Inter Journal of Yoga (S- vyasa)
30	Indian Journal of Medical Research (ICMR)

# **ZOOLOGY**

## **Paper II: Advance level theory and Research Methods**

### **I. Entomology**

1. Chemical, Biological and Environmental control of arthropod vectors.
2. Integrated Pest Management (IPM)
3. Biology and control of important insect pest of agricultural importance.
4. Insects of economic importance
5. Endocrine system in insects.

### **II. Parasitology**

1. Important human and veterinary parasites viz. protozoans, helminthes and arthropods.
2. Mode of transmission of pathogens by vectors.
3. Life cycle and biology of
  - a) Leishmania and Giardia intestinalis
  - b) Ancylostoma duodenale and Trichinella.
  - c) Sacculina and Musca domestica
4. Molecular, cellular, biochemical and physiological basis of host-parasite interrelation.
5. Immune responses in parasitic diseases

### **III. Physiology**

- 1) Thermoregulation Digestion and Respiration.
- 2) Circulation, Excretion and Reproduction.
- 3) Nervous system- CNS, PNS, ANS and Sense organs.
- 4) Neuroendocrine system- Endocrine organs, classification of hormones and mechanism of hormone action.
- 5) Stress and adaptations.
- 6) Homeostasis

### **IV. Toxicology**

- 1) Toxicology of pollutants-
  - a) Introduction, definition and scope.
  - b) Basic tests for air. water and soil pollutants.
- 2) Toxicants and toxicity-
  - a) Definition and types
  - b) Factors influencing toxicity- pH, temperature, reproductive status, age & physiological state,
  - c) Dose, LD 50, LC50, types of effects and response
- 3) Toxicants of public health and hazards- Pesticides, heavy metals, fertilizers, food additives and radioactive substances.
- 4) Genotoxicology

### **V. Animal behaviour**

- 1) Feeding learning, social and sexual behaviour.
- 2) Circadian rhythms, parental care and mimicry.
- 3) Migration of insects, fishes and birds.
- 4) Methods in field biology - methods in study of behaviour, habit characterization, ground and remote sensing methods

### **VI. Evolution**

- 1) Principles and methods of taxonomy, levels of structural organization
- 2) Concept and theories of evolution
- 3) Organic evolution
- 4) Origin of life and origin of species

## **VII. Cellular and molecular biology**

- 1) Cell cycle
- 2) Stem cells and regenerative medicine
- 3) Gene and gene action
- 4) DNA damage and repair.

## **VIII. Developmental biology**

- 1) Cell differentiation and differential gene activity
- 2) Totipotency
- 3) Organizers- Concepts and induction process.
- 4) Biomarkers of cancer detection

## **IX. Fishery science**

- 1) Fresh water fishes in India, river system, reservoir, pond, tank fisheries, captive, cultural fisheries and cold water fisheries.
- 2) Nutritional importance, preservation and economic importance of fish.
- 3) Marine fisheries of India- Pelagic, demersal, fishery resources, their exploitation, production, utilization and demand.
- 4) Importance of fish biotechnology
- 5) Fish Pathology

## **X. Advances and tools in Biology**

- 1) Electrophoresis and chromatographic techniques for characterization of biomolecules DNA, RNA, Protein and Enzymes.
- 2) DNA Microarray, DNA sequencing and Molecular phylogeny
- 3) Methods of gene transfer
- 4) GISH (Genomic In Situ Hybridization) and FISH (Fluorescence In Situ Hybridization).
- 5) Flow cytometry

## **XI. Recent tools in biology**

- 1) Polymerase Chain Reaction (PCR). ELISA, Northern, Western, Southern Blot techniques.
- 2) DNA barcoding and systemic classification
- 3) RFLP, RIA. RAPD and AFLP
- 4) Immunofluorescence

## **XII. Computational methods**

- 1) Proteomics and genomic analysis, nucleic acid and protein sequencing databases
- 2) Data mining for sequence analysis
- 3) Web based tools for sequence search.

## **XIII. Environmental Science**

- 1) Biodiversity- Types and conservation strategies.
- 2) Ecosystem and -types.
- 3) Biotic, abiotic factors and their interrelation.
- 4) Ecological succession and types.
- 5) Natural resources, types and their conservation.
- 6) Wild life management and conservation acts.
- 7) Global warming
- 8) Bioremediation
- 9) Biosensor
- 10) Bioresources
- 11) Pollution Ecology

#### **XIV Immunobiotechnology**

- 1) T cells, B cells, Antigen and antibody structure
- 2) Humoral and cell mediated immune responses, Complements and Cytokines
- 3) Activation of T cell and. B cell, MHC I and II APCs
- 4) Measurement of antigen and antibody reaction
- 5) Rules & Regulation in Biotechnology- Biotechnology & Biosafety, Intellectual property, Rights and Protection.

#### **XV Genetics**

- 1) Human Genome Project
- 2) DNA Barcoding
- 3) Genealogical Tracing
- 4) Genetics in Society
- 5) Genetics of Infectious diseases
- 7) DNA nanotechnology

#### **XVI Biochemistry**

- 1) Fundamentals of Biochemistry
- 2) Biomolecules
- 3) Enzymes
- 4) Bioenergetics
- 5) Metabolism