**Faculty of Science**
**Syllabus for Ph.D. Course Work Paper – I**
**(Research Methodology)**

1. **Scientific Process:** Meaning and Definition, a brief history of scientific process.

2. **Introduction of Research Methodology:** Meaning of research, objectives of research, types of research, significance of research, problems encountered by researchers in India.

3. **Research Problem:** Definition, necessity and techniques of defining research problem, Formulation of research problem, Objectives of research problem.

4. **Research Design:** Meaning, need and features of good research design, Types of Research Designs, Basic Principles of Experimental Designs, Design of experiments, Synopsis design for research topic.

5. **Sampling Designs:** Census and Sample surveys, Different types of sample designs, Characteristics of good sample design, Techniques of selecting a random sample.

6. **Editing, Data Collection and Validation:** Primary and secondary data, Methods of collecting primary and secondary data, Importance and methods of editing and data validation.

7. **Hypothesis:** Definition, testing of hypothesis, procedures of hypothesis testing, flow diagram for hypothesis testing, Parametric and non-parametric tests for testing of hypothesis, Limitations of tests of hypothesis.

8. **Paper/Thesis Writing and Report Generation:** Basic concepts of paper their writing and report generation, review of literature, Concepts of Bibliography and References, significance of report writing, steps of report writing, Types of Research reports, Methods of presentation of report.

9. **Computer Applications:** Fundamentals of computers - definition, types of computers. RAM, ROM, CPU, I/O devices. Number system - binary, octal and hexadecimal, base conversion. Logic gates - AND, OR, NOT. Date Structure - array, stack (push, pop), queue (insert, delete), linked list - singly,

doubly, Operating system - definition, types of OS. Use of software - MS Office - Power Point, WORD and EXCEL and ACCESS.

**10. Field and Computer hards:** viruses, misuse of internet, hacking, Field hazards.

**11. Instrumentation:** Description and principles of (i) Electrophoresis (ii) PCR Machine (iii) Laminar Flow (iv) Ultracentrifuge (v) Autoclave and (vi) Light and electron microscopy, Chromatography and HPLC, Handling of instruments and precautions.

Your text here 3

**12. Safety Measures:**

**(i) Lab Safety Measures:** Introduction, Code of conduct - while entering in the lab, while working with the chemicals, while disposal of chemicals, Storage and disposal of chemical wastes - aqueous wastes, organic wastes and radioactive wastes, Human contribution to reduce hazardous wastes.

**(ii) Field Safety Measures:** Food security during field trip/expedition, safety measures during field trip/expedition - self- care, avoid in fields, care from wild animals, hazard warnings, Safety measures during visit to library and villages, first aid in the fields.

**Suggested Readings:**


1. Blum, Deborah and Mary Knudson, eds. A field guide for science writers: the official guide of the National Association of Science Writers, New York: Oxford University Press, 1997.
2. Booth, Wayne, Gregory G Colomb, Joseph M. Williams. The craft of Research Chicago University of Chicago Press, 1995.
3. Davis, Martha. Scientific Papers and Presentations. San Diego: Academic Press, 1997.
4. Fuscaldo, AA, Erlick, BI, Hindman, B. Laboratory Safety: Theory and Practice. New York: Academic Press, 1980.
5. Bajpai, PK. Biological Instrumentation and Methodology. New Delhi: S. Chand & Co. Ltd. 2006.
6. Rajaraman, V. Fundamentals of Computers.
7. Horowitz & Sahni. Data Structure.
8. Manual of MS Office.

# Syllabus for Ph.D. Course Work Paper – II
# (Recent Advances in Physics)

1. **Mathematical Methods**
   Complex variables, Cauchy – Ricmann condition, analytic functions. Cauchy's theorem. Legendre Bessel Hermite differential egs.. Fourier integral and Fourier ransforms.
2. **Classical Mechanics**
   D' Alembert's principle and Largrange's equations, Hamilton's principle, the principal of least action, Canonical transformations.
3. **Non Relativistic Quantum Mechanics**
   Schordinger equation and its applications, Theory of angular momentum, Quantum theory of Scattering, S-matrix Theory.
4. **Statistical Physics**
   Foundation of Statistical mechanics, Elements of ensemble theory – a system in Microcanoncial, Canonical and Grand Canonical ensembles, Partition functions applications of ensemble theory Maxwell - Boltzman, Bose-Einstein, Fermi-Dirac distributions.
5. **Atomic and Molecular Physics**
   Electronic spectra, Radiative transitions, Applications of Laser in spectroscopy, Basic idea of two photon processes and frequency up conversion.
6. **Nuclear and particle Physics**
   Nuclear forces, Nuclear Models, Beta decay Fermi theory, parity violation, Symmetry and conservation laws, Special Unitary Symmetries and Quark model.
7. **Electrodynamics and Plasma Physics**
   Maxwell's equations in four dimensions, Gauge transformations, Lorentz transformations, Elementary concept of Plasma and Magneto-Hydrodynamics.
8. **Relativistic Quantum Mechanics**
   Relativistic Quantum Mechanics, Basics concepts of Quantum Field Theory.
9. **Electronics**
   Linear integrated circuits, Operational amplifier and its applications.
10. **Condensed Matter Physics**
    Debye theory of solids, Block theorem, K.P. Model distinction between Metal, insulator and semiconductor, Superconductivity, BCS theory of Superconductor.

# Syllabus for Ph.D Course Work in Chemistry
# (Paper II : Recent Advances in Chemistry)

## 1. GREEN CHEMISTRY

**Basic Principles of Green Chemistry. Designing a Green Synthesis:** Choice of starting materials, choice of reagents, choice of catalysts, choice of solvents. Green reagents, Green catalysts, Phase transfer catalysis for greens synthesis. Organic synthesis in solid phase. Versatile ionic liquids as green solvents. Some examples of synthesis involving basis principles of green chemistry of industrial importance.

## 2. NANOCHEMISTRY

Introduction, classification of nanoparticles, synthesis, characterization, properties and application of nanomaterials.

## 3. ADVANCED MATERIALS CHEMISTRY

Structure of solids, symmetry concepts, crystal structure. Preparative methods and characterization of inorganic solids. Crystal defects and non-stoichiometry. Interpretation of phase diagrams, phase transitions. Basics of magnetic, thermal, electrical, optical and mechanical properties of solids.

## 4. APPLICATION OF SILICATE-BASED INORGANIC SOLIDS

Silicates, Clays, Nano clays, Zeolite and Zeolitic Materials: Importance of Zeolite and Zeolitic Materials: As adsorbents and molecular sieves, As heterogeneous reusable catalysts in petrochemical industry, As filler in fire retardant materials, In nuclear industry, In agricultural industries

## 5. SPECTROSCOPY: APPLICATIONS FOR ORGANIC CHEMISTS

N M R Techniques in the identification and characterization of organic compounds, inorganic complexes and Polymers.

## 6. INTRODUCTORY QUANTUM CHEMISTRY

Postulates of Quantum Mechanics. Operators, Chemical bonding: Born-Oppenheimer approximation. Variational treatment of hydrogen molecule ion. Valence bond and MO (LCAO) treatment of hydrogen molecule.

## 7. ADVANCED CHEMICAL KINETICS

Experimental methods for fast reactions. Temperature jump, pressure jump stopped flow and flash photolysis pulse technique as applied to reaction rates of short lived species. Shock tube kinetics. NMR studies in rate processes. Enzyme kinetics of complicated systems, theory of diffusion controlled reactions.

## 8. ANALYTICAL TECHNIQUES FOR MATERIAL CHARACTERIZAION

Diffraction Methods: X-Ray Diffraction, Neutron Diffraction, Electron Diffraction. Thermal Methods: TGA, DTA, DSC, Thermometric Titration. Adsorption/ Desorption Techniques: BET and EGME methods of determination of external and total surface area.

## Syllabus for Ph.D Course Work in Mathematics
## (Paper II : Recent Advances in Mathematics)

**Fuzzy set and fuzzy login**: From classical crisp sets to fuzzy sets, operations on fuzzy sets, Introduction to fuzzy arithmetic, fuzzy relation, fuzzy logic, fuzzy relations equations, uncertainty- based information, and applications of fuzzy sets in decision making and physical sciences.

**Chaos and bifurcation:** Iteration of functions, phase portraits, periodic points and stable sets, differentiability and hyperbolicity, chaso in perspective, Routes to chaos, Chaos (definitions and examples), characteristics of chaos, bifurcation (definitions and examples).

**Optimization Techniques:** Unconstrained optimization techniques, constrained optimization techniques and solutions of constrained nonlinear optimization problems, Decision Theory, Introduction to Game theory, Heuristics based optimization problems, Decision Theory, Introduction to Game theory, Heuristics based optimization Techniques.

**Suggested Reading:**


1. Discrete Dynamical systems by R.A.Holmgrem
2. Chaos theory tamed by Garnett P. Williams, A Joseph Henry
3. Chaotic Dynamical systems by R.L devaney
4. Bifurcation and chaos in complex systems by Jian – Qiao Sun and Albert luo
5. Operations Research by H.A.Taha
6. Operations Techniques by Chander Mohan and kusum Deep
7. Engineering optimization by S.S.Rao
8. Fuzzy sets and fuzzy logic by Klir and Boyuan
9. Fuzzy sets, Uncertainty and information by Klir and Folger
10. Fuzzy sets and logics by Zimmerman

# Syllabus for Ph.D Course Work in Botany
# (Paper II : Recent Advances in Botany)

1. Microbes and Mycorrhiza and their significance.
2. Biodiversity assessment and conservation: Distribution pattern, endemism, resource utilization and conservation.
3. Modern trend in taxonomy with special reference to Biosystematics.
4. Ecosystems: Diversity and Management with special reference to the Himalaya.
5. Genetic engineering and its implications: Gene isolation, enzymatic synthesis of gene, transgenic crops, PCR (Polymerase Chain Reaction).
6. Biotechnology: Scope and importance of biotechnology, tissue culture techniques in biotechnology, biotechnology in medicine and agriculture.

## Suggested Readings:


1. Mitra, Sandhya (1996) Genetic Engineering. Mc-Millian India Co. Ltd., New Delhi.
2. Gupta, P.K. (2001). Elements of Biotechnology. Rastogi Publications, Meerut, Pp:1-13.
3. Odum, E.P.(2000). Fundamentals of Ecology. Thomson Asia Pvt. Ltd., Singapore.
4. Ricklefs, Robert, E. and Gary L. Miller (2009). Ecology (IVth edition). W.H. Freeman and Company, New York.
5. Chawala, H.S (2006). Introduction to Plant Biotechnology. Oxford and IBH Pub. Co., New Delhi.
6. Naik, V.N. (2001). Taxonomy of Angiosperms. Tata MC Graw- Hill Pub. Co. Ltd., New Delhi.
7. Christian Leveque and jean-Claude Moun oluv. – Biodiversity, John Wiley & Sons, Ltd.
8. Smith, S.E. & D.J. Read- Mycorrhizal Symbiosis. Academic Press.
9. Mahendra Raj & Ajit Verma – Diversity and Biotechnology of Actomycorrhiza.

# Syllabus for Ph.D Course Work in Zoology
# (Paper II : Recent Advances in Zoology)

(I) Biodiversity: levels of biodiversity, value of biodiversity, regional, national and global status of biodiversity, threats to biodiversity, conservation and management of biodiversity, biodiversity act and related international conventions, bio-geographical classification of lndia.

(II) Environmental stresses and their management, global warming. atmospheric ozone, Biodegradation and bioremediation of chemicals.

(III)Chemistry of gene: structure of nucleic acids (A,B,C & Z DNAs RL model of Sasisepharan, super coiling, genetic & Non-genetic RNA, DNA replication, DNA repair (excision repair, mismatch repair and SOS repair) and genetic diseases in humans. restriction enzymes in cloning, techniques used in recombinant DNA technology and its application, DNA fingerprinting.

(IV)Social behavior of animals: costs and benefits of group-living, types of social acts, individual adjustments of group-living, parental care and socio-functional organization in apes & monkeys.

(V) Special features of selected micro-organisms: animal viruses, plant viruses, bacteriophages, rikettsiae, mycobacterium, mycoplasma, actinomycetes, fungi and slime-moulds.

(VI) A brief knowledge of environmental endocrinology.

(VII)Cells in culture: requirements for cell culture, aseptic technique, primary culture, organotypic cultures.

(VIII)Pesticides: brief history, pesticide industries and markets. Dose-response relationship, insecticide, carcinogenic, teratogenic effects.

# Syllabus for Ph.D Course Work in Biotechnology
## Paper II Recent advances in Biotechnology

In the era of multidisciplinary approach revolution in biotechnology that began nearly 50 years ago has an enormous impact. As biotechnology pertains to the study of living systems at the molecular level, especially DNA, RNA and PROTEIN, and provides a background appropriate for further work in the rapidly expanding areas, basic techniques in biotechnology are much needed by the students of Botany, Zoology, Microbiology, Fisheries, Veterinary, Pharmacology, Physiology, Medicine, Genetics. Agriculture and allied subjects This course "Recent Advances in Biotechnology" Will focus on selected aspects of biotechnology that provide a comprehensive overview of the key concepts in molecular biology, principles for understanding the structure and functional relationships of molecular biology techniques to facilitate and sharpen skills on biotechnology techniques.

Course will give emphasis on recent molecular biology techniques including several examples of molecular applications in field of Genomics cell biology, Agriculture, Microbiology, Diagnostics, Pharmacology etc.

The overall course is divided into following topics covering following techniques

1. **Hybridization techniques**: Southern,Western, Nortern and Dot Blots etc.
2. **Gene expression studies:** Real-Time-PCR. Micro arrays & Gene chips
3. **Sequencing:** DNA and protein sequencing
4. **Immunological techniques:** Radial lmmuno diffusion test. ELISA, RIA, Surface Plasmon Recsonance etc.
5. **Molecular Marker:** RFLP, AFLP, SCARs, SNPs, ESS-SSR etc
6. **Spectroscopic methods:** UV/Vis, fluorescence spectrometry
7. **Electrophoretic techniques:** Vertical, Horizontal, 2-Dimensional, Denaturating gradient gel electrophoresis, Thermal gradient gel electrophoresis etc
8. **Variants of PCR and Amplification of gene:** Sami-quantitative RT PCR Nested PCR, Multiplex PCR, DOP-PCR etc.
9. **Bioinformatics: Data Mining GENBANK**, Blasting sequence, Primer designing etc.

## Syllabus for Ph.D. Course Work Paper – II
## Recent Advances In Geology
## Subject Code: 19

Recent developments in Himalayan geology – origin, sedimentation, magmetism and metamorphism.

Modern concept in global tectonics. Contemporary developments in Indian stratigraphy and palaeontology.

Recent mineral discoveries, genesis and occurrence in India. Environmental status of Indian subcontinent.

Role of geologist in climate change studies. Application of Computer softwares in Geology

**Suggested Readings**


1. The Making of India Geodynamic Evolution by K.S.Valdiya
2. Geology, Environment and Society by K.S.Valdiya
3. The Dynamic Earth by A.M. Patwardhan
4. Plate Tectonics and Crustal Evolution by Kent C. Condie
5. Fundamentals of Geology by A.B. Roy
6. A handbook of Minerals, Crystals, Rocks and Ores by P.K. Alexander
7. Economic Geology by Umeshwar Prasad
8. Precambrian Geology of India by S.M. Nakvi and Rogers
9. Precambrian of South India by S.M. Nakvi
10. Rockware ® Web page

## Syllabus for Ph.D. Course Work Paper – II
## Recent Advances in Forestry & Enviromental Science

1. Recent advance in the forestry an introduction.
2. Various disciplines of forestry.
3. Forests and impact of climate change.
4. Research methods and sampling techniques for various disciplines of Forestry like Forest Ecology, Soil Science, Social Forestry, Agroforestry. Plantation Forestry, Watershed Management. Seed Science and Technology, Regeneration and Natural Resource Management (NRM).
5. Forestry and its relation to industries, Use of GIS & Remote Sensing and computer application in Forestry
6. Basic statistics used in Forestry. Measures of central tendency, dispersion, correlation, regression and analysis of variation and various software's used in data analysis.
7. Important instruments used in forestry research.

Syllabus for Ph.D. Course Work in Statistics
Paper – II (Recent Advances in Statistics)

1. Sampling Theory  Small area estimation. Controlled selection
2. Composite Hypothesis Testing
3. Analysis of Survey Data – Regression Analysis. Categorical analysis
4. Bootstrapping  Jack Knifing
5. Fractional Factorial Designs
6. Bayesian Estimation Procedures for reliability and sequential estimation
7. Estimation though Simulation techniques/Programming with R – software
8. Markovian  Processes – Discrete and  Continuous Markov Chain

## Syllabus for Ph.D. Course Work in Computer Science
## Paper – II (Recent Advances in Computer Science)

**Unit I - Digital Image Processing (2 Questions)**
Introduction to Digital Image Processing: Enhancement, Segmentation, Object Detection and Recognition.

**Unit II - Machine Learning (2 Questions)**
Introduction to Artificial Intelligence, Artificial neural network, Support Vector Machine (SVM) with applications.

**Unit III - Soft Computing (2 Questions)**
Introduction to Fuzzy Logic, Fuzzy Sets and Operations,
Introduction to Genetic Algorithm and its Applications.

**Unit IV - Network Services (2 Questions)**
Introduction to Cloud Computing, Mobile Computing and Ad Hoc Network.

**Unit V - Computing Software (2 Questions)**
Introduction to MATLAB and R.

**Suggested Readings:**


1. "Digital Image processing" by Rafael C. Gonzalez, Richard Eugene Woods Prentice Hall.
2. "Introduction to Artificial Intelligence and Expert System" by Dan W. Patterson, PHI.
3. "Neural Network, Fuzzy Logic and Genetic Algorithm" by S. Rajashekharan, G.A. Vijay Laxmi, PHI
4. "MATLAB Primer" by Timothy A. Devis Kermit Sigmon, Chapman and Hall.


**Question Paper will consist of 10 questions and student has to attempt one question from each unit.**

**Syllabus for Ph.D. Course Work Paper – II**
**Recent Advances In Information Technology**
**Subject Code: 23**

**UNIT I : Advance Data Base Management System**
ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures (sequential files, indexing, B and B+ trees), Transactions and concurrency control, Introduction to NOSQL.

**UNIT II : Advanced Operating Systems**
History of OS, Types of OS, Processes, Threads, Inter-process communication, Concurrency, Synchronization, CPU scheduling, Memory management and Deadlock handling, Virtual memory, File systems, I/O systems, Protection and security, Introduction to Google file system.

**UNIT III : Computer Networks & the Security Concept**
Introduction to computer networks and the Internet, overview of network building blocks, network architecture with layers, protocols & applications, ISO OSI stack, Basic concepts of hubs, switches, gateways, and routers, LAN technologies (Ethernet, Token ring), Flow and error control techniques, Routing algorithms, IPv4, Congestion control, TCP/UDP, Application layer protocols (ICMP, DNS, SMTP, POP, FTP, HTTP);
*Cryptography and Network Security* : Introduction to cryptography, cryptosystems, cryptanalysis, basic concepts of public key and private key cryptography, symmetric-asymmetric encryption, digital signatures, Network Security, authentication, e-mail, IP & web security, phishing & pharming, various attacks and their prevention.

**UNIT IV : : Artificial Intelligence and Natural Language Processing:**
Introduction & concept, AI problems, AI techniques, problem as state space search, problem characteristics, production systems, types of production systems, *Heuristic search techniques*: Generate and test, Hill climbing, Best first search, Problem reduction, Constraint satisfaction, Means-Ends Analysis, Knowledge Representation, Reasoning Planning & Learning, Expert Systems and their applications.
Introduction to Natural Language Understanding, An Outline of English Syntax, Grammars and Parsing, Grammars for Natural Language, Toward Efficient Parsing, Ambiguity Resolution: Statistical Methods, Linking Syntax and

Semantics, Ambiguity Resolution, Scoping and the Interpretation of Noun Phrases.

**UNIT V : Cloud Computing:**

History, NIST definition of cloud computing, working of cloud computers, pros and cons of cloud computing, developing cloud services, Iaas, Paas, Saas, deploying cloud computing- public, private, hybrid and community cloud, Virtualization, virtual machine monitor and their types, hardware and desktop virtualization, service oriented architecture, Web 2.0, security and privacy issue in cloud computing.

**References:**


- **Avi Silberschatz, Peter Galvin, Greg Gagne, "Operating System Concepts", John Wiley & Sons.**
- **Andrew S. Tanenbaum, "Computer Networks", Prentice Hall.**
- **William Stalling, "Cryptography & Network Security: Principles & Practices", Pearson.**
- **Elaine Rich, Kevin Knight, Shivashankar B Nair, "Artificial Intelligence", McGraw Hill**
- **M. Morris Mano, "Digital Logic and Computer Design", Pearson.**
- **Ronald J. Brachman, Hector J. Levesque, "Knowledge Representation and Reasoning", Morgan Kaufmann.**
- **Daniel Jurafsky, James H. Martin, "Speech and Language Processing", Prentice Hall.**
- **Elmsari & Navathe, : " Fundamentals of Database Systems", Pearson.**
- **Anthony T .Velte, Toby J.Velte, Robert Elsenpeter, "Cloud Computing: A Practical Approach", Tata McGraw Hill.**
- **Buyya & Vecchiola & Selvi, "Mastering Cloud Computing", Morgan Kaufmann.**

## Syllabus for Ph.D. Course Work Paper – II

# Recent Advances in Pharmaceutical Science

Paper II will be divided in two section. Section A will be compulsory to all. A research scholar has to select one topic out of Section B depending upon to specialization or the area identified for the proposed research work

### SECTION A (compulsory to all)

1. **Introduction and Application of following:**
   a) New Drug Development strategies (Definitions and basic principles only)
   i. Combinatorial Chemistry
   ii. QSAR/SAR
   iii. Physicochemical Evaluation
   iv Drug bio-screening and evaluation (Preclinical and Clinical)
   v. High Throughput screening
   b) Extraction methods for Herbal Drugs.
   c) Applications of Nanotechnology in Pharmaceutical Science
2. **Pharmacological Screening and Assays:** General principles of screening correlations between various animal models and human situations, animal ethics
3. **GMP:** Guidelines- Building and facilities Equipment, Personnel, Raw Materials Production, Laboratory Controls, Records, Labeling, Complaints,
4. **Drug discover and Development:** Pre-discovery, Drug Discovery, Early Safety Tests, preclinical Testing, lnvestigational New Drug (NDA) Application and Safety, New Drug Application (NDA) and Approval. Manufacturing, Ongoing Studies and Phase 4 Trials
5. **Drug Regulatory Affairs:** Indian Patent Act 1970, Its amendments, concepts of IPR, criteria for granting patents and filing a Indian patent, PCT, Patent infringement. INDA/NDA/ANDA filing. Para- I, II, III, IV filing. Hatch-Waxman amendments, Introduction to patent Search. OECD guidelines for chemical testing pertaining to use as drug, related substances, excipients, toxicity, etc. WHO guidelines for standardization of raw material and finished products including herbal products.
6. **Stability testing:** Introduction, seientific and technical background to the design of stability testing regulatory requirements as per Indian and other

regulatory authorities for testing of new active substances, bulk active drug substances, dosage form in their final packaging.

7. **Clinical pharmacology and pharmacodynamics:** Clinical study design, documentation, presentation and interpretation. Clinical trials. definition, Phase I, Phase II, Phase III and Phase IV studies, design documentation, presentation and interpretation, statistical analysis of clinical data, factorial design, guidelines as per Indian and other regulatory authorities.

## SECTION B
## (Select one out of I, II, III, IV)

### (I) Pharmaceuties (Subject Specific)

1. Introdueion to the development of the dosage form in the view the drug (S)

2. Historical background of the disease and importance of the selected dosage form and route of administration

3. Review of recent trends of the new formulation and outcomes.

4. The concepts of bioavailability and bioequivalence, In vitro and in vivo methods in establishment of bioequivalence.

5. Compartment modeling in pharmacokinetics, significance of different pharmacokinetic parameters, No-linear pharmacokinetic and reasons thereof. Dose adjustment in disease conditions and in geriatric and pediatric patients.

6. Applications of computer in pharmacokinetics, statistical quality control. Validation of processes. Computer-aided design of experiments

7. Polymers- Natural and synthetic polymers with respect to their pharmaceutical applications, characterization methods of polymers, polymers drug interactions.

8. Controlled drug delivery – Strategies. Oral drug delivery (Gastroretentive and osmotic control systems) targeting through nonparticles colon targeting lung targeting, targeting of cancerous tissues, mucoadhesive and transdermal drug delivery systems.

## (II) Pharm. Chemistry (subject specific)

1. Need of development of new chemical entity.
2. Historical background of the disease in which new chemical is employed.
3. Review of recent trends in development of new chemical entity and its outcomes.
4. Modern synthetic methods: Asymmetric synthesis of chiral drugs, Microwave assisted organic synthesis – concepts, applications and case studies.
5. Advances in QSAR methods (2D,3D QSAR) – concepts and applications in design. case studies.
6. Synthesis, mode of action, structures – activity relationships of newer drugs and agents belonging to the following categories: COX-2 inhibitors anti–histanumes (III, H2&H3), oral hypoglycemics, anticonvulsants, fluoroquinolene antibiotics, anticancer & anti – HIV drugs.
7. Structural elucidation. biosynthesis and mode of (a) Steroids Sex hormones, (b) Alkaloids Quinine and steroidal alkaloids, (c) Antibodies, New generation cephalosporin's and microclines, (d) Glycosides, Cardiac glycosides, Triterpenoid glycosides (Panax ginseng); (e) Prostaglandins and their analogs.

## (III) Pharmacognosy (Subject specific)

1. Biological sources of the selected medicinal plant (s) Bthobotnical review animal Sources of the drug.
2. Review of recent trends of specific chemical constituents related to disease in concern.
3. Biosynthetic pathways and Radio tracer techniques
4. Marine drug
5. Plant tissue culture techniques
6. Methods of extraction, isolation and purification of plant constituents novel solvent extraction methods, modern chromatographic methods (HPLC, HPTLC and GlC)
7. General methods of physicochemical characterization of plant constituents – Melting point, boiling point optical rotation, case studies involving structural elucidation of phyto–constituents (alkaloids. glycosides, phenolics etc) by spectral methods.

8. Standardization of herbal drugs by conventional and modern techniques including chemical markers, DNA based molecular markers Pre –formulation, formulation & standardization of herbal drugs (Traditional and NDDS like phytotsomes nanoparticles etc.). Herbal drug interactions and synergism, Regulatory guidelines for evaluating the safely and efficacy herbal medicines.

**(IV) Pharmacology (Subject Specific)**

1. Epidemiology of disease.
2. Recent trends in Drug Therapy.
3. Methodologies in Evaluation of potential new drug.
4. Chemical transmission and drug action in the CNS, pharmacological kinetics.
5. Drug discovery and evaluation through advanced pharmacological methods with emphasis on neuropsychopharmacology.
6. Pharmacology of drugs in neurodegenerative disorders (Mechanism) neurodegeneration dementia and Alzheimer's disease, Parkinson's disorders Huntington's disease) including case studies on newer agents and drugs.
7. Modern principles of cancer and AIDS therapy. Advances in pharmacotherapy of diabetes, hypertension and other cardiovascular diseases.
8. Applications of PK-PD modeling and related software in drug development.

## LIBRARY AND INFORMATION SCIENCE COURSE

### Syllabus of Ph.D. Course Work (Research Methodology) - Paper I

**Unit 1. Research**

Concept, Meaning, Need and Purpose of research
Types of Research – Fundamental and Applied including inter – disciplinary and multi – disciplinary approach
Research and Development of Scholarship

**Unit 2. Research Design**

Conceptualizations and nationalization
Types of Research Design,
Identification and formulation of problem
Hypotheses, Nominal and Operational definition
Ethical aspects of Research
Literature Search – Print, Non – Print and electronic sources

**Unit 3 . Research Methods**

Scientific Method
Historical Method
Descriptive Method
Survey Method and Case Study Method
Experimental Method and Delphi Method

**Unit 4. Data Collection Methods / Techniques and Tools**

Sampling and Type of Samples
Questionnaire
Schedule
Interview
Observation
Proforma Method
Scales and Check lists
Library Records and Report Analysis

**Unit 5. Data Analysis and Interpretation**

Descriptive Statistics, Measures of Central Tendency – Mean, Mode and Median
Tabulation and Generalization
Measures of Dispersion, Variance and Covariance
Standard Deviation
Graphical presentation of Data – Bar, Pie & Line Graphs, Histograms etc.
Inferential Statistics – Z – test, T – test, Correlation
Regression – linear and Non – linear
Chi Square Test
Sociometry
Statistical packages – SPSS
Statistical Graphics etc.

**Unit 6. Bibliometrics, Scientometrics and Informatics**

Definition and Concept
Bibliometric Laws: Bradord's Law, Zipf's Law Lokta's Law
Bibliographic Coupling
Obsolescence
Citation Analysis
Webometrics
Citation Studies
Informatics
Scientometrics

**Unit 7. Report Writing**

Preparation of Synopsis, Preparation of Literature Review
Structure, Style and Contents
Guidelines for Research Reporting
Style Manuals – Chicago, MLA and APA etc
E – Citation and Methods of Research Evaluation

## LIBRARY AND INFORMATION SCIENCE COURSE
## Paper II - Recent Advances in Library and Information Science

**Unit I: Information and Communication Technology (ICT)**

Origin and Growth.
Information Technology and its Components.
Communication Technology and is components.
Role of ICT in the Development of LIS centers.

**Unit II: Types of Networks and Security measures.**

Types of Network and Network measures.
Network Components: UTP, Optical Fibers, Ethernet, Network Interface card, Hub, Routers, modems and requirements of Wi – fy.
Planning of Computer network in Library and Information centres.
Network security measures.

**Unit III: Internet**

Internet based services.
Web Servers and is functions.
Internet Security
Blogs,RSS Feed, Lib 2.0

**Unit IV: Digital Library (DL)**

Introduction and Basic Concepts.
Hardware and software for DL.
Content creation for DL
Intellectual Property Right (IPR) Issues.
Digitization and preservation.
Development of DL using Greenstone/Dspace.
Important DL projects in the world and India.

**Unit V: Information Literacy**

Concept, meaning and need
Information Literacy Models; ACR Standards
Information use and user studies – Methods and techniques.

## Faculty of Science
## Ph.D. Course Work Module for Research Paper III
## Paper III: On specialized branch of the subject

**Introduction:** This paper is specially meant to adjudge the acquired knowledge and ability of candidate in the specialized branch of the subject related to which the candidate will finally submit the Ph.D. **Memoir (i.e. Maxima)** for evaluation. Hence, this is advisable that in place of a separate theory based examination candidate may be asked to prepare a **dissertation** work therewith called **Minima**) on major themes and or broader issues of the specialized aspects of the subject-field (in which the candidate wishes to pursue the research work) in consultation with his/her supervisor.

**Frame work of Minima:** Through out the course period candidate will primarily consult the supervisor and candidate will be deeply involved in information search and consulting the library. The **Minima** work can be organized as follows.

**Topic:** To be choser from the **specialized** branch approved by the supervisor.

**Content:**

(i) Principles and Theory (historical and modern perspective).
(ii) Review of research (national and international status). This will help researchers identifying the research gaps and all be further useful while framing the research objectives in a more rational manner.
(iii) Materials and Methods (Standard and innovative methods. if any).
(iv) References, Bibliography/Webliography (this would include complete list of consulted journals, books, memoir including the published unpublished Ph.D. theses, web-pages and search engines etc.).

(Minima work can be limited to 100 printing pages including the chart, figures and references).

# Faculty of Arts
## Syllabus for Ph.D. Course Work Paper – I
## (Research Methodology)

**1.0 Course Paper :**

**Paper - I :** Research Methodology

**Paper - II :** Recent Advances in the Subject

**Paper - III :** Specializations in the Subject

**2.0 Organization Of Course Papers**

**2.1 Paper – I :** shall be organized by the Dean/Campus Dean of the Faculty

**2.2 Paper – II :** shall be organized by the respective Head/Campus Head of different departments of the faculty

**2.3 Paper – III :** shall be organized by the teacher(s) who have offered to supervise Ph.D work in a particular specialization area.

**3.0 Syllabi**

**3.1 Paper – I : Research Methodology**

**FACULTY OF ARTS**

**Unit-I : Fundamentals of Research**

Nature and significance of Research, Identification and Formulation of Research Problem, Hypotheses, Research Questions, Research design, Review of Literature

**Unit-II : Research Types and preparation of Synopsis**

Historical Research, Descriptive Research, Survey Research including Case Studies, Scientific Research; Preparation of a Research Synopsis

**Unit-III : Research Methodology : Data/ Literature Collection and Generation** Sampling theory, Types of Sampling, Steps in Sampling Sample Size, Advantages and Limitations of Sampling. Sample Size, Advantages and Limitations of Sampling. Collection of Data: Primary Data and Secondary Data, Limitations and Cautions.

**Unit-IV : Computer Application, Data/Literature Processing and Analysis** Summarization of Data, Variability, Regression and Correlation Analysis, Probability Tests.

**Unit-V : Report Writing**

Writing – organizing the writing, drafting the manuscript, style, Preliminaries-preface and acknowledgement, list of tables and illustrations; The Text-chapters and sub-headings, quotations, use of numbers abbreviations, footnotes, table and illustrations, pagination; References, Appendix, Bibliography.

**References:**

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Kothari, CR (1995) Research Methodology: Methods and Techniques, Wishwa Prakashan, New Delhi.
Mishra, S.K. and Binwal, J.C., Computer Applications in Social Science Research, Vikas Publication Co. Delhi, 1991.
Bhattacharya, D. K., Research Methodology Excel books New Delhi-10028, 2006.
Kapil, H.K., Research Methodology. Bargawa Book Deepo, Agra.
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## Syllabus for Ph.D. Course Work Paper – II
## (Recent Advances in Hindi)

हिन्दी

प्रश्न पत्र 02 – अधुनातन अध्ययन प्रणालियां : समकालीन दृष्टि एवं विमर्श

# Syllabus for Ph.D. Course Work Paper – II
# (Recent Advances in Sanskrit)

संस्कृत

प्रश्न–पत्र द्वितीय – विशिष्ट अध्ययन (Recent Advances in the subject)

(क) संस्कृत वाङ्मय का संक्षिप्त परिचय – वेद, व्याकरण, साहित्य, साहित्यशास्त्र, दर्शनशास्त्र।

(ख) वाल्मीकि, व्यास, भास, कालिदास, भवभूति, भारवि, माघ आदि प्राचीन संस्कृत साहित्यकारों का परिचय।

(ग) अम्बिकादत्त व्यास, लोकरत्नपन्त गुमानी, विश्वेश्वर पाण्डेय, मथुराप्रसाद दीक्षित, डॉ0 श्रीधरभास्कर वर्णेकर, डॉ0 सत्यवृत शास्त्री आदि आधुनिक संस्कृत साहित्यकारों का संक्षिप्त परिचय।

(घ) वर्तमान समय में प्रकाशित होने वाले संस्कृत रिसर्च जर्नल एवं समाचारपत्रों की जानकारी

## Syllabus for Ph.D. Course Work Paper – II
## (Recent Advances in English)

Paper II: Recent Advances in the subject

Modern Literary Criticism and Theory

1. New Criticism
2. Structuralism
3. Post-Structuralism.
4. New Historicism.
5. Feminism.
6. Psychoanalytical Criticism
7. Cultural Criticism.

References:

David Lodge. Modern Criticism and Theory.

Rene Welleck A History of Modern Criticism.

ohn Crowe Ransom The New Criticism.

Jonathan Culler. Struturalist Poetics.

Christopher Norris. Deconstruction; Theory and Practice.

H. Aram Veeser. The New Historicism.

Alan Sinfield. Cultural Politicis.

Toril Moi. Texual/Sexual Politics: Feminist Literary Theory. Mary Eagleton. A Conise Companion to Feminist Theory.

Elaine Showalter. The New Femisnist Criticism.

Sander Gilaman. Introducing Psychoanclytic Theory.

## Syllabus for Ph.D. Course Work Paper – II
## (Recent Advances in Political Science)

# POLITICAL SCIENCE

## Paper II: Recent Advances in the subject

### Group –A: Political Theory

1. Political theory; Meaning, Nature of Political Theory, Its distinction form ideologies- World view and cosmologies; Relevance of Political Theory
2. Types of Political Theory; Grand Theories; Little Theories etc
3. State of Political theory in the 21st century
4. End of Ideology, end of History, End of Sovereignty Debates
5. Environmentalism

### Group- B: Indian Politics And Administration

1. Nature of Indian Political System: Historical and Contemporary Perspectives
2. Major constitutional issues : Review of Constitution Debates
3. Regionalism,Language politics, Communalism, Secularism, Terrorism, Criminalization of politics
4. Political Economy of India
5. Regional Political in India and issues with special reference to Uttarakhand

### Group – C: International Relation

1. Nature of International relations in the 21st century Recent Approaches to the study of International Relations Realism, Neo-realism, PostModernism, Feminism, Constructivism, Rationalism, Critical Theory, Instuitionalism

2. Cold war as a system; End of Cold war; Security dilemmas after the cold war
3. Globalization, Global Governance, Global Culture
4. Third World and International Relations
5. United Nations: Political Strength and Weaknesses
6. Role of Major Powers in World Politics China, USA, Russia, Germany, France and Britain

## Syllabus for Ph.D. Course Work Paper – II
## (Recent Advances in Geography)

# GEOGRAPHY

## Paper-II: Recent Advances in the subject :

**Unit-I:** Emergence of Geography as Scientific Discipline: Impact of Explorations and Discoveries.

**Unit-II:** Dichotomies: Systematic and Regional, Determinism and Possibilism and Physical and Human Geography.

**Unit-III :** Impact of Quantitative Revolution in Geography: Development of Theories and Models.

**Unit-IV:** Introduction of Aerial Photographs, Satellite Data and Global Positioning System a

**Unit-V:** Introduction to Geographical Data in Geographic Information System and Science.

**References:**


1. Hartshorne. R. The Nature of Geography, 1939
2. Hartshorne, R. Perspective on the Nature of Geography. 1959
3. Minshull, R The Changing Nature of Geography. London. 1970
4. Minshull,R. Regional Geography. Theory and Practice. 1967
5. Spate, O.H.K. Let me Enjoy-Essays Partly Geographical
6. Taylor. G(ed) Geography in the twentieth Century. 1951
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8. Wooldridge and East The Spirit and purpose of Geography, London .1958
9. Wooldridge The Geographer as Scientist essays on the scope and nature of Geography: London, 1956
10. Board and Others Progress in Geography, Vol.I to V.
11. Harve , D. Explanation in Geography, London,1969
12. Freeman. T.W A Hundred Years of Geography. London. 1961

13.Dickinson and Howarth The Making of Geography, Oxford, 1933
14.Spilphus The Background of Geography
15.Bundury, E.H. A History of Ancient Geography
16. Newton Travels and Travelers in the Middle Ages
17.Pensore, B Travels and Discovery in Renaissances,1952
18.Tozer, H.F. A History of Ancient Geography
19.Kimbli, G.H.T. Geography in the Middle Ages
20.Singh, L.R. Bhoogol KI Prakriti (in Hindi)
21.Brock J.M. Geography: Its scope and spirit
22.Stamp, L.D.& Wooldridge London Essays in Geography. 1951
23.Prakasa, Rao, V.L.S. Regional Planning
24.Daysh,G.H.J. Essay in Regional Planning
25.Dickinson, R.E. City and Region-A Geographical Interpretation
26.Dickinson, R.E. The Makers of Modern Geography, 1969
27.Dickinson, R.E. Geography as Ecology
28. Stamp, L.D. Applied Geography
29.Singh. R.L.(ed) Applied Geography
30.Willam Bunge Theoretical Geography
31.Haggett and Chorley Models in Geography. London.1967
32.Cooke. F.D & Johnson Trends in Geography
33.Haggett, Peter Geography: A Modern Synthesis, New York, 1975
34.James, P.E. All Possible worlds-A History of Geographical Ideas. 1980
35.Helt Jensen.A. Geography: Its History and Concepts
36.Dikshit. R.D. Geographical Thought, Prentice Hall India. 1997
37.Adhikari, S. Fundamentals of Geographical Thought, Chaittanya. Allahabad
38.Haggett. P.& Chorley Models in Geography, London,1969

39. K.K.Kampal, Handbook of Aerial Photography and Interoperation: A Handbook
40.P.Nag and M.Kundart. Digital Remote Sensing.
41.P.Guha. Remote Sensing for Beginners.
42.Paul A. Longley,Michael F.Goodchild, David Geographic Information System and Science
43.John P. Wilson and A.S. Fotheringham. The Geographic Information Science.

## Syllabus for Ph.D. Course Work Paper – II
## (Recent Advances in History)

## SYLLABUS FOR PRE-PhD COURSE WORK EXAMINATION-HISTORY (w.e.f.Session 2015-16 onwards)

**Note: the question paper will be of three hour duration. It will be required to cover all the three periods, i.e., Ancient, Medieval and Modern India**

### Ancient India

1. Indus Valley Civilization : Salient features
2. Vedic Age; Vedic Literature; Caste system
3. Buddhism and Jainism-Birth and expansion
4. Mauryan Period- Chandragupta Maurya and Asoka
5. Gupta Period-Chandragupta Viramaditya - Political and Cultural achievements
6. Harsa and his times; Rajput period
7. Economic and Social Changes in Ancient India

### Medieval India

8. Advent of Islam - invasions of Mahmud Gaznavi and Mohammed Ghori
9. Delhi Sultanate-different dynasties
10. Mughal Period-Consolidation of Empire-Akbar, Shajahan and Aurangzeb; decline of the Empire
11. Economic and Social Changes in Medieval India

## Modern India

12. Advent of Eurpoean Powers- English, French, Portuguese and Dutch

    East India company-Initial years; Dual Government in Bengal; Administrative Reforms under Warren Hastings and Lord Cornwallis; Struggle for supremacy against Marathas, Mysore, Gurkhas and Sikhs

13. Indian Renaissance: Raja Ram Mohan Roy, Dayanand Saraswati, Annie Besant, Swami Vivekanand

14. Resistance Against British rule: revolt of 1857; Indian National Congress; advent of Mahatma Gandhi; Constitutional reforms; Road to freedom-Quit India Movement; Independence and Partition of India

15. Economic and Social Changes in Modern India

## Syllabus for Ph.D. Course Work Paper – II
## (Recent Advances in Economics)

Economics

Paper II: Recent Advances

Consumerism, Economic Integration, Developmental inequalities, Market vs. government & institutions, Social Welfare initiatives, Technology and Environmental aspects, Objectives of Modern economic Policies.

References:


Blaug. M (1985) Great Economists since Keynes, Harvester Press, Sussex.

Myrdal, G (1953) The Political Elements in the Development of Economic Theory, Routledge and Kegan Paul, London.

Micheal P. Todaro, Economic Development in the Third world, longman, 1981

G.M. Meir and Robert, E Baldwin, Development, Economic Development

Anne O Kruger, Political Economy of Policy Reforms in Developing Countries, MIT Press Cambridge Mass. 1994

Amartya Sen, Development as freedom, House, inc.1999

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Papola, T.S and Alakh N. Sharma, Employment and Poverty Reduction in India ILO Geneva. 2004

Dev, M, Kannan, KP, and Ramachandran, N (eds) (2003) Towards a Food Secure India, Institute for Human Development, New Delhi

Sen, AK (1995) Inequality Re-examined, Harvard Univ. Press, Mas Bassanini,

A, Scarpetta, S and Visco, I (2000) "Knowledge Technology and Economic Growth. Recent Evidence form OECD Countries"

Dasgupta, P and Malor, KG(1997) The Environment and Emerging Development lssues, Clarendon, Oxford

Datt, G and Ravallionm M (1998) " Why have Some Indian States Done Better than Others at Reducing Rural Poverty?" Economics 65 (257),pp 17-38.

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## Syllabus for Ph.D. Course Work Paper – II
## (Recent Advances in Sociology)

## SOCIOLOGY

Paper II: Recent Advances

Mean nature and types of sociological theory, Structural – functional theory, Status and Role theory
Mobility theory – migration (emigration, immigration)
Modernization-Concept and indicators of modernization, Tradition and Modernity,
Social Change-Patterns and theories of social change, Sanskritization and Westernization
Development –Social, Human and sustainable development, Indicators of development, Theories of development
Globalization, Ethno-methodology, Phenomenology

## Syllabus for Ph.D. Course Work Paper – II
## (Recent Advances in Drawimg & Painting)

**DRAWING & PAINITNG**

Paper II: Recent Advances in the subject

Methods and techniques uses recently by Contemporary Indian Artists.

(M.F.Husain, P.N.Choyal, Satish Gujral, Jatin Das, Tayab Mehta, Mansa Ram, Arpana Caur, Vikash Bhattacharya, Yusuf Arakal, Vivek Sundram, Atul Dodia, Rajeev Lochan, Jahangir Sabbawala, Method, Material & other recent technologies etc.)

## Syllabus for Ph.D. Course Work Paper – II
## (Recent Advances in Psychology)

# PSYCHOLOGY

Paper II: Recent Advances in Psychology

1. **Paradigms: Concept of Paradigrns:** Ontology, Epistemology, and Methodology and Methodology; Key paradignls: Positivisms, Post-positivism, the Critical Perspective and Social Constructionism, Participate Research/Co-operative Enquiry; Existential-Phenonlenology.
2. **Indian psychological concepts:** Introduction to Irldian Perspectives.
   Upanidhads, Samkhya, Vedanta, Jainism, Buddhism, Nyaya, Charvak, Bhyagvadgita; Methods of knowing. Consciousness and Self and Identity.
3. **Positive Psychology:** Identifying and rneasuring strengths: Positive self, traits, emotional strength, and flow. Promoting positive relationship: Compassion, forgiveness, gratitude, Empathy, Yoga, Health and Well-Being
4. **Social issues:** Critical Psychology: Examining the relationship between political processes, cultural realities, historical forces & subjective experience. The interpersonal & intrapsychic formation of our gendered subjective: Masculinity, femininity & the "recovery" of women voices. Poverty, Deprivation and disadvantage.
5. **Cultural Indian Psychology:** The Pan-Indian Identity; A critical look into "The Inner World" the meeting place for childhood and Society. Symptoms and Healing Traditions in India; In India Intimate Fusion: Fantasies and fears of Indian Men and Women, Analysis of Social Violence.

## Syllabus for Ph.D. Course Work Paper – II
## (Recent Advances in Home Science)

## HOME SCIENCE

A: Foods and Nutrition

Unit I – Food Science

- Introduction to food science – evolution of food industry and allied industries.
- Understanding food groups for balanced diet, structure and composition, nutritive value processing techniques of cereals, pulses and legumes, fruits and vegetables, nuts and oil seeds, milk and milk products, egg, meat and fish.
- Sugar, spices and condiments
- Processed food: jams, jellies, squashes, pickles
- Beverages – Coffee, Tea, Cocoa, carbonated and non carbonated, alcoholic beverages
- Food additives, food colour, emulsifiers, stabilizers and flavors
- Leavened products
- Food fortification, enrichment and supplements
- Sensory evaluation of food products
- Food spoilage and food poisoning – Spoilage caused by micro – organisms, enzymes, pets and rodents
- Principles of food preservation – food dehydration, heat preservation, cold preservation
- Food irradiation and microwave heating
- Fermentation and fermented foods

## Unit II – Human Nutrition and Dietetics

- Nutrients in foods: Their function, requirements and sources, digestion absorption and utilization of nutrients. Effect of low and excess intake of nutrients on human body, B.M.R.
- Recommended dietary allowances and nutrition for different age sex and activities
- Methods of assessment of nutritional status
- History of dietetics, effect of illness on food acceptance, role of dietician, dietetic counseling
- Therapeutic modification of normal diet, food exchange lists, special feeding methods
- Causes, symptoms and principles of dietetic managements of

  - Fevers
  - Peptic ulcer
  - Gastritis, diarrhea, constipation
  - Jaundice
  - Hepatitis
  - Cardiovascular disease
  - Nephritis and renal disorders
  - Gout
  - Arthritis
  - Diabetes mellitus
  - Obesity
  - Under weight, (PCM)
  - Cancer
  - Diet in surgery, burns, injury and allergy
  - Nutritional Management of eating disorders-Anorexia Nervosa, Bulimia, Binge eating.

## Unit III Community Nutrition

- National and international agencies and various programmers dealing with nutrition of community in India
- Nutritional education-Rationale, planning, execution and evaluation
- Food security : food distribution system, PDS, FCI
- Magnitude of nutritional problems in India: Major deficiency disorders PEM, Vitamin A deficiency, endemic goiter, fluorosis etc.
- Concept of health, vital statistics and demographic indicators
- Community nutrition as a field: public health nutrition, goals of nutrition programme, dietary guidelines, present trends and focus on community nutrition, methods of assessing nutritional status
- National food and nutrition policy, plan of action and prgrammes
- Primary health care-concept and organization, current status of health care system in India
- Nutrition and infection

## Unit IV Nutrition during life span

- Nutrition in infancy – growth and development, nutritional requirements, feeding pattern, weaning practices, wending and supplementary foods
- Pre-School age-growth and development, nutritional requirements, special care in feeding them, nutritional problems of this age - School age and adolescents-growth and development, nutritional requirements, nutritional problems
- Yong adults-nutritional requirements, nutritional status of India adult population, nutritional problems common to this age

- Elderly-nutritional requirements, special needs, nutritional problems
- Pregnancy-Physiological adjustments, nutritional requirements, nutritional status of India pregnant women, effect of malnutrition on outcomes of pregnancy
- Lactation-Physiology of lactation, factors affecting lactation, nutritional requirements

## B: Clothing and Textile

### Unit I Textile Science

- Natural fibers: Physical and chemical properties and fabric manufacture
- Man made fibers: Physical and chemical properties and fabric manufacture
- Blends and mixtures, yarn classification, spun yarns, filament yarns
- Labels and their classification
- Identification of fibers
- Laundering of textiles
- Soaps and detergents, bleaches, whitening agents and blues
- Hard and soft-water
- Care and storage of textiles

### Unit II Fabric Formation and finishes

- Method of fabric formation
- Basic weaves, non woven fabric construction, knitted fabrics
- Looms
- Special finishes – Bleaching, scouring, degumming, carbonizing, mercerizing, sanforzing, beetling, creping, glazing, calendaring, flocking, napping, tentering, shearing

- Functional finishes – water proof and water repellent finish, soil repellent finish, shrinkage control, wrinkle resistance, flame retardant finish, mildew proof, rot proof, moth proof, antistatic and antibacterial finish
- Adding colour textile: Natural and synthetic dyes
- Classification of dyes, dyeing techniques
- Textile and environment
- Printing techniques

**Unit III Apparel Designing and Historic Textiles**

- Sources of inspiration for apparel designing
- Techniques of pattern making - Drafting their applications and limitation in clothing construction
- Psychological and sociological influence of dress
- Basic principles of construction of garments for different age
- Clothing – origin and reasons
- Costumes in ancient Indian civilization
- Indian embroideries

**C: Human Development**

**Unit I Life Span Development**

- Prenatal development stages – Genetic and environmental factors, critical influences, birth process

- Infancy (Birth to 2 years)

- Physiological, cognitive, social, physical emotional, motor development

- Early environment and its importance

- Child rearing practices

- Early childhood years – Physical, motor, emotional cognitive and language development

- Middle childhood – Physical and motor development, language and intellectual development, growth trends emotional, social and moral development

- The function of family, school and community in growth of children

**Unit II Life Span Development II**

- Adolescence – Physical and social changes development of emotional maturity, personal and vocational interest, problems of this stage
- Early and middle adulthood – Meaning, development of self, physical, intellectual and personality development
- Old age – Older adults, characteristics physical, cognitive and personality changes attitude towards life, psychological changes, special needs of elderly

**Unit III Theories of Human Development**

- Theories of Human development
- Learning theories
- Personality
- Mental development – Meaning, components, assessment, significance and types of mental tests
- Exceptional children
- Family relationship
- Juvenile delinquency -Mental hygiene

## Unit IV Aspects of Human Development

- Concept of human development, Human development index, human development indicators
- Millennium development goals and human development
- Human development in India and human rights
- Education and development education and social change. Population and education. Educational profile of India
- Elementary school and higher education in India
- National polices for education, National curriculum frame work, NCERT 2005, DPEP, Right to education 2010 & MDM
- Social empowerment – education, health, nutrition, drinking water and sanitation
- Self help groups, women in agriculture, women and industry support services
- Legal empowerment – legal literacy on personal and family laws, role of family court and legal aid center
- Support system – role and functions of department of women and child development, central social welfare board, state social welfare boards, National Commission for woman
- Programmers for women and child development

## Family Resource Management

## Unit I Theory of Management

- History of home management
- Ends sought through management Goals – factors affecting, end Values – sources of values, patterns, status security Standards
- Management as a system
- Management abilities

- Decision Making – Meaning, types, modes and techniques and tools for decision making
- Management functions and process
- Planning organizing, guiding, controlling evaluation

**Unit II Family Economics**

- Importance and relationship of economics to resource management
- Consumption functions and consumption pattern of families, elements of market, theory of consumer behavior – central problem of choice and utility, solution, low of diminishing and marginal utility and low of equi – marginal utility
- Planning of expenditure (account keeping and marketing-types), functions, importance and market devices – labels, packing, guarantee and brands
- Techniques of financial assessment budgeting taxes, saving and insurance
- Consumer behaviors
- Consumer protection government, public and private protection, role of consumer education, standardization of consumer goods and testing methods

**Unit III Housing**

- Requirement of housing, history of housing, changes in housing, changes in housing need and standards
- Present housing condition in India
- Housing in India as effected by various trends
- Solving India's housing problems
- Factors affecting housing
- Approaches to housing
- Housing schemes and agencies, rent control policies
- Housing standards and housing legislation.

- Technical aspects of house design with reference to priciples of planning
- Residential architectural design for various life styles
- Cost of housing design – estimating and costing in relation to land price and construction, factors influencing cost, sources of financial assistant
- Analysis of housing design – analysis of plans, material and construction techniques, study of different housing designs
- Housing research – agencies for research and development, methods and techniques
- Graphic representation of interiors and floor plans

**E: Home Science Extension Education**

**Unit I Extension Education System**

- History, philosophy, objectives, concepts, contribution, principles, development of extension, Extension education: meaning, process and principal of learning in extension
- Formal and non formal education, principles, significance, steps and types of program planning and evaluation
- Community development programmes in India
- Review of different rural development programme – IRDP, TRYSEM, JRY, NREGA, PMRY, SRY, SGSY
- Institutions for child and women development- WHO, UNICEF, UNESCO etc
- Support structures and their functions – Panchayats, panchayati raj institution, central social welfare boards, state social welfare boards, national level voluntary agencies, CAPART etc.

**Unit II Communication Technologies in Extension**

- Types of communication systems – concept, functions and significance

- Interpersonal, characteristics and scope of mass communication
- Mass communication – Elements, characteristics, models, theories, scope and challenges
- Traditional and modern methods of communication
- Media systems: Trends and techniques, concepts, scope, relevance of media in society functions, reach and influences of media
- Participatory rural appraisal PRA and RRA techniques
- Elements of diffusion of innovation and decision making process

## Unit III Research Methods and Statistics

- Research in home science concept, need and approaches
- Types of research: Historical, survey, experimental and case study
- Definition and identification of research problems, hypothesis, basic assumption and limitation of research problem
- Sampling: Types and section of samples
- Data collection and processing methods
- Role of statistics in research – elementary statistics, classification and tabulation and frequency distribution of data, , mean, median, mode, probability
- Use of computer for analysis of data

## प्री0 पी0 एच0 डी0 पाठ्क्रम वर्क कार्स

द्वीतीय प्रष्न पत्र ( Research Advances in the Subject Music)

इकाई–1

1 भारतीय संगीत का इतिहास (प्राचीन काल, मध्यकाल, आधुनिक काल।)
2 षास्त्री संगीत की विभिन्न गीत ष्षैलियॉ (ध्रुपद, धमार ,ख्याल, गत, तराना,ठुमरी,दादर भजन) आदि का विस्तृत अध्ययन।
3 हॉरमनी तथा मैलोडी।

इकाई–2

1 तत्वाद्य सुषिर वाद्य, घनवाद्य तथा अवनद्ध वाद्यों का विस्तृत अध्ययन।
2 षास्त्री संगीत में प्रयुक्त होने वाली तथा प्रचलित तालों का (लयकारी सहित अययन)।
3 षुद्ध राग, छायालग राग, संकीर्ण राग, पूर्वांग उत्तरांगवादी राग, सन्धि राग, परमेल प्रवेष रागों का अध्ययन।
4 स्वर राग व ताल की दृष्टि से हिन्दुस्तानी उत्तरी दक्षिणी संगीत पद्धतियों व तुलनात्मक अध्ययन ।

इकाई–3

1 सौनदर्य ष्षास्त्र, मेजरटी, मेजरटोन, मानरटोन, सेमीटोन, कॉडस, क्लैफ।
2 स्वर–स्वरान्तर।
3 स्नातक एवं स्नात्तकोत्तर पाठ्क्रम के समप्रकृति रागों का तुलनात्मक अध्ययन।

इकाई–4

1 कंठ साधना।
2 श्रुति, स्वर थाट, ग्रम, मूर्च्छना, प्रबन्ध, जातिगायन, राग गायन का विस्तृत अध्ययन।
3 ष्षास्त्रीस संगी के किन्हीं पॉच प्रसिद्ध गायन एवं गायिकाओं का जीवन परिचय एवं संगीत में योगदान।
4 रामायण, महाभारत तथा पुराणों में संगीत।

## Faculty of Art
## Ph.D. Course Work Module for Research Paper III
## Paper III: On specialized branch of the subject

**Introduction:** This paper is specially meant to adjudge the acquired knowledge and ability of candidate in the specialized branch of the subject related to which the candidate will finally submit the Ph.D. **Memoir (i.e. Maxima)** for evaluation. Hence, this is advisable that in place of a separate theory based examination candidate may be asked to prepare a **dissertation** work therewith called **Minima**) on major themes and or broader issues of the specialized aspects of the subject-field (in which the candidate wishes to pursue the research work) in consultation with his/her supervisor.

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**Topic:** To be choser from the **specialized** branch approved by the supervisor.

**Content:**

(i) Principles and Theory (historical and modern perspective).
(ii) Review of research (national and international status). This will help researchers identifying the research gaps and all be further useful while framing the research objectives in a more rational manner.
(iii) Materials and Methods (Standard and innovative methods. if any).
(iv) References, Bibliography/Webliography (this would include complete list of consulted journals, books, memoir including the published unpublished Ph.D. theses, web-pages and search engines etc.).

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## Department and Faculty of Education

## Syllabus for Ph.D. Course Work Paper – I

## (Research Methodology in Education)

### Paper-I Research Methodology in Education

**Contents:**

**Unit-1 :** Nature of scientific research : Quantitative and qualitative approaches

**Unit-II :** Steps in the Process of Quantitative and qualitative Research

**Unit-III :** Basic Concepts in the process of Positivist research: Theory, Hypothesis, Data and their collection, Sampling for data collection, Data Analysis, Hypothesis testing, Interpretation of findings, Repost writing.

**Unit-VI :** Qualitative Data their collection and analysis

**Unit-V :** Overview of Major types of Educational Research: Historical, Normative Survey, Experimental, Action Research and Case Study

**Unit-VI:** Development of a Research Proposal

**Unit -VII:** Types of different data collection tools and methods of their Construction

**Unit-VIII:** Strategies for Undertaking and writing Review of Research Literature

**Unit - IX :** Review of different Methods of statistical analysis of qualitative and quantitative data

**Unit - X :** Writing and publishing research repots/ papers

**Unit -XI :** Making effective presentation of research findings

**Suggested Readings:**

(1) Blaxter, L. Hughes. C & Tight, M., "How to Research" , Viva Books, Pvt Ltd., New Delhi, 1999.

(2) De Vaus, D.A., “Surveys in Social Research” , Rawat Publications, 2003.
(3) May, Tim, "Social Research : Issues, methods and Process”, Open University Press, 2001
(4) Henn, M., Weinstein, M. & Foard, N., “A short Introduction to Social Research”, Vistaar Publications, 2006
(5) Boyatzis, R.E., “Transforming Qualitative Informing”, SAGE, 1998.
(6) Thakur, D. "Research Methodology in Social Sciences”, Deep & Deep Pub. Pvt. Ltd., 2005.
(7) McNiff, J. & Whitehead, J., “ Action Research: Principles and Practices", Routledge falmer, London, 2002.
(8) Broota, K.D., “ Experimental Designs in Behavioural Research” New Age International Pub., 2006.
(9) Kanji, G.K., “100 Statistical Tests”, SAGE, 2006.
(10) Best, J.W. & Kahn, J.V., “ Research in Education”, Printice Hall of India, 2000.
(11) Kumar, R., “Research Methodology”, SAGE, New Delhi, 1999.
(12) Mohan, R., “Research in Education”, Neel Kamal Pub. Pvt. Ltd., 2003.
(13) Shepard, K., “Presenting at Conferences, Seminars and Meetings”, Response Books, New Delhi. 2005.
(14) Garett, H.E., “ Statistics in Psychology and Education” Paragon International Publishers, 2004.
(15) Lowenthal, K.M., “An introduction to Psychological Tests and Scales” Psychological Press (Indian Reprint ), 2003.
(16) Freeman, F.S. “Theory and Practice of Psychological Testing”, Oxford & IBH Pub. Co. Ltd., New Delhi, 1955.

## Department and Faculty of Education
## Syllabus for Ph.D. Course Work Paper – II
## (Recent Advances in the field of Education)

**Paper II : Recent Advances in the field of Education**

**Contents:**

**Unit-I:** Higher Education in the Context of Globalization

**Unit-II:** Changing Paradigm of Technology in Higher Education: m-learning, u-learning, weblog, Information literacy in higher education

**Unit-III:** Developments in the field of Education :
Right to Education Bill-2008
Human Rights Education and Teacher Education Curriculum
Shakshar Bharat Program
Rashtriya Madhyamic Shiksha Shaksharta Mission
National Curriculum framework
Knowledge Commission
Delor's report

**Unit-IV:** Reforms in examination and evaluation in higher Education
**Unit-V:** Total quality management in Education
**Unit-VI:** Future of Open Distance Learning under GATS policy regime
**Unit-VIII:** Future perspectives in Teacher Education

**Suggested Readings:**

(1) Sam Pitroda, "National Knowledge Commission: Report to the Nation", 2006-2009, Govt. of India, New Delhi.
(2) Hallak,J, "Globalization, Human Rights and Education", UNESCO, IIEP, Paris, 1999.

(3) Yazali Josephine, "Globalization and Challenges for Education", NIEPA, Shipra Publication, New Delhi, 2003.
(4) Khajapeer, M., "Teacher Education in 21st century India", University News, Vol. 39, No.9, 2001.
(5) NCERT, "National Curriculum Framework-2005", New Delhi
(6) Terenzini, P.N & Chaffe, E.E., " Total Quality Management in Higher Education", San Francisco , Jossey Buss, CA 1991.
(7) University News: Vols. 47 (24); 47(40); 47(41); 47(43); 47(44); 47(50); 47(48); 45(50); 48(15); 48(18); 48(19); 48(20); Journal of Higher Education, Association of Indian Universities, New Delhi.
(8) Right to Education Bill – 2008 PRS: www.prsindia.org.
(9) Teacher Education in Madhya Pradesh, SCERT, Bhopal, NCTE, MG Marg, IP Estate, New Delhi, 1997.
(10) Rao, D. Bhaskar, "Global consensus on Teacher Education", Discovery Pub. House, New Delhi, 1998.

**Department and Faculty of Education**
**Ph.D. Course Work Module for Research Paper III**
**Paper III: On specialized branch of the subject**

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**Department and Faculty of Commerce & Management**
**Syllabus for Ph.D. Course Work Paper – I**
**(Research Methodology in Commerce & Management)**

## Paper-I: Research Methodology in Commerce & Management

**Contents:**

Nature of scientific research: Quantitative and qualitative approaches
Role of research in functional areas of business – Accounting, finance, Marketing, Human Resource Management, Planning and business management
Research Method, Research Methodology and Research Process.
Defining Research Problems, Setting Objectives, Formulating Hypothesis,
Research.
Design, Sample Design.
Business Surveys – Collection of Primary and Secondary data, Design of questionnaire.
Data processing – Classification, Tabulation. Editing.
Analysis and Interpretation of Data: Uni – variate, bi-bivariate and multi-variate analysis.
Report Writing: Categories of Report, Parts of Report, Presentation of a Report

**Suggested Readings:**


(1) Blaxter, L. Hughes, C & Tight, M., "How to research" Viva Books, Pvt Ltd., New Delhi, 1999.
(2) De Vaus, D.A., "Surveys in Social Research", Rawat Publications, 2003.
(3) May, Tim, "Social Research: Issues, methods and Process", Open University Press, 2001
(4) Henn, M., Weinstein, M. & Ford, N., "A short Introduction to Social Research", Vistaar Publications, 2006.

(5) Boyatzis, R.E., “Transforming Qualitative Informing”, SAGE, 1998.
(6) Thakur, D. “Research Methodology in Social Science”, Deep & Deep Pub. Pvt. Ltd., 2005.
(7) McNiff, J. & Whitehead, J., “ Action Research: Principles and Practices”, Routledge Falmer, London, 2002.
(8) Broota, K.D., “Experimental Designs in Behavioural Research”, New Age International Pub., 2006.
(9) Kanji, G.K., “100 Statistical Tests”, SAGE, 2006.
(10) Best, J.W. & Khan, J.V., “Research in Education”, Printice Hall of India, 2000
(11) Kumar, R., “ Research Methodology”, SAGE, New Delhi, 1999.
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(16) Freeman, F.S. “Theory and Practice of Psychological Testing”, Oxford & IBH Pub. Co. Ltd., New Delhi, 1955.

## Department and Faculty of Commerce & Management

## Syllabus for Ph.D. Course Work Paper – II

## (Recent Advances in the Field of Commerce & Management)

### Paper-II : Recent Advances in the Field of Commerce and Management

**Contents:**

(1) Survey and research work in different functional areas of business.
(2) Different dimensions of international business and its environment.
(3) Policies and legal provisions of government with respect to the business environment in India.
(4) Managerial economics and their applications in managerial decision making.
(5) Understanding of finance functions and relevant techniques of financial management.
(6) Recent changes in financial accounting and reporting practices.
(7) Understanding of the services and its management.
(8) An insight into the interface of information technology with business, and to familiarize them with computer applications in business decisions.
(9) Changing dimensions of the Modern Organization and their Management.

Suggested Readings:

(1) Sam Pitroda, "National Knowledge Commission: Report to the Nation", 2006-2009, Govt of India, New Delhi.

(2) Yazali Josephine, "Globalization and Challenges for Education", NIEPA, Shipra Publication, New Delhi, 2003
(3) Terenzini, P.N. & Chaffe, E.E., "Total Quality Management in Higher Education", San Francisco, Jossey Buss, CA, 1991
(4) University News: Vols. 47 (24); 47(40); 47(41); 47(43); 47(44); 47(50); 47(48); 47(50); 48(15); 48(18); 48(19); 48(20); Journal of Higher Education, Association of Indian Universities, New Delhi.
(5) Bajaj: Management Processing and Organization, Excel Publication
(6) Gosh: HRD and Management Vikas
(7) Sundaram and Bank: International Business Environment Text and Cases, PHI.
(8) Govt. of India, Latest Economic Survey.
(9) Mary Ellen Ceuffey, Business English.
(10) Edwin B Flippo, Personal Management.
(11) Subrahmanyam, et,al Personality Development, Excel Books, New Delhi.
(12) N. Vinaykn, A Prabile of Indian Capital Market.
(13) RBI, Report on trends and progress of banking in India, Various Issues, Mumbai.
(14) N. Ghosh, Management Control Systems. Prentice Hall of India.
(15) Saunderr, Research Methods for Business Students (Person India, New Delhi).
(16) Smith, Malcom, Research Methods in Accounting (Sage Publ, 2007).
(17) Smith, Thorp and Lowe, Management Research (Sage Publication)
(18) Cereensteinand Feinamn, Electronic Commerce, Tata Mv Cerawhill, New Delhi,

**Department and Faculty of Commerce & Management**
**Ph.D. Course Work Module for Research Paper III**
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## Department and Faculty of Law

## Syllabus for Ph.D. Course Work Paper – I

## (Research Methodology in Law)

### Paper-I-Research Methodology

1- Meaning, Objectives and Kinds of Legal Research
2- Methods of Legal Research
i- Doctrinal and Non-doctrinal Research
ii- Quantitative and Qualitative Research
iii- Socio-legal Research
iv- Relevance of Empirical Research
3- Identification of Research Problem
4- Research Design
5- Devising Tools and Techniques for Data Collection
6- Data Analysis

## Department and Faculty of Law

## Syllabus for Ph.D. Course Work Paper – II

## (Recent Advances in the Field of Law)

### Paper –II- Recent Advances in the Subject Concerned

1- Feminist Jurisprudence
2- Critical Legal Studies Movement
3- Challenges to Indian Federalism
4- Challenges to Parliamentary Democracy in India, Concept of Panchayati Raj and Village Courts
5- Important Constitutional Amendments during last ten years
6- Landmark Judicial Pronouncements and Important Central legislations during last two years
7- Recent Trends in Tortious Liability in Relation to Hazardous Activities

## Department and Faculty of Law

## Syllabus for Ph.D. Course Work Paper – III

## (On specialized branch of the subject)

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Subject – Defence and Strategic Studies
Syllabus of Ph.D. Entrance Test

Unit – I Military History of India

1.Military System in Vedic and Epic Age (1500-600B.C.)
2.Eattle of Hydaspes (326.B.C)
3.Warfare and Military Organization (600-185B.C)and Kautilya Philosophy of War
4.Changes in Hindu Military system and Art of Warfare during the Age of Gupta and Harsh Vardhana (185B.C.to 647 A.D.)
5. Arab and Turk invasions of India and new trends in Warfare. Rajput Military System and art of Warfare with special reference to the battle of TARRAIN (1191-92A.D.)
6.Military system of the Delhi Sultanate (1206 to 1520A.D.)
7.The development in Mughal Military system and changes in the art of Warfare (1526 to1707 A.D.) with special reference to the Battles of PANIPAT and KHANWA, cause of the failure of Mughal Military systems.
8.Maratha Military system, with special reference to the Third Battle of PANIPAT 1761 A.D.
9.Military system and pattern of warfare of SIKH ARMY, ANGLO-SIKH Warfare with Rreference to the Battle of ASSAYE (1803A.D) and SOBRAON (1846A.D.)
10.Development of the presidency armies under the East India Company.
11.Indian war of Independence 1857.
12. Organization of the Indian Armed Force after independence.
13.Kashmir Operation 1947-1948.
14.India – Pakistan Conflict of 1965.
15.India- Pakistan Conflict of 1971.

16.Kargil war 1999.

Selected Readings

Majumdar B.N. - A Study of India Military History.
Majumdar P.K. - Bhartiya Sana ka ltinas
Fukker J.F.C. - Generalship of Alexander the Gareat.
Singh L.J.