Ph.D. Course Work (I) Syllabus
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Research Methodology, Quantitative Techniques and Computer Applications


Unit- III : Simple correlation, Biserial correction, Tetrachoric correlation, and partial correlation. Overview of simple and multiple regressions. Introduction to factor analysis.

Unit- IV : Defining Qualitative research. How is qualitative research conducted ? Issues in conducting of qualitative research, Non-reactive research or unobtrusive measures : The logic, purpose and definition and types of non-reactive research. Research report writing in APA style.


Recommended Readings:


1. **Fundamental Laboratory Techniques**: Basic Principles, Health and safety, working with liquids, Basic laboratory procedures-I, Basic laboratory procedures-II, Principles of solution chemistry, pH and buffer solutions.

2. **The investigative approach**: Making and recording measurements, SI units and their use, Scientific method and design of experiments, Project work.

3. **Analysis and Presentation data**: Using graphs, presenting data in tables, Hints for solving numerical problems, Descriptive statistics, choosing and using statistical tests, drawing chemical structures, chemometrics, computational chemistry.


5. **Spectrometry**: UN-Vis, IR, Mass, NMR, AAS, AES, GC-MS, HPLC-MS, Sooterfluorometry.

6. **Thermal Methods of Analysis**: Principle and applications of TGA, DTA and DSC; Cyclic voltammetry.
Reference :-


2. OSU safety Manual 1.01.

3. Research Methodology, Methods and Techniques : C. R. Kothari,


SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

COURSE WORK FOR Ph.D. STUDENT
SUBJECT : MATHEMATICS

Unit- I.  **Introduction to Research Methodology**: Meaning of Research, Objectives of Research, Motivations in Research, Significance of Research.

Unit - II.  **Research Problem**: Selection of Problem, Domain and Boundaries of Problem, Research Problem Analysis, Variable and Parameters, Technique Selection.


Unit - IV.  **Research Presentation**: Presentation of Project Proposal, Presentation of Project Report, Presentation at Research Degree Meeting, A Poster Presentation of Research Paper, Direct (Oral) Presentation of Research, Presentation of Talk, Presentation and Delivering of Plenary Lecture, Virtual/Tele Presentation.

Unit - V.  **Computer Programming and Technique**: Introduction of Computer, Computer Orientation to Research Problem, Introduction to Simple Programming Languages, Software Packages and Application, Computational Data Analysis. Basic concepts of Mathematical modelling.

**Reference Books:**
Subject - Botany

Unit-I  Research in Biology, Biological problems and assumption, Search of research problems, Reference and literature search, Records and presentation of data. Biological literature, Technical papers, Abstracts, Reprints and other literature. Rules for maintaining the Biosafety in the laboratory.

Unit-II  Principle and Application: Microscope, Incubator, Hot Air Oven Laminar flow, Soxhlet, Spectrophotometer, Colorimeter, pH meter, B.O.D., Centrifuge, Electrophoresis, Microtome, Electronic balance, Chromatography, Cryotomy, staining microphotography.

Unit-III  Field survey, Plant Collection, and Identification, Key Preparation. Conservation techniques for Plant material. Biochemical and phytochemical Techniques, Soil and Water analysis.

Unit-IV  Biostatistics: Mean, Median, Mode, Histogram, Frequency curve, Frequency Polygons, standard Deviation, and Standard Error, Normal &Binomial Distribution, Test of Significant Based on large and Small sample (\(t\)-test, Chi-Square test,) ANOVA Basics of correlation and regression analysis.

Unit-V  Computer Application: Basic Idea of computer, (MS world, power point, excel. Bioinformatics: definition, role .and limitation, Biological Data type.Classification of biological data base sequence data base, Gene bank swiss-proy. Secondary nucleotide and protein sequence data base,CUTG, PROSITG, specialized data base; KEGG, ENZYME.)
SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE
SYLLABUS OF Ph.D. COURSE WORK-I

SUBJECT: MICROBIOLOGY

Biosafety Lab (BSL) conditions: Rules for maintaining the Biosafety in the Microbiology laboratory, Making the aseptic, sterilized and dust free conditions in the lab for prevention of unwanted contamination of the sterilized lab from outer Sources.

Culture, Characterization and Identification: Awareness about of types of Culture media for both aerobic and anaerobic microbes under extreme conditions. Knowledge of Biochemical, Serological and Molecular biological aspects of techniques are essential.

Laboratory Animal Care: Maintenance of Germ free animals (rat, mice, guinea pigs) and inoculation via various route, immunization schedule and their knowledge, handling of WISTAR rats, Swiss albino, Balb/C mice and Rabbits is required, Also knowledge of Cell and Animal tissue culture.

Research in Biology:- Microbiological, Serological and Molecular biology related problems and assumptions, Search of Antimicrobial herbal products, Immunomodulation, Secondary metabolical product of Microbes study problems, Reference and literature search, Records and presentation of data, Biological literature, Technical papers, Abstracts, Reprints and other literature.

Principles And Application: PCR and RT-PCR, Geldocumentation, RAPD and RFLP, PAGE and Western and Southern blotting., Special staining, and Microscopy, Spectrophotometer, Ultra violet and infra red Spectrophotometer, ELISA, Geldoc, PAGE, Thermocycler, Microscope, Paper electrophorpsis and Gel electrophoresis.

Centrifugation techniques: Principle, Types of centrifuges and their applications.

General Principles and techniques of Histology: Microtomy and Histopathology, Cryotomy and Microphotography.

Quantitative Estimations: Principle, methods and applications of Protein, Lipids, Enzymes, Free Radicals, Antigen and Antibody estimation.

Biostatistics: Mean, Median, Mode, Histograms, Frequency curve, Frequency Polygons, Bar diagrams, Pie-diagrams Standard Deviation and Standard Error Normal Distribution and Binomial Distribution.

Test of Significance Based on large Samples and Small Samples: t-Test, Chi-square test, ANOVA, Basics of correlation and Regression analysis.

Computer applications: Basic idea of computers: MS Word, power point and Excel.

Bioinformatics: Definition, role, scope and limitations.

Biological data and databases: Biological data type, classification of biological Data base, Sequence databases: Gen Bank, SWISS-PROT, Specialized databases: KEGG, ENZYME Secondary nucleotide and protein sequence databases: CUTG, PROSITE

BOOKS FOR REFERENCE:
Cell and Molecular Biology- De Robertis and De Robertis
Textbook of Medical Physiology- Guyton and Hall
Cell and Molecular Biology- P.K.Gupta
Fundamentals of Statistics- D.M. Elhance
Biostatistics and Computer Allocation- Dr. R. Goswami
Immunology - Evan M Roit
Microbiology- Peljar
Manual of Microbiology- Cruckchank, Monica Cheesburgh.
Unit-1  Introduction to Research Methodology, Meaning, Objection, Significance of Research in Management, Importance and scope of research methodology, Review of Literature.

Unit-2  Research process, setting of Hypothesis Research design, Types of Research, Sampling concept, Type of Samples Design (Only Theoretical Part)

Unit-3  Data Collection, Type of Data, Processing of Data-Editing, coding, Classification, Field work and tabulation of Data.

Unit-4  Data Analysis, Measures of central tendency and dispersion, coefficient of variation, “Skewness” Kurtosis, Probability Theory, simple correlation and regression analysis, Z test, t test, f test chi square test and Anova.

Unit-5  Report Writing, Characteristics of good report, information processing and analysis skills Basics of MS Office, Research related software’s like SPSS etc.
Unit 1. Introduction to research methodology meaning, concept, Objectives needs significance of research in commerce, importance and Scope of Research, Methodology, Review of Literature.

Unit 2. Research process, setting of Hypothesis, Research Design, Types of Research, Sampling Meaning, Concept, Uses of sampling, Types of sample design (Only theoretical part)

Unit 3. Data Collection, Types of Data, Processing of Data-Editing, Coding, Classification, Field work and Tabulation of data.

Unit 4. Data analysis and research tools- Measures of central tendency and dispersion, coefficient of variation, Skerness, correlation and Regression analysis, z test, t test, f test, chi square test and Anova.

Unit 5. Report writing characteristics of good report, information processing and analyzing, Research basics of problems with help of software like SPSS etc.
Section A 1

Research Methodology

1. What is research
2. Defining the hypothesis
3. Research design
4. Types of research- quantitative and qualitative
5. Identification and evaluation of resources
6. Differences in methods of data collection in quantitative and qualitative type
7. Writing a research proposal
   - Preamble/introduction
   - Problem
   - Objectives of the study
   - Hypothesis
   - Study design and structure
   - Problem and limitations
   - Documentation
8. Writing a research report
   - Size and physical design
   - Procedure
     - Data collection
     - Analysis and interpretation/critique of data
     - Findings
     - Conclusion
   - Layout
   - Treatment of quotations
   - Documentation style
9. Role of computer in research work
   - Identification of area and topic- internet and web resources
   - Collection of data/information for study
   - Drafting and editing of proposal and report
   - Use of text supporting applications like MS Word, Excel, Pagemaker etc.
   - Documentation and referencing
Recommended Reading

SYLLABUS OF Ph.D. COURSEWORK
SUBJECT- SOCIOLOGY

2. Logic of enquiry in social sciences research.
3. Scientific method in social research: Observation, interview schedule & questionnaire, content analysis, sampling design, case study method.
4. Survey techniques measurement and scaling.
5. Operationalization & research design.
6. Encounters and experiences in field work.
7. Application of computers in social research (SPSS)

References -
SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SYLLABUS OF Ph.D. COURSE WORK

SUBJECT- CIVIL ENGINEERING

UNIT I. STRUCTURAL ENGINEERING


ii) Strength of Materials: Shear force and bending moment, simple stresses and strains, stresses in beams, direct and bending stresses.


UNIT II. WATER RESOURCES ENGINEERING

i) Fluid Mechanics and Hydraulics: Fluid properties, fluid pressure, kinematics and dynamics of fluid flow, principles of conservation of mass, energy and momentum, Bernoulli’s equation.

ii) Hydrology: Hydrologic cycle, rainfall, evaporation, infiltration, stage discharge relationship, runoff, hydrograph.

iii) Irrigation: Duty, delta, water requirements of crops, introduction to dams and diversion headworks, introduction to canals and cross drainage works, types of irrigation systems, water logging and drainage.

UNIT III. ENVIRONMENTAL ENGINEERING

i) Water Supply Engineering: Sources of supply, estimation of demands, water quality standards, introduction to primary and secondary treatments, conveyance and distribution of treated water.


UNIT IV.

i) Transportation Engineering: Classification of roads as per Indian Road Congress. Geometric design elements – camber, superelevation, transition curves, radius of horizontal curves, stopping sight distance, overtaking sight distance. Traffic engineering – traffic volume, origin destination surveys.

ii) Geotechnical Engineering: Soil classification, geotechnical properties, shear stresses in soil, compaction and consolidation, bearing capacity.

iii) Surveying: Principles and classification of surveys leveling, uses of theodolite, tacheometry, plane table survey, curves. Electronic Distance Measurement.
UNIT V.


iii) **Construction Planning and Management**: Elements of scientific management, management techniques and uses, material management, network analysis, safety in construction, quality control. Construction equipments and methods.

**Reference Books**-

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SYLLABUS OF Ph.D. COURSE WORK
SUBJECT- Computer Science Engineering

Unit-I Graph Theory: -
Basic terminology, multigraphs and weighted graph, paths and circuits, shortest path algorithm, Euler and Hamiltonian Paths and circuits, factors of a graph, Planer graph.
Theory of Computation:
Finite State Machines: Deterministic and Non-deterministic FSM’s, Moore and Mealy FSM’s. Regular Expressions: Converting DFA’s to RE. Context Free Grammars: Definition, Simplification of CFG. Pushdown Stack Memory Machines: Power of PDM over FSM. Universal TM.

Unit-II Operating Systems: -
System Programming:
System software: Assemblers, Loaders, Compilers, Interpreters, Macros, Operating system and formula system, Translators. Compiler: Types, Overview of compilation process, Phases of compiler.

Unit-III Software Engineering: -
Data Base Management Systems:
**Unit IV Data Structures:**

**Unit V Computer Networks:**

**Reference Books:**
2. J. Treamblay, R. Manohar, “Discrete Mathematical structures with application to computer science”, TMH.
7. John J. Donovan “System Programming”, TMH.
13. Thomas H. Cormen and charles E.L. Leiserson, ”Introduction to Algorithm”, PHI, 2nd Ed.
UNIT-I: Analog Circuits

UNIT-II: Digital circuits
Boolean algebra, minimization of Boolean functions; logic gates; digital IC families (DTL, TTL, ECL, MOS, CMOS). Combinatorial circuits: arithmetic circuits, code converters, multiplexers, decoders, PROMs and PLAs. Sequential circuits: latches and flip-flops, counters and shift-registers. Sample and hold circuits, ADCs, DACs.

UNIT-III: Networks

UNIT-IV: Control Systems
Basic control system components; block diagrammatic description, reduction of block diagrams. Open loop and closed loop (feedback) systems and stability analysis of these systems. Transient and steady state analysis of LTI control systems and frequency response. Tools and techniques for LTI control system analysis: root loci, Routh-Hurwitz criterion, Bode plots.

UNIT-V: Communications
Random signals and noise: probability, random variables, probability density function, autocorrelation, power spectral density. Analog communication systems: amplitude and angle modulation and demodulation systems, spectral analysis of these operations, superheterodyne receivers; elements of hardware, realizations of analog communication systems; signal-to-noise ratio (SNR) calculations for amplitude modulation (AM) and frequency modulation (FM) for low noise conditions.
Reference Books:


3- D Roy Chaudhary, “Network and System”, New Age International


Chromatography: Basic Principle instrumentation, Methodological Techniques and Quantitative Analysis of drugs and their Metabolites using Column, Paper chromatography, TLC, Ion-exchange chromatography, GC, HPLC and HPTLC.

Statistical Analysis: Design of Experiments and Data collection, Analysis of Data collected and interpretation of the Analysis (‘T’ Test, ‘F’ Test, Chi-square Test), Statistics in Biological Testing.

Computer aided drugs design: A brief introduction of CADD and their application in designing of molecules.


Medicinal Chemistry: Structure, nomenclature, classification, synthesis, SAR and metabolism of the following category of drugs, which are official in Indian Pharmacopoeia and

**Pharmaceutics:** Formulation and Evaluation of tablets, capsules, liquids, semisolid, ophthalmic and parental preparations. Stability testing of pharmaceutical dosage form as per ICH guidelines. Biopharmaceutics and Pharmacokinetics and their importance in formulation. Formulation and characterization of cosmetics – lipstick, shampoo, creams, nail preparations and dentifrices and Pharmaceutical calculations.

**Pharmaceutical Jurisprudence:** Drugs and cosmetics Act and rules with respect to manufacture sales and storage. Pharmacy Act, Pharmaceutical ethics.

**Biochemistry:** Biochemical role of hormones, Vitamins, Enzymes, Nucleic acids, Bioenergetics, General principles of immunology. Immunological, Metabolism of carbohydrate, lipids, proteins, Methods to determine, kidney & liver function. Lipid profiles.

**Microbiology:** Principles and methods of microbiological assays of the Pharmacopoeia. Methods of preparation of official sera and vaccines. Serological and diagnostics tests. Applications of microorganisms in Bio Conversions and in Pharmaceutical industry.

BOOK RECOMMENDED


Jain N K A Text Book of Forensic Pharmacy, Vallabh Prakashan, Delhi.


SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SYLLABUS OF Ph.D. COURSE WORK
SUBJECT- EDUCATION

Unit 1  Philosophical foundation of Education
        Indian Schools
        Western schools

Unit 2  Sociological foundation of Education
        Relationship of Sociology and Education
        Sociological Aspects of Education

Unit 3  Psychological foundation of Education
        Motivation and learning theories.
        Intelligence- types, theories and measurement
        Personality- types, theories and measurement
        Inclusive Education

Unit 4  Educational Evaluation and Assessment
        Tools of Evaluation
        Characteristics of good measuring instrument
        Test standardization
        Continuous and comprehensive evaluation

Unit 5  Educational Technology
        Multimedia Approach in teaching & learning
        Instructional system design
        E-communication

Unit 6  Teacher Education
        Innovations in TE
        Quality Management in TE

Unit 7  Data Analysis
        Qualitative and Quantitative data Analysis
        Descriptive analysis and Inferential Analysis
Unit-1 Electric Circuits and Fields:
Node and mesh analysis, transient response of dc and ac networks, sinusoidal steady-state analysis, resonance, basic filter concepts, ideal current and voltage sources, Thevenin's, Norton's and Superposition and Maximum Power Transfer theorems, two port networks, three phase circuits, measurement of power in three phase circuits, Gauss Theorem, electric field and potential due to point, line, plane and spherical charge distributions, Ampere's and Biot-Savart's laws, inductance, dielectrics, capacitance.

Unit-2 Electrical Machines: Magnetic circuits
Magnetic circuits, Single phase transformer- equivalent circuit, phasor diagram, tests, regulation and efficiency, Three phase transformers- connections, parallel operation, auto-transformer; energy conversion principles, DC Machines- types, starting and speed control of dc motors, Three phase induction motors- principles, types, performance characteristics, starting and speed control, Single phase induction motors, synchronous machines performance, regulation and parallel operation of synchronous machine operating as generators, starting and speed control of synchronous motors and its applications, servo and stepper motors.

Unit-3 Power Systems:
Basic power generation concepts, transmission line models and performance, cable performance, insulation, corona and radio interference, Distribution systems, per-unit quantities, bus impedance and admittance matrices, load flow, voltage and frequency control, power factor correction; unbalanced analysis, symmetrical components, basic concepts of protection and stability; Introduction to HVDC systems.

Unit-4 Control Systems:
Principles of feedback control, transfer function, block diagrams, steady state errors, Routh and Nyquist techniques, Bode plots, Root loci, Lag, Lead and Lead-lag compensation; proportional, PI, PID controllers, state space model, state transition matrix, controllability and observability.

Unit-5 Power Electronics and Drives:
Semiconductor Power devices - power diodes, power transistors, thyristors, triacs, GTOs, MOSFETs, IGBTs - their characteristics and basic triggering circuits; diode rectifiers, thyristor based line commutated ac to dc converters, dc to dc converters - buck, boost, buck-boost, c'uk, flyback, forward, push-pull converters, single phase and three phase dc to ac inverters and related pulse width modulation techniques, stability of electric drives; speed control issues of dc motors, induction motors and synchronous motors.
इकाई - 1 साहित्य का स्वरूप : परम्परा एवं आधुनिक संदर्भ, साहित्य का प्रयोजन, साहित्य की प्रासंगिकता, विचारधारा और साहित्य।

इकाई - 2 हिंदी साहित्य का आदर्शतात्त्विक काव्य (नाथ, सिद्ध, जैन, रासो एवं लीलिक साहित्य) मध्यकालीनवंश का स्वरूप, भविष्यकाल की सामाजिक और सांस्कृतिक परिस्थितियाँ, भविष्य आंदोलन और लोकचेतना, विभिन्न दार्शनिक मत-अंहैतवाद, विशिष्टांत, हैतवाद, धौलांतवाद, सुध्वान्तवाद।

इकाई - 3 सूफी धर्म का विकास, सूफी काव्य में भारतीय सांस्कृतिक और लोक जीवन, कविता और जायसी का साहित्यिक एवं सांस्कृतिक अवदान, संत कवियों की लोकचेतना।

इकाई - 4 साधनशील काव्य और वृत्त भविष्य काव्य में चित्रित भारतीय संस्कृति और लोकजीवन, सूरदास और लोककूट्ट, पुष्टिमार्ग के सिद्धांत, तुलसीदास का समाजवाद, संगीत भविष्यकाव्य का साहित्यिक और सांस्कृतिक अवदान, रौतिकालीन कवियों की लोकचेतना।

इकाई - 5 मार्क्सवाद, मनोविश्लेषणवाद, असिस्टेंस, संरचनावाद, विखण्डनवाद, आधुनिकता, उत्तर आधुनिकता, समाजवाद।
(A) Research Methodology
1) Audio video aids
2) Interview
3) Book reading
4) Writing articles
5) Listening and observing

(B) Subject Specific
According to the subject the candidate has to involve in seminar and workshops and concerts and programmes. It includes-

1) Tools and techniques,
2) Computer application
3) Communication Skills
4) Review of research (published)
5) Methods
6) Seminar Presentation.

(C) Field work -
1) Active participation in organizing programmes, seminars and lecture and demonstration of eminent artists.
2) Other academic help at the center it includes - computer work, help for other and day today activities at the center.
SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SYLLABUS OF Ph.D. COURSE WORK
SUBJECT- HISTORY

1. अनुसंधान की प्रकृति – विश्लेषण एवं ध्यानार्थिक अनुसंधान
Nature of Research, Pure and Applied Research

2. वैज्ञानिक पद्धति – सामान्य शोध और विज्ञान, वैज्ञानिक चिंतन के चरण –
The Scientific Method - Common Sense and Science Steps in Scientific Thinking. The Scientific Method and History.

3. अध्ययन की प्रकृति: व्यक्ति और सामाजिक अध्ययन, स्थानिक अध्ययन, ज्ञान अध्ययन।
Nature of Study : Pannel Studies, Case Studies and Area Studies.

4. अनुसंधान प्रस्तावना: उपकल्पनायें और अवधारणायें
Research Formulation : Hypothesis and Concepts.

5. तथ्य सामग्री के स्रोतों के प्रकार – प्राथमिक और द्वितीयक तथ्य सामग्री के
Types of Sources of Data with Special Reference to Primary and Secondary Data.

6. तथ्य सामग्री संकलन की प्रविधियाँ: सामग्री विश्लेषण – अवलोकन,
The Techniques of Data Collection : Content Analysis, Observation -
प्रश्नावलियाँ और अनुसूचियाँ, व्याख्यात साधनों का प्रयोग – टेपरिकाउडर, पंक्ति,
Punchers, Verifiers, Sorter etc.

7. जीवन कथाएं प्रविधियाँ – साहित्यी और असाहित्यी निर्देशिकाएं, साक्षात्कार,
Techniques of Field Work - Participant and Non Participant Observation,
जीवन इतिहास का प्रयोग आदि.
Interviewing, use of Life Histories etc.

8. तथ्य विश्लेषण और प्रतिक्रिया–निर्देश
Data Analysis and Report - Writing.
SYLLABUS OF Ph.D. COURSE WORK
SUBJECT- PHYSICS

Unit-I: General: Definition of Research, Components of Research Problems, Scientific Hypotheses, Research Purpose, Research Design, Literature searching, Aims and Objectives, Expected outcome, Methodology to be adapted, Planning of experiments/theory.

Unit-II: Data Collection & Analysis: Types of data methods and techniques of data collection, primary and secondary data, meta-analysis, historical methods, content analysis, devices used in data collection, pilot study and protest of tools, choice of data collection methods.

Unit-III: Basics of Computers: Operating System-Windows and Linux, MS OFFICE (Document, EXCEL, power point Presentation), Peripheral device installation and operation, antivirus, internet browsing.

2. “Survival skills for Scientists” by Federico Rosel & Tudor Johnson (Imperial College Press).
3. “How to Research” by Loraine Blaster, Christina Hughes & Malcum Tight (Viva Books)
6. “A Students Guide to Methodology” by Peter Clough and Cathy Nutbrown (Sage Publications.)
UNIT – I: Chromatographic techniques – Gel filtration, ion exchange chromatography, hydrophobic interaction and reverse phase chromatography, affinity chromatography, gas chromatography, high performance liquid chromatography, fast protein liquid chromatography; Application in separation of proteins including enzymes.

UNIT – II: Molecular Biology and spectroscopic techniques – Comet Assay; Real time PCR; RAPD, RFLP, ARDRA and Fluorescence in situ hybridization techniques. Atomic absorption spectroscopy, infrared spectroscopy, nuclear magnetic resonance spectroscopy, mass spectrometry including ESI MS and MALDI-TOF MS.

UNIT – III: Electrophoretic and centrifugation techniques - SDS and Native PAGE, Agarose gel electrophoresis, isoelectric focusing and two-dimensional electrophoresis, proteome analysis; Differential and density gradient centrifugation, analytical ultracentrifugation, separation of DNA/RNA using ultracentrifugation technique, determination of molecular weight and sedimentation coefficient. Biosafety in laboratory conditions: rules for marinating the biosafety in laboratory. Making aseptic sterilized and dust free conditions in laboratory.

UNIT - IV: Quantitative methods; Principles and Designs of Experiments; Analysis of variance for one way and two way classifications; Multiple Comparisons – Least Significant Difference Test, Duncan’s New Multiple Range Test; Factorial Analysis; Analysis of Covariance. Correlation and regression analysis

UNIT - V: Computer application Bioinformatics-Concept and application, Introduction to data mining techniques
Biological Databases: sequence databases (genBank, EMBL, DDBJ, UniProtKB), Protein family/Domain databases (PROSITE, PFam, PRINTS, PRODOMAIN), Structure databases (PDB, PubChem), Expression profile database (GEO, SWISS-2D-PAGE), Literature Database (PubMed, PubMed Central).
Sequence Analysis: Pairwise alignment, Homology search (BLAST & FASTA), Multiple sequence alignment (ClustaW), Phylogenetic Analysis (MEGA5 & PHYLIP), Introduction to tools- Jemboss and UGENE.
SYLLABUS OF Ph.D. COURSE WORK  
SUBJECT- POLITICAL SCIENCE

1-1 अनुसंधान प्रकृति विशुद्ध तथा व्यावहारिक शोध

1-2 शोध की वैज्ञानिक पद्धति वैज्ञानिक पद्धति का इतिहास, वैज्ञानिक विन्दन के चरण 
तथा पद्धतियाँ
The Scientific Method, A History of Scientific Method, Steps of 
Scientific Methods and techniques.

1-3 शोध की रचना— उपकल्पनाएं एवं अवधारणाएँ
Formulation of research design- Hypothesis and concepts.

1-4 तथ्यों के स्रोत तथा उनका संकलन— प्राथमिक तथा द्वितीयक तथ्य,
सामग्री विश्लेषण, अवलोकन, प्रश्नावलियाँ, अनुसूचियाँ, साक्षात्कार, सर्वेक्षण,
वांछित साधन—टैपरिकार्डर, कम्प्यूटर आदि
Sources of data and their collection- primary and secondary data, 
content analysis, observation, questionnaire, schedules, interview, survey, 
mechanical aids- tape recorder and computer etc.

1-5 क्षेत्रीय कार्यों की प्राविधिकता सहभागी तथा असहभागी, अवलोकन,
जीवन—पृथ्वी तथा साक्षात्कार
tTechniques of field work, participant and non-participant, life study and 
interviewing.
SYLLABUS OF Ph.D. COURSE WORK
SUBJECT - PHYSICAL EDUCATION

Unit-I
- Meaning of Research. Need and Importance and its scope in Physical Education.
- Formulation and Development of Research problem. Formulation of hypothesis.
- Research report, Abstract and Research proposal.

Unit-II
- Historical Research, Scope and Validity of historical data.
- Survey studies: tools of survey research, Questionnaire and interview.

Unit-III
- Case studies: Definition and importance.
- Characterization of case studies, Data collection in case studies.
- Experimental Research: Meaning, scope and nature.
- Experimental design, control of Experimental factors.

Unit-IV
- Use of statistical application in Physical Education and Sports research.
- Sampling: Simple and stratified random sampling, Standard error.
- Relation between binomial and normal curve, skewness kurtosis, standard scales.
- Percentile Z, T, 60 and 70 scales.
- Reliability limits. Null hypothesis. Type I and II errors. One tail and Two tails tests.
- Coefficient of variation, sampling error. Analysis of variance.

Unit-V
- Introduction to computer: Hardware and Software (Only preliminary concept).
- Introduction to Operating system: Need, functions and control programme.
- Introduction to Window, MS Office, Word, Excel, Power Point, Word Processing, Printing.
Reference:


Course-I- LIBRARY INFORMATION SCIENCE

1. Research: General
   Meaning, need, process
   Spiral scientific method
   Kinds of Research: Diagnostic, Descriptive, Exploratory, Explanatory
   Research Ethics

2. Typology for Literature search.
   Typology for Literature search
   Scientific methods: Components of scientific methods.
   Formulation of research problems

3. Research Design
   Types of research design: Historical design, Descriptive design, Formation of
   Hypothesis; Synopsis Writing

4. Brief Review of Research Methods

5. Qualitative & Quantitative Techniques

6. Analysis, Interpretation & Presentation of data
   Presentation of Data
   Statistical analysis
   Use of Statistical package
   Use of Computers in research

7. Research Reporting
   Style manuals (Chicago, APA, MLA)
   Evaluation of research
   Current trends in LIS research
UNIT-1

**Research Methodology:** Meaning and Objectives of research; Types of research [Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, Field setting vs. laboratory, clinical vs. diagnostic, Exploratory vs. Formalized]; Research Approaches [Qualitative approach and Quantitative approach] Significance of research; Basic concepts about research and scientific method; Research process.

**Defining the Research problem:** Meaning of research problem; Selecting the research problem; Techniques involved in Defining problem.

**Research Designs:** Meaning, need, features of a good design, concepts relating to research design. Different research designs – Exploratory research studies, descriptive and diagnostic research studies, Longitudinal, cross-sectional and sequential studies; Hypothesis-testing research studies; Basic principles of Experimental designs; Important experimental designs; Evaluation and Interventional designs.

UNIT 2

**Sampling Design:** Steps in sample design; criteria of selecting a sampling procedure; Characteristics of a good sampling design; Types of sample designs [Non-probability sampling and Probability sampling]; Complex Random Sampling Designs [Systematic sampling, Stratified sampling, Cluster sampling, Area sampling, Multi-stage sampling, Sequential sampling].

**Measurement and Scaling Techniques:** Measurement in research, measuring scales, sources of error in measurement, test of sound measurement- validity, reliability, practicality; meaning of scaling, scale classification bases, important scaling techniques - rating scales, scale construction techniques-arbitrary scales, differential scales, likert-type scales, cumulative scales, factor scales, multidimensional scaling.

UNIT 3

**Methods of Data Collection:** Collection of primary data in surveys and descriptive research - Observation, Interview, Questionnaire, schedules, Case study, and Collection of secondary data and characteristics to be noticed before using secondary data.

**Ethical Issues in Research:** Benefits of the Research, Responsibility, Rights of the Research Participant, Physical and Psychological Risks, Deception, Reducing Risk and/or Minimizing Harm, Informed Consent, Privacy, Summary of Results; Ethical Issues regarding Copyright.

UNIT 4

Statistical Methods II: Regression and the General Linear Model - Analysis of variance designs (two-/three-way), repeated measures, correlation, simple/multiple regression methods, non-parametric procedures, multivariate analyses.

**Computer Application in Analysis of Data**

**UNIT 5**

**Interpretation:** Meaning, Techniques and precautions in interpretation.

**Scientific writing:** Significance and steps in scientific writing, Review of literature, Authenticity of reviews, Layout of the research report writing, Types of Reports, Mechanics of writing a research report, Precautions for writing research reports: Writing the research articles and project proposal

**Research designs in Nutrition**

Nutritional epidemiology
- Levels of epidemiologic research (primary, secondary and tertiary prevention)
- Observational studies – cross-sectional, case-control, cohort (prospective, retrospective, time-series)

Types of analysis – eg., incidence rate, prevalence rate. B. Experimental studies
- Pre-clinical studies - Laboratory based *in vitro* and animal studies
- Clinical studies - Human intervention trials. Types - Randomized controlled trials (RCT), Non-randomized trial.

Ethical issues, Informed consent process, Regulations and Guidelines for research on human subjects

**Nutrition research - Data collection** - Principles, definition and examples in nutrition research for the following.

Quantitative tools
- Direct parameters – Application of anthropometry, dietary survey, clinical, biochemical and growth monitoring tests, body composition tests and physical fitness tests.
- Indirect parameters –vital statistics, population tests, socio-economic indices, KAP surveys.

Qualitative research tools- Types of interviews, Focus group discussions, Free listing and pile sorting, Narrative, Case studies, Participatory methods.

Integrating qualitative and quantitative methods.

Nutrition Intervention: Tools & techniques to facilitate nutrition intervention.

Biomarkers and their use in nutrition intervention

**Research Techniques in Food Science and Nutrition**

1. Analytical techniques for determination of food composition.
2. Techniques in sensory analysis.
3. Product development and consumer behavior.
4. Food behavior surveys.
1) Introduction to Research Methodology: Meaning of Research, Objectives of Research, Motivations in Research, Types of Research, Research Approaches, Significance of Research, Research Methods v/s Methodology, Research and Scientific Methods, Research Process, Criteria of Good Research Defining the Research Problem: What is Research Problem?, Selecting the Problem, Necessity of and Techniques in defining the problem


Unit-II Sampling Theory, Standard Error concept, Construction of Hypothesis and their testes. Analysis of Variance-one and two way classification, Block Designs, Chi square (X2) tests. Multiple Correlation and Regression Analysis Non-linear Regression and Functional Form of Regression, tests of Regression coefficients, Coefficient of Determination (R2) Problems of Regression Analysis.


Unit-IV Computer Applications, Operation of MS Word, M.S. Excel, PowerPoint Presentation, Word Conversion to PDF, Functions of Save as File Transfer Data, Mail Merge.

Unit-V Use of Excel for simple statistical Calculations of Central Tendency, S.D. Correlation, Regression, Preparation Graphs & Diagrams Use of SPSS- for calculations of above, Factor analysis and construction of composite index.
Unit-1- **Fundamental Laboratory Techniques**: Basic principles, Health and safety, working With liquids, Basic laboratory procedures I, Basic laboratory procedures II, Principles of Solution chemistry, pH and buffer solutions. The investigative approach- Making and recording measurements, SI units and their use, Scientific method and design of experiments, Project work.

Unit-2- **Analysis and presentation data**: Using graphs, presenting data in tables, Hints for Solving numerical problems, Descriptive statistics, choosing and using statistical tests, Drawing chemical structures, chemo metrics, and computational chemistry. Information technology and library resources- The Internet and World Wide Web, Internet resources for chemistry, using spreadsheets, word processors, databases and Other packages, finding and citing information.

Unit-3- **Communicating information**: General aspects of scientific writing, writing essays, Reporting practical and project work, writing literature surveys and reviews, organizing a Poster display, giving an oral presentation examination.

Unit-4- **Chemical safety and Disaster Management**: Emergency response- chemical spills, radiation spills, biohazard spills, leaking Compressed gas cylinders, fires, medical emergency accident reporting. General safety- General safety and operational rules, safety equipments, personal Protective equipments, compressed gas safety, safety practices for disposal of broken Glass wares, centrifuge safety, treated biomedical wastes and scientific ethics.


**Reference Books:**
2. OSU safety Manual 1.01.
3. Research Methodology. Methods and Techniques : Kothari, C. R.
Unit – 1. Brief history of computers, generation of computers, application of computers in research.


Unit – 3. Data processing tools & techniques, Security issue of computers, use of later.

Unit – 4. Introduction to Operating Systems, Types of operating Systems, system protection, Operating system, services. Operating system structure.

Unit – 5. Use of excel for simple statistical calculations of central tendency, S.D. correlation, Regression, Preparation of graphics & diagrams, Factors analysis.

Reference Books

- Fundamental of Computer By Pradeep K. Sinha
- Fundamental of Computer By E-Balagurusamy
- Silberschatz ,"Operating system", Willey Pub
Sri Satya Sai University of Technology & Medical Sciences
Pre Ph.D. Syllabus
Zoology course -I


Unit-3- Cellular and molecular biology- Cell cycle, Stem cells and regenerative medicine, Gene and gen action, DNA damage and repair.

Unit-4- Advances and Recent tools in Biology- Electrophoresis and chromatographic techniques for characterization of Biomolecules DNA, RNA, Protein and Enzymes. DNA Microarray, DNA sequencing and Molecular phylogeny, Methods of gene transfer, GISH (Genomic In Situ Hybridization) and FISH (Fluorescence In Situ Hybridization). Flow cytometry, Polymerase Chain Reaction (PCR), ELISA, Northern, Western, Southern Blot techniques. DNA barcoding and systemic classification, RFLP, RIA, RAPD and AFLP. 8) Immunofluorescence


Reference books:

1- C.B. Pawar: Genetics Vol I and II, Himalaya Publishing House, Mumbai
2- Crop pests and how to fight them- Govt. of Maharashtra Pub. Bombay
3- Dr. Nageshwar Rao and Dr. Rajendra P. Das: Communication Skills, Himalaya Publishing House 2005
4- Dr. P.V. Jabade: General Physiology
5- G. J. Tortora: Principle of Anatomy and Physiology
6- B. Lewin: Genes Xth edition, Wiley Eastern Limited, New Delhi
7- B.K.Berry: Animal Physiology
8- C.C.Chatterjee: Human Physiology
10- Bell and Davidson: Textbook of Physiology and Biochemistry.
Sri Satya Sai University of Technology & Medical Sciences

Pre Ph.D. Syllabus

Computer Application course - I

Unit I: Scientific Research: Research: Definition, Characteristics, types, need of research. Identification of the problem, assessing the status of the problem, formulating the objectives, preparing design (experimental or otherwise), Actual investigation, determining the mode of attack.

Unit II: Literature survey: References, Abstraction of a research paper, Possible ways of getting oneself abreast of current literature. Data Analysis: Mathematical and statistical analysis using software tools like MAT Lab, SPSS, PsiLAB or free ware tools.


Unit IV: Use of word processing, spreadsheet and database software. Plotting of graphs. Internet and its application: E‐mail, WWW, Web browsing, acquiring technical skills, drawing inferences from data.


Main References:
4. Research Methodology by R. Panneerselvam, PHI, New Delhi 2005
8. Survival skills for Scientists by Federico Rosei and Tudor Johnson, (Imperial College Press).
Sri Satya Sai University of Technology & Medical Sciences

Pre Ph.D. Syllabus

MECHENICAL ENGINEERING -I


Theory of Machines: Mechanisms and Machine, Gear and Gear Trains, Cams, Engine Dynamics, Governors, Balancing, Gyroscope


Fluid mechanics: Governing equations, Navier-Stokes equations, Boundary Layers, Turbulent flow, Turbulent Shear flows, Compressible flow


processing. Process control strategies, Distributed control vs. Central control, Direct digital control and Supervisory Computer control.


**Reliability engineering and maintenance management**: concepts of reliability, failure rate and hazard rate, common distribution in failure mechanism, system reliability analysis- parallel, series, standby, shared load and complex system; determination of system reliability- set theory, star-delta method, matrix method, and event tree method. Monte Carlo simulation and Techno economic life. Fault Tree Analysis (FTA), Failure Mode and Effect Analysis (FMEA), Failure Modes, Effects and Criticality Analysis (FMECA). Replacement theories based on reliability effort function, in- built reliability in design and life castings.

UNIT 1

Research Methodology: Meaning and Objectives of research; Types of research [Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, Field setting vs. Laboratory, clinical vs. Diagnostic, Exploratory vs. Formalized]; Research Approaches [Qualitative approach and Quantitative approach] Significance of research; Basic concepts about research and scientific method; Research process.

Sampling Design: Steps in sample design; criteria of selecting a sampling procedure; Characteristics of a good sampling design; Types of sample designs [Non-probability sampling and Probability sampling]; Complex Random Sampling Designs [Systematic sampling, Stratified sampling, Cluster sampling, Area sampling, Multi-stage sampling, Sequential sampling].

Ethical Issues in Research: Benefits of the Research, Responsibility, Rights of the Research Participant, Physical and Psychological Risks, Deception, Reducing Risk and/or Minimizing Harm, Informed Consent, Privacy, Summary of Results; Ethical Issues regarding Copyright.

UNIT 2


Statistical Methods II: Regression and the General Linear Model - Analysis of variance designs (two-/three-way), repeated measures, correlation, simple/multiple regression methods, non-parametric procedures, multivariate analyses.

UNIT 3 Research designs in Nutrition

A. Nutritional epidemiology
   i. Levels of epidemiologic research (primary, secondary and tertiary prevention)
   ii. Observational studies – cross-sectional, case-control, cohort (prospective, retrospective, time-series)
   iii. Types of analysis – eg. incidence rate, prevalence rate

B. Experimental studies
   i. Pre-clinical studies - Laboratory based in vitro and animal studies
   ii. Clinical studies - Human intervention trials. Types - Randomized controlled trials (RCT), non-randomized trial.

C. Ethical issues, Informed consent process, Regulations and Guidelines for research on human subjects.

UNIT 4

Nutrition research - Data collection- Principles, definition and examples in nutrition research for the following.

A. Quantitative tools
   i. Direct parameters – Application of anthropometry, dietary survey, clinical, biochemical and growth monitoring tests, body composition tests and physical fitness tests.
   ii. Indirect parameters – vital statistics, population tests, socio-economic indices, KAP surveys.

B. Qualitative research tools- Types of interviews, Focus group discussions, Free listing and pile sorting, Narrative, Case studies, Participatory methods.

C. Integrating qualitative and quantitative methods.

D. Nutrition Intervention: Tools & techniques to facilitate nutrition intervention, Biomarkers and their use in nutrition intervention.

UNIT 5

Research Techniques in Food Science and Nutrition

1. Analytical techniques for determination of food composition.
2. Techniques in sensory analysis. 3. Food behavior surveys.
4. Product development and consumer behavior.