# **SRI SATYA SAI**

# UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES SEHORE (MP)



Ph.D. Course Work (I) Syllabus

# SUBJECT SPECIALIZATION-I SUBJECT: BIOTECHNOLOGY

# UNIT –I

**CHROMATOGRAPHY TECHNIQUES :** Chromatographically methods of Protein Purification.Primary structure determination of proteins; sequencing and detection of sequenced proteins.Ion exchange chromatography, hydrophobic interaction and reverse phase chromatography, affinity chromatography, gas chromatography, high performance liquid chromatography, liquid chromatography.

# UNIT –II

**Molecular biology and spectroscopy techniques:** Comat assay; real time PCR; RAPD, RFLP, ARDRA and fluorescence in situ hybridization techniques. Atomic absorption spectroscopy, Infrared spectroscopy, nuclear magnetic resonance spectroscopy, mass spectroscopy.

# UNIT –III

**Electrophoretic and centrifugation techniques:** SDS and native PAGE,Agrose 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.

# UNIT-IV

**Molecular Biochemistry:** production of amino acid, insulin, antibiotics, and protease enzyme. Isolation, screening and maintenance of industrially important microbes. Strain improvement for increased yield and other desirable characteristics. Basic concept of fermentation, its type and application fermentation. Bioreactor design information and types.

# UNIT-V

**Bioremediation:** Types of Bioremediation, reaction in Bioremediation, factor affecting Bioremediation. Biopolymer production and bio plastic. Bio-fertilizers, bio-pesticides, biosensors, vermicomposting Degradation of Xenobiotics in environment.

# **REFERENCES:**

1. Ricochon G G. Ricochon CP, Girardin M, Muniglia L, journal of chromatography B.2011;879:1529-1536.

2. Lioyed R S,Joseph J K, John W D, Introduction to modern liquid chromatography, A John Wiley & sons,Inc.New Jersey,USA,3<sup>rd</sup> Ed.(2010).

3. V.kreamp organic spectroscopy Macmillan Press Ltd.

- 4. Recombinant DNA By Watson et al.
- 5. Environmental Biotechnology by Dr. Hans soachim jordning, Prof. Dr. Joseph Winter.

# SUBJECT SPECIALIZATION-I 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. Plant Anatomy and Plant Physiology: Apical meristem (Shoot and Root): Structural organisation, Tunica-corpus theory, Quiescent centre concept and Promeristem concept. Plant cell wall: Ultra structure and organization Leaf Anatomy: Stomatal - types and distribution, dorsiventral and isobilateral.Stem and Root Anatomy : Primary and secondary structure of monocot and dicot.Xylem: Tracheids and Vessels. Heart and sapwood. Phloem : Ultra structure and function.Anomalous growth: Bignonia and Aristolochiasp.

#### 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 word, power point, excel. Bioinformatics: definition, role and limitation, Biological Data type. Classification of biological data base sequence data base, Gene bank Swiss-prot. Secondary nucleotide and protein sequence data base, specialized data base;:KEGG,ENZYME.

- 1. A Dictionary of Ecology by Michael Allaby
- 2. Encyclopedia of Evolution by Stanley Rice; Massimo Pigliucci (Introduction by)
- 3. Desk Encyclopedia of Microbiology by Moselio Schaechter (Editor)
- 4. The Penguin Atlas of Endangered Species by Richard MacKay

# Sri Satya Sai University of Technology & Medical Sciences, Sehore

- 5. Fundamentals of Light Microscopy and Electronic Imaging By Douglas B. Murphy
- 6. Introduction to Optical Microscopy By Jerome C. Mertz
- 7. Basic Methods in Microscopy: Protocols and Concepts from Cells: A Laboratory Manual. By David L. Spector and Robert D. Goldman
- 8. Introduction to Light Microscopy. By H. S. M. Bradbury and Brian Bracegirdle
- 9. The Organic Constituents of Higher Plants by Trevor Robinson
- 10. Phytochemical Methods A Guide to Modern Techniques of Plant Analysis by Natural Products By Raphael Ikan
- 11. Selected Topics in the Chemistry of Natural Products by Raphael Ikan
- 12. Naturally Occurring Glycosides By Raphael Ikan
- 13. An Introduction to Medical Statistics" by Martin Bland
- 14. Mathematics and Statistics for the Biosciences" by G Eason
- 15. Design and Analysis of Experiments" by Douglas C Montgomery
- 16. Categorical Data Analysis" by A Agresti
- 17. Biostatistics For Dummies" by John Pezzullo
- 18. Techniques in plant sciences, biostatistics and bioinformatics by Dr. Alok Kumar Shrivastava

# SUBJECT SPECIALIZATION-I SUBJECT: CHEMISTRY

# UNIT-I

Atomic and Molecular Structure: Molecular orbit of diatomic molecules, Equation for atomic and molecular orbitals, Energy level diagrams of diatomic, Pi-molecular orbital of benzene and aromatically, crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties.

# UNIT-II

**Reaction Mechanism of Transition Metal Complexes - I**: Energy Profile of a reaction, reactivity of metal complex, inert and labile complexes, Kinetic application of valence bond and crystal field theories. Kinetics of octahedral substitution, acid hydrolysis, factors affecting acid hydrolysis, base hydrolysis, conjugate base mechanism, direct and indirect evidences in favour of conjugate mechanism, anion reactions, reactions without metal ligand bond cleavage. Substitution reaction in

square planer complexes, the trans effect, Mechanism of substitution reactions.

#### UNIT-III

**Polymers and Green Chemistry:** Introduction, classification, functionality, mechanisms, types of polymerization, Plastics; types of plastics, rubbers (elastomers), biopolymers/natural polymers, conducting polymers.

Green Chemistry: Introduction, principle and significance, industrial application super critical fluids as a solvent, Example-super critical CO2, Bio catalysis and concept of carbon credits. **UNIT-IV** 

**Techniques of Quantitative And Qualitative Analysis of Organic And Inorganic Compounds:** Theoretical bases, Audiometry Alkalimetry, lodometry, redox titration, precipitation & comlexometry, gravimetry, miscellaneous methods.

#### UNIT-V

Stereochemistry and Bonding in Main Group Compounds : Valence shell electron pair repulsion (VSEPR) theory and its applications, Walsh diagram (triatomic and penda-atomic molecules),  $d\Pi$ -p $\Pi$  bond, Bent rule and energetic of hybridization, some simple reactions of covalently bonded molecules such as Atomic inversion, Berry pseudo ration, Nucleophile displacement, free radical mechanisms.

#### **REFERENCES:**

1. Advanced Inorganic Chemistry, F. A. Cotton and Wilkinson, John Wiley.

2. Inorganic Electronic Spectroscopy, A.B. P. Lever, Elsevier.

3.Modern Methods of organic synthesis, William Carruthers and Iain Coldham, Cambridge University Press, Fourth Ed. 2004.

4. Experiments and Techniques in organic chemistry, D. Casto, C Johnson and M. Miller, Prentice-Hall.

5. Inorganic Chemistry G.L.Misseler and D. A. Tarr Pearson Education, 2009.

# SUBJECT SPECIALIZATION-I SUBJECT- CIVIL ENGINEERING

#### UNIT I

**STRUCTURAL ENGINEERING** i) Engineering Mechanics: Resultant and equilibrium of coplanar force system, centroid and moment of inertia, friction. ii) Strength of Materials: Shear force and bending moment, simple stresses and strains, stresses in beams, direct and bending stresses. iii) Analysis of Structures: Fixed and continuous beams and simple frames – analysis using moment distribution method (without sway analysis).

#### 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. ii) Waste Water Engineering and Pollution control: Quantity, collection, conveyance, quality, disposal of sewage. Characteristics of sewage and its treatment. Sources and effects of air and noise pollutions, standards.

#### UNIT IV

**TRANSPORTATION ENGINEERING**: i) 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

**BUILDING MATERIALS AND CONSTRUCTION TECHNOLOGY** : i) Bricks, cement, timber, concrete, steel. Principles of building planning. Foundation, brick masonry, framed, load bearing and composite structures, floors, doors and windows, roofs. ii) Concrete Technology: Properties of cement, aggregates, wet and hardened concrete. Factors affecting strength of concrete. Admixtures, concrete mix design by Indian Standard method. Introduction to Non-Destructive Test. iii) Construction Planning and Management: Elements of scientific management, management techniques and uses, material management, network analysis, safety in construction, quality control. Construction equipment's and methods.

#### **Reference Books**

1- Hibbeler R.C., Mechanics of Materials (SI Units), Sixth Edition, Pearson.

# Sri Satya Sai University of Technology & Medical Sciences, Sehore

- 2- Unadcut Sanjeev, Engineering Mechanics, Techmax Publications, Pune.
- 3- Ramamrutham S., Strength of Materials, S. Chand & Bros., New Delhi.

4- Pandit & Gupta, Structural Analysis, Tata McGraw-Hill Publishing Company Ltd. New Delhi.

- 5- Prof. Shah V.L. & Prof. Karve S.R., Limit State Theory & Design, Pune Vidyarthi Publications.
- 6- Negi L.S., Design of Steel Structures.
- 7- Dr. Jain A.K., Fluid Mechanics, Khanna Publishers, New Delhi.
- 8- Dr. Subramanya K., Engineering Hydrology, Tata McGraw-Hill Publishing Company Ltd., New Delhi.

9- Dr. Modi, Water Resources, Irrigation & Water Power Engineering, Standard Publishers, New Delhi.

- 10- Garg S.K., Water Supply Engineering, Khanna Publishers, New Delhi.
- 11- Punmia & Jain, Waste Water Engineering, Laxmi Publications (P) Ltd., New Delhi.
- 12- Pevy, Environmental Engineering, McGraw-Hill Publishing Company Ltd.
- 13- Basak Anindita, Environmental Studies, Pearson, Delhi.
- 14- Justo & Khanna, Highway Engineering.
- 15- Murthy V.N.S., Soil Mechanics & Foundation Engineering.
- 16- Kasmalkar S., Foundation Engineering.
- 17- Kanitkar T.P. & Kulkarni S.V., Surveying & Levelling Vol. I & II
- 18- Sushilkumar, Building Construction.
- 19- Gambhir M.L., Concrete Technology, TMH Pub. Co. Ltd., New Delhi.
- 20- Peurifoy R.L., Construction Planning and Management, TMH Pub. Co. Ltd., New Delhi.

# SUBJECT SPECILIZATION - I

# SUBJECT: COMMERCE

#### UNIT- I

#### **Business Environment and International Business**

Concepts and elements of business environment: Economic environment- Economic systems, Economic policies(Monetary and fiscal policies); Political environment- Role of government in business; Legal environment- Consumer Protection Act, FEMA; Socio-cultural factors and their influence on business; Corporate Social Responsibility (CSR), Scope and importance of international business; Globalization and its drivers; Modes of entry into international business , Theories of international trade; Government intervention in international trade; Tariff and non-tariff barriers; India's foreign trade policy ,Foreign direct investment (FDI) and Foreign portfolio investment (FPI); Types of FDI, Costs and benefits of FDI to home and host countries; Trends in FDI; India's FDI policy , Balance of payments (BOP): Importance and components of BOP , Regional Economic Integration: Levels of Regional Economic Integration; Trade creation and diversion effects; Regional Trade Agreements: European Union (EU), ASEAN, SAARC, NAFTA , International Economic institutions: IMF, World Bank, UNCTAD , World Trade Organisation (WTO): Functions and objectives of WTO; Agriculture Agreement; GATS; TRIPS; TRIMS

#### UNIT- II

#### Accounting and Auditing

Basic accounting principles; concepts and postulates, Partnership Accounts: Admission, Retirement, Death, Dissolution and Insolvency of partnership firms, Corporate Accounting: Issue, forfeiture and reissue of shares; Liquidation of companies; Acquisition, merger, amalgamation and reconstruction of companies, Holding company accounts, Cost and Management Accounting: Marginal costing and Break-even analysis; Standard costing; Budgetary control; Process costing; Activity Based Costing (ABC); Costing for decision-making; Life cycle costing, Target costing, Kaizen costing and JIT, Financial Statements Analysis: Ratio analysis; Funds flow Analysis; Cash flow analysis, Human Resources Accounting; Inflation Accounting; Environmental Accounting, Inflation ad valuation of assets and liabilities; Audit of financial statements and audit report; Cost audit , Recent Trends in Auditing: Management audit; Energy audit; Environment audit; Systems audit; Safety audit

#### UNIT -III

#### **Business Economics**

Meaning and scope of business economics ,Objectives of business firms , Demand analysis: Law of demand; Elasticity of demand and its measurement; Relationship between AR and MR , Consumer behavior: Utility analysis; Indifference curve analysis , Law of Variable Proportions: Law of Returns to Scale , Theory of cost: Short-run and long-run cost curves , Price determination under different market forms: Perfect competition; Monopolistic competition; Oligopoly- Price leadership model; Monopoly; Price discrimination , Pricing strategies: Price skimming; Price penetration; Peak load pricing

# UNIT -IV

Ph.D. Course Work-I Sem

#### **Business Finance**

Scope and sources of finance; Lease financing, Cost of capital and time value of money, Capital structure, Capital budgeting decisions: Conventional and scientific techniques of capital budgeting analysis, Working capital management; Dividend decision: Theories and policies, Risk and return analysis; Asset securitization, International monetary system, Foreign exchange market; Exchange rate risk and hedging techniques, International financial markets and instruments: Euro currency; GDRs; ADRs, International arbitrage; Multinational capital budgeting

#### UNIT- V

#### **Business Statistics and Research Methods**

Measures of central tendency, Measures of dispersion, Measures of skewness, Correlation and regression of two variables, Probability: Approaches to probability; Bayes' theorem, Probability distributions: Binomial, poisson and normal distributions, Research: Concept and types; Research designs, Data: Collection and classification of data, Sampling and estimation: Concepts; Methods of sampling - probability and non-probability methods; Sampling distribution; Central limit theorem; Standard error; Statistical estimation ,Hypothesis testing: z-test; t-test; ANOVA; Chi–square test; Mann-Whitney test (U-test); Kruskal-Wallis test (H-test); Rank correlation test, Report writing

#### **References:-**

1. Dr.S.M shukla, Financial Accounting, sahitya Bhawan Publication, Agra.

**2.** Donald R. Cooper. Pamela S. Schindler, Business Research Methods. Tata McGraw-Hill Co. Ltd.

3.Dr.S.M.Shukla And Dr.S.P.Sahay, Statistical Anlysis, Sahitya Bhawan Publication, Agra.

4.Dr.K.N Mishra and Dr.A.k.Gupta, Management Accounting, Jawahar Publication, Agra.

5.Cherunilam, Francis. Business Environment . Himalaya Publishing House, 2003. Dessler, Gary. Human Resource Management. Prentice Hall, n.d.

6.Garrison, Ray, Eric Noreen and Peter Brewer. Managerial Accounting. n.d.

7.Gupta, N.S., Organisation Theory and Behaviour, Himalayas Publishing House, New Delhi 8.Jain, SP and K.L.Narang, Advanced Financial Accounting. Kalyani Publishers,

9.Dr, Tr. Sahrma, Auditing, Sahitya Bhawan Publication, Agra

10. H. L. Bhatia Micro Economic Theory; Modern Publisher, Gulab Bhawan, 6, Bahadurshah Zafar Marg, New Delhi.

11. M.L. Jhingan Micro Economic Theory; Konark Publishers Pvt. Ltd., A-149, Vikas Marg, Shakarpur, New Delhi-110 092.

12. S. K. Agarwala Economic System and Micro Economic Theory; Galgotia Publishing Company, 6A/4, WEA, Karol Bagh, New Delhi.

13. D.D. Chaturvedi Macro Economic - Analysis and Policy; Galgotia Publishing Company, 6A/4, WEA, Karol Bagh, New Delhi. 5. D.M. Mithani Macro Economics; Himalaya Publishing House.

14.Eddie Mc Laney, Pearson Educartion, Prentice Hall.

#### Ph.D. Course Work-I Sem

# SUBJECT SPECIALIZATION-I SUBJECT: COMPUTER APPLICATION

# UNIT-I

**Basics of Computer and Research:** Brief history of computers, Generation of Computers, Characteristics of Computers, Computer memory, Basic computer organization; System software, Application software, introduction to operating system, single user, multi-user, multi-tasking single tasking, application of computer for Research, MS-windows, Linux.

# UNIT-II

**Computer organization**: Introduction of hardware & software of computers, Memory organization: Memory Maps, Memory Hierarchy, Cache Memory -Organization and mappings. Associative memory. Virtual memory, Memory Management Hardware.

# UNIT-III

**Using Internet for Research:** Internet, Intranet, Extranet, Website. Internet and its application: E-mail, WWW, Web browsing, acquiring technical skills, drawing inferences from data, E-communication and E-collaboration. Research tools for better computing Internet, Use of E-Journals, Use of E-library, searching the keyword search engines.

# UNIT-IV

**Data processing tools & techniques for Research:** Use of word processing, Research publishes tool- MS-Word, Graphics tool- MS-Excel, spreadsheet, MS-Power Point: Creating presentations and adding effects and database software. Plotting of graphs.

# UNIT-V

**Research Related Software's:** software tools like MAT Lab, SPSS, PsiLAB or free ware tools. Data analysis software-SPSS: Definition, objectives and features, Data entry creating variables, switching to data labels,

- 1. Fundamental of Computer By Pradeep K. Sinha.
- 2. Digital Logic and Computer Design | First Edition | By Pearson by Mano
- 3. A Hand Book of Methodology of Research P. Rajammal and P. Devadoss, R. M. M. Vidya Press, 1976. 3. The Craft of Scientific Writing by Michael Alley, (Springer).
- 4. The Fundamentals of Computer Organization, Raja Rao, Scitech
- 5. Silberschatz ,"Operating system", Willey Pub.
- 6. Courter G. and Marquis A., "MS-Office 2000 No Experience Required", BPB Publications.

# SUBJECT SPECIALIZATION-I SUBJECT: COMPUTER SCIENCE

# UNIT-I

**Basics of Computer and Research:** Brief history of computers, Generation of Computers, Characteristics of Computers, Computer memory, Basic computer organization; System software, Application software, introduction to operating system, single user, multi-user, multi-tasking single tasking, application of computer for Research, MS-windows, Linux.

# UNIT-II

**Computer organization**: Introduction of hardware & software of computers, Memory organization: Memory Maps, Memory Hierarchy, Cache Memory -Organization and mappings. Associative memory. Virtual memory, Memory Management Hardware.

# UNIT-III

**Computer Network for Research:** Computer Network, Type of Computer Network, LAN, MAN, WAN, Wireless Network, Internet, Intranet, Extranet, Website. Internet and its application: E-mail, WWW, Web browsing, Research tools for better computing Internet, Use of Network in Research.

# UNIT-IV

**Data processing tools & techniques for Research:** Use of word processing, Research publishes tool- MS-Word, Graphics tool- MS-Excel, spreadsheet, MS-Power Point: Creating presentations and adding effects and database software. Plotting of graphs.

# UNIT-V

**Data Analysis and database Software's:** Data analysis software-SPSS: Definition, objectives and features, data analysis using SPSS: Data entry creating variables, switching to data labels, MAT Lab, , PsiLAB or free ware tools. Introduction of DBMS Concept, RDMBS, Tool for RDBMS.

- 1. Fundamental of Computer By Pradeep K. Sinha.
- 2. Data Base System Concepts By Henry F. Korth ,S. Sudarshan.
- 3. A Hand Book of Methodology of Research P. Rajammal and P. Devadoss, R. M. M. Vidya Press, 1976. 3. The Craft of Scientific Writing by Michael Alley, (Springer).
- 4. Tanenbaum A. S ,"Computer Networks "Pearson Education.
- 5. Silberschatz ,"Operating system", Willey Pub
- 6. Courter G. and Marquis A., "MS-Office 2000 No Experience Required", BPB Publications.

# SUBJECT SPECIALIZATION-I SUBJECT: Computer Science and 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. Trees: Trees, rooted trees, path length in rooted trees, prefix code, binary search trees, spanning trees and cut set, minimum spanning trees. Set Theory: Set, Combinations of Sets, Mathematical Induction, and Principle of inclusion and Exclusion. 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 calls, OS structure like monolithic, layered, kernel based, micro-kernel based. CPU Scheduling: algorithms and performance evaluation. Inter-process communication and synchronization needs: Mutual exclusion, semaphores. Deadlock: Principles, detection, prevention. avoidance and recovery. Virtual memory management: Concepts, implementation. File management: concepts, free space management. Security and protection: goals of security and protection, security and attacks,. 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:

Planning and Managing Software projects: Metrics for software quality, Software Acquisition, Software risks, Monitoring Project Scheduling, Work break down structures, Project plan. Requirement Analysis: Communication Techniques, FAST, Quality deployment, Data flow Diagrams. Design Fundamentals: Software Design and software design process, Abstractions, Refinement and modularity. Software Testing Techniques and Strategies: Software testing fundamentals. Data Base Management Systems: Database administration issues: DBA role, Data dictionary, security, backups, Replication. Data modeling: Basic concepts, types of data models, E-R data model E-R and ERR diagramming. SQL: Structure of a SQL query, DDL and DML, SQL queries, set operations. Transaction Management: Basic concepts of transaction, Different concurrency control protocols. Normalization: Need of normalization, Types of normalization. Object oriented DBMS: Review of object oriented concepts: Objects, Classes, attributes, Messages, Inheritance, and Polymorphism.

#### UNIT –IV

# **Data Structures:**

Data Structures: Stack Queue, Circular Queue, and Array. Fundamental operations on data structures. Applications of stack, Polish notations and interconversions. Linked List: Creation, insertion, deletion, traversing. Linked stack and linked queue. Binary tree, binary search tree, threaded binary tree, Huffman algorithm, height balanced tree. Algorithms: Algorithm analysis, complexity issues, designing algorithms. Divide and Conquer method: Binary search, merge sort, quick sort. Probabilistic analysis and randomized algorithms. Branch and Bound: Traveling salesman<sup>e</sup> problem. Greedy Algorithms: Elements of greedy algorithms.

#### UNIT-V

# **Computer Networks :**

OSI and TCP/IP reference models. Network Layer: Logical Addressing - IPv4 addresses-Address space, notations, Classful addressing, Classless Addressing, IPv6 addresses-Structure and address space, IPv6- Advantages over IPV4. Unicast Routing Protocols: Optimization, Intra and Inter domain routing, distance vector routing, link state routing, path vector routing. TCP: process to process communication, UDP, TCP/IP protocol suit, addressing. Congestion control: open- loop, closed- loop congestion control in TCP.

- 1. C.L. Liu, "Elements of Discrete Mathematics", 2nd edition, TMH.
- 2. J. Treamblay, R. Manohar," Discrete Mathematical structures with application to computer science", TMH.
- 3. K.L.P.Mishra, "Theory of Computer Science", PHI.
- 4. E V Krishnamurthy, ",,Theory of Computer Science", EWP.
- 5. Silberschatz, Galvin, Gagne, "Operating System Concepts", 7th Ed, Wiley India
- 6. D.M. Dhamdhere, "Operating Systems", Tata McGraw Hill, 2nd Ed.
- 7. John J. Donovan "System Programming", TMH.
- 8. Pressman, "Software Engineering", McGraw Hill, 6th Ed.
- 9. Henry F. Korth, Abraham silberschatz, "Database system concepts", 5th Ed.Mc Graw Hill Inc.
- 10. Singh, "Database Systems: Concepts, Design & Application"- Pearson LPE.
- 11. Ellis Horowitz and Sahani, "Fundamentals of data Structure" Galgotia.
- 12. Seymour Lipschutz, "Data Structures", Schaum"s Outline.
- 13. Thomas H. Cormen and charles E.L. Leiserson, "Introduction to Algorithm", PHI, 2nd Ed.
- 14. Aho, "Design & Analysis of Computer Algorithms"- Pearson LPE.
- 15. Andrew S. Tanenbaum, "Computer Networks", 4th edition, Pearson LPE /PHI.
- 16. Behrouz Forouzan,"Data Communications and Networking", TMH, 4th edition.

# SUBJECT SPECIALIZATION-I SUBJECT: EDUCATION

#### UNIT-I

**Philosophical Foundation of Education**: Indian schools, Western schools, School of educational thoughts (Idealism, naturalism, constructive, Pragmatism), Concept and nature of Philosophy, Concept and nature of Education, Concept and nature of Pedagogy,

Relationship between education and philosophy.

#### UNIT-II

**Sociological Foundation of Education:** Relationship of Sociology and Education, Sociological Aspects of Education, Concept and nature of sociology of education, Meaning and Social Change, Social Control.

#### UNIT-III

**Psychological Foundation of Education:** Motivation and learning theories. Intelligence-types, theories and measurement Personality- types, theories and measurement Inclusive Education.

#### UNIT-IV

**Educational Evaluation and Assessment & Teacher Education:** Tools of Evaluation, Characteristics of good measuring instrumentTest standardization,

Continuous and comprehensive evaluation, Innovations in TE, Quality Management in TE, **UNIT-V** 

**Data Analysis and Statistics**: Qualitative and Quantitative data Analysis, Descriptive analysis and Inferential Analysis. Measures of central tendency Mean, Mode and Median, Importance, types of statistics, Measures of variability R MD, Q and SD, Coefficient of correlation, Use of 't' test and use of chi square.

# **References:**

1.Best J.W. (1999). Research in Education, New Delhi: Prentice Hall of India Pvt. Ltd.

2.Borg, W.R. and Gall, M.D. (1983). Educational Research – An Introduction, New York: Longman, Inc.

3. Christensen, L. (2007). Experimental Methodology. Boston: Allyn & Bacon.

4.Clive Opie (2004). Doing Educational Research- A Guide for First time researchers. New Delhi: Vistar Publications.

5.Cohen, Lewis and Manion Lawrence (1994) Research Methods in Education New York: Holt Rinchart and Winston Inc.

6.Fraenkel, J.R., Wallen, N.E. (1996). How to Design and Evaluate Research in Education. New York: McGraw Hill.

7.Flick, Uwe (1996): An Introduction to Qualitative Research . London sage publication 19

8. Kaul, Lokesh (1984). Methodology of Educational Research. New Delhi: Vikas Publications.

9. Kumar, K.L. (1996)"Educational Technology", New Delhi: New Age International Publishers.

# SUBJECT SPECIALIZATION-I SUBJECT: Electrical Engineering

#### UNIT- I

#### **Electric Circuits and Fields**:

Network graph, KCL, KVL, node and mesh analysis, transient response of dc and ac networks; sinusoidal steady-state analysis, resonance, basic filter concepts; ideal current and voltage sources, The venin's, Norton's and Superposition and Maximum Power Transfer theorems

#### UNIT-II

#### Signals and Systems:

Representation of continuous and discrete-time signals; shifting and scaling operations; linear, time-invariant and causal systems; Fourier series representation of continuous periodic signals; sampling theorem; Fourier, Laplace and Z transforms.

#### UNIT-III

#### **Electrical Machines**:

Single phase transformer - equivalent circuit, pharos diagram, tests, regulation and efficiency; three phase transformers - connections, parallel operation; auto-transformer; energy conversion principles

#### UNIT –IV

#### **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 control; power factor correction; economic operation; symmetrical components; fault analysis

#### UNIT-V

#### **Power Electronics and Drives**:

Semiconductor power diodes, transistors, thrusters, traces, GTOs, MOSFETs and IGBTs - static characteristics and principles of operation; triggering circuits; phase control rectifiers;

# **References:**

- 1. M E Van Valkenburg , Network Analysis and Synthesis , Phi Learning
- 2. Oppenheim, Signals & Systems, Prentice Hall Signal
- 3. P S Bimbhra ,Electrical Machinery , Khanna Publishers
- 4. C. L. Wadhwa, Electrical Power Systems, New Age International
- 5. Rashid Muhammad H, Power Electronics, Pearson Education India

Ph.D. Course Work-I Sem

# SUBJECT SPECIALIZATION-I SUBJECT: ELECTRONICS AND COMMUNICATION ENGINEERING

# UNIT- I

# Analog Circuits:

Small Signal Equivalent circuits of diodes, BJTs, MOSFETs and analog CMOS. Simple diode circuits, clipping, clamping, rectifier. Biasing and bias stability of transistor and FET amplifiers. Amplifiers: single-and multi-stage, differential and operational, feedback, and power. Frequency response of amplifiers. Simple op-amp circuits. Filters. Sinusoidal oscillators; criterion for oscillation; single transistor and op-amp configurations. Function generators and wave-shaping circuits, 555 Timers. Power supplies.

# UNIT-II

# **Analog Communication:**

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.

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# UNIT-III

# **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-IV

# Digital Communication:

Digital PAM, binary PAM formats, line coding, band limited digital PAM systems, Nyquist pulse shaping, equalization, synchronization techniques, bit and frame synchronization. Coded pulse modulation, voice digitization rate (VDR) of PCM, DPCM, DM, ADM, CVSD, log PCM, their performance comparison, VDR reduction by speech coding, VOCODERS, AT & T and CCITT hierarchies, quasi-synchronous multiplexes, Digital CW modulation, BPSK, DPSK, DEPSK, QPSK, QASK, BFSK, Doubinary encoding, QPR coherent and non-coherent systems, error probabilities in PSK, DPSK, FSK, QPSK, 16 QAM, MSK, QPR . ISDN & Value added communication system simulation & Analysis using MATLAB.

#### UNIT –V Wireless Communicatio

# Wireless Communication:

Wireless Communications Systems, Cellular concepts -frequency reuse, Trucking & grade of service, DMA, TDMA, SSMA, (FHMA/CDMA / Hybrid techniques), SDMA technique, Packet radio access-protocols, CSMA protocols, Reservation protocols, Capture effect in packet radio, Capacity of Cellular Systems. operation of mobile IP, Co-located address, Registration, Tunneling, WAP Architecture, overview, WML scripts, WAP service, WAP session protocol, Wireless transaction, Wireless datagram protocol. Infrared LANs, Spread spectrum LANs, Narrow bank microwave LANs, IEEE 802 protocol Architecture, IEEE802 architecture and services, 802.11 medium access control, 802.11 Physical layer. Adhoc Wireless Networks- Cellular and Adhoc Wireless Networks, Applications, MAC protocols, Routing, Multicasting, Transport layer protocols, Quality of service browsing, Adhoc Wireless Internet

# **References:**

1- Jacob Millman and Christos Halkias, "Integrated Electronics" Tata McGraw Hill.

2- R.P. Jain, "Modern Digital Electronics", Tata McGraw Hill

3- George Kannedy and Bernard Davis, "Electronics Communication System", Tata McGraw Hill

4- Digital Communication. By Haykins Mc Graw Hill Int Edition

5- . Wireless Communication and Networking - Williams Stallings, 2003 PHI.

# SUBJECT SPECIALIZATION-I SUBJECT: ENGLISH LITERATURE

#### UNIT- I

**Recent Trends in Critical Theories:** Structuralism, Post Structuralism, Psychoanalysis, Reader Response Theory, New Historicism and Cultural Materialism, Feminist Criticism, Techno criticism, Post-colonial criticism.

#### UNIT-II

**Modern Trends in Literature:** Imagism, Symbolism, Expressionism, Impressionism Modernism, Absurdist, Realism, Dadaism and Surrealism.

#### UNIT-III

**Trends in Indian English Writings:** Nativism, Diaspora, Colonialism, Post Colonialism, Ethnicity, Gender and Ideology, Subaltern literature- Problems of Expression, Orientalism Marginality and Identify Formation, Resistance in Subaltern Literature.

#### UNIT –IV

#### The study of English language and English Language Teaching:

A Historical Survey of English Language Teaching, The Status of English in India, The Psychology of Language Learning, Methods of Teaching English, Materials for Teaching English, Evaluation Processes in ELT, Use of Technology in ELT.

#### UNIT-V

**Structure of English language:** Phonetics and phonology of English, Syntax of English, Semantics of English, Morphology of English, Lexicon of English.

# Sri Satya Sai University of Technology & Medical Sciences, Sehore

# **References:**

1. Ayers, David. Modernism. Indian Rpt. Oxford, Blackwell Publishers, 2009.

2.Chandra, Joseph and K.S. Antony Samy. Classical to Contemporary Literary Theory. New Delhi, Atlantic Publishers, 2010.

3.Cuddon, J.A. A Dictionary of Literary Terms and Literary Theory. New Delhi, Maya Blackwell, 1998.

4.Das, Ajay. Literary Criticism. New Delhi, Murari Lal & Sons, 2010.

5.Das Bijay Kumar. Twentieth Century Literary Criticism. 6th Edn. New Delhi, Atlantic Publishers, 2010.

6.Eagleton, Terry. Literary Theory. New Delhi, Wiley India, 2008.

7. Jain, Jabir. Ed. Dislocations and Multiculturalisms. New Delhi, Rawat Publications, 2004.

8.Lucy, Naill. Ed. Postmodern Literary Theory. Indian Rpt. Oxford, Blackwell Publishers, 2005.

9. Pathak, R. S. Marginalized Voices. New Delhi, Creative, 2003.

10.Pattanayak, Bijay Ketan. Dynamics of Twentieth Century Literary Criticism. New Delhi, Atlantic Publishers, 2009.

11. Ryan, Michael. Literary Theory. Oxford, Blackwell Publishers, 2007.

12.Shukla, Bhaskar A. Feminism. Jaipur, Mark Publishers, 2008.

13.Singh, Naval Kishor. Colonial and Postcolonial Literature. Delhi Mangalum Publishers, 2010.

14. Webster, Roger. Studying Literary Theory. London, Arnold, 1996.

15.Napoli, Jo Donna. Linguistics: An Intrduction. OUP,1996.

16.Verma, S.K. and N, Krishnaswami. Modern Linguistics. OUP,1989.

17.Verma, S.K. and N, Krishnaswami. Modern Applied Linguistics.Macmillan.2006

18.Szpyra, Jolanta. The Phonology-Morphology Interface Cycles, Levels and Words.

Rontedge,London and New York,1989.

19. Trask, R. L. Key Concepts in Language and Linguistics. London, 2004.

20.Hockett, Charles F. A Course in Modern Linguistics. Surjeet Publications, Delhi, 2006.

21.George, Yule. The Study of Language. Cambridge Univ. Press. 2003.

22.Hudson, R. A. Sociolinguistics. CUP, 2003.

23. Abrams, M. H. A Glossary of Literary Terms ,1993.

24.R. K. Srinivas Iyengar ,Indian Writing in English, New Delhi, Asia Publishing House, 1962.

Ph.D. Course Work-I Sem

# SUBJECT SPECIALIZATION-I SUBJECT:LIBRARY AND INFORMATION SCIENCE

# UNIT- I

**Research** - Definition, scope of research in human development, types of research – survey, experimental and case study. Spiral of scientific method: Diagnostic, descriptive, exploratory and explanatory research ethics.

# UNIT-II

**Typology for Literature Search-** Typology for literature search, Network Topology, Types and Diagrams. And research reporting- style manuals (Chicago, APA, and MLA) evaluation of research, current trends in LIS research.

# UNIT-III

**Research Design**- Definition, principles, purposes and models. Historical design, descriptive design, and Philosophical World-Views (Qualitative, Quantitative and Mixed Approaches) sampling, definitions of population and sample, types and selection of samples, evaluating a sample, testing of hypothesis, synopsis writing, Formulation of research problems.

# UNIT-IV

**Classification and Cataloguing** – Meaning, purpose, and function of classification, knowledge classification and documentation classification. Study of Classification scheme DDC, UDC, CC.Types and Physical form standard codes of cataloguing - CCC and AACR-II. Entries related with AACR-II and CCC5th structure and rules.

# UNIT-V

**Library Software and Computer Application** – Some utility softwares for LIS research, Software and Programming Language: Machine Language; Assembly Language; High Level Language; (FORTRAN, COBOL, C++, UNIX, BASIC), and SPSS.

- 1. Test, Measurements and Research, Methods in Bechavioural Sciences: A.K., Singh.
- 2. Research Methodology: Methods and Techniques., Kothari, C.R, New Delhi: New Age International Ltd, 1985
- 3. Thesis Writing: A Manual for Researchers. Rahim, F. Abdul, New Delhi: New Age International Pvt. Ltd, 1996
- 4. The Art of Literary Research. Altick, Richard D. and John J. Fenstermaker. 4th ed. NewYork: Norton, 1993. Print.
- 5. MLA Handbook for Writers of Research Papers. Gibaldi, Joseph, 7th Ed. New Delhi: East-West Press, 2009
- 6. Research Methodology by R, Panneerselvam. PHI, New Delhi 2005

# SUBJECT SPECIALIZATION-I SUBJECT: MATHEMATICS

# UNIT- I

**Analysis:** Elementary Set Theory, Finite, Countable and Uncountable Sets, Continuity, Uniform Continuity, Differentiability, Mean Value Theorem, Sequence and Series of Functions, Uniform Convergence, Riemann Sums and Riemann Integral, Improper Integrals, Monotonic Function, Types of Discontinuity, Functions of Bounded Variation, Lebesgue Measure, Lebesgue Integral, Metric Spaces, Compactness, Connectedness.

# UNIT-II

**Linear Algebra:** Selection of Problem, Domain and Boundaries of Problem, Research Problem Analysis, Variable and Parameters, Technique Selection, Algebra of Matrices, Rank and Determinant of Matrices, Linear Equation of Matrices, Eigen Values and Eigen Vectors, Cayley-Hamilton Theorem, Matrix Representation of Linear Transformations, Change of Basis, Canonical Forms, Diagonal Triangular Forms, Inner Product Spaces, Orthonormal Basis.

# UNIT-III

**Complex Analysis:** Algebra of Complex Numbers, Complex Plane, Polynomials, Power Series, Transcendental Functions such as Exponential, Trigonometric and Hyperbolic Function, Analytic Functions Cauchy-Riemann Equations, Contour Integral, Cauchy's Theorem, Cauchy's Integral Formula, Liouville's Theorem, Maximum Modulus Principle, Schwarz Lemma, Open Mapping Theorem, Taylor Series, Laurent Series, Calculus of Residues, Conformal Mappings, Mobius Transformatios.

# UNIT -IV

**Ordinary Differential Equations:** Existence and Uniqueness of Solutions of Initial Value Problems for First Order Ordinary Differential Equations, Singular Solutions of First Order Ordinary Differential Equations, System of First Order Ordinary Differential Equations, General Theory of Homogenous and Non- Homogenous Linear Ordinary Differential Equations, Method of Variation of Parameter's.

# UNIT-V

**Partial Differential Equations:** Lagrange's and Charpit's Method for Solving First Order Partial Differential Equations, Cauchy's Problem for First Order Partial Differential Equations, Classification of Second Order Partial Differential Equations, General Solution of Higher Order Partial Differential Equations with Constsant Coefficients, Method of Separation of Variables for Laplace, Heat and Wave Equations.

- 1. H.L. Royden, Real Analysis, Macmillan (Indian Edition).
- 2. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill.
- 3. I. V. Ahlfors, Complex Analysis, McGraw-Hill.
- 4. B V Ramana, Higher Engineering Mathematics, Tata McGraw-Hill Publishing Company Limited New Delhi.
- 5. Erwin Kreyszig, Advanced Engineering Mathematics 10<sup>th</sup> Edition, John Wiley and Son's Publishing Company (Indian Edition).

# SUBJECT SPECIALIZATION-I SUBJECT: MECHANICAL ENGINEERING

#### UNIT- I

#### **Basics of Mechanical Engineering :**

Engineering Thermodynamics: First Law of Thermodynamics, Second Law of Thermodynamics, Availability & Irreversibility, Pure Substances, Air Standard Cycles, Computational Fluid Dynamics Internal Combustion Engines: Combustion in S.I. & C.I. Engines, Lubrication & Cooling Systems, Engine Testing and Performance, Supercharging, Gas Turbines and Jet Propulsion, Power Plant Engineering, Automobile Engineering Heat and Mass Transfer: Basic Laws, Conduction, Extended Surface Conduction, Convection, Thermal Radiation, Heat Exchangers, Mass Transfer Refrigeration and Air-Conditioning: Air Refrigeration System, Vapour Compression Refrigeration System, Vapour Absorption Systems and Refrigerants, Psychrometry, Air Conditioning. Fluid mechanics: Governing equations, Navier-Stokes equations, Boundary Layers, Turbulent flow. Turbulent Shear flows.

flow, Turbulent Shear flows, Compressible flow.

#### UNIT-II

#### Machine Design:

Strength of Material: Mechanical Properties and Testing, Deflection of Beams, Torsion of Shafts, Columns & Struts, Strain Energy, Pressure Vessels, Composite Materials Its Classification and Processing Methods, Advanced Mechanics of Solids Theory of Machines: Mechanisms and Machine, Gear and Gear Trains, Cams, Engine Dynamics, Governors, Balancing, Gyroscope Design of Machine Elements: Engineering materials and properties, Design for Production, Belt, Rope, Chain Drives, Design of Shaft, Bearings, Springs, Tribology. Mechanical Vibrations: Fundamentals of Vibration, Vibration of Single Degree of Freedom System, Vibration of Multi Degree of Freedom, Vibration of Continuous Systems, Static and Dynamics Testing of Machine Tools. Manufacturing Technology: Fundamental Machine Tool Operations, Casting, Welding, Bulk Metal Forming Processes, Forging, Extrusion, Rolling, Non-Conventional Manufacturing Processes Machine Tool Engineering: Fundamental of Metal Cutting, Machine Tool Design, Vibration in Machine Tools, NC, CNC, DNC Machine Tools, Automation in Manufacturing, FMS, CIMS

#### UNIT-III CAD/CAM/CNC:

Computer aided design & manufacturing: CAD/CAM: Fundamentals of Computer Aided Design, Geometrical Transformation, Plane Curves, Geometrical Modelling, Application of CAD Techniques to Finite Element Mesh Generation, Computer Aided Manufacturing, Rapid Prototyping, Robotics & AGVs CAD/CAM Hardware & Software, Numerical Control: Numerical Control & its components, NC procedure and motion control systems, applications and economics of NC, Part programmingmanual, computer-assisted and voice programming. Computer Control In N.C: CNC, DNC and combined DNC/CNC Systems. Adaptive control

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machining systems, latest developments. Group Technology And Process Planning: Concepts of Group Technology. Traditional & Computer Aided Process Planning, Retrieval & Generative Process Planning, Machinability data systems, computer-generated time standards. Computer-Integrated Production Management System: Introduction to computer aided Production Planning and Control, Cost planning and control, Introduction to computer aided inventory management & material requirement planning. Shop Floor Control & Computer Process Monitoring: Shop Floor Control System, Operation Scheduling, Factory data collection system, Computer Process monitoring. Computer Process Interfacing & Control: Manufacturing Process data & System interpretation, Interface hardware devices, Digital input/output processing, Process control strategies, Distributed control vs. Central control, direct digital control and Supervisory Computer control.

#### UNIT -IV

#### **Finite Element Method**:

One dimensional problems - Finite element modeling, Co-Ordinate and shape functions, Potential energy approach, Garlekin's method, Global stiffness matrix. Finite Element Analysis of 2-D problems Basic boundary value problems in 2-D, Triangular, Quadrilateral, Higher order elements, Poisson's and Laplace equations, Isoparametric formulation – Natural Co-ordinate system, Lagrangian interpolation polynomials. Solution to plane elasticity problems - Introduction to theory of elasticity. Special Topics: - Dynamic Analysis, Equation of motion, mass matrices, Free vibration analysis, Natural frequencies of longitudinal, Transverse, Torsional vibration. Computer Integrated Manufacturing: Development of CIM, fundamentals of CAD/CAM, computerized networks for manufacturing, Production operations and automation strategies, production economics. Automated inspection and testing, QC and CIM, computer aided inspection using robots, integrated computer aided inspection system, flexible inspection system. Introduction to control systems, linear control systems, linear feedback control systems, optimal control, sequence control and programmable controllers, process control

#### UNIT-V

#### **Reliability, Maintenance and Advanced Mechatronics:**

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. Mechatronics: Sensors, transducers and Encoders, resolvers for position and motion control, solenoide valves, ball screws. Drives and Actuators, Digital and servomotors, hydraulic and Pneumatic motors, motor speed control, Electronic Hardware. Electronic system communication – Interfacing and Buses, A/D and D/A Convertors, Integration of hard ware components, system response of Electronic and Mechanical systems. Software Control.

- 1. Yuman S.W Foundations of Fluid Mechanics.
- 2. An Introduction to Compressible Flow Pai.
- 3. Dynamics & Theory and Dynamics of Compressible Fluid Flow Shapiro.
- 4. Fluid Mechanics and Machinery D. Rama Durgaiah.(New Age Pub.)
- 5. Fluid Dynamics William F. Hughes & John A. Brighton (Tata McGraw-Hill Pub.)
- 6. Fundamentals of Heat & Mass Transfer Incroera Dewitt (Jhon Wiley)
- 7. Heat Transfer : A basic approach Yunus Cangel (MH)
- 8. Heat & Mass Transfer D.S. Kumar
- 9. Heat Transfer P.K. Nag(TMH)
- 10. Principle of Heat Transfer Frank Kreith & Mark.Bohn.
- 11. Convective Heat and Mass Transfer / W.M.Kays & M.E.Crawford(TMH)
- 12. Grover GK; Mechanical Vibration;
- 13. Thomson WT; Theory of Vibration with applications; PHI
- 14. Ambekar; Mechanical vibrations and noise engineering; PHI
- 15. CAD/CAM Theory and Practice Zeid, Mc Graw Hill.- 1991.
- 16. Computer Integrated Design and Manufacturing, Mark Henderson & Philip Wolfe,

# SUBJECT SPECIALIZATION-I SUBJECT: PHYSICAL EDUCATION

# UNIT-I

- Define Physical Education, Need and Importance of Physical Education.
- Scope of Physical Education, Concept of Physical Education.
- Relationship of Physical Education with general Education.

# UNIT-II

- Physical Education is an Art & Science,
- Biological growth and Development,
- Age & Growth Characteristics, Body Types

#### UNIT-III

- Case Study: Definition and importance.
- Characterization of case study, Data collection in case study.
- Experimental Research : Meaning, Scope and nature
- Survey Research, Concept of Survey research.
- Criteria of selection of problem, formulation of the problem.

# UNIT-IV

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

#### UNIT-V

- Learning types, Learning curve, Laws and Principles of Learning,
- Sociological: Society and culture, Leadership,
- Social acceptance and recognition.

- 1. Best, John W. Research in Education, New Delhi: Prentice Hall of India (P) Ltd. 1963
- 2. Campbell Willian, G. Form and Style in Thesis writing, Broton: Houghten Moffin Company,
- 3. Charke David H. and Clarke H. Harrison. Research Process in Physical Education, Recreation and Health Englewood Cliffor N.J. Prentice Hall Inc. 1979.
- 4. Robson, M Bara T.S. and Uppal A.K: Thesis format Gwalior : LNCPE 1979.

- 5. Blommers Paul and Lindquist, E.F. Statistical methods in Psychology and education Calcutta: Oxford Bool Co. 1959.
- 6. Giilford, J.P. Fundamental Statistics in Physiology Education New York : McGraw Hill Book Co. Inc.1966.
- 7. Steel, Robert G. D. and Torrie, James A: Principles and Procedures of Statistics, New York : McGraw Hill Book Co. Inc.1960.
- 8. Taxali R. K : P.C. Software made Simple, TMH.
- 9. Sinha P.K.: Computer Fundamentals BPB.
- 10. Cowart, R. : Mastering Windows, BPB.
- 11. Mansfields : The Compact Guide to M.S. Office, BPB.

# SUBJECT SPECIALIZATION-I SUBJECT: PHYSICS

#### UNIT-I

#### **QUANTUM MECHNAICS**

One dimensional problems: potential wells, steps and barriers. Harmonic oscillator, Hydrogen Atom, Spherically symmetric potentials: Bound States and scattering. Partial wave method, the Born approximation. Time-independent and Time-dependent perturbation theory. WKB approximation. Symmetry in Quantum Mechanics, Identical particles and spin.

#### UNIT-II

#### **CLASSICAL MECHANICS**

Newton's Laws and their meaning, simple applications conservation laws. Principle of virtual work and D'Alembert's principle. Central forces, Conservation of energy and angular momentum. Kepler problem, planetary orbits. Canonical Equation, Hamilton's equations, Canonical transformations. Rigid body dynamics. Euler's theorem. Moment of Inertia-calculations and theorems.

#### UNIT-III

#### STATISTICAL MECHANICS

Maxwell-Boltzmann gas velocity and speed distribution. Maxwell-Boltzmann, Bose-Einstein, Fermi-Dirac gases. Thermodynamics of Black body radiation, Stefan-Boltzmann law, Wien's displacement law. Specific heat of solids (Einstein and Debye models). Ideal Fermi System: Thermodynamic behavior of an ideal Fermi gas, degenerate Fermi gas, Fermi energy and mean energy, Fermi temperature.

#### UNIT-IV

#### ELECTRODYNAMICS

Electrostatics: Coloumb's law, Gauss's law, Electrostatic potential energy Poisson and Laplace's equations, Boundary value problems.

Magnetostatics: Biot Savart's law, Ampere's law, Motion of a charged particle in uniform, static, electric, magnetic and combined fields Time varying fields, Faraday's law, Maxwell's displacement current, Maxwell's equations, pointing's theorem. Wave equations, Electromagnetic plane waves, Linear, circular and elliptic polarization.

#### UNIT-V

#### MATHEMATICAL PHYSICS

Cauchy Riemann conditions, Analytic function, Line Integrals, Cauchy Integral Formula, Solutions of Differentials Equation in series, Legendre, Bessel, Hermite, Leaguers functions and their generating functions, Fourier Transform, Matrix algebra, Vector analysis. Coordinate transformations. Tensors- Notations and Conservations, Contra variant tensors, Rank of the tensors, Properties of the Tensors.

#### **References:**

Ph.D. Course Work-I Sem

# Sri Satya Sai University of Technology & Medical Sciences, Sehore

- 7. Quantum Mechanics: L.I. Schiff (McGraw Hill)
- 8. Quantum Mechanics: A.S. Davydov (Pergamon)
- 9. Quantum Mechanics: Cohen-Tannaudji et al. (Wiley VCH)
- 10. Classical Mechanics Rana Joag. TMH
- 11. Mathematical Methods of Classical Mechanics V. I. Arnold. Springer.
- 12. Fundamentals of Statistical and Thermal Physics, F. Reif (International Student Ed.) McGraw Hill.
- 13. Statistical Mechanics, K. Huang, John Wiley & Sons, 2nd Ed.
- 14. Statistical Mechanics, R. K. Pathria, (Pergamon Press).
- 15. Fundamentals of Statistical Mechanics, B. B. Laud, (New Age International Edition).
- 16. J. D. Jackson Classical Electrodynamics
- 17. D. J. Griffiths Introduction to Electrodynamics
- 18. J. Complex Analysis by Churchil
- 19. Mathematical Methods for Physicist by Arfken and Weber
- 20. Finite dimensional Vectror Spaces, P. Halmos
- 21. Mathematics of Classical and Quantum Physics by F. W. Byron and R.. W. Fuller
- 22. R. Reitz, F. J. Milford, W. Christy Foundations of Electromagnetic Theory

# SUBJECT SPECIALIZATION-I SUBJECT: PSYCHOLOGY

# UNIT- I

**Basic Concepts**: Definition of Psychology, Schools of Psychology: Behaviorist, Gestalt, Psychoanalysis and Humanistic. Scientific methods in psychology, Application of Psychology: Psychology in industry, community, family, education, health, self development and human relations.

#### UNIT-II

**Learning:** Principles and Methods, Classical conditioning. Operant Conditioning, The principle of reinforcement, Multiple response learning, Cognitive learning, Optimizing learning: Programmed learning and automated instruction. Transfer of Learning, Role of Reward and punishment in learning.

#### UNIT-III

**Motivation and Emotion:** Physiological basis of motivation, Current status of motivational concepts, Theories of motivation, Motivational factors in aggression, Emotion: Emotional expression and Theories of emotions.

#### UNIT –IV

**Memory and Forgetting:** Process, encoding, storage and retrieval, sensory, short term and long term memory. The nature of forgetting, Two process theories of memory, Improving memory, Language and thought, Symbols and concepts, Structure, forms of thought, Thinking and reasoning and Concept Formation.

#### UNIT-V

**Intelligence and Personality:** Theories of Intelligence, Measuring Intelligence, Kinds of Intelligence tests. Ability: Formation of aptitude and attitude, Aptitude tests. Creativity and its tests, Personality : Definition of Personality , Theories of Personality and Assessment of Personality.

- All port, G.W. 1961. Pattern and Growth in Personality, Holt Rinecnt & Winton.
- Singh.A.K 1992. Advanced General Psychology, Motilal Banarsi Das, New Delhi
- Baron, R.A. 2002 Psychology, 5<sup>th</sup> Edition, Pearson Education, New delhi
- Feldman, R.S. 2002. Understanding Psychology, Tata MC Graw Hill, New Delhi
- Galotti, K.M 1999. Cognitive psychology in and outside laboratory, Thomas Asia, Mumbai.
- Lahey Benjamin., B.2003, Psychology, McGraw Hill, New York.

# SUBJECT SPECIALIZATION-I SUBJECT: SOCIOLOGY

#### UNIT-I

**Basic Sociological Concept:-** Society, Community, Association, Institution, Social Group, Status and Role, Social Structure, Social organization and Social System.

#### UNIT-II

**Basic Sociological Institutions:-**Marriage, Family, Kinship, Socialization, Norms, Values, social Stratification.

#### UNIT –III

#### **Sociological Theories:-**

# (i) Classical Sociological Theories

- Auguste Comte -Positivsm
- Herbert Spencer Social Evolution
- ► Emile Durkheim –Social Solidarity
- ► Karl Marx Surplus value
- Vilfredo Pareto –Logical and Non Logical Actions
- Robert K.Merton- Reference Group

#### (ii) Advance Sociological Theories:-

- Ralf Dahrendorf –Dialectical Cnflict theory
- Lewis A. Coser -Functionalism Conflict
- ➢ Herbert blumer −Symbolic Ineraction
- Schutz Phenomenological Sociology
- ➢ Harold Garfinkal Ethonomethodology

#### UNIT –IV

**Social Problems:**-Dowry System, Domestic Violence, Divorce, Inter –generation and Intra –generation Conflict, Problem of Elderly, Cartelism, Corruption, Problems of Tribal People.

#### UNIT –V

#### **Changing Profile of Crime and Criminals:-**

Professional and organized crime, Crime against women and children, Cyber Crimes, Correctional, Institutions in India.

- 1. Abraham ,F and Morgan J.H.(1985) –Sociological Thought from Comate to Sorokin.
- 2. Coser ,L. A. (2001) Master of Sociological Thought, Rawat Publishers, Jaipur.
- 3. Shankar das, Rani Dhavan 2000 Punishment and the Prison; India &International Perspective New Delh, saga Publication.
- 4. Singh Y. 1973 : Modernization of Indian Tradition , Delhi , Thompson press.
- 5. Population Problems: Thompson and Lewis.

# Sri Satya Sai University of Technology & Medical Sciences, Sehore

- 6. D.S. Baghel and Kiran Baghel: Vivek Prakashan New Delhi.
- 7. Bedi Kiran 1998 it is always possible , new Delhi . Sterling Publications put.Ltd.
- 8. Gill S.S. 1998 The Pathology of corruption, New Delhi : Harper Collins Publishers (India).
- 9. Ministry of Home affairs: 1998.Crime in India New Delhi Government of India.
- 10. Makkar S.P. Singh and Paul C.Friday 1993 Global Perspective in Criminology Jalandhar : ABC Publications.