SPPU B.E./B.Tech ENTC Sem 6 syllabus

System Programming and Operating Systems

304190 System Programming and Operating System

Credits: TH-03

Unit I: Introduction to Systems Programming (8 Hrs)
Introduction:
Components of System Software, Language Processing Activities, Fundamentals of Language Processing.
Assemblers:
Elements of Assembly language programming. Simple assembler scheme, Structure of an assembler, Design of single and two pass assembler.
Macro Processors:
Macro Definition and call, Macro expansion, Nested Macro Calls, Advanced Macro Facilities, Design of a two-pass macro-processor.

Unit II : Compiler, Loaders and Linkers (8Hrs)
Compilers:
Basic compilers function, Phases of compilation, memory allocation, compilation of expression, Compilation of expressions, compilation of control structures, Code of optimization.
Loaders:
Loader Schemes: Compile and go, General Loader Scheme, Absolute loaders, subroutine linkages, relocating loaders, direct linking loaders, Design of an absolute loader.
Linkers:
Relocation and linking concepts, Design of linker, self relocating programs, Static and dynamic linker.

Unit III : Introduction to OS and Process management (6 Hrs)
Introduction to OS :
Architecture, Goals & Structures of O.S, Basic functions, Interaction of O. S. & hardware architecture, System calls, Batch,

multiprogramming. Multitasking, time sharing, parallel, distributed & real -time O.S.
Process Management:
Process Concept, Process states, Process control, Threads, Scheduling: Types of scheduling: Preemptive, Non preemptive, Scheduling algorithms: FCFS, SJF, RR.

Unit IV : Concurrency control (6Hrs)
Concurrency:
Interprocess communication, Mutual Exclusion, Semaphores, Classical Problems of Synchronization: Readers-Writers, Producer Consumer, and Dining Philosopher problem.
Deadlock:
Principles of deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection.

Unit V : Memory Management (8 Hrs)
Basics of memory management, Swapping, Memory Allocation, Paging, Segmentation ,Virtual memory, Demand Paging, Page replacement, Page replacement algorithms – Optimal FIFO, LRU, LRU approximation, Allocation of frames

Unit VI : Input and Output, File System (8Hrs)
I/O management & Disk scheduling:
I/O Devices, Organization of I/O functions, Operating System Design issues, I/O Buffering, Disk Scheduling (FCFS), RAID, Disk Cache.
File Management:
Concepts, File Organization, File Directories, File Sharing, Record Blocking, Allocation methods, Free Space management

Text Books:
1. 1 Dhamdhere D., "Systems Programming and Operating Systems", 2nd Edition, 'TMH
2. Siberschatz A; Galvin P.B; Gagne G, ?Operating System Concepts?, John Wiley.
3. J. J. Donovan, ?Systems Programming?, McGraw Hill

Reference Books:
1. Stalling William, "Operating Systems" , Pearson Education, fifth edition.
2. Adam Hoover, ?System Programming with C and UNIX?, Pearson Education
3. Leland L. Beck, ?System Software,? Pearson Editions.

4. Andrew S. Tanenbaum, ?Modern Operating Systems?, Second Edition, PHI.

5. A. V. Aho, R. Sethi, J. D. Ullman. Compilers: Principles, Techniques, and Tools. Addison-
Wesley

Power Electronics

304186 Power Electronics
Credits: 04

Unit I : Power Devices (8 Hrs)
Construction, Steady state characteristics & Switching characteristics of SCR, Construction, Steady state characteristics of Power MOSFET & IGBT. SCR ratings: IL, IH, VBO, VBR, dv/dt, di/dt, surge current & rated current. Gate characteristics, Gate drive requirements, Gate drive circuits for Power MOSFET & IGBT,opto isolator driving circuits for SCR. Series and parallel operations of SCR‘s. Applications of above power devices as a switch .

Unit II :AC-DC Power Converters (8 Hrs)
Concept of line & forced commutation, Single phase Semi & Full converters for R, R-L loads, Performance parameters, Effect of freewheeling diode, Three phase Semi & Full converters for R load, effect of source inductance, Power factor improvement techniques, Diode based boost converter. Single Phase dual converter with inductive load.

Unit III : DC-AC Converters (8 Hrs)
Single phase bridge inverter for R and R-L load using MOSFET / IGBT, performance Parameters, single phase PWM inverters. Three Phase voltage source inverter for balanced star R load with 120? and 180 mode of operation, Device utilization factor, Harmonics Elimination/Modulation Techniques.

Unit IV : DC-DC converters & AC Voltage Controller (8 Hrs)
Working Principle of step down chopper for R-L load (highly inductive), control strategies. Performance parameters, Step up chopper, 2-quadrant & 4-quadrant choppers, SMPS: Fly back/ Half Bridge/ LM3524

based or equivalent Circuit. Single-Phase full wave AC voltage controller by using IGBT with R load.

Unit V : Resonant Converters & Protection of Power Devices & Circuits (8 Hrs)
Need for Resonant converters, Concept of Zero current switching (ZCS) and Zero voltage switching (ZVS)
resonant converters. Cooling & heat sinks, over voltage conditions, over voltage protection circuits, metal
oxide varistors, over current fault conditions, Over current protection. Electromagnetic interference, sources, minimizing techniques, shielding techniques for EMI.

Unit VI : Power Electronics Applications (8 Hrs)
ON-line and OFF line UPS with battery AH, back up time, battery charger rating. Electronic Ballast, LED
Lamp with Driver Circuit, fan Regulator. Single phase separately excited DC motor drive, stepper motor
drive, BLDC motor drive. Variable voltage & variable frequency three phase induction motor drive.

Text Books:
1) M. H. Rashid, ?Power Electronics circuits devices and applications?, PHI 3rd edition, 2004 edition, New Delhi.
2) M. S. Jamil Asghar, "Power Electronics", PHI, 2004, New Delhi

Reference Books:
1) Ned Mohan, T. Undeland & W. Robbins, ?Power Electronics Converters Applications and Design? 2nd edition, John Willey & sons, Singapore, Oxford University Press, New Delhi, 2005
2) P.C. Sen, ?Modern Power Electronics?, S Chand & Co New Delhi
3) "GE SCR MANUAL" 6th edition, General Electric, New York, USA
4) Dr. P. S. Bimbhra, ?Power Electronics?, Khanna Publishers, Delhi.
5) M D Singh, K B Khanchandani ?Power Electronics? TMH

Business Management

304188 Business Management
Credits: 03

Unit I :Basics of Business Management (8 Hrs)
Introduction, Definition of management, characteristics of management, functions of management -
Planning, Organizing, Staffing, Directing, Co-ordination, Controlling,

Motivating, Communication,
Decision Making, Principles of management – F.W.Taylor, Henry Fayol, Elton Mayo,
Administration and management, Nature of management, levels of management, scientific
management, managerial roles, Forms of Organization- Line , Line – staff,committee etc, Dist
Business sectors & forms of business organizations- private sector,Cooperative sectors, public sector,
joint sector, Services sector, Various forms of business organizations – Sole Proprietorship,
Partnership firms, Joint stock companies -their features, relative merits, demerits & suitability.
Concept of globalization

Unit II :Quality Management (6 Hrs)
Definition of quality, goalpost view of quality, continuous improvement definition of quality, types of quality – quality of design, conformance and performance, phases of quality management, Juran‘s
and Demings view of quality, Quality Management Assistance Tools: Ishikawa diagram – Pareto
Analysis – Pokka Yoke (Mi stake Proofing).quality circles, TQM, Kaizen, Five S (5S), Six sigma
Quality Management Standards Application of six sigma a CASE study - The ISO 9001:2015
Quality Management System Standard. Software quality management with respect to CMM level
and ISO standard.

Unit III : Financial Management and Project Management (6 Hrs)
Capital Structure, Fixed & working capital, Cash flow, Financial accounting concepts and
application, Scope of business, Macro analysis, micro analysis, Demand and supply analysis.
Function of money market and capital Market, sources of finance. Introduction to capital budgeting,
Techniques of capital budgeting. Break even analysis - assumptions, importance, Cost-Benefit
analysis,. Introduction to Project Management process (Project Life cycle Management),Project

selection criteria, project scope, Project planning, scheduling , Resources and constrains. Project
estimates and costing .Project qualitative and quantitative Risk analysis and Mitigation, project
quality planning and deliverables. Case study of a project Mnagement.

Unit IV : Human Resource Development (6 Hrs)
Strategic importance HRM; objectives of HRM; challenges to HR professionals; role,
Responsibilities and competencies of HR professionals; HR department operations; Human Resource
Planning - objectives and process; human resource information system.. Talent acquisition;
recruitment and selection strategies, career planning and management, training and development,
investment in training program; executive development, Case study on Recent trends in Human
Resource Development. Case study of a HR of an organization.

Unit V : Entrepreneurship Development (6 Hrs)
Concept of entrepreneurship, Identification of business opportunities, Generation of business idea,
Business plan, Preparation of business proposal, Sources of finance – government and
nongovernment agencies, , Policies and incentives for small business development, Government
policies and incentives, Woman entrepreneurship, Industrial relations, Case study on Small scale
industries in India.

Unit VI : Marketing (6 Hrs)
Introduction to marketing, marketing environment, segmentation. Consumer behavior and Marketing
management. Marketing research, pricing, advertising, branding and packaging. Personal selling and
sales force Management .Modern marketing system (digital Mastering?marketing) Email
Marketing, Social Media Marketing, Web Marketing, Google (Google Analytics, Advertising and Applications), Facebook, LinkedIn, Twitter, Guides & Directories, Online Publications etc for sales,

customer services, staff recruitment etc, Blogging and Micro Blogging Event Management, Online
Payments, Disability Web Access, Surveys & Forms, Affiliate & Voucher Marketing, Crowd
sourcing, Mobile Social Media (Geotagging etc) and Mobile Marketing, Mobile Applications (Apps
and Mobile Web), Audio , Video podcasting.
Introduction to supply chain management and customer relationship management

Text Books:

1) O. P. Khanna, ?Industrial Engineering and Management?, Dhanpatrai publications Ltd,
NewDelhi.
2) L.C.Jhamb , Savitri Jhamb , Industrial Management – I , Everest Publishing House .
3) Jenniffer Greene, Andrew Stellman,Head First PMP 3rd Edition OREILLY Publication
4) Marketing Management-Phillip Kotlar, The Millennium Edition, PHI EEE Edition

Reference Books:

1) G. S. Batra , ?Development of entrepreneurship ? , deep and deep publications, new delhi
2) Ashwathappa, ?human resource management?, mc-gra w-hill education (india) pvt. Ltd.
3) M.Y. Khan and P. K. Jain, ?financial management? , mc-graw-hill education (india) pvt. Ltd.
4) Ravi M. Kishore, ?project management?, mc-graw-h ill education (india) pvt.
5) Pravin kumar, ? fundamentals of engineering economics?, wiley india
6) Mo n g a . .i.r. . F i n a n c i a l Ac c o u n t i n g : c o n c e p t s a n d Appli c a t i o n s , ma y t i r p a p e r b a c k s
7) Business organization and management by dr. C. B. Gupta, publisher sultan chand & co. Delhi
8) Fundamentals of accounting & financial analysis: by Anil Chowdhry (Pearson education)
9) Textbook of economic theory - Stonier and Hague; LongmanGreen and co., london.
10) managerial economics - theory and application - D. M. Mithani

Information Theory, Coding and Communication Networks

304187 Information Theory ,Coding Techniques and Communication Networks

Credits: 04

Unit I :Information Theory & Source Coding (6 Hrs)
Introduction to information theory, Entropy and its properties, Source coding theorem, Huffman coding, Shannon-Fano coding, The Lempel Ziv algorithm, Run Length Encoding, Discrete memory less channel, Mutual information, Examples of Source coding-Audio and Video Compression.

Unit II :Information Capacity & Channel Coding (8 Hrs)
Channel capacity, Channel coding theorem, Differential entropy and mutual Information for continuous ensembles, Information Capacity theorem, Linear Block Codes:Syndrome and error detection, Error detection and correction capability, Standard array and syndrome decoding, Encoding and decoding circuit, Single parity check codes, Repetition codes and dual codes, Hamming code, Golay Code, Interleaved code.

Unit III : Cyclic Codes (8 Hrs)
Galois field, Primitive element & Primitive polynomial, Minimal polynomial and generator polynomial, Description of Cyclic Codes, Generator matrix for systematic cyclic code, Encoding for cyclic code, Syndrome decoding of cyclic codes, Circuit implementation of cyclic code.

Unit IV : BCH and Convolutional Codes (7 Hrs)
Binary BCH code,Generator polynomial for BCH code, Decoding of BCH code, RS codes, generator polynomial for RS code, Decoding of RS codes, Cyclic Hamming code and Golay code. Introduction of convolution code, State diagram, Tree diagram, Trellis diagram, Sequential decoding and Viterbi decoding

Unit V : Data Communication & Physical Layer(7 Hrs)
Data Communications – Networks - Network models – OSI model – Layers in OSI model – TCP / IP
protocol suite – Addressing – Guided and Unguided Transmission media.

Unit VI : Data Link Layer (7Hrs)
Data link control: Framing – Flow and error control –Protocols for Noiseless and Noisy Channels – HDLC.

Text Books:
1) Bernad Sklar, ?Digital Communication Fundamentals & applications?, Pearson Education. Second Edition.
2) Behrouz A. Foruzan, ?Data communication and Networking?, Tata McGraw-Hill

Reference Books:
1) Ranjan Bose, ?Information Theory coding and Cryptography?, McGraw-Hill, 2nd Ed
2) Murlidhar Kulkarni, K.S.Shivaprakasha, ?Information Theory & Coding?, Wiley Publications
3) Simon Haykin, ?Communication Systems?, John Wiley & Sons, Fourth Edition.
4) Shu lin and Daniel j, Cistello jr., ?Error control Coding? Pearson, 2nd Edition.
5) Todd Moon, ?Error Correction Coding : Mathematical Methods and Algorithms?, Wiley Publication
6) Khalid Sayood, ?Introduction to Data compression?, Morgan Kaufmann Publishers