

E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

Accredited by NAAC with „A“ Grade | Accredited by NBA

NAGAPATTINAM – 611 002



B.E COMPUTER SCIENCE AND ENGINEERING

Second Year – Fourth Semester

Code No.	Course	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1902CS401	Software Engineering	3	0	0	3	40	60	100
1902CS402	Operating System	3	0	0	3	40	60	100
1902CS403	Computer Networks	3	0	0	3	40	60	100
1902CS404	Design and Analysis of Algorithms	3	0	0	3	40	60	100
1901CS405	Biology for Engineers	3	0	0	3	40	60	100
1902CS406	Database Management Systems	3	0	0	3	40	60	100
Laboratory Course								
1902CS451	Networks Lab	0	0	2	1	50	50	100
1902CS452	Operating System Lab	0	0	2	1	50	50	100
1902CS453	Database Management Systems Lab	0	0	2	1	50	50	100
1904GE451	Life Skills : Verbal Ability	0	0	2	1	100	-	100
Audit Course								
1901MCX01	Environmental Science	2	0	0	0	100	0	100

L – Lecture | T – Tutorial | P – Practical | CA – Continuous Assessment | ES – End Semester

1902CS401	SOFTWARE ENGINEERING	L	T	P	C
		3	0	0	3
MODULE I	SOFTWARE ENGINEERING CONCEPTS				9 Hours
Software Engineering introduction- Project management concepts - Software engineering paradigms – Generic process models, water fall life cycle model -prototype model - RAD model - spiral model - incremental model – Understanding requirements.					
MODULE II	MANAGING SOFTWARE PROJECTS				9 Hours
Metrics : Metrics in process and project domains - Software measurement - Metrics for software Quality - Integrating metrics in a software engineering process - Estimation , Scheduling – Risk Management – Review Techniques - Software quality assurance.					
MODULE III	DESIGN CONCEPTS				9 Hours
Design Process - Design Principles - Design Concepts - Software architecture – Architectural style,design and Mapping - user interface design.					
MODULE IV	SOFTWARE TESTING AND DEBUGGING				9 Hours
Testing Fundamentals and strategies - White-box and Black box testing - Basis path testing - dataflow testing - testing for special environments - Module testing, - Integration testing – validation testing - system testing – debugging - software maintenance – software configuration management					
MODULE V	ADVANCED CONCEPTS				9 Hours
Computer Aided Software Engineering - Clean room software engineering – Reengineering - Reverse Engineering.					

TOTAL: 45 HOURS

REFERENCES:

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Mc-Graw Hill, 7th Edition, 2010.
2. Ian Somerville, Software Engineering,, Addison-Wesley, 8th edition, 2006.
3. Steve McConnell, Code Complete, Second Edition, Microsoft Press.
4. Richard E. Fairley, Software Engineering Concepts, McGraw- Hill, 1985
5. <https://nptel.ac.in/courses/106105087/#>

1902CS402

OPERATING SYSTEMS

L	T	P	C
3	0	0	3

MODULE I INTRODUCTION 9 Hours

Operating System overview – Types of Operating Systems - Operating Systems Structures - Operating System Componenets – Operating System Services – System Calls – System Programs – System Structures - Virtual Machines.

MODULE II PROCESS MANAGEMENT 9 Hours

Processes-Process Concept, Process Scheduling, Co-operating process, Inter process Communication; Threads-Overview, Multithreading Models; CPU Scheduling, Process Synchronization - Critical Section Problem, Semaphores, Classic problems of synchronization; Deadlocks - Deadlock Characterization – Methods for handling Deadlocks -Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks.

MODULE III MEMORY MANAGEMENT 9 Hours

Memory Management: Background – Swapping – Contiguous memory allocation –Paging – Segmentation – Segmentation with paging. Virtual Memory: Background –Demand paging – Process creation – Page replacement – Allocation of frames –Thrashing.

MODULE IV FILE SYSTEMS AND I/O SYSTEMS 9 Hours

File System : File concept – Access methods – Directory structure – File system mounting – Protection. File-System Implementation : Directory implementation – Allocation methods – Free-space management. Mass-Storage Structure: Disk scheduling – Disk management –Swap-space management – RAID..

MODULE V CASE STUDY 9 Hours

Linux System- Basic Concepts;System Administration-Requirements for Linux System Administrator, Setting up a LINUX Multifunction Server, Domain Name System, Setting Up Local Network Services; Virtualization- Basic Concepts, Setting Up Xen,VMware on Linux Host and Adding Guest OS.

TOTAL: 45 HOURS

REFERENCES:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, 9th Edition, John Wiley and Sons Inc., 2012.
2. Andrew S. Tanenbaum, “Modern Operating Systems”, Fourth Edition Prentice Hall of India Pvt. Ltd, 2015 .
3. Harvey M. Deitel, “Operating Systems”, Pearson Education Pvt. Ltd, Third Edition, 2004.
4. William Stallings, “Operating System”, Pearson Education, Sixth Edition, 2012.
5. <http://nptel.ac.in/courses/106106144/>

1902CS403

COMPUTER NETWORKS

L	T	P	C
3	0	0	3

MODULE I INTRODUCTION

9 Hours

Data Communications – Network Criteria - Components of Networks -Types of Connection - Direction of Data Flow - Network Topologies– Protocols and standards–Categories of Networks –Network Models: The OSI Model - TCP/IP Protocol Suite - Addressing - Networking Devices.

MODULE II PHYSICAL AND DATA LINK LAYER

10 Hours

Physical Layer- Types of errors-Media Access Control: CSMA, CSMA/CD, CSMA/CA-Ethernet-Wireless LAN- Bluetooth - Flow Control-Error Control - Error Detection Techniques- HDLC and other Data Link Protocols

MODULE III NETWORK LAYER

9 Hours

Internetworking - IPv4 - IPv6 –Network Layer: Delivery, Forwarding and Routing-Routing Protocols - IP Protocols: ARP and RARP, BOOTP, ICMP, DHCP

MODULE IV TRANSPORT LAYER

9 Hours

Overview of Transport layer, Reliable/Unreliable Transmission, TCP, UDP,– TCP Connection Management - Flow Control – Congestion Control, Congestion Avoidance and Quality of Service: (QoS).

MODULE V APPLICATION LAYER

8 Hours

Domain Name System (DNS): Domain Name Space - DNS in the Internet - HTTP – Email: SMTP, POP3and IMAP - File Transfer Protocol -SNMP-Web Services.

TOTAL: 45 HOURS

REFERENCES:

- 1.BehrouzA.Forouzan, Data Communication and Networking, 5th Edition, Tata McGraw-Hill, 2013
- 2.James F.Kurose and Keith W.Ross, Computer Networking: A Top-Down Approach Featuring the Internet, Pearson Education, 2017
- 3.Larry L.Peterson and Bruce S.Davie, Computer Networks, Elsevier, 2009
- 4.Andrew S.Tanenbaum, Computer Networks, Pearson Education, 2010
- 5.William Stallings, Data and Computer Communication, Pearson Education, 2007
- 6.profameencse.weebly.com
- 7.<http://nptel.ac.in/courses/106105081/1>

1902CS404	DESIGN & ANALYSIS OF ALGORITHMS	L	T	P	C
		3	0	0	3

MODULE I INTRODUCTION 9 Hours

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non-recursive algorithms.

MODULE II DIVIDE-AND-CONQUER 9 Hours

Divide and conquer methodology – Merge sort – Quick sort – Binary search – Strassen’s Matrix Multiplication- Knapsack Problem-Finding Max & Min

MODULE III DYNAMIC PROGRAMMING 9 Hours

Warshall’s and Floyd’s algorithm – Optimal Binary Search Trees – 0/1 Knapsack Problem and Memory functions- Travelling Salesman Problem.

MODULE IV BACKTRACKING 9 Hours

Backtracking – n-Queens problem – Graph Coloring Problem-Hamiltonian Circuit Problem – Subset Sum Problem- Knapsack problem

MODULE V BRANCH AND BOUND 9 Hours

Branch and Bound – Assignment problem – Knapsack Problem – Traveling Salesman Problem- Approximation Algorithms for NP – Hard Problems.

TOTAL: 45 HOURS

REFERENCES:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, “Introduction to Algorithms”, Third Edition, PHI Learning Private Limited, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, “Data Structures and Algorithms”, Pearson Education, Reprint 2006.
3. Donald E. Knuth, “The Art of Computer Programming”, Volumes 1& 3 Pearson Education, 2009.
4. Steven S. Skiena, “The Algorithm Design Manual”, Second Edition, Springer, 2008
5. <http://nptel.ac.in/courses/106101060/>

1902CS406

DATABASE MANAGEMENT SYSTEMS

L	T	P	C
3	0	0	3

MODULE I INTRODUCTION

9 Hours

Introduction to file system - Introduction to database system - Data Base Architecture - Data Independence – View of Data - Instance and Schema– Data Models- Types of Data Models – Database Languages- Database user and administrator-Entity relationship model - Mapping Cardinalities-Keys, E-R diagrams.

MODULE II QUERY LANGUAGE & OPTIMIZATION

9 Hours

SQL –DDL- DML-DCL-TCL-Embedded SQL-Static Vs Dynamic SQL - Views – Constraints – Triggers-Data Base security and authorization-Query processing and optimization - Functional Dependencies-Normalization

MODULE III TRANSACTION PROCESSING

9 Hours

Transaction Concepts – ACID Properties–Need for Concurrency Control –Schedules- Serializability: Conflict and View - Concurrency Control - Locking Mechanisms – Two phase locking- Time Stamp based Concurrency Control –Deadlock-Recovery Techniques-Immediate update- Deferred update- shadow paging.

MODULE IV FILES AND INDEXING

9 Hours

Overview of Physical Storage Media-RAID -File Organization-File operations – Hashing Techniques – Indexing - Single level and Multi-level Indexes-B+ tree Index Files-B tree Index Files.

MODULE V ADVANCED TOPICS

9 Hours

Data warehousing-Data mining and knowledge discovery-OODBMS- Object Relational Databases –XML Data Base - Cloud based systems – NOSQL introduction -Hbase data model -Database Tuning -Case Study for Design and Manage the Database for any Project.

TOTAL: 45 HOURS

REFERENCES:

- 1.Abraham Silberschatz, Henry F.Korth and S.Sundarshan “Database System Concepts”, Sixth Edition, McGraw Hill, 2017.
2. Ramez Elmasri and Shamkant B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education, 2013.
- 3.Thomas M. Connolly and Carolyn E. Begg, —Database Systems - A Practical Approach to Design, Implementation, and Managementl, fifth edition, Pearson Education, 2011
- 4.C.J.Date, A.Kannan and S.Swamynathan, —An Introduction to Database Systemsl, Eighth Edition, Pearson Education, 2012.
- 5.Raghu Ramakrishnan, —Database Management Systemsl, Fourth Edition, McGraw-Hill College Publications, 2015.
- 6.Frank. P. Coyle, “XML, Web Services And The Data Revolution”, Pearson Education, 2012
7. <http://nptel.ac.in/>
8. <http://coursera.org/>

1901MCX01

ENVIRONMENTAL SCIENCE
(Common to all Branches of B.E/ B.Tech)

L T P C
3 0 0 0

MODULE I ECOSYSTEMS AND BIODIVERSITY

10 Hours

Concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers-Oxygen cycle and Nitrogen cycle – energy flow in the ecosystem – ecological succession processes – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Documentation of the medicinal plants in your native place

MODULE II NATURAL RESOURCES

10 Hours

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and overutilization of surface and ground water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources. Energy Conversion processes – Biogas – production and uses, anaerobic digestion; case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

Documentation of the effect of modern Agriculture in your nearby Village

MODULE III ENVIRONMENTAL POLLUTION

9 Hours

Definition – Source, causes, effects and control measures of: (a) Air pollution - Mitigation procedures- Control of particulate and gaseous emission, Control of SO_x, NO_x, CO and HC) -Technology for capturing CO₂ (metallo organic frame works)(b) Water pollution – Waste water treatment processes. (c) Soil pollution - soil waste management: causes, effects and control measures of municipal solid wastes – (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards–role of an individual in prevention of pollution – pollution case studies.

Documentation study of local polluted site – Urban / Rural / Industrial / Agricultural.

MODULE IV SOCIAL ISSUES AND THE ENVIRONMENT

8 Hours

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management -environmental ethics: Issues and possible solutions – 12 Principles of green chemistry – consumerism and waste products – environment protection act – Air act – Water act – Wildlife protection act – Forest conservation act – The Biomedical Waste (Management and Handling) Rules; 1998 and amendments-scheme of labeling of environmentally friendly products (Ecomark) central and state pollution control boards-disaster management: floods, earthquake- Public awareness.Analyze the recent steps taken by government of India to prevent pollution (Green India and Clean India)

MODULE V HUMAN POPULATION AND THE ENVIRONMENT

9 Hours

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare –Environmental impact analysis (EIA) -GIS-remote sensing-role of information technology in environment and human health – Case studies. Documentation study of the Human health and the environment in nearby Hospital (Statistical report)

TOTAL: 45 HOURS

REFERENCES:

1. Trivedi.R.K., "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media, 3rd edition, BPB publications, 2010.
- 2.Cunningham, W.P. Cooper, T.H. Gorbani, "Environmental Encyclopedia", Jaico Publ., House,Mumbai, 2001.
3. Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi,2007.
4. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2005.
5. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2006
6. Ravikrishnan"Environmental Science and Engineering" Sri Krishna Hi-tech Publishing Company Pvt .
- 7.https://en.wikipedia.org/wiki/Carbon_capture_and_storage

1901CS405

BIOLOGY FOR ENGINEERS

L	T	P	C
3	0	0	3

MODULE I LIFE (INTRODUCTION TO CELLS) 8 Hours

Biomolecules: Carbohydrates, Proteins, Nucleic Acids, Lipids, Enzymes. Cell structure and composition; The central dogma in molecular biology; Darwinian evolution; Molecular perspective and classification; Phylogenetic trees; Study of inter-and intra-species relationships; Microorganisms and Infectious Diseases.

MODULE II LIFE PROCESSES (FUNCTIONING OF HUMAN SYSTEMS): 7 Hours

Muscular System; Nervous System; Special Senses; Sensory organs (eye, ear, smell, taste, touch); Cardiovascular System; Respiratory System; Renal System; Immune System; Endocrine System; Cancer and Life style diseases; Stem cells.

MODULE III BIO-INSPIRED ALGORITHMS 10 Hours

Artificial Neural Networks; Swarm intelligence algorithms; Particle Swarm Optimization; Ant colony optimization; Bees colony optimization; Genetic Algorithms.

MODULE IV COMPUTATIONAL MEDICINE 10 Hours

Computational Challenges – Phenotyping, Biomarker discovery, Predictive modeling, Casual modeling, Optimizing and or selecting interventions, Advancements.

MODULE V HEALTH INFORMATICS 10 Hours

Overview of Health Informatics, Electronic Health Records and Data Standards and Exchange, Workflow Analysis and Process Redesign, Usability and Human Factors, Systems Design and Designing for Safety.

TOTAL: 45 HOURS

REFERENCES:

1. Biology for Engineers, Rajiv Singal , CBS Publishers and Distributors Pvt Ltd; First Edition edition (4 June 2019).
2. Biology for Engineers, Wiley Editorial, Wiley (2018).
3. Principles of Soft Computing, S. N. Sivanandam, S. N. Deepa, Wiley; Third edition (2018).
4. Computational Medicine: Tools and Challenges, Zlatko Trajanoski, Springer; 2012 edition (19 September 2012).
5. Health Informatics - E-Book: An Interprofessional Approach, Ramona Nelson, Nancy Staggers, Elsevier; 2 edition (December 8, 2016).
6. <https://nptel.ac.in/courses/121/106/121106008/>

1902CS451

NETWORKS LAB

L	T	P	C
0	0	2	1

List of Experiments:

1. Study Of Colour Coding Jack Rj45 And Do The Following Cabling Works In A Network
 - A. Cable Crimping
 - B. Standard Cabling
 - C. Cross Cabling And
 - D. Establish A Lan Connection Using Three Systems Using Any Topology with kit.
2. Implementation Of Stop And Wait Protocol And Sliding Window Protocol.
3. Implementation Of Simulation Of Arp And Rarp
4. Implementation Of Ping Command .
5. Implementation Of Traceroute Command .
6. Implementation Of Http Socket For Web Page Upload And Download .
7. Implementing Subnetting.
9. Implementation Of Implementation Of Tcp Chat
10. Implementation Of File Transfer Using Tcp And Echo Program
11. Simulation Of Domain Name System And Simulation Of Snmp .
12. Implementation Of Rpc .

Total: 45 Hours

ADDITIONAL EXPERIMENTS:

1. Socket Programming
2. Implementation of Networking concepts in Linux

REFERENCES:

- 1.. BehrouzA.Forouzan, Data Communication and Networking, 5th Edition, Tata McGraw-Hill, 2013
2. James F.Kurose and Keith W.Ross, Computer Networking: A Top-Down Approach Featuring the Internet, Pearson Education, 2012
3. Larry L.Peterson and Bruce S.Davie, Computer Networks, Elsevier, 2009
4. Andrew S.Tanenbaum, Computer Networks, Pearson Education, 2010
5. William Stallings, Data and Computer Communication, Pearson Education, 2007
6. Douglas E.Comer and M.S.Narayanan, Computer Networks and Internets, Pearson Education, 2008.
7. <http://nptel.ac.in>
8. profameencse.weebly.com

1902CS452

OPERATING SYSTEMS LAB

L	T	P	C
0	0	2	1

List of Experiments:

1. Study of basic Commands in Unix Operating System
2. Write programs using the following system calls (fork, exec, getpid, exit, wait, close, stat, opendir, readdir).
3. Write programs using the I/O system calls (open, read, write, etc).
4. Simulation of Unix commands.
5. Implementation of CPU Scheduling Algorithms(FCFS, SJF, RR, Priority).
6. Implementation of Page Replacement Algorithms (LRU, OPT, FIFO).
7. Implementation of memory allocation algorithms (First Fit, Best Fit, Worst Fit)
8. Implement the Producer – Consumer problem using semaphores.
9. Simulation of Shared Memory Concept.
10. Implementation of bankers Algorithm.
11. Implement Paging Technique of memory management.
12. Implementation Disk Scheduling Algorithms
13. Study of Linux OS, Android OS.

Total: 45 Hours

ADDITIONAL EXPERIMENTS:

3. Implement some memory management schemes
4. Application Oriented Experiments
5. Mini Project

REFERENCES:

1. <http://www.ee.surrey.ac.uk/Teaching/Unix/unixintro.html>
2. <https://kb.iu.edu/d/afsk>
3. <http://www.ch.embnet.org/CoursEMBnet/Pages05/slides/Unix05.pdf>
4. <http://www.ee.surrey.ac.uk/Teaching/Unix/>
5. http://www.comptechdoc.org/os/linux/usersguide/linux_ugshellpro.html
6. <http://www.cs.jhu.edu/~yairamir/cs418/os4/sld025.html>

1904GE451	LIFE SKILLS : VERBAL ABILITY	L	T	P	C
		0	0	2	1

MODULE I VOCABULARY USAGE 6 hours

Introduction - Synonyms and Antonyms based on Technical terms – Single word Substitution – Newspaper, Audio and video listening activity.

MODULE II COMPREHENSION ABILITY

Skimming and Scanning – Social Science passages – Business and Economics passages – latest political and current event based passages – Theme detection – Deriving conclusion from passages

MODULE III BASIC GRAMMAR AND ERROR DETECTION 6 hours

Parallelism – Redundancy – Ambiguity – Concord - Common Errors – Spotting Errors – Sentence improvement – Error Detection FAQ in Competitive exams.

MODULE IV REARRANGEMENT AND GENERAL USAGE 6 hours

Jumble Sentences – Cloze Test - Idioms and Phrases – Active and passive voice – Spelling test.

MODULE V APPLICATION OF VERBAL ABILITY 6 hours

Business Writing - Business Vocabulary - Delivering Good / Bad News - Media Communication - Email Etiquette – Report Writing - Proposal writing – Essay writing– Indexing –Market surveying.

TOTAL: 30 HOURS

REFERENCES:

1. Arun Sharma and Meenakshi Upadhyav, How to Prepare for Verbal Ability and Reading Comprehension for CAT, McGrawHill Publication, Seventh Edition 2017
2. R S Aggarwal and Vikas Aggarwal , Quick Learning Objective General English ,S.Chand Publishing House, 2017
3. Dr.K.Alex , Soft Skills, S.Chand Publishing House, Third Revise Edition, 2014
4. Raymond Murphy, Essential English Grammar in Use, Cambridge University press, New Delhi, Third Edition , 2007