

E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

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Chennai Accredited by NAAC with 'A' Grade | Accredited by NBA

NAGAPATTINAM – 611002



B.E. COMPUTER SCIENCE ENGINEERING

2019 Regulation : Full Time Curriculum and Syllabus

SEMESTER IV									
Course Code	Course Name	L	T	P	C	Maximum Marks			Category
						CA	ES	Total	
Theory Course									
1902CS401	Software Engineering	3	0	0	3	40	60	100	PC
1902CS402	Operating System	3	0	0	3	40	60	100	PC
1902CS403	Computer Networks	3	0	0	3	40	60	100	PC
1902CS404	Design and Analysis of Algorithms	3	0	0	3	40	60	100	PC
1901CS405	Biology for Engineers	3	0	0	3	50	50	100	BS
1902CS406	Database Management Systems	3	0	0	3	40	60	100	PC
1901MCX01	Environmental Science	2	0	0	0	100	0	100	MC
Laboratory Course									
1902CS451	Networks Laboratory	0	0	2	1	50	50	100	PC
1902CS452	Operating System Laboratory	0	0	2	1	50	50	100	PC
1902CS453	Database Management Systems Laboratory	0	0	2	1	50	50	100	PC
1904GE451	Life Skills: Verbal Ability	0	0	2	1	100	-	100	EEC
Total		20	0	8	22	600	500	1100	

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

1902CS401	SOFTWARE ENGINEERING	L	T	P	C	
		3	0	0	3	
PREREQUISITES: Basic Computer knowledge,C Programming						
COURSE OBJECTIVES:						
1. To help the students in understanding the basic theory of software engineering and to apply these basic theoretical principles to a software project development. 2. To guide students to develop skills that will enable them to construct software of high quality, software that is reliable and that is reasonably easy to understand, modify and maintain. 3.To provide an understanding of why these skills are important.						
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
FURTHER READING / SEMINAR :						
Version management ISO 9000 Quality Standards						
COURSE OUTCOMES:						
	After completion of the course, students will be able to					
CO1	Build an appropriate process model for a given project					
CO2	Analyse the principles at various phases of software development					
CO3	Translate specifications into design and identify the components to build the architecture for a given problem, all using an appropriate software engineering methodology					
CO4	Define a Project management plan and tabulate appropriate testing plans at different levels during the development of the software					
CO5	Understand the software project estimation models and estimate the work to be done and resources required and the schedule for a software project					
REFERENCES:						
1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Mc-Graw Hill, 7 th 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
PREREQUISITES: Basic Computer knowledge					
COURSE OBJECTIVES: The student should be made to:					
1.Understand the structure and functions of OS. 2. Learn about Processes, Threads and Scheduling algorithms. 3.Understand the principles of concurrency and Deadlocks. 4.Learn various memory management schemes. 5.Study I/O management and File systems. 6.Learn the basics of Linux system and perform administrative tasks on Linux Servers.					
Module I	INTRODUCTION	9 Hours			
Operating System overview – Types of Operating Systems - Operating Systems Structures - Operating System Components – 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
FURTHER READING / SEMINAR :					
Issues on Linux Multi-Function Server Study about Stable and Tertiary Storage devices Learn about Multi-threading issues in Linux Systems					
COURSE OUTCOMES: After completion of the course, Student will be able to					
CO1	Understand Operating System Structure, Operations and Services & Illustrate the operating system concepts and its functionalities.				
CO2	Design various Scheduling algorithms and deadlock, prevention and avoidance algorithms.				
CO3	Compare and contrast various memory management schemes.				
CO4	Analyze the File systems and disk scheduling mechanism.				
CO5	Perform administrative tasks on Linux Servers.				
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	
PREREQUISITES:						
1. Basic Computer knowledge. 2. Computer Organization and Architecture						
COURSE OBJECTIVES:						
1. Understand the state-of-the-art in network protocols, architectures and applications. 2. Gain knowledge about the functions of different network layers. 3. Familiarize in the various aspects of computer networks.						
MODULE I	INTRODUCTION	9				
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				
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				
Internetworking - IPv4 - IPv6 –Network Layer: Delivery, Forwarding and Routing-Routing Protocols - IP Protocols: ARP and RARP, BOOTP, ICMP, DHCP						
MODULE IV	TRANSPORT LAYER	9				
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				
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
FURTHER READING :						
SSH: Simple Socket Shell - Security Services - Firewalls.						
COURSE OUTCOMES:						
	After completion of the course, Student will be able to					
CO1	Describe the basics of computer networks and protocols					
CO2	Apply the functions of different layers and in depth knowledge of data link layer					
CO3	Analyze the different protocols and network layer components.					
CO4	Identify the basic functions of transport layer and congestion in networks.					
CO5	Explain the working of application layer					
REFERENCES:						
1. Behrouz A. 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	
PREREQUISITES:						
1.Data Structures						
COURSE OBJECTIVES:						
1. Learn the algorithm analysis techniques.						
2. Become familiar with the different algorithm design techniques.						
3. Understand the limitations of Algorithm power						
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				
Dynamic programming -Warshall’s and Floyd’ 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						
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
FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :						
Iterative Methods – Simplex Linear Problem, Stable Marriage Problem, Bipartite Problem, Max Flow problem						
COURSE OUTCOMES:						
After completion of the course, Student will be able to						
CO1	Analyze the time and space complexity of algorithms					
CO2	Design algorithms for various computing problems					
CO3	Critically analyze the different algorithm design techniques for a given problem.					
CO4	Modify existing algorithms to improve efficiency.					
CO5	Identify the limitations of algorithms in problem solving.					
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/						

1901CS405	BIOLOGY FOR ENGINEERS	L	T	P	C	
		3	0	0	3	
COURSE OBJECTIVES:						
The objective of this course is to enable learners to understand the basic concepts of biology and its applications in engineering.						
Module I	Biology Introduction and its Classification	7 Hours				
Introduction to Biology, fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Exciting aspect of biology - need to study biology- Discussion about biological observations of 18th Century - major discoveries. Examples from Brownian motion and the origin of thermodynamics - original observation of Robert Brown and Julius Mayor. Classification - morphological, biochemical or ecological. Hierarchy of life forms at phenomenological level. classification based on (a) cellularity- Unicellular or multicellular (b) ultrastructure- prokaryotes or eucaryotes. (c) energy and Carbon utilization -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricotelic, ureotelic (e) Habitata- aquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. Model organisms for the study of biology- E.coli, S.cerevisiae, D. Melanogaster, C. elegance, A. Thaliana, M. musculus						
Module II	Genetics and Macromolecular analysis	10 Hours				
Genetics - Newton's laws to Physical Sciences"- Mendel's laws, Concept of segregation and independent assortment. Concept of allele. Gene mapping, Gene interaction, Epistasis. Meiosis and Mitosis - part of genetics. Concepts of recessiveness and dominance. Concept of mapping of phenotype to genes. Single gene disorders in humans. Complementation using human genetics. Macromolecular analysis: analyses of biological processes at the reductionistic level Proteins- structure and function. Hierarch in protein structure. Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structural elements.						
Module III	Biomolecules and Enzymes	10 Hours				
Biomolecules - Molecules of life. monomeric units and polymeric structures. Sugars, starch and cellulose. Amino acids and proteins. Nucleotides and DNA/RNA. Two carbon units and lipids. Enzymes - monitor enzyme catalyzed reactions. Enzyme catalyzed reactions. Enzyme classification. Mechanism of enzyme action -two examples. Enzyme kinetics and kinetic parameters. RNA catalysis. Information Transfer - The molecular basis of coding and decoding genetic information - universal Molecular basis of information transfer. DNA - genetic material. Hierarchy of DNA structure- from single stranded to double helix to nucleosomes. Concept of genetic code. Universality and degeneracy of genetic code. Gene in terms of complementation and recombination.						
Module IV	Metabolism and Microbiology	8 Hours				
Metabolism: principles of energy transactions. Thermodynamics to biological systems. Exothermic and endothermic versus endergonic and exergonic reactions. Concept of Keq and its relation to standard free energy. Spontaneity. ATP - energy currency. Breakdown of glucose to CO ₂ + H ₂ O (Glycolysis and Krebs cycle) - synthesis of glucose from CO ₂ and H ₂ O (Photosynthesis). Energy yielding and energy consuming reactions. Concept of Energy charge - Microbiology Concept of single celled organisms. Concept of species and strains. Identification and classification of microorganisms. Microscopy. Ecological aspects of single celled organisms. Sterilization and media compositions. Growth kinetics.						
Module V	Bio-inspired Engineering	10 Hours				
Introduction to biologically-inspired designs (BID for Biomedical and Non-biomedical applications): Human-organs-on-chips; Muscular Biopolymers; Bio-optics; Nanostructures for Drug Delivery; Genetic Algorithms; Artificial neural networks; Swarm intelligence algorithms; Biosensors: role in medical diagnostics (Sensium digital plaster); environmental monitoring; Bio-filters; Bio-robotics; 3D Bio-printing; Self-healing concrete.						
				Total:	45 Hours	
COURSE OUTCOMES:						
Upon completion of this course, students will be able to						
CO1	Describe how biological observations of 18th Century that lead to major discoveries.					
CO2	Classify biology based on morphological, biochemical and ecological matters					
CO3	Describe the concepts of recessiveness and dominance during the passage of genetic material from parent to offspring					
CO4	Analyze biological processes at the reductionistic level					

CO5	Describe about all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine
CO6	Classify enzymes and distinguish between different mechanisms of enzyme action.
CO7	Describe DNA as a genetic material in the molecular basis of information transfer.
CO8	Apply thermodynamic principles to biological systems.
CO9	Classify microorganisms.
CO10	Describe about bio-inspired engineering.
REFERENCES:	
<ol style="list-style-type: none">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. Biology for Engineers, G.K..Suraishkumar, Oxford University Press7. Biology for Engineers, Arthur T. Johnson, CRC Press	

1902CS406	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	0	3
PREREQUISITES:					
Computer Programming Languages					
COURSE OBJECTIVES:					
1.To understand the fundamentals of data models and conceptualize and depict a database system using ER diagram					
2. To make a study of SQL and relational database design					
3. To impart knowledge in transaction processing, concurrency control techniques and recovery procedures.					
4. To know about data storage techniques a query processing.					
5. To familiarize the students with the different types of databases.					
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
FURTHER READING / SEMINAR :					
1. Advanced Database Technology					
2. Data mining and Data warehousing, Data Analytics					
COURSE OUTCOMES:					
After completion of the course, Student will be able to					
CO1	Understand the basic concepts of the database and data models				
CO2	Illustrate a database using ER diagrams and map ER into Relations and normalize the Relations				
CO3	Acquire the knowledge of query evaluation to monitor the performance of the DBMS				
CO4	Acquire the knowledge about different storage techniques and Query Processing				
CO5	Explain the basic concepts of various types of Databases				
REFERENCES:					
1.Abraham Silberschatz, Henry F.Korth and S.Sundarshan “Database System Concepts”, Sixth Edition, McGraw Hill, 2017.					
2. RamezElmasri 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 Management, fifth edition, Pearson Education, 2011					
4.C.J.Date, A.Kannan and S.Swamynathan, —An Introduction to Database Systems, Eighth Edition, Pearson Education, 2012.					
5.Raghu Ramakrishnan, —Database Management Systems, 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
PREREQUISITES:					
1. Basic knowledge about the valuable environment 2. Basic knowledge to conserve this precious environment					
COURSE OBJECTIVES:					
1. Realize the interdisciplinary and holistic nature of the environment. 2. Understand how natural resources and environment affect the quality of life and stimulate the quest for sustainable development 3. Recognize the socio-economic, political and ethical issues in environmental science.					
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 CO ₂ (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	8 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					

COURSE OUTCOMES:	
	On the Successful completion of the course, Students will be able to
CO1:	Describe the importance of ecosystem and its conservation.
CO2:	Differentiate various natural resources and the urgent need to conserve the natural resources.
CO3:	Explain the different types of pollution and its effects.
CO4:	Describe the various environmental protection acts.
CO5:	Explain the major diseases, women, child development and the impacts of population explosion.
FURTHER READING / CONTENT BEYOND SYLABUS / SEMINAR :	
Human rights violation E - waste and biomedical waste -Identification of adulterants in food materials	
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. Gorhani, "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	

1902CS451	NETWORKS LABORATORY	L	T	P	C
		0	0	2	1
PREREQUISITES:					
1.Computer Organization and Architecture 2. Computer Programming Languages					
COURSE OBJECTIVES:					
1. To configure networking in system 2. To Familiarize with different protocols and network components using simulators 3. To gain knowledge about the working of routing algorithms.					
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:					
Socket programming					
Implementation of Networking concepts in Linux					
COURSE OUTCOMES:					
After completion of the course, Student will be able to					
CO1	Identify the different types of cables in networks.				
CO2	Configure networking in a system.				
CO3	Implement and simulate protocols.				
CO4	Compare the performance of different routing algorithms using simulation tools.				
REFERENCES:					
1.Behrouz A.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 LABORATORY	L	T	P	C	
		0	0	2	1	
PREREQUISITES:						
1.Basic Computer knowledge. 2.C Programming.						
COURSE OBJECTIVES:						
1. To gain a complete knowledge about UNIX commands. 2. To obtain an overview of distributed operating systems and the related topics of inter process communication models (message passing, remote procedure call, distributed object computing, and shared memory) 3. To know the concepts of process management and synchronization 4. To know the concept of memory management such as best fit, worst fit and so on						
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:						
1. Implement some memory management schemes 2. Application Oriented Experiments 3. Mini Project						
COURSE OUTCOMES: After completion of the course, Student will be able to						
CO1: Be familiar with the language and terms of the UNIX/LINUX operating system CO2:delineate the commands and procedures needed to carry out basic operations on the UNIX/LINUX operating system CO3: Design, develop and implement a software solution to a given problemwhich employs operating systems tools						
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						

1902CS453	DATABASE MANAGEMENT SYSTEMS LABORATORY	L	T	P	C
		0	0	2	1
PREREQUISITES::					
Computer Programming Languages					
COURSE OBJECTIVES:					
1. Learn to create and use a database 2. Be familiarized with a query language 3. Have hands on experience on DDL Commands 4. Have a good understanding of DML Commands and DCL commands 5. Familiarize advanced SQL queries. 6. Be exposed to different applications					
LIST OF EXPERIMENTS:					
1	DDL and DML commands				
2	Transaction control commands and Aggregate Functions				
3	Joins and Nested Queries				
4	Constraints and Views				
5	High level programming language extensions Control structures				
6	Cursors				
7	Triggers				
8	Procedures, Functions and Report				
9	Database Design and implementation with any one front end tool (Mini Project) Sample list of Projects 1. Hospital management 2. Railway ticket reservation 3. Student Mark list processing 4. Employee pay roll processing 5. Inventory control 6. Personal Information System 7. Timetable Management System 8. Hotel Management System 9. Online Course Registration System 10. Library Management System				
				TOTAL:	45 HOURS
REQUIREMENTS:					
Hardware: Standalone desktops 30 Nos. (or) Server supporting 30 terminals or more.					
Software: Front end: Visual Studio/Java/Equivalent Back end: Oracle/MySQL/Sql Server DB2 or Equivalent.					
FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :					
Under MoU with Oracle Academy, a programme Oracle Workforce Development Programme (OWDP) is conducted. In this programme extensive hands-on training on SQL and PL/SQL will be given to students during the Lab sessions.					
<ul style="list-style-type: none"> • Writing SQL queries for Hierarchical retrieval of data (tree structured data) • Querying Data Dictionary static Views • Using stored procedures and Functions for implementing object level data security 					
COURSE OUTCOMES:					
After completion of the course, Student will be able to					
CO1	Design and implement a database schema for a given problem-domain				
CO2	Create and maintain tables using various PL/SQL statements				
CO3	Apply Triggers, Views and constraints commands to solve real time problems				
CO4	Create reports using functions and procedures				
CO5	Apply front end and back end tools for real time projects				
REFERENCES:					
1. http://ilearning.oracle.com					
2. http://coursera.org/					
3. http://nptel.ac.in/					

1904GE451	LIFE SKILLS : VERBAL ABILITY			L	T	P	C	
				0	0	2	1	
COURSE OBJECTIVES:								
1. To help students comprehend and use vocabulary words in their day to day communication 2. To apply appropriate reading strategies for interpreting technical and non-technical documents used in job-related settings. 3. To ensure students will be able to use targeted grammatical structures meaningfully and appropriately in oral and written production. 4. To enable the students to arrange the sentences in meaningful unit and to determine whether constructions rely on active or passive voice 5. To Apply the principles of effective business writing to hone communication skills								
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						6 hours	
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								
COURSE OUTCOMES								
CO1	Construct new words in their day to day communication.							
CO2	Predict the information swiftly while reading passages.							
CO3	Elaborate their oral and written communication.							
CO4	Rephrase the sentences and able to identify the voice of the sentence.							
CO5	Summarize their knowledge of the best practices to craft effective business documents							
CO6	Make use of the etiquette in business.							
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								