

University of Mumbai
B.E Information Technology
Scheme of Instruction and Evaluation

Third Year Engineering

Semester V

Scheme of Instructions					Scheme of Examinations					
Sr. No	Subjects	Lect/	Pract/	Tut/	Theory		T/W	Practical	Oral	Total
		Week	Week	Week	Hours	Marks	Marks	Marks	Marks	Marks
1	Operating System for Computational Devices	4	2	--	3	100	25	--	25	150
2	Computer Graphics and Virtual Reality Systems	4	2	--	3	100	25	25	25	175
3	Convergence of Technologies and Networking in Communication	4	2	--	3	100	25	--	25	150
4	Manufacturing processes, Planning and Systems	4	--	2	3	100	25	--	25	150
5	Object Oriented Analysis and Design	4	2	--	3	100	25	25	--	150
6	Environmental Studies	2	--	1	2	50	25	--	--	75
7	Open Source Software Laboratory	--	2	--	--	--	25	25	--	50
	TOTAL	22	10	3	--	550	175	75	100	900

Operating System for Computational Devices				
CLASS T. E. (INFORMATION TECHNOLOGY)				
SEMESTER V				
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		3	25
	ORAL		-	-
	TERM WORK		-	25

Introduction and Overview of OS

Operating systems: Definition, objective and function of OS, the history and evolution of OS, characteristics of modern OS, application scenarios, organization of a computer system, operational view of a computing system with resources like processor, memory, input and output, issues in resource management, a bare-bone operating system, introduction to the issues in communication with devices, kernel and shell of an operating system, processes, file and system calls, layered Vs monolithic OS.

File Systems and Management

File systems: What is a file, user view of files, file types and file operations, file types in Unix/Linux and Microsoft, file operation commands, file access rights, file storage management, Inode or FAT structure, file control blocks, root file system, directory and file paths, blocks, impact of block size selection, contiguous allocation, chained and indexed allocations, Impact of allocation policy on fragmentation, anatomy of disk address translation, mapping file blocks on the disk platter, cylinder, file related system services, disk access control and scheduling

Process Management

Process, threads, task, Implicit and explicit tasking, processor utilization, multi-processing and time sharing, response time., process relationship, process state, process state transitions, process scheduling, short-term and long term schedules, non-pre-emptive and pre-emptive scheduling policies, time slice, CPU scheduling policies like FCFS, SJF etc. Gantt charts and parameters to compare policy performance, context switching of process state information. Kernel architecture: User and kernel mode of operation, System calls, process states, kernel operations, design of a scheduler.

Memory Management

Motivation, when and where primary and secondary memory management is needed, compiled code and memory relocation, linking and loading, processes and primary memory management, static and dynamic partitioned using MFT and MVT algorithms, memory allocation policies, critique of various policies like first fit, best fit, internal and external fragmentation, secondary memory management, fixed and variable partitions,

virtual memory concept, paging and page replacement policies, page faults, thrashing, hardware support for paging, segmentation, segmentation with paging

Input Output Management

Issues in human centric, device centric and computer centric IO management, input output modes, programmed IO, polling, interrupt mode of IO, various types of interrupts, interrupt servicing, priority interrupts, interrupt vectors, direct memory access (DMA) mode of transfer, setting up DMAs, device drivers, interrupt handling using device drivers, buffer management, device scheduling, disk scheduling algorithms and policies.

Resource Sharing and Management

Shared resources, resource allocation and scheduling, resource graph models, deadlocks, deadlock detection, deadlock recovery, deadlock avoidance, deadlock prevention algorithms, mutual exclusion, semaphores, wait and signal procedures.

Interprocess Communication

Spawning a new process, parent and child processes, assigning a task to child processes, need for communication between processes, modes of communication, pipes, shared files, shared memory, message based IPC, signals as IPC, the distributed computing environment.

Real Time Operating Systems

Introduction to Real time systems and Real Time Operating Systems, characteristics of real-time operating systems, classification of real time operating systems, services, goals, structure, features of RTOS, architectures of real-time operating systems, micro kernels and monolithic kernels, tasks in RTOS, performance measures, estimating program runtimes, task assignment, scheduling in RTOS, rate monotonic scheduling, priority inversion, task management, race condition, inter-task communication, applications of real time systems, overview and comparison of various RTOS – LIKE Vx works, QNX, RT Linux, Monta Vista, Nucleus Window CE, Symbian, Psos, Introduction to Mobile and Embedded Operating Systems, RTOS for hand-held devices.

Reference

- Applied Operating System Concepts, 1st ed. Silberchatz, Galvin and Gagne, John Wiley Publishers.
- Operating System Concepts, 2nd Edition, Milenekovic, McGraw Hill.
- An introduction to Operating System, Dietel, Addison Wesley.
- Modern Operating Systems, Tanenbaum., PHI
- Operating System, 4th Edition, William Stallings, Pearson,
- Real Time Operating System, Barr M.
- Real-Time Systems, Jane Liu, Pearson Ed. Asia
- Real -Time Systems, Krishna and Shin, McGraw Hill International.

Term Work:

Term work shall consist of at least 10 practical experiments covering all topics and one written test.

Distribution of marks for term work shall be as follows:

- | | |
|--|----------|
| 1. Attendance (Theory and Practical) | 05 Marks |
| 2. Laboratory work (Experiments and Journal) | 10 Marks |
| 3. Test (at least one) | 10 Marks |

The final certification and acceptance of TW ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

Computer graphics & Virtual Reality techniques				
CLASS T.E. (INFORMATION TECHNOLOGY)				
SEMESTER VI				
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		-	-
	ORAL		-	25
	TERM WORK		-	25

Computer Graphics Part I

1. Introduction to Computer graphics and Image Analysis

Introduction, Image and Object ,Image Representation, The basic graphics pipeline, Bitmap vs. Vector based Graphics, Applications of Computer Graphics, Display Devices, Cathode Ray Tubes, Raster scan display, Random Scan display, Flat Panel display ,Volatile displays, Static flat panel displays, Input technology, Touch Screens, Light Pen ,Graphics Tablets, Coordinate system overview

2. Scan Conversion algorithms of CG primitives

Introduction, Scan Conversion of a point, Scan conversion of lines, Digital differential analyzer algorithm, Bresenhams line drawing algorithm

3. Two – Dimensional Transformations

Introduction, Transformation Matrix, Types of transformation in 2D Graphics, Identity transformation, Scaling ,Reflection, Shear transformation,Rotation,Translation ,Rotation about arbitrary point, Combined transformation, Homogeneous coordinates ,Translation in homogeneous coordinates, Rotation in homogeneous coordinates ,Scaling in homogeneous coordinates ,Shear transformation in homogeneous coordinates

4. Three Dimensional Transformation

Introduction, Objects in Homogeneous coordinates ,Three dimensional transformations ,Scaling,Translation,Rotation,Shear Transformations, Reflection ,Transformation from world coordinates to viewing coordinates ,Projection, Parallel projection, Orthographic projection, Oblique projection, Perspective projection ,One point perspective, Two point perspective, Three point perspective .

5. Viewing and Clipping:

Introduction ,Viewing transformation in two-dimensions ,Introduction to clipping,2D clipping, Point clipping, Line clipping, Cohen Sutherland line clipping, Midpoint subdivision algorithm ,Cyrus Beck line clipping,Liang Barsky line clipping, Introduction to Polygon clipping ,Sutherland Hodgeman polygon clipping, Weller Atherton algorithm ,Viewing and clipping in 3D ,Cohen Sutherland line clipping ,Viewing transformation, Text clipping ,

6. Solid Area Scan Conversion:

Introduction ,Inside Outside test ,Winding number method, Coherence ,Polygon filling ,Seed fill algorithm ,Boundary fill algorithm ,Flood fill algorithm ,Scan line algorithm ,Priority algorithm ,Scan conversion of characters ,Anti aliasing ,Types of anti aliasing ,Haftoning ,thresholding and dithering

7. Curve Design:

Introduction ,Curve continuity ,Conic curves ,Piecewise curve design ,LeGrange interpolated curves ,Spline curve representation ,Bezier Curves, B Spline Curves ,Non Uniform Rational B Spline curves

8 Computer Animations and Virtual Reality:

Introduction ,Key Frame Animation ,Construction of an animation sequence ,Motion control methods ,Methods based on geometric and kinematics information ,Methods based on physical information ,Methods based on Behavioral Information ,Procedural Animation ,Introduction to Morphing ,Intermediate Images ,Mapping orders ,Warping techniques ,Mesh warping, Feature based image warping ,Thin plate spline TPS based image warping ,3D morphing ,Introduction to Virtual reality ,Design of Virtual reality systems ,Important factors in VR systems ,Types of VR systems ,Interaction and input devices ,Advantages of virtual reality

Virtual Reality technologies Part II

1. Introduction:

A short history of early virtual reality, early commercial VR Technology, VR becomes an Industry, The five classical components of VR Systems.

2. Input Devices: Trackers, Navigations and Gesture Interfaces.

-Three Dimensional Position Trackers:

Tracker performance parameters, Mechanical trackers, Magnetic trackers, Ultrasonic trackers, Optical Trackers and Hybrid Inertial Tackers.

- Navigation and Manipulation Interfaces:

Tracker bases Navigation/Manipulation Interfaces, Trackballs, three Dimensional

- Probes.
- Gesture Interfaces:
The Pinch Glove, the 5DT Data Glove, the Didjiglove, the Cyberglove.

3. Output Devices: Graphical, Three Dimensional Sound and Haptic Displays.

- Graphical Display: The human visual system, personal graphics displays, large volume displays.
- Sound displays: the human auditory system, the convolutron, Speaker based three dimensional sound.
- Haptic Feedback: The human Haptic system, Tactile Feedback Interfaces, Force Feedback Interfaces.

4. Computing Architectures for Virtual Reality:

The Rendering Pipeline: The graphical rendering pipeline, the haptics rendering pipeline. PC Graphics Architectures: Pc Graphics Accelerators, Graphics Benchmarks. Work Station Based Architectures: the Sun Blade 1000 Architecture, The SGI Infinite Reality Architecture. Distributed VR Architectures: Multipipeline Synchronization, Collocated rendering Pipelines, Distributed Virtual Environments.

5. Modeling:

Geometric Modeling: Virtual Object Shape, Object Visual Appearance.
Kinematics Modeling: Homogeneous Transformation Matrices, Object Position, Transformation Invariants, Object Hierarchies, viewing the three dimensional words.
Physical Modeling: Collision Detection, Surface Deformation, Force Computation, Force Smoothing and Mapping, Haptic Texturing.
Behavior Modeling and Model Management: Level of Detail Management, Cell Segmentation.

6. Virtual Reality Programming: Toolkits and Scene Graphs.

World Toolkit: Model Geometry and Appearance, the WTK Scene Graph, Sensors and Action Functions, WTK Networking,

JAVA 3D: Model Geometry and Appearance, Java 3D Scene graph, Sensors and Behaviors, Java 3D Networking, WTK and Java 3D Performance Comparison.

General Haptics Open Software Toolkit: GHOST Integration with the Graphics Pipeline, The GHOST Haptic Scene Graph, Collision Detection and response, Graphics and PHANToM Calibration.

7. Human Factors in Virtual Reality:

Methodology and Terminology: Data Collection and Analysis, Usability Engineering Methodology. User Performance Studies: Test bed Evaluation of universal VR Tasks, Influence of System Responsiveness on User Performance, Influence of Feedback Multimodality.

8. Traditional Virtual Reality Applications:

Medical Application of VR: Virtual Anatomy, Triage and Diagnostic, Surgery and Rehabilitation. Education, Arts and Entertainment: VR in Education, VR and the Arts, Entertainment Application of VR. Military VR Application: Army use of VR, VR Application in Navy, Air Force use of VR.

9. Emerging Application of VR:

VR Application and Manufacturing: Virtual Prototyping, other VR Application in Manufacturing, Application of VR in Robotics: Robot Programming, Robot Tele operation. Information Visualization: Oil Exploration and Well Management, Volumetric Data Visualization.

Text book

1. R.K Maurya Computer Graphics , Wiley India
2. Grigore Burdea, Philippe Coiffet, Virtual Reality Technology 2nd edition. Wiley India

Convergence of technologies & Networking in communication			
Class B.E.(Information Technology) semester VI			
Hours per week	Lectures	:	04
	Tutorials	:	==
	Practicals	:	02
		Hours	Marks
Evaluation scheme	Theory	3	100
	Practical/ Termwork	2	25
	Oral		25

1. Introduction:

Communication model, Data Communication, Data representation transmission, modes of data transmission, synchronous and asynchronous communication, Network and services, Introduction to 2G,3G and 4G Wireless communication system.

2. Convergence Technology: The blending or integration of voice, video, data and image into one flexible network

2. Network topology and extent:

Network topology, OSI reference model, TCP/IP protocol suite, Network extent LAN applications, LAN architecture, Bus LANs, Ring LANs, Star Lans, Wireless LANs, Lan Bridges, WAN, ATM Protocol architecture, ATM cells, Transmission of ATM cells, ATM Adoption layer and other area networks

3. Modem:

Digital modulation methods, ASK, PSK, FSK. Modem and standards, Data multiplexers, Multiplexing techniques, Comparison of data multiplexing techniques ADSL, RADSL, HDSL, SDSL.

4 Bandpass modulation:

Binary phase shift keying, Probability of error for Binary phase shift keying Differentially encoded phase shift keying, Probability of error for DEPSK, QPSK, M-ary PSK, Quadrature amplitude shift keying, Binary frequency Shift keying, M-ary FSK Minimum shift keying (MSK). Error performance for binary systems, Probability of error for coherently detected Binary orthogonal FSK, GMSK.

5. Static and Dynamic channel allocation:

Different schemes, multiple access protocol, ALOHA, CSMA/CD, Collision free protocols. Ethernet, IEEE 802.2, 802.3, 802.4, 802.5 standards.

6. Network services & Protocol layering:

Connection oriented & connectionless services, their comparison layered architecture, services Interface, primitives and service access points, Ad-hoc wireless networks, Handoff Algorithms, Bluetooth Technology and Infrared Technology.

7. Transmission and multiple accesses:

Transfer Modes circuit switching, routing, virtual circuit switching comparison of transfer modes Asynchronous transfer mode. Multiple access concepts FDMA/TDMA in GSM networks, CDMA in UMTS Networks.

8 Data transmission functions:

Probability of error for coherently detected BPSK, Data link control, Data link line configurations, data link layer functions, services offered to network Layer DLC protocol layering logical link control (LLC) Media access control (MAC), Flow control protocols Error detection and correction mechanisms e.g. HDLC Bridging Transparent source route bridging in ETHERNET LANS, switching components of typical switch performance measures in switch design switching, switching issues, switching architectures shared-memory architecture, shared-medium architectures space division architecture switching in ATM and its examples.

9. Communication network functions:

Addressing techniques, classification of addressing techniques, addressing structure in INTERNET addressing structure in Telecom Networks, signaling complexity in Different Networks, Classification of signaling techniques signaling issues, Signalling models, point to multipoint signaling, ISDN signaling, Routing protocols/techniques, core routing concepts, core routing concepts.

10. Traffic Management:

Concept of traffic, concept of service, Network capabilities, Types of traffic, Traffic

Management, Traffic contract management, traffic policing, priority control, priority control

Flow control versus congestion control, Traffic Management in ATM.

11. Network management:

Goals of Network Management, Functional Areas of Network Management Telecommunications management Network (TMN).

12. Security Management:

Security Management, symmetric (secret key) Encryption Techniques
Asymmetric encryption techniques, Key management, Hash functions, Digital signatures and certificates, Firewalls, Security management in Third generation UMTS network

13 Convergence Technologies for 3G Networks:

Operation and integration of GSM, GPRS, EDGE, UMTS, CDMA2000, IP, and ATM, practical examples of 3G connection scenarios. Signaling flows and protocol stacks, IP and ATM as used in a 3G context, issues of QoS and real-time application support IP/SS7 internetworking and IP soft switching, the architecture of the IP Multimedia Subsystem (IMS) for UMTS

Term Work:

Term work shall consist of at least 10 practical experiments covering all topics and one written test.

Distribution of marks for term work shall be as follows:

- | | |
|--|----------|
| 4. Attendance (Theory and Practical) | 05 Marks |
| 5. Laboratory work (Experiments and Journal) | 10 Marks |
| 6. Test (at least one) | 10 Marks |

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Text Books:

1. Sumit Kasera, Nishit Narang, Sumita NARANG. Communication Networks Principles & Practice Tata McGraw-Hill Publishing company Limited New Delhi
2. Jeffrey Bannister, Paul Mather, Sebastian Coope "Convergence Technologies for 3G Networks: IP, UMTS, EGPRS and ATM", Wiley india
3. "Digital communications" Sklar." Pearson education, 2001 2nd Edition.
4. William Stallings, Data & Computer Communication, Pearson Education, 6th Edition.
5. Lean Garcia, Widjaja, Communication Networks, Tta Mcgraw Hill, 2nd Edition.
- 6.. T.S.Rappaport, Wireless Communication, Pearson Education, 2nd Edition.

Reference Books:

1. Forouzan, Data Communication & Networking, Tta Mcgraw Hill, 3rd Edition.
2. Andrew Tanenbaum, Computer Networks, Prentice Hall of India.
3. Raj Pandya, Mobile & Personal Communication system & services, Prentice Hall of India.

List of Experiments:

1. To study PC to PC Communication.
2. To study ASK, PSK, FSK techniques.
3. To study Hand off algorithm for Ad-hoc wireless networks.
4. To study Belmann Ford Algorithm.
5. To study Dijkstra"s Algorithm.
6. To study OFDM (Orthogonal Frequency Divison Multiplexing) technique.
7. To study Static channel allocation scheme.
8. To study Dynamic channel allocation scheme.
9. To study various types of signaling techniques.
10. To study various types of Encryption techniques.

MANUFACTURING PROCESSES, PLANNING AND SYSTEMS				
CLASS T. E. (INFORMATION TECHNOLOGY)				
SEMESTER V				
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	02	
	PRACTICALS	:	--	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		3	25
	ORAL		-	-
	TERM WORK		-	25

1. Introduction to production and operations Management

Products and services, the product/ process Continuum, the transformation process, product design, process design, automation

2. Contemporary manufacturing processes

Evolution of the enterprise, Classification of Basic Manufacturing, design, Materials and Production, English Metric Practice

Casting processes, Metal molds, Investment casting, Continuous Casting.

Metal cutting: Metal Cutting Theory, Metal Cutting tools

Turning, drilling, boring and milling machine tools: Lathe group, Drill Press group, Boring Machine tool Group, Milling Machine Group, and Transfer Type Production Machine Group.

Hot working of metal

Plastic Deformation, Rolling, Forging, Extrusion, Pipe and tube manufacturing

Plastic materials and processes:

Raw materials and properties, thermosetting compounds, Thermoplastic compounds, processing Plastics

Electronic fabrications

Components and Definitions, From Components to products, The Soldering System, Thermal Characteristics, Electromagnetic Interference and Electrostatic Discharges, Cleaning Process, emerging Packaging Technologies.

3 OPERATIONS PLANNING:

Business Objectives, Systems Analysis, Operations Sheet preparation, Information, Sequence of Operations, pinion operations Sheet, welded Steel Assembly operations Sheet, Trends.

4 QUALITY SYSTEMS:

Quality systems and Process Improvement, Process Variation, Control Charts for Variable Data, Control charts for Attribute Data, Process Capability Analysis, Statistical Design of Experiments, reliability Theory

5 COMPUTER NUMERICAL CONTROL SYSTEMS:

Types of CNC Systems, Evolution of CNC Machine tools, types of Controllers, CNC Operational Sequence, rectangular Coordinates, Program Formatting and Coding, Types of Programming and Interpolation, High Level Languages, Emergent Control Methods.

6 PROCESS AUTOMATION

Simulation, Automation, Robots, Group technology, Flexible, Manufacturing Systems, Other Production Systems, Economic Considerations.

7 OPERATOR- MACHINE SYSTEMS

Operator-Machine Systems Structure, Ergonomics, Designing Ergonomic Tools, Redesigning Workstations, Job Analysis, Systems to measure Injury Frequency, Impact of Intelligent Systems.

8 facility capacity and layout planning

Capacity planning, Decision tree analysis in Facility Capacity planning, facility layout planning, assignment model in layout planning, load-distance analysis in process layouts

9 Demand Management

The make –to –stock , the Assemble-to-order, make to order environment, sales and operations planning, master production scheduling , dealing with customers on a day –to-day basis, Information use in Demand Management make –to-knowledge data capture and monitoring customer relationship management, outbound product flow

10 Materials requirement planning (MRP) & Just-in-time (JIT) practices

Material requirement planning in manufacturing, MRP-JIT production systems, Sales and operations planning, Enterprise Resource Planning, Forecasting for Strategic business planning, sales and operations planning, master production scheduling,

Term Work

Term work shall consist of at least 10 assignments/ demonstration of workshop practice / documentation of industry visit and one written test.

Marks

- | | |
|--|----------|
| 1. Attendance (Theory and Practical) | 05 Marks |
| 2. Laboratory work (Experiments and Journal) | 10 Marks |
| 3. Test (at least one) | 10 Marks |

The final certification and acceptance of TW ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

Text book

1. Phillip F. Ostwald and Jairo Munoz, "Manufacturing Processes and Systems " Wiley India Edition ISBN No: 978-8126-518937
2. Vollmaan , Berrt, Whybark, Jacobs "Manufacturing planning and control for supply chain Management" Tata McGraw Hill

Reference:

1. Mikell P. Groover, "Fundamental of Modern Manufacturing" Wiley India Edition
2. Kanishka Bedi, "Production ans operations management", OXFORD university press

OBJECT ORIENTED ANALYSIS AND DESIGN				
CLASS T.E. (INFORMATION TECHNOLOGY)				
SEMESTER V				
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		-	-
	ORAL		-	25
	TERM WORK		-	25

Chapter I

Review of object orientation: class and objects, effect of inheritance on polymorphism and variable declarations, concepts that define object orientation.

Chapter II

Developing requirements, reviewing requirements, managing requirements, Difficulties and risks in domain and requirement analysis, requirement documents - Discussion on case studies.

Chapter III

Introduction to UML – visual modeling with UML.

Use case model- use case, actor, and roles

Modeling with classes – association, multiplicity, generalization, process of creating class diagram – difficulties and risks in creating class diagram.

Modeling interaction and behavior – interaction diagrams, state diagram and activity diagram, implementing classes based on interaction and state diagram- difficulties and risks in modeling interactions and behavior.

Chapter IV

Architecting and designing software – the process of design, design principles,

Architectural patterns, design document, difficulties and risks in design

Chapter V

Usability principles- user interface design evaluating user interfaces

Testing and quality – strategies, defects, test cases and test plan, inspections, quality assurance.

Chapter VI

Frameworks: reusable subsystem. Design patterns – Singleton, observer, adapter, Façade, proxy with examples

Text Books

1. Timothy C. Lethbridge, Robert Laganieri “Object-Oriented Software Engineering – A practical software development using UML and Java”, Tata McGraw-Hill, New Delhi.
2. Mike O’Docherty “Object-Oriented Analysis & design – understanding system development with UML 2.0”, John Wiley.

Term Work

Term work shall consist of at least 10 assignments/programming assignments and one written test.

Marks

- | | |
|--|----------|
| 1. Attendance (Theory and Practical) | 05 Marks |
| 2. Laboratory work (Experiments and Journal) | 10 Marks |
| 3. Test (at least one) | 10 Marks |

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Suggested List of Experiments

1. At least one or two review assignments covering object oriented concepts.
2. A full-fledged mini project in which a student will design an application using OOAD case tool.
3. Assignments for the UML diagrams not used in the case study.
4. Hands on any one good Framework.

Environment Studies				
CLASS T.E. (INFORMATION TECHNOLOGY)				
SEMESTER V				
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		-	-
	ORAL		-	25
	TERM WORK		-	25

Nonliving Environment

Soil

Origin, Classification, Soil types of India, Mineral Resources, Equitable Use of Mineral Resources

Water

Earth's reserves, Saltwater , Freshwater, Atmospheric water & Rainfall, Hydrology, Minimum Environmental Flows

Air

Composition, Oxygen, Carbon dioxide, Nitrogen, Wind

Solar System

The Sun, Solar energy

Living Environment

Biodiversity, Genes, Populations, Species, Communities, Value of Biodiversity

Ecosystems

Classification, Ecosystem Resilience, Productivity, Food chain, Food web
Nutrient cycling

Biomes

Rainforests, Seasonal broadleaved forests, Conifer forests
Swamps, Grasslands, Arid and Semi-arid biome, Polar biome, Oceans

Social Environment

Population

Population explosion and migration, Women and Children, Pressures of population growth, Industrialization, Conflicts over land, Social conflicts
Disasters, Human Rights and Value Education

Food

Agriculture, Irrigation, Livestock, Fisheries, Sustainable agriculture

Health

Communicable diseases, Vector borne diseases, Pandemics, Vulnerable groups, Role of information and awareness

Energy

Non-renewable Energy, Renewable Energy, Hydroelectric energy, Solar energy, Wind energy, Energy from biomass, Bio-diesel

Urbanization

Habitation, Communication, Recreation

Waste

Solid wastes, Sewage and Wastewater, Hazardous wastes, Management of solid wastes, Land disposal and Sanitary landfills, Recycling, Medical wastes
Industrial wastes, Wastewater treatment, Bioremediation of wastewater
Biodegradation and Composting , Management of toxic and hazardous wastes

Pollution

Air pollution, Noise pollution, Thermal pollution, Water pollution, Marine pollution, Bio-magnification, Land pollution, Control

Economy

Subsistence, Markets, Global trade regimes

Natural resource depletion

Deforestation, Mining, Soil erosion, Loss of wetlands, Loss of biodiversity, Desertification

Invasive species

Plants, Animals, Genetically Modified Organisms

4 Environmental Conservation

Early warning systems, Bio-indicators, Tsunami & other natural disasters
Disaster management

Impact assessment

Inventorying, Monitoring, GIS

Protected Areas

Wildlife Sanctuaries, National Parks, Biosphere Reserves

Endangered species

Ex-situ conservation, Conservation breeding

Economic valuation

Bio-resources, Nature's services

National Legislation

Constitutional provisions for safeguarding the environment, The Environmental (Protection) Act, The Air (Prevention and Control of Pollution) Act, The Water (Prevention and Control of Pollution) Act, The Wildlife (Protection) Act, Forest Act, Biodiversity Act

International Conventions and Treaties

Ramsar Convention, CITES, Convention on Biological Diversity, Convention to Combat Desertification, Convention on Climate Change

Global Efforts in protecting the living environment

Global Biodiversity Assessment, Ecosystem services and Millennium Ecosystem Assessment

Sustaining Biodiversity: The Species Approach

Species Extinction, importance of wild species, causes of premature extinction of wild species, protecting wild species, wild sanctuary, legislation, Reconciliation ecology

Environmental Economics, politics, and worldviews

Economic Systems and Sustainability

Using Economics to improve Environmental Quality

Reducing poverty to improve Environmental quality and human well-being

Micro loans for the poor

Text Book

1. Jagdish Krishnawamy , R J Ranjit Daniels, “ Environmental Studies”, Wiley India Private Ltd. New Delhi
2. G. Tyler Miller, Jr., “Environmental Science”, THOMSON INDIA EDITION
3. Benny Joseph” Environmental Studies”Tata McGRAW HILL

Subject: Computer Programming Lab (SEM V)

Course Content: Open Source in the Lab - Linux Lab

INTRODUCTION TO LINUX : An Introduction to UNIX, Linux, and GNU
What Is UNIX, What Is Linux, The GNU Project and the Free Software Foundation

Installation of Linux: Basic Installation, network based installation

LINUX SYSTEM ADMINISTRATION: Process Management with Linux, Memory Management , File System management, User Administration, Linux Startup and Shutdown, Software package Management

SHELL PROGRAMMING: Shells ,Scripting Rationale Creating a bash Script ,bash Startup Files ,A Script's Environment ,Exporting Variables,Exit Status,Programming the Shell, Parameter Passing, Operators,looping, Input and Output ,Interrupts

SOFTWARE TOOLS :C Language and Linux , MySQL Database, Network Simulator, SciLAB configuration, Multimedia , etc..

KERNEL CONFIGURATION :Overview of the Linux Kernel ,Configuring the Linux Kernel ,Configuration Options ,Building and Installing the Kernel ,Building the Kernel ,Installing a New Kernel ,Configuring your Boot Manager

NETWORK ADMINISTRATION: LAN Card configuration, DHCP, DNS, FTP, Telnet, SSH, NFS, Web Server, SQUID Proxy configuration

TEXT BOOKS:

- 1) Red Hat Linux Network and System Administration. 3rd edition.

Terry Collings, Kurt Wall, wiley

- 2) Beginning Linux Programming. 4th edition. Neil Mathews, Wrox Press.