Third Year -Semester V

Scheme of Instructions					Scheme of Examinations					
Sr. No	Subjects	Lect/ Week	Pract/ Week	Tut/ Week	Theory Hours	Theory Marks	T/W Marks	Practical Marks	Oral Marks	Total 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		--	--
	ORAL		--	25
	TERM WORK		--	25

1. 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. Kernel architecture: User and kernel mode of operation, System calls, process states, kernel operations, design of a scheduler.

2. 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

3. 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.

4. 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

5. 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.

6. 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.

7. 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.

8. 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.

9. Case Study

Comparative study of NOS and DOS

References

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

Term Work:

Term work shall consist of at least 10 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.

Suggested Experiment list

1. System Calls
2. CPU Scheduling Policies
3. Page Replacement Algorithm
4. IPC (Producer – Consumer)
5. Multithreading
6. Remote Procedure Calls
7. Deadlock Avoidance
8. Simulation using RTOS like Symbian/Vx works/ QNX/RT Linux/Monta Vista/Nucleus Window CE

COMPUTER GRAPHICS AND VIRTUAL REALITY SYSTEMS				
CLASS T.E. (INFORMATION TECHNOLOGY) SEMESTER V				
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	**MARKS**
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		--	25
	ORAL		--	25
	TERM WORK		--	25

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, Various Display Devices and Input Technology Overview of Coordinate System. Scan Conversion algorithm: Scan Conversion of a point, Scan conversion of lines, Digital differential analyzer algorithm, Bresenhams line drawing algorithm

2. Two and Three Dimensional Transformations

Introduction, Transformation Matrix, Types of transformation, Translation, Rotation, Scaling, Reflection, Shear, Composite transformations, and Transformation function.

3. 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,Viewing transformation, Text clipping**,** Projection, Parallel projection, Orthographic projection, Oblique projection, Perspective projection ,One point perspective, Two point perspective, Three point perspective.

4. 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

5. 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, Introduction to fractal and introduction color models.

6. Computer Animation

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.

7. Introduction to Virtual Reality

A short history of early virtual reality, early commercial VR Technology, The five classical components of VR Systems, Design of Virtual reality systems, Important factors in VR systems, Types of VR systems, Advantages of virtual reality .

8. Input and Output Devices

Three Dimensional Position Trackers, Navigation and Manipulation Interfaces, Gesture Interfaces, Graphical Display, Sound displays, and Haptic Feedback.

9. 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.

10. 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.

11. 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.

12. Application areas of Virtual Reality

Medical, Education, Arts and Entertainment, Military, Manufacturing, Robotics, Information Visualization.

Text Books

1. R. K Maurya, "Computer Graphics", Wiley India.
2. Donal Hearn and M. Pauline Baker, "Computer Graphics", Pearson Education.
3. Newman and Sproll, "Principles of Interactive Computer Graphics", McGraw Hill.
4. Harrington, "Computer Graphics", McGraw Hill.
5. Rogers, "Procedural Elements of Computer Graphics", Tata McGraw Hill.
6. Vince, "Virtual Reality Systems", Pearson Education.
7. Grigore Burdea, Philippe Coiffet, "Virtual Reality Technology", 2nd edition. Wiley.

Term Work

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

Marks

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 Term Work ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

Suggested Experiment List

1. Bresenham line drawing algorithm
2. 2D Transformation
3. 3D Transformation
4. Line Clipping Algorithm (Cohen - Sutherland & Liang - Barsky)
5. Polygon Clipping Algorithms
6. Projections
7. Polygon Filling Algorithms

8. Generation of 2D Curves
9. Fractals
10. Various Operations on Image such Morphing, Mapping, Warping etc.
11. Study of VR Architectures
12. Designing a Virtual Model (Geometric, Kinematics etc.)
13. VR Programming using toolkits

CONVERGENCE OF TECHNOLOGIES AND NETWORKING IN COMMUNICATION				
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

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, overview of network topology.

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 Differentally 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. **Network Services and 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.

6. **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.

7. **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.

8. **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, Signaling models, point to multipoint signaling, ISDN signaling, Routing protocols/techniques, core routing concepts, core routing concepts.

9. **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.

10. **Network Management**

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

11. **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.

12. **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

Text Books:

1. Sumit Kasera, Nishit Narang, Sumita Narang, "Communication Networks Principles and 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", Wily india

3. Skalar, "Digital communications", Pearson education, 2001 2nd Edition.

4. William Stallings, "Data and Computer Communication", Pearson Education, 6th Edition.

5. Lean Garcia, Widjaja, "Communication Networks", Tata McGraw Hill, 2nd Edition.

6. T. S. Rappaport, "Wireless Communication", Pearson Education, 2nd Edition.

Reference Books:

1. Forouzan, Data Communication & Networking, Tata 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.

Term Work:

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

Marks

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 Term Work ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

Suggested Experiment List

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 Davison 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.
11. Simulation of routing protocols using Network Simulators like NS2, Nistnet etc.
12. Study of M/M/1 Queuing Model

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		--	--
	ORAL		--	25
	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. Manufacturing Processes

Elementary treatment on various manufacturing process like turning, milling, shaping and drilling- machine tolls, tooling and set up for each processes. Basic concepts on cold and hot working with metals – examples. Welding brazing and soldering: Differences, elementary treatment on important welding process, brazing and soldering techniques, soldering techniques for manufacturing/electrical/electronic components – cleaning. Solder, flux materials, process and preventions of dry soldering.

3. Polymeric Materials

Classification – examples, properties and application areas, processing of plastics – elementary treatment on compression/transfer moulding, injection moulding and extraction (film, pipes, sheets and cable/wire coursing)

4. Operations Planning

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

5. Quality Systems

Definition of quality, TQM concept, SQC tools like bar and pie charts, scatter diagram, cause effect diagram, Pareto analysis, 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

6. 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.

7. Process Automation

Simulation, Automation, Robots, Group technology, Flexible, Manufacturing Systems.

Other Production Systems, Economic Considerations, lean current and re-engineering, lean manufacturing.

8. Operator- Machine Systems

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

9. 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

10. 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, CANBAN.

11. 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,

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 and operations management”, OXFORD university press

3. E. S. Buffa, “Modern Production and Operation Management”, Wiley.

4. H. G. Menon, “Total Quality Mnagament in Product Manufacturing”,

5. D. H. Bester Field, “ Total Quality Management”, PHI

6. Raghuvanshi, “Production Technology”.

7. Garmo, “Materials and Manufacturing Processes”.

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 Term Work ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

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		--	25
	ORAL		--	--
	TERM WORK		--	25

1. Review of Object Orientation

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

2. Requirements

Developing requirements, reviewing requirements, managing requirements, Difficulties and risks in domain and requirement analysis, requirement documents, Case studies and discussion on the above topics.

3. Unified Modeling Language

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.

4. Architecting and Designing Software

The process of design, design principles, architectural patterns, design document, difficulties and risks in design.

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

5. Implementation

Mapping models to Code, Mapping Object Model to Database Schema

6. Usability, Testing and Quality

Usability Principles- user interface design evaluating user interfaces

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

Text Books

1. Timothy C. Lethbridge, Robert Laganiere " 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.

3. Bernd Bruegge, "Object oriented software engineering", Second Edition, Pearson Education.

4. Stephan R. Schach, "Object oriented software engineering", Tata McGraw Hill.

5. Booch, Jacobson, Rumbagh, "The UML user Guide", Pearson Education.

6. Ali Bahrami, "Object Oriented System Development", McGraw Hill.

7. David William Brown, "An Introduction to Object Oriented Analysis Objects and UML in Plain English", 2nf Edition, 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

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

Suggested Experiment List

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.

ENVIRONMENTAL STUDIES				
CLASS T.E. (INFORMATION TECHNOLOGY) SEMESTER V				
HOURS PER WEEK	LECTURES	:	02	
	TUTORIALS	:	1*	
	PRACTICALS	:	--	
			HOURS	**MARKS**
EVALUATION SYSTEM:	THEORY		2	50
	PRACTICAL		--	--
	ORAL		--	--
	TERM WORK		--	25
* Class wise Tutorial				

Module	Contents	Hours
1	The Multidisciplinary nature of environmental studies Definition, scope and importance Need for public awareness	1
2	Natural resources Renewable and non-renewable resources Natural resources & associated problem. a. Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and teir effects on forests and tribal people. b. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems. c. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d. Food resources: World food problems overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e. Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies. f. 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.	4

3	• Ecosystems • Concepts of an ecosystem. • Structure and function of an ecosystem. • Producers, consumers and decomposers. • Energy flow in the ecosystem. • Ecological succession. • Food chains, food webs and ecological pyramids. • Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)	3
4	Biodiversity and its conservation • Introduction-Definition: genetic species and ecosystem diversity • Bio-geographical classification of India • Value of biodiversity : Consumptive use, productive use, social, ethical, aesthetic and option values • Bio-diversity at global, national, local levels • India as a mega diversity nation • Hot spots of bio-diversity • Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts • Endangered and endemic species of India	4

	• Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity	
5	Environmental Pollution Definition – • Causes, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear Hazards • Solid waste management: Causes, effect and control measures of urban and industrial wastes • Role of an individual in prevention of pollution • Pollution case studies • Disaster management: floods, earthquake, cyclone and land slides	4
6	Social issues and environment • From unsustainable to sustainable development • Urban problems related to energy • Water conservation, rain water harvesting, watershed management • Re-settlement and rehabilitation of people: Its problems and concerns. Case studies.	4

	• Environmental ethics: issues and possible solution • Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. • Wasteland reclamation • Consumerism and waste products • Environment protection act • Air(Prevention and control of pollution) act • Water (Prevention and control of pollution) act • Wildlife protection act • Forest conservation act • Issues involved in enforcement of environmental legislation • Public awareness	
7	Human population and the environment • Population growth, variation among nations • Population Explosion- family welfare program • Environment and human health • Human rights • Value education • HIV/AIDS • Women and child welfare • Role of information technology in environment and human health • Case studies	4

8	**Understanding Existence and Co-existence** Interrelation and Cyclicity between Material order, Bio-order, Animal order and Human order **Understanding the human conduct :** Relationship in Family, Justice in Relationship, Relationship of of human with nature (environment),human Behavior, Human Values, Nature & Morality **Understanding the Human society:** **Dimensions of Human Endeavor and Objectives, Interrelationship in Society, Mutual Fulfillment and Cyclicity in nature.**	

Theory Examination:

1. Question paper will be comprising of total 7 questions, each of 10 marks.

2. Only 5 questions need to be solved.

3. Question number 1 will be compulsory and covering the all modules.

4. Remaining questions will be mixed in nature. (e.g.- suppose Q.2 has part (a) from, module 3 then part (b) will be from any module other than module 3.)

5. In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Term work:

Term work shall consist of minimum five projects (PROJECTS SHALL BE DESIGNED ON THE SAME GUIDE- LINE OF GIVEN TEXT BOOK) and a written test.

The distribution of marks for term work shall be as follows,

Laboratory work (Tutorial/Project and Journal) : 15 marks.

Test (at least one) : 10 marks.

The final certification and acceptance of term-work ensures the satisfactory performance of laboratory work and minimum passing in the term-work.

Recommended Books:

Text book

1. Erach Bharucha, text book of environmental studies, Universities Press/Orient Blackswan

Reference book

1 Jagdish Krishnaswami, R J Ranjit Daniels, 'Environmental Studies", Wiley India

Private Ltd. New delhi

2 Anindita Basak, 'Environmental Studies", Pearson

3 Deeksha Dave, "Text book of , 'Environmental Studies", Cengage learning,

Thomason India edition

4 Benny Joseph , 'Environmental Studies", Tata McGRAW HILL

5 D L Manjunath, , 'Environmental Studies",Pearson

6 R Rajgopalan, , 'Environmental Studies", Oxford

7 Alok Debi, 'Environmental science and Engineering", University press

8. A Nagraj, Jeevan Vidya-A Primer.

Open Source Software Laboratory				
CLASS T.E. (INFORMATION TECHNOLOGY) SEMESTER V				
HOURS PER WEEK	LECTURES	:	--	
	TUTORIALS	:	02	
	PRACTICALS	:	02	
			HOURS	**MARKS**
EVALUATION SYSTEM:	THEORY		--	--
	PRACTICAL		--	25
	ORAL		--	--
	TERM WORK		--	25

1. Introduction To Linux

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

2. Installation of Linux

Basic Installation, network based installation

3. Linux System Administration

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

4. 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

5. Software Tools

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

6. 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

7. Network Administration

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

Text Books

1. Terry Collings, Kurt Wall, "Red Hat Linux Network and System Administration" 3rd edition Wiley.
2. Nemeth, "Linux Administration Handbook", 2e, Pearson Education,
3. Neil Mathews, "Beginning Linux Programming" 4th edition, Wrox Press.
4. Best, "Linux Debugging and Performance Tuning : Tips and Techniques", Pearson Education
5. Habraken, " Novell Linux Desktop 9 User's Handbook", Pearson Education.

Term Work

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

Marks

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 Term Work ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

Suggested Experiment List

1. Linux OS Installation
2. System Accounting and Logging
3. File Systems
4. Shell Scripts
5. Logic Development
6. Command Line Argument Handling
7. Loops Using while and for statement
8. Arithmetic in shell scripting
9. File handling
10. Screen handling/echo command with escape sequence code
11. Background process implementation
12. User interface and functions in shell script
13. Application development using tools like network simulators, MySQL Databses.