Course No:	39		Course Title:	Operating System and System Programming

Course Code: CSE-3101 Credit: 3.00 Contact Hours: 3 Hours/Week	Pre-Requisites: CSE 2105 Total Marks: 100

Mark Distribution:

Semester Final Exam:	72 Marks	Class Test:	20 Marks	Class Attendance:	08 Marks

11.1	Rationale:

Computer Engineers should be competent in Operating Systems. They must know the basic concepts of the operating system, various types of CPU scheduling algorithms, Deadlock problems and some deadlock handling strategies, Paging, segmentation, fragmentation and file-management strategies.

11.2	Objectives:
	1. To implement different types of scheduling algorithms.
	2. To implement various types of page- replacement algorithms in real-life problem.
	3. To apply the Banker's algorithms in real-life situations to know whether a system is in safe state or not.
	4. To apply deadlock-recovery algorithm to recover from this situation.

11.3		11.4	11.5	11.6
Learning Outcomes		**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**
a.	Define process management	Introduction. Process management: process synchronization and mutual exclusion, two process solution and Dekker's algorithm, semaphores, examples (producer-consumer, readers-writer, dining philosophers, etc.)	Lecture Group Assignment	Assignment Short Answer
b.	Describe two process solution			
c.	Discuss Dekker's algorithm			
d.	Illustrate producer-consumer, readers-writer, dining philosophers problem			
a.	Draw Gantt Charts for different types of scheduling algorithm	CPU scheduling: multiprogramming and time sharing, scheduling approaches (SJF, FIFO, round robin, etc.)	Lecture Case Studies Assignment	Exercise Assignment.
b.	Illustrate various types of CPU scheduling algorithms			
a.	Describe device controllers and device drivers	Input/Output: device controllers and device drivers, disks, other devices.	Demonstration Group Discussion	Observation Self-Rating.

a.	Illustrate the memory management scheme with and without swapping	Memory management: with and without swapping, virtual memory - paging and segmentation, page replacement algorithms, implementation.	Lecture Reading Assignment	True Or False Multiple Choice.
b.	Discuss various types of page replacement algorithm			
a.	Discuss the several file systems	File systems: FS services, disk space management, directory and data structure.	Lecture Group Assignment	Questionnaire Short Answer.
b.	Explain directory and data structure			
a.	Define deadlock	Deadlocks: modeling, detection and recovery, prevention and avoidance. Example Systems: Unix, MSDOS.	Lecture Group Discussion	Group Exercise Assignment Viva Voce
b.	Explain various methods for handling deadlocks			
c.	Illustrate Banker's algorithm			

Recommended Books And Periodicals		
	Authors	**Book Name**
1.	J. Peterson, A. Silberschatz, and P. Galvin	Operating System Concepts. Addison Wesley, 3rd edition
2.	M. J. Bach	Design of the Unix Operating System, Prentice Hall of India
3.	William Stalling	Introduction to Operating System
4.	Tanenbaum, Andrew S.	Modern Operating Systems
5.	Milenkoviæ, Milan	Operating Systems: Concepts and Design

Course No:	**40**	**Course Title:**	Operating System and System Programming Lab

Course Code: CSE-3102 Credit: 1.50 Contact Hours: 3 Hours/Week	Pre-Requisites: Nil Total Marks: 100

Mark Distribution:

Lab Final Exam:	60 Marks	Viva:	30 Marks	Class Attendance:	10 Marks

11.1	Rationale:

Computer Engineers should be competent in Operating System. They must be able to apply the basic concepts of operating system, various types of CPU scheduling algorithms, Deadlock problem and some deadlock handling strategies, Paging, segmentation, fragmentation and file-management strategies.

11.2	Objectives:
	1. To implement the different types of scheduling algorithms.
	2. To apply the Banker's algorithms.
	3. To apply deadlock-recovery algorithm to recover from this situation.

11.3	**11.4**	**11.5**	**11.6**
Learning Outcomes	**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**

				Assignment Observation
a.	Apply & analyze FCFS scheduling algorithm	FCFS (First Come First Serve) scheduling algorithm	Demonstration Exercise	Assignment Observation
a.	Apply & analyze SJF non-preemptive scheduling algorithm	SJF (Shortest Job First) non-preemptive scheduling algorithm	Demonstration Exercise	Assignment Observation
a.	Apply & analyze SJF preemptive scheduling algorithm	SJF (Shortest Job First) preemptive scheduling algorithm	Demonstration Exercise	Assignment Observation
a.	Apply & analyze Priority non-preemptive scheduling algorithm	Priority non-preemptive scheduling algorithm	Demonstration Exercise	Assignment Observation
a.	Apply & analyze Priority preemptive scheduling algorithm	Priority preemptive scheduling algorithm	Demonstration Exercise	Assignment Observation
a.	Apply & analyze Round-Robin scheduling algorithm	RR(Round-Robin) scheduling algorithm	Demonstration Exercise	Assignment Observation
a.	Apply & analyze Banker's algorithm	Banker's algorithm	Demonstration Exercise	Assignment Observation

Recommended Books And Periodicals		
	Authors	**Book Name**
1.	J. Peterson, A. Silberschatz, and P. Galvin	Operating System Concepts. Addison Wesley, 3rd edition
2.	M. J. Bach	Design of the Unix Operating System, Prentice Hall of India
3.	William Stalling	Introduction to Operating System
4.	Tanenbaum, Andrew S.	Modern Operating Systems
5.	Milenkoviæ, Milan	Operating Systems: Concepts and Design

Course No:	41	Course Title:	Computer Networks and IoT

Course Code: CSE-3103 Credit: 3.00 Contact Hours: 3 Hours/Week	Pre-Requisites: CSE 2205 Total Marks: 100

Mark Distribution:

Semester Final Exam:	72 Marks	Class Test:	20 Marks	Class Attendance:	08 Marks

11.1	Rationale:
A computer Science engineer needs to know the basic of network architecture, and design.	

11.2	Objectives:
	1. To develop and understanding of modern network architectures from a design and performance perspective.
	2. To clarify network terminology.

3.	To provide an opportunity to do network programming using TCP/IP.
4.	To expose students to emerging technologies and their potential impact.

11.3	11.4	11.5	11.6
Learning Outcomes	**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**
a. Illustrate network applications. b. Identify channel allocation problem. c. Discuss multiple access protocols. d. Illustrate WLAN, Ethernet, broadband, Bluetooth technology. e. Compare broadband and narrowband. f. Demonstrate data link layer switching.	Wireless Network concepts: frequency reuse, handoff strategies, system capacity, improving capacity and coverage; Wireless LAN Technology; Ethernet, wireless LAN, broadband wireless.	Lecture Discussion	Assignment Exercise
a. Identify IP Address, b. Discuss Classfull and classless address, c. Illustrate subnetting and supernetting concept.	**The network layer:** IPv4 address, IPv6 address, Classfull and classless address, subnetting and supernetting, NAT	Lecture Q/A Assignment Case Studies	Assignment Exercise Short Answer
a. Examine network layer design issues. b. Analyze routing and congestion control algorithms. c. Characterize QoS. d. Implement Internetworking. e. Discuss the network layer in the internet.	**The network layer:** network layer design issues, routing algorithms, congestion control algorithms, quality of service, internetworking, the network layer in the internet	Lecture Q/A Assignment Case Studies	Assignment Exercise Short Answer
a. List transport service. b. Name elements of transport protocols. c. Illustrate SMTP, UDP and TCP. d. Differentiate UDP and TCP.	**The transport layer:** the transport service, elements of transport protocols, a simple transport protocol, the internet transport protocols: UDP, the internet transport protocols: TCP	Lecture Q/A Assignment Group Discussion	Assignment Exercise Short Answer Essay
a. List application layer activities, b. Design E-mail c. Discuss WWW and multimedia	**The application layer:** DNS--domain name system, electronic mail, the world wide web, multimedia	Lecture Q/A Assignment Case Studies	Assignment Exercise Short Answer Essay
a. Define Network management systems and its function, role.	**The application layer:** Functions, protocols, Manager and agent, management components.	Lecture Q/A Reading Assignment	Assignment Exercise Short Answer Essay

		Security: Cryptography, plaintext, cipher text, cipher, symmetric and asymmetric key, ceaser cipher, substitution, transposition, XOR, shift, modern round cipher, DES, triple DES, RSA algorithm, Diffie Helman algorithm, man in the middle attack, security services, message and digest, Hash function, role of KDC, key management and digital signature.	Lecture Q/A Reading Assignment	Assignment Exercise Short Answer Essay
a.	Define cryptography and security; differentiate between symmetric and asymmetric key cryptography, Traditional and modern ciphers, man in the middle attack concept, security services, Hash function, digital signature.			

Recommended Books And Periodicals

	Authors	Book Name
1.	William Stallings	Data and Computer Communication
2.	Hajkins	Data Communication
3.	Taub	Data Communication
4.	Behrouz A. Forouzan	Data Communications and networking.

Course No:	42	Course Title:	Computer Networks and IoT Laboratory

Course Code: CSE 3104 Credit: 1.50 Contact Hours: 3 Hours/Week	Pre-Requisites: Nil Total Marks: 100

Mark Distribution:

Lab Final Exam:	60 Marks	Viva:	30 Marks	Class Attendance:	10 Marks

11.1	Rationale:

A computer Science engineer needs to know the basic of network architecture, and design.

11.2	Objectives:
	1. Learn basic concepts of computer networking and acquire practical notions of protocols with the emphasis on TCP/IP.
	2. To understand the layered architecture and how do some important protocols work.
	3. Ability to make a practical network design.
	4. Understand configuring LAN communication, Cisco Router.
	5. Explain and Apply Static and Dynamic Routing.
	6. Network Routing process and packet delivery.

11.3		11.4	11.5	11.6
Learning Outcomes		Course Content	Teaching Strategy/ Learning Experience	Assessment Strategy
a.	To familiarize with the Lab Network Topology.	Study Different Networking tools and pools of IP addresses.	Lecture Discussion Demonstration	Assignment
a.	To learn and observe the usage of different networking commands	Study Different Networking commands	Lecture Discussion Demonstration	Practical Exam Assignment
a.	Implement static routing table. Implement distance vector routing table.	To implement and observe the characteristics of static, distance	Demonstration, Exercise	Assignment, Exercise, Observation

	Implement link state routing table.	vector and link state routing table.		
a.	Implement and observe the characteristics of DNS, TCP, ICMP and UDP packet	Observing the characteristics of DNS, TCP, ICMP and UDP packet	Demonstration, Exercise	Assignment, Exercise, Observation
a.	To explore the non-privileged mode of the installed routers.	Study the router configuration	Assignment, Demonstration, Case Studies	Practical Exam Assignment
a.	To observe the working of TCP three-way-hand-shaking procedure.	Study the TCP three way hand shaking	Assignment Demonstration Case Studies	Practical Exam Assignment

Recommended Books And Periodicals

	Authors	Book Name
1.	William Stallings	Data and Computer Communication
2.	Hajkins	Data Communication
3.	Taub	Data Communication
4.	Behrouz A. Forouzan	Data Communications and networking.

Course No:	43	Course Title:	Microprocessors and Embedded System

Course Code: CSE 3105 Credit: 3.00 Contact Hours: 3 Hours/Week	Pre-Requisites: CSE 2105
	Total Marks: 100

Mark Distribution:

Semester Final Exam:	72 Marks	Class Test:	20 Marks	Class Attendance:	08 Marks

11.1	Rationale:

A computer engineer needs to know design activities, interrelationship among different peripherals and microcontroller based embedded system

11.2	Objectives:	
	1.	To gain knowledge about microprocessors and microcomputers and internal architecture
	2.	To learn about internal relationship of different functional units of CPU and software interaction with hardware
	3.	To know about the assembly language programming technique
	4.	To learn the activities of I/O devices with respect to CPU
	5.	To acquire knowledge about microcontroller based system design
11.3	**Course Learning Outcomes (CLO):**	
	1.	Understand the architecture and program module of microprocessors and microcontrollers.
	2.	Analyze Intel 8085/8086 architecture with explanation of internal organization of some popular microprocessors/microcontrollers, addressing modes, coprocessors.
	3.	Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor and microcontroller.
	4.	.IInterface different external peripheral devices with microprocessors and microcontrollers.
	5.	Develop an assembly language program for specified applications.
	6.	Access different portions of ram.

11.4	11.5	11.6	11.7
Unit Learning Outcomes (ULO)	Course Content	Teaching Strategy/ Learning Experience	Assessment Strategy

a.	Introduce with microprocessor	**Introduction:** Microprocessors and microcomputers; microprocessor applications; Programming Languages; General architecture of microprocessor; The Memory; Input/Output; Co-processors.	Lecture	Short Question
b.	Describe evolution of processor (i/o processor, numeric data processor, coprocessor, multiprocessor, bit slice processor).			
a.	Explain Computer languages and its implementation	**Assembly Language Programming:** Introduction to Assembly Language Programming, Addressing Modes, Machine & Assembly instruction types & their formats; Character representation instructions; Instruction execution; Control structures, Subroutines, Interrupt, Macros & files; I/O programming; Assembler.	Lecture Exercise Assignment Lab Report	Short Question, Quiz Group Exercise
b.	Apply assembly language program for solving problem			
a.	Summarize of hardware, software and interfacing system	Hardware and Software Interfacing in Microcomputer System Design, I/O Design and Total System Design,	Lecture Exercise Assignment	Short Answer Analytical Answer Quiz
a.	Design microprocessor based system,	Microprocessor based system design: Hardware design, Building, Debugging, Testing and Linking program modules, Programming EPROM.	Lecture Exercise Assignment	Short Answer Analytical Answer Quiz Group Exercise
b.	Outline of debugging and testing			
c.	Explain memory interfacing			
a.	Details description of 8086.	**Intel 8086 microprocessor:** Internal architecture; Register structure; Programming model; Addressing modes, Instruction set; Programming; Memory subsystem; Bus timing and standards, Co-processors interfacing, Intel-processors communication.	Lecture	Short Answer Analytical Answer Quiz
b.	Outline of Intel-processor communication			
a.	Overview of other microprocessors.	**Overview of Other Processors:** Intel 80186, 80286, 80386, 80486 & Pentium microprocessors and other advance processors; Motorola 68000, Dual Core, Core to Duo, Core i3, Core i5, Core i7, Core i9, Quad Core, Atom, Processors in cell phones.	Lecture Exercise Assignment	Short Answer
b.	Describe some microprocessor architecture.			

Recommended Books And Periodicals		
	Authors	**Book Name**
1.	M. Rafiquzzaman,	"Microprocessors: Theory and Applications: Intel and Motorola",

2.	Brey, Bary	The Intel Microprocessors
3.	Hall, Douglas	Microprocessors and Interfacing
4.	Ytha Yu, Charles Marut,	"Assembly Language Programming and organization of IBM PC" Mc.Graw Hill International Edition
5.	Kenneth.J.Ayala	The 8051 microcontroller, 3rd edition,Cengage learning,2010

Course No:	44	Course Title:	Assembly Programming and Embedded System lab

Course Code: CSE 3106
Credit: 1.00
Contact Hours: 2 Hours/Week

Pre-Requisites: Nil
Total Marks: 100

Mark Distribution:

Lab Final Exam:	60 Marks	Viva:	30 Marks	Class Attendance:	10 Marks

11.1	Rationale:

A computer engineer needs to gain practical knowledge to identify components of computing devices and design, manipulate the microprocessor and microcontroller.

11.2	Objectives:
	1. To gain knowledge about microprocessors and peripherals of computing devices.
	2. To learn about programming language and relation (Assembly and machine language).
	3. To know about the microcontroller and its associate components.
	4. To know the interfacing mechanism of microcontrollers and other components using high level and assembly language.

11.3	Course Learning Outcomes (CLO):
	1. Analyze the instructions of 8086 and basic structure of assembly language.
	2. Apply the instructions to solve exercise problems.
	3. Understand the instructions and programming concept of 8051
	4. Selecting a project and choosing a group partner then break the work into parts and distribute the workload among group partners.

11.3		11.4	11.5	11.6
Learning Outcomes		**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**
a.	Identify different types of microprocessor	Introduction to different types of microprocessors.	Demonstration	Identification
b.	Identify different component and peripherals			
a.	Describe computer languages and its implementation	Machine and assembly language programming, Assembly language program writing, Opcode, Debugging and execution. Programming in Microcomputers.	Demonstration	Implementation Exercise And Lab Report
b.	Apply assembly language program for solving problem			
a.	Describe the hardware and software interfacing	Hardware and Software Interfacing in Microcomputer	Demonstration	Implementation

b.	Design microprocessor based system.	System Design, I/O Design and Total System Design, Microprocessor based system design: Hardware design, Building, Debugging		Exercise And Lab Report

Recommended Books And Periodicals

		Authors	Book Name
	1.	Brey, Bary	The Intel Microprocessors
	2.	Hall, Douglas	Microprocessors and Interfacing

Course No:	45	Course Title:	System Analysis and Design

Course Code: CSE 3107 Credit: 1.50 Contact Hours: 3 Hours/Week	Pre-Requisites: Nil Total Marks: 100

Mark Distribution:

Semester Final Exam:	72 Marks	Class Test:	20 Marks	Class Attendance:	08 Marks

11.1	Rationale:

This course provides a practical experience on manual and automated software testing.

11.2	Objectives:

	1.	Understand the effectively strategies of testing, the methods and technologies of software testing;
	2.	Design test plan and test cases;
	3.	Do automatic testing;
	4.	Establish a testing group and manage the whole testing project;
	5.	Clearly and correctly report the software defectives;
	6.	Asses the software product correctly;
	7.	Distinguish relationship between the software testing and the quality assurance.

11.3 Learning Outcomes	11.4 Course Content	11.5 Teaching learning Strategy	11.6 Assessment Strategy
a.	Learn Introduction to System Analysis	Introduction to System Analysis: a. What is a System? b. System Fundamentals c. Types of Systems d. The Study of Systems Analysis e. Advantages of Systems Analysis f. Limitations of Systems Analysis	Lecture Exercise Demonstration	Quiz Assignment
a.	Learn duties of System Analyst	The Systems Analyst: a. The Duties of the Systems Analyst b. Communications and the Organization c. Job Description d. Skills, Knowledge and Training e. Preparing for a Career in Systems Analysis	Lecture Exercise Demonstration	Quiz Assignment Project Task

		f. The Future of the Systems Analyst g. Formal Organization Structure		
a.	Demonstrate the tools of the Systems Analysist	a. System Modeling b. Advantages of Design Diagrams c. Traditional Design Tools d. The Gantt Chart e. Decision Trees f. Decision Tables g. Flowcharts h. Structured Design Tools i. Data Dictionary j. Data Flow Diagrams k. Hierarchy Plus Input-Process-Output (HIPO) l. Structured English (Pseudocode) m. Warnier-Orr Diagrams n. Nassi-Shneiderman Charts o. Presentation Graphs	Lecture Exercise Demonstration	Quiz Assignment
a.	Learn Project Management Skills	a. Project Concepts b. Need for Project Management c. Why Projects Fail? d. Managing Projects e. Traditional Project Management f. Computer Project Management g. Microcomputer Project Management Software	Lecture Case Studies	Project Task Report Writing
a.	Learn basics of design and analysis phase	a. Systems Design b. Logical and Physical Designs c. Prototype Designs d. Computerized System Design e. Design Principles f. The Data Cycle g. Systems Design Task List	Lecture Demonstration	Quiz Assignment
a.	Learn basics of development phase	a. The Task of Systems Development b. Lead Time Schedules c. Contract Terms d. Hardware Performance e. Software Performance f. Communication Equipment Performance g. Prototype Installation h. Benchmark Testing	Lecture Exercise Demonstration	Quiz Assignment

a.	Learn basics of implementation phase	a. How to Undertake Systems Implementation b. The Changeover Timetable c. The Human Element d. Training and In-Service Education e. Implementation Trouble Spots f. Assistance during Implementation	Lecture Exercise Demonstration	Quiz Assignment
a.	Systems Evaluation and Optimization	a. Need for Documentation b. Guidelines for Preparing Documentation c. Major Systems Documentation d. Distribution of Documentation e. Revision of Documentation	Lecture Exercise Demonstration	Quiz Assignment

Recommended Books And Periodicals		
	Authors	**Book Name**
1.	R. Wirfs-Brock et.al.	Designing Object-oriented
2.	Ian Sommerville	Software engineering
3.	R.S. Pressman	Software Engineering: A Practitioners Approach
4.	Gerald A. Silver and Myrna L. Silver	Systems Analysis and Design

Course No:	46 **Course Title:**	**System Analysis and Design Lab**
Course Code: CSE 3108 **Credit: 1.50** **Contact Hours: 3 Hours/Week**		**Pre-Requisites: Nil** **Total Marks: 100**
Mark Distribution:		

Lab Final Exam:	60 Marks	**Viva:**	30 Marks	**Class Attendance:**	10 Marks

Course No:	**47**	**Course Title:**	Web Development Lab
Course Code: CSE 3110 **Credit: 1.50** **Contact Hours: 3 Hours/Week**			**Pre-Requisites: Nil** **Total Marks: 100**
Mark Distribution:			

Lab Final Exam:	60 Marks	**Viva:**	30 Marks	**Class Attendance:**	10 Marks

11.1	**Rationale:**

Computer Engineers should be competent in Web programming through scripting Language This HTML, CSS, JavaScript, Joomla 2.5 and WordPress, PHP,MySql .It is valuable to both beginners and advanced developers that already have experience in developing web applications.

11.2	**Objectives:**
	1. Demonstrate understanding of (X) HTML (5)+CSS programming.
	2. Create and compile advanced dynamic web projects using client – Jquery (Javascript) and server – PHP technology.
	3. Demonstrate understanding of database applications with MySQL.
	4. Show understanding of the logic behind advanced web applications.
	5. Demonstrate an understanding of Content Management System.

11.3	**11.4**	**11.5**	**11.6**
Learning Outcomes	**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**

a.	To Apply HTML Knowledge	HTML, Creating a HTML page, HTML Tags, Paragraph & Text Formatting, Lists, Horizontal Ruling lines, HTML Color, Background Color, Specifying Font Information, Formatting Tags, HTML Hyperlinks, HTML Table & Data Alignment Options, Table Cell Spacing & Padding, Changing Table Height & Width of Table, Elements Links Anchor Tag, HTML pre tag HTML Form Overview HTML Frames, Create Interactive Button List Background Using Images Make menu Button Using HTML code & Image HTML bdo tag HTML span tag Marquee Tag	Group Assignment, Panel Discussion, Problem Based Learning	Matching Type, Peer-Rating
a.	To Apply CSS Knowledge	CSS, Introduction to CSS, External Style Sheet, Internal Style Sheet Inline Style, Multiple Style Sheet, Div Concept, Div ID, Div Class, Keywords, Float, Padding, Margin The letter-spacing Property, The word-spacing Property, Text Align Property, Line Height Property, Background-URL, Background-Position, Background-Repeat, Table Captions, Table Columns, Other Table Style, Background-Gradient Color, Horizontal Menu Design PSD to HTML Convert	Problem Based Learning, Project, Inquiry –Based Learning	Practical Exam, Matching Type
a.	To Apply Java Scripting Knowledge	Introduction to Java Scripting, Client and Server side scripting, JavaScript inserted into HTML pages, can be executed by all modern web browsers, JavaScript is easy to learn, JavaScript Slide Customization, Form Validation, Basic Function	Group Assignment ,Panel Discussion	Observation
a.	To Apply Flash based Animation Knowledge	Introduction to Adobe Flash, Tools in Adobe Flash, Shape Tween and Motion Tween, Frame Animation, Various Flash Effects, Creating Flash Banners /Slide	Group Assignment ,Panel Discussion	Observation
a.	To Apply jQuery ,Knowledge	Getting Started with jQuery, Accessing HTML Elements, Selecting HTML Elements, Attributes, and Positions, Managing Events, Hide-and-Seek with Web Page Elements, Sliding and Fading Web Page Elements, Animating Web Page Elements, Making Web Page Content Dynamic, Understanding Plug-ins.	Problem-Based Learning, Demonstration, Project /Assignment	Group Exercise , Observation, Inventories
a.	To Apply PHP Knowledge	Conditional Statements, if (...else) statement, Switch statements, Loop, For statement, o For each statement, While statement, Do While statementArrays, PHP Functions, Get & Post Variable, Include and Require Once, Deleting file, Uploading files, Downloading files Register session variable, Creating a cookie, Header, Subject, From, Message, Send email to a mail address.	Problem-Based Learning, Demonstration, Project /Assignment	Group Exercise , Observation, Inventories
a.	To Apply MySql Knowledge	General Concept of Database, Database Architecture, Creating a Database, Creating a Table, Data type, Mysql Select, Mysql Insert, Mysql Where, MysqlOrderby,Mysql Update, Mysql Delete, Designing Web Database, Tables, Mysql Function, Mysql query	Problem-Based Learning, Demonstration, Project /Assignment	Group Exercise , Observation, Inventories

a.	To Apply Joomla! Knowledge	Introduction Joomla!, Site Menu,*Menus* Menu, Articles Menu, Content Editing, Extensions, Components Menu	Problem-Based Learning, Demonstration, Project /Assignment	Group Exercise, Observation, Inventories
a.	Project	Project, Review & Exam	Problem-Based Learning, Demonstration, Project /Assignment	Group Exercise, Observation, Inventories

Recommended Books And Periodicals	
Authors	**Book Name**
1. W3school.com	
2. On line tutorial	

Course No:	48	Course Title:	Technology Transfer Policy and Professional Ethics

Course Code: HUM-3101 Credit: 2.00 Contact Hours: 2 Hours/Week	Pre-Requisites: Nil Total Marks: 100

Mark Distribution:

Semester Final Exam:	72 Marks	Class Test:	20 Marks	Class Attendance:	08 Marks

11.1	**Rationale:**

To work in an organization one has to follow different types of ethical guides, rules, regulations, and policies. An IT expert would face more than theses because there are some additional due to the information technology hardware and software. In this course a computer science student will learn these essential things.

11.2	**Objectives:**	
	1.	Understand basics of rules and regulations.
	2.	Know the different factors of ethics and morality.
	3.	Realize details about professional ethics codes

11.3		11.4	11.5	11.6
Learning Outcomes		**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**
a.	Analyze Technology Transfer & Transmission Process	**Theory and Practice:** Entrepreneurship and Innovation; Technology Transfer & Transmission Process; Technology Commercialization Process; Role of Intellectual Property in Protecting Innovation	Lecture, Demonstration, Exercise, Case Study, IT industry visiting	Exercise, Assignment, Report Writing, Quiz.
b.	Identify Role of Intellectual Property in Protecting Innovation			
a.	Learn Customer Needs Driven Product Specifications	**Technology and Market Assessment:** Customer Needs Driven Product Specifications; Negotiating the Deal and Marketing the Innovation; Financial Plan and Selection of Innovation Projects; Innovation	Lecture, Demonstration, Exercise, Case Study, IT industry visiting	Exercise, Assignment, Report Writing, Quiz.
b.	Learn to Negotiating Deal and Marketing the Innovation			

c.	Analyze Market Assessment and Alignment of Technology	and Risk Management; Technology Valuation and Impact Analysis; Market Assessment and Alignment of Technology.		
a.	Understanding Business Plan Science and Technology Policy	**Commercialization Strategy**: Coming Full Circle in the Commercialization Loop; Business Plan Science and Technology Policy; Negotiating and Monitoring the Licensing Agreement; Start-Up and Spin-Off Companies; Joint Venture.	Lecture, Demonstration, Exercise, Case Study, IT industry visiting	Exercise, Assignment, Report Writing, Quiz.
a.	Understanding the facts of rules and regulations of an organization	**Professional Ethics:** Egoism and Relativism, Rationalist Ethics, the Ethics of Character and Virtue, Ethics and Religion, Ethics and Culture, Professional Ethics Codes. Morality and moral thoughts, Responsibility, Interpersonal moral sentiments (anger, blame, shame, guilt and praise), Reason, Emotion, and Intuition in Moral Judgment, Confidentiality, privacy and harassment.	Lecture, Demonstration, Exercise, Case Study, IT industry visiting	Exercise, Assignment, Report Writing, Quiz.
b.	Identifying the impacts of social, religious, family, friends, working environment and etc. on a person's ethics and morality			
c.	Finding reasons of being morally and ethically corrupted in work places			
d.	Gathering knowledge about the differences			

	Authors	Book Name
Recommended Books And Periodicals		
1.	George Reynolds	Ethics in Information Technology
2.	Herman T. Tavani and Richard A. Spinello	Readings in Cyberethics
3.	Jacques Berleur	Ethics of Computing: Codes, Spaces for Discussion and Law
4.	Robert Schultz	Contemporary Issues in Ethics and Information Technology
5.	Perry Morrison and Tom Forester	Computer Ethics: Cautionary Tales and Ethical Dilemmas in Computing
6.	Banks McDowell	Ethics and Excuses: The Crisis in Professional Responsibility
7.	Allen, Catherine; Bunting, Robert	A Global Standard for Professional Ethics: Cross-Border Business Concerns
8.	Michael Davis; Andrew Stark	Conflict of Interest in the Professions
9.	Justin Oakley; Dean Cocking	Virtue Ethics and Professional Roles
10.	Richard Rowson	Working Ethics: How to Be Fair in a Culturally Complex World
11.	Pettifor, Jean L.; Paquet, Stephanie	Preferred Strategies for Learning Ethics in the Practice of a Discipline

Course No:	49	Course Title:	Artificial Intelligence and Machine Learning

Course Code: CSE-3201 Credit: 3.00 Contact Hours: 3 Hours/Week	Pre-Requisites: CSE 2201 Total Marks: 100

Mark Distribution:

Semester Final Exam:	72 Marks	Class Test:	20 Marks	Class Attendance:	08 Marks

11.1	Rationale:

To build automated systems and modern IT solutions we need to include artificial intelligence so that it can interact dynamically facilitating customers or optimize the number of employees needed. So every computer science graduate needs sound knowledge in artificial intelligence.

11.2	Objectives:
	1. To understand intelligent agents and environments.
	2. To understand and implement informed and uninformed search algorithms.
	3. To understand neural networks.
	4. To acquire proper knowledge in reasoning.

11.3	Course Learnig Outcomes (CLO)

1. Examine the basic idea of Artificial Intelligence and Machinge learning
2. Define intelligent agents
3. Illustrate different search techniques
4. Interpret Knowladge based reasoing and expert systems
5. Apply logic programming

11.4		11.5	11.6	11.7
Learning Outcomes		**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**
a.	Explain AI, rationality	**Introduction:** Introduction to AI and intelligent agents.	Lecture	Short Question
b.	Describe various agents			
c.	Identify the kind of environment.			
a.	Explain various informed and uninformed search technique	**Problem Solving:** Solving Problems by Searching, Search Strategies, Heuristic search techniques, Game Playing	Lecture, Assignment, Exercise	Assignment Essay.
b.	Implement various search algorithms			
c.	Simulate different search technique for specific input set			
d.	Analyze complexity and performance for various search technique			
a.	Explain logic, knowledge base and knowledge based agent	**Knowledge and Reasoning:** Building a Knowledge Base Agent, Propositional logic, First order logic, Inference in First order Logic.	Lecture Assignment	Essay Viva Voce
b.	Describe syntax, semantics & inference of propositional logic & first order logic			
c.	Change sentences into first order logic			
d.	Identify truth value for propositional logic sentences			
e.	Justify satisfiability of sentence by resolution			

a.	Implement algorithm in PROLOG	**Logic Programming:** Logic programming using PROLOG, LISP	Lecture, Exercise	Essay
a.	Describe the differences and similarities between problem solving and planning	**Logical Action:** Planning, partial order planning, Knowledge Engineering for Planning, Conditional Planning, A Replanning Agent.	Lecture Assignment	Assignment Essay
b.	Explain the process for generating predecessors in backward search			
c.	Construct levels 0, 1,and 2 of the planning graph for a problem			
d.	Prove assertions about planning graphs			
a.	Prove that any probability distribution on a discrete random variable must sum to 1.	**Uncertain Knowledge and Reasoning:** Uncertainty, Probabilistic Reasoning Systems, Fuzzy Logic, Making Simple Decisions	Lecture Exercise	Essay
b.	Generate reasonable conditional probability tables for nodes in a network			
c.	Draw a Bayesian network for a domain			
d.	Explain which network is the best			
a.	Explain different forms of learning	**Knowledge Acquisition:** Overview of different forms of learning, Learning Decision Trees, Neural Networks, Genetic Algorithms, Intelligent Editors, Introduction to Natural Language Processing	Lecture Assignment Exercise	Essay Assignment
b.	Draw decision tree for specific problem of deciding what to do			
c.	Explain different components of the neural network. Describe different types of neural network			
d.	Simulate a two layer perceptron			
e.	Explain self-organized feature map			
f.	Train a model that identifies whether the word "Apple" in a sentence belongs to the fruit or the company			
a.	Write the priority research areas in developing an understanding on the relationship between wetlands and rangelands in a holistic manner	**Selected topics in AI:** Expert consultation, Development of Expert Systems, Pattern recognition, Computer vision, Robotics	Lecture Assignment Reading	Essay Viva Voce.
b.	Describe the components of expert systems			

c.	Explain knowledge base, forward and backward chaining				
d.	Differentiate between Robot System and Other AI Program				
e.	Describe and explain Robot Locomotion				

Recommended Books And Periodicals

	Authors	Book Name
1.	Norvig, Peter and Russel, Stuart	Artificial Intelligence: A Modern Approach

Course No:	**50**	**Course Title:**	**Artificial Intelligence Machine Learning Lab**

Course Code: CSE-3202
Credit: 1.50
Contact Hours: 3 Hours/Week

Pre-Requisites: Nil
Total Marks: 100

Mark Distribution:

Lab Final Exam:	60 Marks	**Viva:**	30 Marks	**Class Attendance:**	10 Marks

11.1	**Rationale:**

The objective of the lab work is to familiarize students with implementation of theories covered in artificial intelligence.

11.2	**Objectives:**

1. To develop the student's understanding of the issues involved in trying to define and simulate intelligence.
2. To familiarize the student with specific, well known Artificial Intelligence methods, algorithms and results.
3. To provide the student additional experience in the analysis and evaluation of complicated systems.
4. To provide the student with paper and proposal writing experience.

11.3	**Course Learnig Outcomes (CLO)**

1. Implement logic programming language
2. Experiment searching algorithms
3. Implement decision tree
4. Produce Neural network

11.3		**11.4**	**11.5**	**11.6**
Learning Outcomes		**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**
a.	Implement uninformed search algorithm	BFS, DFS, IDS, Depth-limited, Bidirectional etc uninformed search algorithm	Exercise	Assignment Viva voce
a.	Implement informed search algorithm	Best-first search, A* search, RBFS, IDA* search algorithm	Exercise	Assignment Viva voce
a.	Generate decision tree by specific classification	Decision tree and reasoning	Exercise	Assignment Viva voce

a.	Prove that whether a corresponding goal is satisfiable or not	Introduction to Prolog Programming	Exercise	Assignment Viva voce
a.	Implement various neural networks in java	Neural networks	Exercise	Assignment Viva voce

Recommended Books And Periodicals	
Authors	**Book Name**
1. Norvig, Peter and Russel, Stuart	Artificial Intelligence: A Modern Approach

Course No:	51	Course Title:	Nanotechnology, Peripherals and Interfacing

Course Code: CSE-3203 Credit: 3.00 Contact Hours: 3 Hours/Week	Pre-Requisites: Nil Total Marks: 100

Mark Distribution:

Semester Final Exam:	72 Marks	Class Test:	20 Marks	Class Attendance:	08 Marks

11.1	Rationale:

A computer engineer must have adequate practical knowledge of the various methods and techniques used to interconnect peripheral devices to computers.

11.2	Objectives:
	1. To understand the principles used in interfacing devices to computers and will gain a practical understanding of how those principles are put to use by manufacturers.
	2. To assign I/O addresses, IRQs, DMA channels, and other I/O related parameters in installing real equipment.

11.3		11.4	11.5	11.6
Learning Outcomes		**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**
a.	Design and explain the interface between computer and the outside world	Design and operation of interface between computer and the outside world.	Lecture	Essay, Short Answer
a.	Relate the operation of various devices to interfacing	Sensors, transducers ad signal conditioning circuits, interfacing memory and I/O devices-such as monitors, printers, disc drives, optical displays, some special purpose interface cards, stepper motors and peripheral devices.	Lecture, Demonstration	Identification, Essay, Quiz, Short Question
a.	Define and explain IEEE-488, RS-232 and other buses	IEEE-488, RS-232 and other buses.	Lecture	Essay, Short Question.
a.	Examine various peripheral chips	Study and applications of peripheral chips including 8212, 8155, 8255, 8251, DMA controllers.	Lecture, Demonstration, Problem Based Learning, Exercise	Exercise, Assignment

Recommended Books And Periodicals

	Authors	Book Name
1.	Jyoti Snehi	Computer Peripherals and Interfacing
2.	Amit Karma	Computer Peripherals and Interfacing

Course No:	52	Course Title:	Nanotechnology, Peripherals and Interfacing Lab

Course Code: CSE-3204 Credit: 1.00 Contact Hours: 2 Hours/Week	Pre-Requisites: Nil Total Marks: 100

Mark Distribution:

Lab Final Exam:	60 Marks	Viva:	30 Marks	Class Attendance:	10 Marks

11.1	Rationale:

A computer engineer needs to gain practical knowledge of the various methods used to interconnect peripheral devices to computers.

11.2	Objectives:
	1. To explain and design different types of microcontroller and embedded systems.
	2. To interface various sensors and analog to digital converter with microcontroller, different EDK.

11.3		11.4	11.5	11.6
Learning Outcomes		**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**
a.	Familiarize with the required devices	Introduction	Lecture, Demonstration, Exercise	Identification, Viva Voce
a.	Design mini projects	Microcontrollers, 8086 Architecture and Instruction Set, PIC Microcontroller, C Programming for Microcontrollers, Peripherals & Interrupts, Analogue Interfacing, Programmable Logic and Rapid prototyping using FPGAs	Lecture, Demonstration, Exercise	Practical Exam, Presentation, Viva Voce

Recommended Books And Periodicals	
	Authors	Book Name
1.	Julio Sanchez and Maria P. Canton	Microcontroller Programming
2.	Tim Wilmshurst	Designing Embedded Systems
3.	B. Cook and N. White	Computer Peripherals
4.	Brey	Microprocessor and Peripherals: Hardware Software Interfacing and Applications

Course No:	53	Course Title:	Compiler Design and Automata Theory

Course Code: CSE-3205 Credit: 3.00 Contact Hours: 3 Hours/Week	Pre-Requisites: Nil Total Marks: 100

Mark Distribution:

Semester Final Exam:	72 Marks	Class Test:	20 Marks	Class Attendance:	08 Marks

11.1	Rationale:

Computer Engineers should be competent in compiler design and automata theory. They must learn the fundamental concepts of compiler design and automata theory and also various phases in the design of a compiler, how to generate a machine code from a C program statement.

11.2	Objectives:	
	1.	To design a LEX compiler
	2.	To construct a DFA from the NFA
	3.	To design an NFA for the corresponding regular expressions.

11.3	**Course Learning Outcomes:**	
	1	Basic knowledge of compilation steps; ability to apply automata theory and knowledge on formal languages.
	2	Ability to design and implement scanner modules in compilers.
	3	Ability to identify and select suitable parsing strategies for a compiler for various cases. Knowledge in alternative methods (top-down or bottom-up, etc).
	4	Knowledge and ability to devise, select, and use modern techniques and tools needed to design and implement compilers.

11.4		11.5	11.6	11.7
Learning Outcomes		**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**
a.	Explain Phases of a compiler	Introduction: Phases of a compiler (lexical analyzer, syntax analyzer, semantic analyzer, intermediate code generator, code optimizer, code generator, symbol-table manager & error handler), overview of C, C++, Java, C# compilers.	Lecture, Group Assignment	Assignment, Questionnaire
b.	Explain intermediate code generator			
c.	Overview of compilers			
a.	Construct NFA from Regular Expression	Lexical analysis: Role, finite automata, from regular expression to NFA, from NFA to DFA.	Lecture, Case Studies, Assignment	Exercise, Assignment
b.	Design DFA from NFA			
c.	Design of a lexical analyzer generator using LEX			
a.	Classify different types of parsing	Syntax analysis: Role, CFG, writing a grammar, top-down parsing, bottom-up parsing, operator precedence parsing, LR parser, using ambiguous grammar. Symbol table, structure and management.	Demonstration, Group Discussion	Observation, Self-Rating
b.	Design different types of grammar			
a.	Explain different types of intermediate code generation	Intermediate code generation: Intermediate languages, declarations, assignment statement, Boolean expression, case statements, back patching, procedure calls.	Lecture, Reading Assignment	True Or False, Multiple Choice

a.	Discuss the several issues in the design of a code generator	Code generation: issues in the design of a code generator, target machine, runtime storage management, basic blocks and flow graphs, register allocation and assignment, dag representation of basic blocks, peephole optimizations, generating code from dags.	Lecture, Group Assignment	Question naire, Complet ion, Assignm ent.
b.	Draw a basic block & corresponding flow graph for the given three-addres statements			
a.	Role of the code optimization in compiler design	Code optimization: principle of source optimization, optimization of basic blocks, loop in flow graphs, global data flow analysis, iterative solution of data flow equations.	Lecture, Group Discussion	Short Answer, Group Exercise , Viva Voce

Recommended Books And Periodicals

	Authors	Book Name
1.	Alfred V.Aho, Ravi Sethi, Jeffrey D.Ullman	Compilers Principles, Techniques and tools. Third edition.
2.	Hopcroft and Ullman	Introduction to Automata Theory, Languages and Computation
3.	Lewis and Stern	Compiler Design Theory

Course No:	54	Course Title:	Compiler Design and Automata Theory Lab

Course Code: CSE-3206 Credit:1.50 Contact Hours: 3 Hours/Week	Pre-Requisites: Nil Total Marks: 100

Mark Distribution:

Lab Final Exam:	60 Marks	Viva:	30 Marks	Class Attendance:	10 Marks

11.1 Rationale:

Computer Engineers should be competent in compiler design and automata theory. They must learn the fundamental concepts of compiler design and automata theory and also various phases in the design of a compiler, how to generate a machine code from a C program statement.

11.2 Objectives:

1. To design a Lex compiler
2. To construct a DFA from the NFA
3. To design an NFA for the corresponding regular expressions.

11.3 Course Learning Outcome

- To apply the knowledge of lex tool & yacc tool to develop a scanner & parse
- To design & conduct experiments for NFA and DFA from a given regular expression
- To design & implement a front end of the compiler.
- To develop program for implementing symbol table.
- To develop program for solving parser problems.
- To create program for intermediate code generation.
- To learn the new code optimization techniques and apply it to improve the performance of a program in terms of speed & space.
- To learn & use the new tools and technologies used for designing a compiler

● To apply the knowledge of patterns, tokens & regular expressions in programming for solving a problem in the field of data mining.		

11.4	11.5	11.6	11.7
Learning Outcomes	**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**
a. Apply symbol table using c or java language	Symbol Table	Demonstration, Exercise	Assignment, Observation
a. Apply & analyze lexical analyzer using Lex	Lexical analyzer using Lex	Demonstration, Exercise	Assignment, Observation
a. Design DFA from the given regular expression	Construct DFA from regular expressions	Demonstration, Exercise	Assignment, Observation
a. Design NFA from the given regular expression	Construct NFA from regular expressions	Demonstration, Exercise	Assignment, Observation
a. Implement a C/Java program which eliminates the whitespace from the given source of code	A C/Java program which eliminates the whitespace from the given source of code	Demonstration, Exercise	Assignment, Observation
a. Apply & analyze the design of a parser which produces parse tree for the tokens produced by the lexical analyzer	Design of a parser which produces parse tree for the tokens produced by the lexical analyzer	Demonstration, Exercise	Assignment, Observation

Recommended Books And Periodicals		
	Authors	**Book Name**
1.	Alfred V.Aho, Ravi Sethi, Jeffrey D.Ullman	Compilers Principles, Techniques and tools. Third edition.
2.	Hopcroft and Ullman	Introduction to Automata Theory, Languages and Computation
3.	Lewis and Stern	Compiler Design Theory

Course No:	**55**	**Course Title:**	Software Development Project-II

Course Code: CSE-3208
Credit: 1.50
Contact Hours: 3 Hours/Week

Pre-Requisites: Nil
Total Marks: 100

Mark Distribution:

Lab Final Exam:	60 Marks	**Viva:**	30 Marks	**Class Attendance:**	10 Marks

11.1	**Rationale:**

Computer Engineers should be competent in web application software through different web oriented language. This C#.net /ASP.net/Java Programming Knowledge is valuable to both beginners and advanced developers that already have experience in developing applications software.

11.2	**Objectives:**

1. Create and populate Windows Forms.

11.3	11.4	11.5	11.6
Learning Outcomes	**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**

a.	To Apply OOP Knowledge	**C# .NET Language Basics** Data Types, Type Conversion, Boxing & Unboxing, Conditional Statements, Looping, Methods in C#, Properties, Arrays, Indexers, Structures, Enumerations	Group Assignment, Panel Discussion, Problem based Learning	Matching Type, Peer-Rating
a.	To Apply OOP Knowledge	**Memory Management:** Garbage Collector, Stack and Heap, System. GC Class.	Problem Based Learning, Project, Inquiry –based Learning	Practical Exam, Matching Type
a.	To Apply OOP Knowledge	**OOP Concepts:** Encapsulation, Inheritance,Polymorphism,Class and Object Constructors, Dynamic types, Optional parameters,Names & optional arguments,Covariant generic type parameters, Destructors,Method overloadingMethod overriding,Early binding, Late Binding,Abstract Classes, Abstract Methods,Interfaces, Multiple Inheritance,Generic classes,Static classes, Static constructors, Object initialize	Group Assignment, Panel Discussion	Observation
a.	To Apply OOP Knowledge	**Exception Handling:** System Defined Exceptions, Custom Exceptions, Try, Catch, Finally, Throwing exceptions	Group Assignment, Panel Discussion	Observation
a.	To Apply OOP Knowledge	**Delegate:** Function Pointers, Multi cast delegates,File HandlingSystem. IO namespace, File stream,Stream Reader, Stream writer, File info, Directory info, Drive Info	Problem-based Learning, Demonstration, Project /Assignment	Group Exercise, Observation, Inventories
a.	To Apply .NET Knowledge	**Developing Microsoft.NET Applications for Windows (Visual C#.NET)** ☐Creating a Form ☐Adding Controls to a Form ☐Creating an Inherited Form ☐Organizing Controls on a Form ☐Creating MDI Application **Working with Controls** ☐Creating an Event Handler for a Control ☐Using Windows Forms Controls ☐Using Dialog Boxes ☐Application ☐Adding Controls at Run Time ☐Creating Menus ☐Validating User Input **Using Data in Windows Forms Applications** ☐Adding ADO.NET ☐Objects to and ☐Configuring ADO.NET ☐Objects in a Windows ☐Forms Application	Problem-based Learning, Demonstration, Project /Assignment	Group Exercise, Observation, Inventories

		☐Accessing and Modifying Data by Using DataSets ☐Binding Data to Controls ☐Overview of XML Web ☐Services ☐Persisting Data		
a.	To Apply .NET Knowledge	**Developing Microsoft.NET Applications for Windows (Visual C#.NET)** ☐Printing and Reporting in Windows Forms ☐Applications Lessons 　☐Printing From a ☐Windows Forms Application 　☐Using the Print Preview, Page Setup, and ☐Print Dialogs 　☐Constructing Print Document Content by Using GDI+ 　☐Creating Reports by Using Crystal Reports 　☐Deploying Windows Forms Applications 　• .NET Assemblies	Problem-based Learning, Demonstration, Project /Assignment	Group Exercise, Observation, Inventories
a.	To Apply Database Knowledge	**Introduction to LINQ and ADO.NET Entity Framework.** LINQ expressions Using via extension methods, Filtering, Sorting, Aggregation, Skip and Take operators, Joins, Query, Lambda expressions. **Data Projection** Single result value, Existing types, Anonymous types, Grouping	Problem-based Learning, Demonstration, Project /Assignment	Group Exercise, Observation, Inventories
a.	To Apply ASP.NET Knowledge	**ASP.NET INTRODUCTION** Difference Between ASP and ASP.NET ,Architecture Inline Technique & Code-Behind Technique,Code Render Blocks Server Controls ,Page Basics, Page lifecycle, Post back Request View State, Directives **PROGRAMMING WITH SERVER CONTROLS** Web Server Controls Basic Web Controls, List Controls, Data Controls,Adv Controls, User Controls, Master Page and Content Page. **Validation Controls** Understanding Validation Client or Server Site Validation Required Filed Validator Rang Validator, Regular Expression Validator, Compare Validator, Custom Validator Validator Summary. **CONTENT**	Problem-based Learning, Demonstration, Project /Assignment	Group Exercise, Observation, Inventories

		Developing Microsoft.NET Applications for Web (ASP.NET using C#.NET) STATE MANAGEMENT WITH ASP.NET Context, View State, Cookie State Session State, Session Tracking Application Object, Session and Application Events ADO.NET AND ASP.NET Working with Data Controls, Grid View, -Inserting, Updating, Deleting,-Sorting in Data Grid -Paging in Data Grid, Data Source Controls, Dataset, Details View Form View, Data List, Repeater Control, Crystal Reports ADO.NET PROGRAMMING Architecture, Data Readers and Data Sets, Command Object Transaction Programming Procedure Execution Data Adapter and Data Set, Data Tables, Data Relation, Data Views Updating Dataset		
a.	Project	Project, Review & Exam	Problem-based Learning, Demonstration, Project /Assignment	Group Exercise, Observation, Inventories

Recommended Books and Periodicals		
	Authors	**Book Name**
1.		W3school.com
2.		On line tutorial

Course No:	**56**	**Course Title:** Linear Algebra

Course Code: Math 2201
Credit: 3.00
Contact Hours: 3 Hours/Week

Pre-Requisites: Nil
Total Marks: 100

Mark Distribution:

Semester Final Exam: 72 Marks   **Class Test:** 20 Marks   **Class Attendance:** 08 Marks

11.1   Rationale:

This is an undergraduate course in linear algebra for students of engineering, science, and mathematics. Linear algebra is the study of linear systems of equations, vector spaces, and linear transformations. Solving systems of linear equations is a basic tool of many mathematical procedures used for solving problems in science and engineering.

11.2   Objectives:

1. Build an understanding of the fundamental concepts of Linear Algebra.

2. Learn how to solve linear equations, performing matrix algebra, calculating determinants, and finding eigenvalues and eigenvectors

3. Learn about the applications of linear algebra applications

11.3	11.4	11.5	11.6
Learning Outcomes	**Course Content**	**Teaching Strategy/ Learning Experience**	**Assessment Strategy**
1. Basics of Matrices	**Introduction:** Matrices and their Significance, Matrix Notation, Dimension (Order) of a Matrix, Addressing Elements of a Matrix, Solving Linear Systems in 2 Unknowns, Types of Matrices, Addition and Subtraction of Matrices, Multiplication of Scalars with Matrices, Multiplication of two Matrices	Lecture	Essay Short Question
2. Matrix Operations			
3. Matrix Operations			
4. Matrices and Systems of Linear Equations	Systems of Linear Equations Preview, Elementary Row Operations, Row Echelon Form (REF)	Lecture Tutorial	Essay Short Question
5. Matrix Algebra and Operations	Matrix Algebra - Addition and Subtraction, Matrix Algebra - Scalar Multiplication, Matrix Algebra - Matrix Multiplication	Lecture Exercise	Short Question Assignment
6. Matrix Algebra and Operations	Matrix Algebra - Addition and Subtraction, Matrix Algebra - Scalar Multiplication, Matrix Algebra - Matrix Multiplication	Lecture Exercise Assignment	Quiz Short Question Assignment
7. Determinant of a Matrix	Determinant of a 2x2 Matrix, Determinant of a 3x3 Matrix, Finding Determinants Quickly	Lecture Exercise Assignment	Essay Quiz Short Question Assignment
8. Inverse of a Matrix	Inverse exists only for Square Matrices, Singular Matrices, Importance of Inverse in solving Linear Systems, Inverse of a 2x2 Matrix, Inverse of a 3x3 Matrix - The Two Methods	Lecture Exercise Assignment	Essay Quiz Short Question
9. Properties of Determinants	Properties of Determinants - Row Operations	Lecture Exercise Assignment	Essay Quiz Short Question Assignment
10. Introduction to Vectors	Scalars and Vectors, Geometrical Representation of Vectors, Vector Addition and Subtraction, Laws of Vector Addition and Head to Tail Rule, Unit Vector	Lecture	Short Question Essay
11. Vector Spaces	Introduction to Vector Spaces, Euclidean Vector Spaces - Part 1, Euclidean Vector Spaces - Part 2,	Lecture Exercise Assignment	Quiz Short Question
12. Subspace and Nullspace	Euclidean Vector Spaces - Part 3, Definition and Closure Properties, Axioms of Vector Spaces, Subspace and Nullspace	Lecture Exercise Assignment	Essay Quiz Short Question

16.	Span and Spanning Sets	Span of a set of vectors	Lecture	Essay Short Question
17.	Linear Dependence and Independence	Linear Dependence - Introduction, Definition, Example	Lecture Exercise	Short Question Essay
18.	Eigenvalues and Eigenvectors	Introduction to Eigenvalues and Eigenvectors, How to Calculate Eigenvalues and Eigenvectors	Lecture Discussion	Assignment Group Exercise Multiple Choice

Recommended Books And Periodicals

Authors	Book Name
1. Gilbert Strang	Linear Algebra and Its Applications
2. Sheldon Axler	Linear Algebra Done Right

Course No:	57	Course Title:	Business Communication and Technical Writing

Course Code: BUS 3202 Credit: 1.50 Contact Hours: 3 Hours/Week	Pre-Requisites: Nil Total Marks: 100

Mark Distribution:

Lab Final Exam:	60 Marks	Viva:	30 Marks	Class Attendance:	10 Marks

Rationale:

A computer engineer must be able to communicate with others for business purpose. Moreover, to be a successful researcher, a computer engineer must be able to explain, analyze and justify different algorithms developed by practitioners and researchers in writing clearly.

Objectives:

- To make oneself comfortable with the stakeholders
- To communicate with others clearly both in writing and speaking.

Course No:	58	Course Title:	Viva Voce

Course Code: CSE 3200 Credit: 1.00 Contact Hours:	Pre-Requisites: Nil Total Marks: 100

Mark Distribution:

Viva voce	100 Marks				