

Detailed Scheme

ACADEMIC YEAR 2020-2021

**Dr. Ambedkar Institute of Technology
Bangalore**

V - VI (2018-2022 BATCH) (175Credits)



B.E

Department Of Information Science and Engineering

Vision

- To create **D**ynamic, **R**esourceful, **A**dept and **I**nnovative **T**echnical professionals to meet global challenges.

Mission

- To offer state-of-the-art undergraduate, postgraduate and doctoral programmes in the fields of Engineering, Technology and Management.
- To generate new knowledge by engaging faculty and students in research, development and innovation
- To provide strong theoretical foundation to the students, supported by extensive practical training to meet industry requirements.
- To install moral and ethical values with social and professional commitment.

DEPARTMENT VISION AND MISSION**Vision:**

- Imparting quality technical education and preparing professionals to meet Information Technological challenges globally.

Mission:

- Prepare highly capable Information Science engineers through best practices.
- Encourage students to pursue higher education for further growth in the learning process and to promote research in the frontier areas of Information Technology.
- Educate students to take up social and professional responsibilities with ethical values for the betterment of the society.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

PEO1: Graduates will have the ability to become successful computing professionals in the area of Information Science and Engineering.

PEO2: Graduates will be equipped to enhance their knowledge through core engineering and latest technological skills to promote lifelong learning.

PEO3: Graduates will be able to take up social, technical and entrepreneurial challenges in inter disciplinary and multi disciplinary fields.

PROGRAM SPECIFIC OBJECTIVES(PSOS)

PSO1:Students should be able to understand, analyze and adopt principles of programming paradigms by using latest technologies such as Cloud computing, Big data analytics, AI ,Machine Learning and IoT based applications for solving real-world problems.

PSO2:Students should be able to acquire and demonstrate the team work, professional ethics, competence and communication skills while developing software products.

PROGRAMME OUTCOMES (POs)

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

Dr. Ambedkar Institute of Technology, Bengaluru-560 056

SCHEME OF TEACHING AND EXAMINATION from Academic Year 2020-2021

B.E Information Science and Engineering

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

V SEMESTER												
Sl. No	Course and Course code		Course Title	Teaching Department	Teaching Hours /Week			Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P					
1	Hu	18HS51/52	M&E / IPR (title as per BOS decision)	HS	3	--	--	03	50	50	100	3
2	PC	18IS51	Operating System	ISE	4	-	--	03	50	50	100	4
3	PC	18IS52	Web Technologies	ISE	3	2	--	03	50	50	100	4
4	PC	18IS53	Artificial Intelligence	ISE	4		--	03	50	50	100	4
5	PC	18IS54	Data base Management Systems	ISE	4	--	--	03	50	50	100	4
6	PE	18IS55X	Elective-1	ISE	3	--	--	03	50	50	100	3
7	PC	18ISL56	Computer Networks Lab	ISE	--		2	03	50	50	100	1
8	PC	18ISL57	Data base Management System Lab	ISE	--		2	03	50	50	100	1
TOTAL					20	2	4	24	400	400	800	24
Mini-project: To be carried out during the intervening vacations of V and VI semesters. The SEE examination will be conducted during VI semester. The credit prescribed for mini – project is added to VI semester credits. The mini-project is considered as a head of passing and is considered for the award of degree. Those, who do not take-up/complete the mini-project will be declared as failed and have to complete during subsequent SEE examination after satisfy the Mini-project requirements. Also, mini-project is considered for eligibility to VII semester.												
Note: Hu: Humanities, PC: Professional Core, MC: Mandatory Course,												
Course code		Electives -1										
18IS551		Internet of things										
18IS552		Unix System Programming										
18IS553		Information systems										

HEAD DEPT. OF INFORMATION SCIENCE & ENGG

Course code	Electives -2	Open Elective -A
18IS641	Advanced Java and J2EE	<p>Students can select any one of the open electives (Please refer to consolidated list of Dr AIT for open electives) offered by any Department.</p> <p>Selection of an open elective is not allowed provided,</p> <ul style="list-style-type: none"> • The candidate has studied the same course during the previous semesters of the programme. • The syllabus content of open elective is similar to that of Departmental core courses or professional electives.
18IS642	Mobile Application and Development	
18IS643	Network and Cyber Security	

Course code	Open Electives -A	<ul style="list-style-type: none"> A similar course, under any category, is prescribed in the higher semesters of the programme. Registration to electives shall be documented under the guidance of Programme Coordinator/ Mentor.
18ISE651	Data Base Management System	
18ISE652	Web Technologies	
18ISE653	Unix and Shell Programming	

HEAD DEPT. OF INFORMATION SCIENCE & ENGG

V SEMESTER

Sub Title: MANAGEMENT AND ENTREPRENEURSHIP		
Sub Code:18HS51	No. Of Credits : 4	No. of Lecture hours/week : 4
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours: 52

Course Objectives :

1. To help students understand the Management concepts & its evolution.
2. To impart the knowledge about various Managerial functions.
3. To make the student learn the Entrepreneurial process.
4. To gain an insight of funding agencies & understand the role of SSI in economic development.
5. To have a clear understanding of various business opportunities & designing the Business plan.

UNIT NO	Syllabus Content	No. of Hours
1	MANAGEMENT: Introduction- Meaning, characteristics of management, scope, functions of management, Management as science or an art or profession, Management and Administration, Roles of managers. Levels of management, Development of management thought -Early management approaches, Modern management approaches.	08 Hours
2	PLANNING: Definition & Meaning, Types of Plans (Single use & Standing), Steps in Planning process. ORGANIZING: – Definition & Meaning, Types of organization. Departmentation, Committees, Centralization Vs Decentralization, Authority and responsibility, span of control, MBO and MBE. Decision Making: Definition, Decision Making Process. STAFFING: Nature and importance of staffing, process of selection and recruitment. DIRECTING: Meaning, Leadership: Definition, Leadership styles – Autocratic, Democratic, Charismatic, Laissez faire and Participative. Leadership theories – Trait, Behavioral and Contingency. <i>Introduction to motivation theories</i> – Maslow, Herzberg, & McGregor's Theory of X & Y. <i>Communication</i> – Meaning and importance, communication process, barriers of communication, overcoming barriers. <i>Co-ordination:</i> Meaning and importance, stages of group forming, types of groups. CONTROLLING: Meaning and steps in controlling, Types of control, Method of establishing control (in brief). <i>Case study discussion with respect to Indian context.</i>	12 Hours
3	ENTREPRENEUR: Definition & Meaning, Characteristics, types of entrepreneur, Difference between Entrepreneurs, Intrapreneur & Manager, Stages in Entrepreneurial process, barriers to entrepreneurs,	10 Hours

	<p>Role of Entrepreneurs in economic development.</p> <p>Rural entrepreneurs - Meaning & schemes. Women entrepreneurs – Concept, challenges, women entrepreneurship in India, Institutional support & special bank scheme. Family Business: Meaning, Roles & responsibility, types of family business, challenges faced by family business, reasons for failure of family business.</p> <p><i>Case study discussion with respect to Indian context.</i></p> <p><i>Activity: Profile of successful entrepreneur.</i></p>	
4	<p>MSME: Definition & Concept of MSME, role & importance, current schemes for MSME. SMALL SCALE INDUSTRY: Meaning, Characteristics, Steps to start an SSI, problems faced by SSI. Introduction to GATT, WTO & LPG. Sources of financing, forms of ownership. Institutional Support: Different schemes. <i>Central level Institutions</i> – SIDBI, NABARD, HUDCO, TCO. <i>State level Institutions</i>- DIC, SFC, KIADB, TECKSOK. STARTUP COMPANIES-Meaning and Challenges. <i>Activity for students: Schemes for startup companies.</i></p>	12 Hours
5	<p>PREPARATION OF PROJECT: Meaning, Project identification, Project selection, Project Appraisal, Project Report – Contents, Errors of project report, Feasibility Study-Market Feasibility Study, Technical Feasibility Study, Financial Feasibility Study, Social Feasibility Study. Business plan: Meaning, contents of business plan, reasons for failure of business plan. <i>Activity for students: Writing of a business plan.</i></p>	10 Hours

Note 1: Unit 2 and Unit 3 will have internal choice.

Note 2: Two assignments are evaluated for 5 marks:

Assignment -1 from units 1 and 2

Assignment – 2 from units 3, 4 and 5.

Course Outcomes :

CO1 : The students will gain knowledge on management concepts & its evolution.

CO2 : The students will learn the application of managerial skills & attributes.

CO3 : The students will get an in depth knowledge of entrepreneurial process & will be able to apply the entrepreneurial skills.

CO4 : Students compile information & explore the sources of funding agencies.

CO5 : Students will be able to identify business opportunities & prepare the business plan.

TEXT BOOK:

1. Entrepreneurship and Management- S Nagendra and V S Manjunath- Pearson Publication 4 /e, 2009.
2. Dynamics of Entrepreneurial Development and Management-Vasant Desai-Himalaya Publishing House.
3. Principles of Management – PC Tripathi, and P N Reddy – Tata MacGraw Hill.
4. Management and Entrepreneurship- N V R Nidu and T Krishna Rao. I K International Publishing house.

REFERENCE BOOKS:

1. Entrepreneurship Development – Poornima M Charanthimath Pearson Education 2nd Edition.
2. Entrepreneurship and management - Shashi k Gupta- Kalyani publishers, Latest edition.
3. Organizational behaviour, Stephen P Robbins, Timothy A. Judge, Neharika Vohra, Pearson, 14/e, 2012.
4. Financial Management- Shashi k Gupta- Kalyani publishers, Latest edition.

Sub Title : OPERATING SYSTEMS		
Sub Code: 18IS51	No. of Credits:4=4 : 0 : 0 (L-T-P)	No. of lecture hours/week :4
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours : 52
Course Objectives: <ol style="list-style-type: none"> 1. To analyze structure ,management, concepts of process scheduling and multithreading in operating system 2. To identify the various methods of causing deadlocks. 3. To describe the techniques for main memory management. 4. To analyze the file system interface, implementation and disk management. 5. To understand the Protection and security concepts in operating system. 		

Unit No.	Syllabus Content	No of Hours
1	Introduction: What operating systems do, Computer-System Architecture, Operating System Structure, Operating System Operations, Process Management, Memory Management, Storage Management, Protection and Security. T1: Ch 1: 1.1 to 1.9. System Structures: Operating System Services, User Operating System Interface, System Calls, Types of System Calls, System Programs, Operating System Structure; T1: Ch 2: 2.1 to 2.7. Processes: Process Concept, Process Scheduling, Operations on Processes, Inter process Communication; Multithreaded Programming: Multithreading Models; T1: Ch 3: 3.1 to 3.4, Ch 4: 4.1 to 4.3.	10
2	Process Synchronization: The Critical Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization Examples; T1: Ch 5: 5.1 to 5.9. CPU Scheduling : Scheduling Criteria , Scheduling Algorithms , Thread Scheduling, Multiple-Processor Scheduling , Real-Time CPU Scheduling ,Operating-System Examples. T1: Ch 6: 6.1 to 6.7. Dead locks: System Model, Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention, Deadlock Avoidance and detection, Recovery from Deadlock T1: Ch 7: 7.1 to 7.7.	10

3	Memory Management Strategies: Main Memory: Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of Page Table. T1: Ch 8: 8.1 to 8.6. Virtual Memory Management: Background, Demand Paging, Copy on Write, Page Replacement, Allocation of frames, Allocating Kernel Memory. T1: Ch 9: 9.1 to 9.8	10
4	File System: File Concept, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection; T1: Ch 11: 11.1 to 11.6. File-System Implementation: File System Structure , File System Implementation, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery. T1: Ch 12: 12.1 to 12.7. Mass storage structures, protection: Mass storage structures; Disk structure; Disk attachment, Disk scheduling; Disk management; Swap space management. T1: Ch 10: 10.1 to 10.6	11
5	Protection and Security: Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights, Capability-Based systems. T1: Ch 14: 14.1 to 14.8 The Security Problem, Program Threats ,System and Network Threats, Cryptography as a Security Tool , User Authentication, Implementing Security Defenses, Firewalling to Protect Systems and Networks, Computer-Security Classifications T1:Ch 15 : 15.1 to 15.8	11

TEXT BOOK:

Abraham Silberschatz Peter Baer Galvin, Greg Gagne - **Operating System concepts**, , 9th edition, Wiley-India, 2012.

REFERENCE BOOKS:

1. D.M Dhamdhare – **Operating Systems: A Concept Based Approach**, 2nd Edition, Tata McGraw- Hill, 2002.
2. P.C.P. Bhatt - **Operating Systems**, 2nd Edition, PHI, 2006.
3. Harvey M Deital - **Operating Systems** –, 3rd Edition Wesley, 1990.

Note 1: All units will have internal choice

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4

Assignment -III from Unit 5

Course Outcomes

After the completion of the course students will be able to

CO1: Analyze the fundamental principles and concepts of operating systems.

CO2: Identify, analyze various synchronization technique, deadlocks.

CO3: Identify, analyze, apply the various algorithms for memory management.

CO4: Analyze issues related to file system, disk management, protection and security.

COs	Mapping with POs
CO1	PO1,PO2
CO2	PO1,PO2,PO3
CO3	PO1,PO3,PO4
CO4	PO1,PO4

Sub Title : WEB TECHNOLOGIES		
Sub Code: 18IS52	No. of Credits:4=3 : 1 : 0 (L-T-P)	No. of lecture hours/week : 4
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours : 52
Course Objectives: <ol style="list-style-type: none"> 1. To create a web pages using XHTML using Cascading Style Sheets 2. To do data validation and user interaction using JavaScript 3. To create XML documents and provide styling to documents. 4. To design web applications using the concepts of PHP 5. To design real world Web applications 		

Unit No	Syllabus Content	No of Hours
1	XHTML : Origins and evolution of HTML and XHTML; Basic syntax; Standard XHTML document structure; Basic text markup. Images; Hypertext Links; Lists; Tables; Forms; Frames; Syntactic differences between HTML and XHTML. Introduction to XML : XML Syntax; Document structure; Document Type definitions; Namespaces; XML schemas; Displaying XML documents with CSS; XSLT style sheets; XML processors; Web services CSS : Introduction; Levels of style sheets; Style specification formats; Selector forms; Property value forms; Font properties; List properties; Color; Alignment of text; The Box model; Background images. T1:Ch 2, Ch 3, Ch 7	12
2	JavaScript : Overview of JavaScript; Object orientation and JavaScript; General syntactic characteristics; Primitives, operations, and expressions; Screen output and keyboard input; Control statements; Object creation and modification; Arrays; Functions; Constructor; Pattern matching using regular expressions. T1: Ch 4	10
3	JavaScript and HTML documents:	10

	The JavaScript execution environment; The Document Object Model; Element access in JavaScript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements; The DOM 2 event model T1: Ch 5	
4	PHP: Origins and uses of PHP, Overview of PHP, General syntactic characteristics, Primitives, Operations, and Expression, Output, Control Statements, Arrays, Form handling, Files, Cookies, Session Tracking. T1: Ch 11	10
5	Web Application Design: Real World Web Software Design, Principles of Layering, Software design patterns in the web context, Data and Domain patterns, Presentation patterns, T2: Ch 14	10

Note 1: All units will have internal choice

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4 .

Assignment -III from Unit 5

Course Outcomes:

Students will demonstrate the knowledge and the skills acquired with respect to:

CO1: Design simple web pages using different tags of XHTML and Classify and use different levels of style sheets

CO2 : Validate and provide user functionality using JavaScript

CO3 : Design and develop XML document and use the style sheet to display.

CO4: Design and develop PHP programs to perform database access & session tracking.

CO5: Develop web application projects

COs	Mapping with POs
CO1	PO1,PO2,PO3,PO4,PO5,PO6,PO7,PO10,PO11
CO2	PO2,PO3,PO5,PO6,PO9
CO3	PO1,PO5,PO9,PO10,PO11
CO4	PO1, PO5,PO9,PO10,PO11
CO5	PO5, PO6, PO8,PO10,PO11

TEXT BOOKS:

1. Robert W. Sebesta: Programming the World Wide Web, 4th Edition, Pearson education, 2011.

2. Randy Connolly, Ricardo Hoar, "Fundamentals of Web Development", 1st Edition, Pearson education, 2015. (ISBN:978-9332575271)

REFERENCE BOOKS / WEBLINKS:

1. M. Deitel, P.J. Deitel, A. B. Goldberg: Internet & World Wide Web How to Program, 4th Edition, Pearson education, 2011.
2. Pro PHP and jQuery- JASON LENGSTORF, 2010.
3. <http://nptel.ac.in>
4. <http://www.w3schools.com/>

Sub Title :ARTIFICIAL INTELLIGENCE		
Sub Code:18IS53	No. of Credits:4=4: 0 : 0 (L-T-P)	No. of Lecture Hours/Week : 4
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours :52

Course Objectives:

1. Understand about agent, behavior and structure
2. Learn different AI models and search strategies
3. Representation of knowledge and reasoning
4. Gain knowledge about learning strategies

Unit No	Syllabus Content	No of Hours
1	What is AI? Intelligent Agents: Agents and environment; Rationality; the nature of environment; the structure of agents. Problem-solving: Problem-solving agents; Example problems	10
2	Knowledge representation issues: Representations and mappings approaches to knowledge representation, Issues in knowledge representation.	10
3	Logical Agents: Knowledge based agents, The Wumpus world, Logic-Propositional logic Propositional theorem proving, Effective propositional model checking, Agents based on propositional logic. Using predicate logic: Representing simple facts in logic	10
4	Resolution, Natural Deduction, Learning: Forms of Learning; Inductive learning; Learning decision trees; Ensemble learning; Computational learning theory	10
5	Statistical learning, Maximum likelihood parameter learning, Bayesian parameter learning, passive reinforcement learning, active reinforcement learning	12

Note 1: All units will have internal choice

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4 .

Assignment -III from Unit 5

Course Outcomes:

After the completion of course, the students will be able to:

CO1: Describe the modern view of AI as the study of agents that receive percepts and perform actions.

CO2: Apply AI search Models and Generic search strategies.

CO3: Write Logic for representing Knowledge and Reasoning of AI systems.	
CO4: Design different learning algorithms for improving the performance of AI systems.	
CO5: Implement projects using different AI learning techniques	
COs	Mapping with POs
CO1	PO1,PO2
CO2	PO1,PO2,PO12
CO3	PO1,PO2,PO4,PO6,PO12
CO4	PO1,PO2,PO3,PO4,PO12
CO5	PO1,PO2,PO3,PO4,PO6,PO12

TEXT BOOKS:

- 1.“**Artificial Intelligence: A Modern Approach** ” by Stuart Russel, Peter Norvig, 2nd Edition, Pearson Education, 2003.
- 2.“**Artificial Intelligence**” by Elaine Rich, Kevin Knight, Shivashankar B Nair: Tata McGraw Hill 3rd edition. 2013

REFERENCE BOOKS/WEBLINKS:

1. Luger, G. F., & Stubblefield, W. A., Artificial Intelligence - Structures and Strategies for Complex Problem Solving. New York, NY: Addison Wesley, 5th edition (2005).
2. Nilsson, N. J. Artificial Intelligence - A Modern Synthesis. Palo Alto: Morgan Kaufmann. (1998).
3. Nilsson, N. J., Principles of Artificial Intelligence. Palo Alto, CA: Tioga (1981).
4. Rich, E., & Knight, K., Artificial Intelligence. New York: McGraw-Hill (1991).

E Books:

1. Practical Artificial Intelligence Programming With Java,Third Edition ,Mark Watson
2. Artificial Intelligence Lecture Notes MIT.

MOOCs:

1. Artificial Intelligence -<http://www.nptelvideos.in/2012/11/artificial-intelligence.html>

Sub Title : DATABASE MANAGEMENT SYSTEMS		
Sub Code:18IS54	No. of Credits:4=4 : 0 : 0 (L-T-P)	No. of lecture hours/week : 4
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours :52

Course Objectives:

1. To analyze the basic concepts and architecture of DBMS.
2. To understand the conceptual and relational models to design databases.
3. To Create and manipulate a relational database using SQL.
4. To understand the normalization steps in database design and removal of data anomalies.
5. To acquire the knowledge of transaction processing, NoSQL and MongoDB concepts

UNIT No	Syllabus Content	No of Hours
1	<p>Introduction: Introduction; Characteristics of Database approach; Actors on the screen; Workers behind the scene; Advantages of using DBMS approach; A when not to use a DBMS. Data models, schemas and instances; Three-schema architecture and data independence; Database languages and interfaces; The database system environment; Classification of Database Management systems.</p> <p>Entity-Relationship Model: Using High-Level Conceptual Data Models for Database Design; An Example Database Application; Entity Types, Entity Sets, Attributes and Keys; Relationship types, Relationship Sets, Roles and Structural Constraints; Weak Entity Types; Refining the ER Design; ER Diagrams, Naming Conventions and Design Issues; Relationship types of degree higher than two.</p> <p>TEXT 1 Chapter-1,2,7</p>	12
2	<p>Relational Model and Relational Algebra: Relational Model Concepts; Relational Model Constraints and Relational Database Schemas; Update Operations, Transactions and dealing with constraint violations; Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary Relational Operations : JOIN and DIVISION; Additional Relational Operations; Examples of Queries in Relational Algebra. Relational Database Design Using ER-to-Relational Mapping</p> <p>TEXT1 Chapter- 3, 6.1,6.2,6.3,6.4,6.5, 9.1</p>	10
3	<p>SQL :Schema Definition, Basic Constraints and Queries: SQL Data Definition and Data Types; Specifying basic constraints in SQL; Schema change statements in SQL; Basic queries in SQL; More complex SQL Queries. Insert, Delete and Update statements in SQL; Specifying</p>	10

	constraints as Assertion and Trigger; Views (Virtual Tables) in SQL; Embedded SQL. Introduction to SQL Programming Techniques: Database programming issues and techniques, Embedded SQL, Dynamic SQL. TEXT1 Chapter 4,5,13.1,13.2	
4	DatabaseDesign: Functional Dependencies and Normalization: Informal Design Guidelines for Relation Schemas; Functional Dependencies; Normal Forms Based on Primary Keys; General Definitions of Second and Third Normal Forms; Boyce-Codd Normal Form. Relational Database Schema Design Algorithms and further Dependencies: Properties of Relational Decompositions; Multi valued Dependencies and Fourth Normal Form; Join Dependencies and Fifth Normal Form TEXT1 Chapter15,16	10
5	Transaction Management: Overview of Transaction Management: The ACID Properties, Transaction and schedules, Concurrent Execution of Transactions, Lock based concurrency control, performance of locking, Transaction support in SQL,Introduction to crash recovery,Concurrency control Introduction to NoSQL and MongoDB: What is NoSQL? Why NoSQL? Benefit over RDBMS, Types of NoSQL Database, and NoSQL vs. SQL Comparison. What is MongoDB? Overview of MongoDB, Design Goals for MongoDB Server and Database, MongoDB Tools, MongoDB CRUD Concepts, MongoDB Datatypes TEXT2 Chapter-16,17	10

Note 1: All units will have internal choice

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4 .

Assignment -III from Unit 5

Course Outcomes:

After completing the course the students are able to:

CO1: Analyze the database concepts, data models and design the ER model for real world applications.

CO2: Design a database schema for database application.

CO3: Develop complex queries using SQL to retrieve the information required from the database.

CO4: Apply normalization techniques to database.

CO5: Analyze the concepts of transaction processing, NoSQL and MongoDB

COs	Mapping with POs
CO1	PO1,PO2,PO3,PO5
CO2	PO1,PO3,PO5
CO3	PO2,PO3, PO5, PO9
CO4	PO1,PO2,PO3
CO5	PO1, PO2, PO3,PO5

TEXT BOOKS:

1. Elmasri and Navathe: Fundamentals of Database Systems, 6th Edition, Pearson Education, 2011.
2. Raghu Ramakrishna and Johannes Gehrke: Database Management Systems, 3rd Edition, McGraw-Hill, 2003.

REFERENCE BOOKS/WEBLINKS:

1. Silberschatz, Korth and Sudharshan: Data base System Concepts, 5th Edition, McGrawHill, 2006.
2. C.J. Date, A. Kannan, S. Swamynatham: A Introduction to Database Systems, 8th Edition, Pearson education, 2006.
3. www.w3resources.com

Sub Title : INTERNET OF THINGS		
Sub Code:18IS551	No. of Credits:3=3 : 0 : 0 (L-T-P)	No. of lecture hours/week : 4
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours :52
Course Objectives <ol style="list-style-type: none"> 1. To Learn the characteristics, designs,and challenges in the IoT 2. To Understand the key Technologies and protocols in IoT 3. To Analyze various Layers connectivity and motivation of IPV6 4. To Illustrate the role of IoT in various domains of Industry 5. Infer the role of Data Analytics in IOT 		

UNIT No	Syllabus Content	No of Hours
1	Introduction to IoT Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs.Enabling IOT Technologies,IOT and M2M-Introduction, difference between IOT and M2M. T1:Chapter1-1.1,1.2,1.3,1.4 , Chapter3-3.1,3.2,3.3	10
2	Fundamentals IoT Mechanism and Key Technologies-Identification of IoT Object and Services, Structural Aspects of the IoT, Key IoT Technologies. Evolving IoT Standards-Overview and Approaches,IETF IPV6 Routing Protocol for RPL Roll, Constrained Application Protocol, Representational State Transfer, ETSI M2M,Third Generation Partnership Project Service Requirements for Machine-Type Communications, CENELEC, IETF IPv6 Over Lowpower,Zigbee. T2:Chapter4-4.1,4.2,4.3 T2:Chapter5-5.1,5.2,5.3,5.4,5.5,5.6,5.7,5.8,5.9	12
3	Layer ½ Connectivity: Wireless Technologies for the IoT-WPAN Technologies for IoT/M2M, Cellular and Mobile Network Technologies for IoT/M2M,Layer 3 Connectivity :IPv6 Technologies for the IoT: Overview and Motivations. Address Capabilities,IPv6 Protocol Overview, IPv6 Tunneling. TEXT BOOK 2: Chapter6-6.1,6.2, Chapter7-7.1,7.2,7.3,7.4,7.5	10
4	Case Studies Illustrating IoT Design-Introduction, Home Automation, Cities,Environment, Agriculture, Productivity Applications. T1:Chapter 9-9.1,9.2,9.3,9.4,9.5,9.6	10
5	Data Analytics for IoT– Introduction, Apache Hadoop, Using Hadoop MapReduce for Batch Data Analysis, Apache Oozie, Apache Spark, Apache Storm, Using Apache Storm for Real-time Data Analysis, Structural Health Monitoring .	10

	T1:Chapter 10-10.1,10.2,10.3,10.4,10.5,10.6,10.7,10.8	
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Note 1: All units will have internal choice

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4

Assignment -III from Unit 5

Course outcomes:

On successful completion of the course, the student will be able to

CO1: Interpret the impact and challenges posed by IoT networks

CO2: Appraise the role of IoT protocols for efficient network communication

CO3: Deployment of different sensor technologies and Layers to connect the network.

CO4: To Deploy the role of IoT design in various domains of Industry

CO5:Elaborate the need for Data Analytics .

COs	Mapping with PO's
CO1	PO3,PO4,PO5,PO6,PO9,PO10
CO2	PO3,PO4,PO5,PO6,PO7,PO9,PO10
CO3	PO4,PO6,PO7,PO8,PO9,PO11
CO4	PO4,PO5,PO8,PO9,PO10,PO11
CO5	PO4,PO5,PO6,PO7,PO9,PO10

TEXT BOOK:

1. ArshdeepBahga, Vijay Madiseti, "Internet of Things : A Hands on Approach"
Universities Press., 2015
2. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6:The Evolving
World of M2M Communications", Wiley, 2013

REFERENCE BOOKS/WEBLINKS

- 1.Michael Miller," The Internet of Things", First Edition, Pearson, 2015.
- 2.Claire Rowland,Elizabeth Goodman et.al.," Designing Connected Products", First
Edition,O'Reilly, 2015

Sub Title : UNIX SYSTEMS PROGRAMMING		
Sub Code:18IS552	No. of Credits:3=3 : 0 : 0 (L-T-P)	No. of lecture hours/week : 4
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours : 52

Course Objectives:

1. Know the operating system standards like POSIX standards.
2. Comprehend UNIX internal-kernel structures.
3. Design & develop UNIX commands & applications using UNIX system API's.
4. Understand the UNIX process control mechanism.
5. Analyze the problem & apply the relevant IPC techniques in UNIX system programming.
- 6 Adopting signals as IPC for efficient low level and high level application development on Unix systems.

UNIT No.	Syllabus Content	No of Hours
1	Introduction: UNIX and ANSI Standards:The ANSI C Standard, The ANSI/ISOC++ Standards, Difference between ANSI C and C++, The POSIX Standards, The POSIX.1 FIPS Standard, The X/Open Standards. UNIX and POSIX APIs: The POSIX APIs, The UNIX and POSIX Development Environment, API Common Characteristics. T2:Ch 1,Ch 5,Ch 6	10
2	UNIX Files: File Types, The UNIX and POSIX File System, The UNIX and POSIX File Attributes, Inodes in UNIX System V, Application Program Interface to Files, UNIX Kernel Support for Files, Relationship of C Stream Pointers and File Descriptors, Directory Files, Hard and Symbolic Links. UNIX File APIs: General File APIs, File and Record Locking, Directory File APIs, Device File APIs, FIFO File APIs, Symbolic Link File APIs. T2:Ch 7,Ch 8,Ch 9	12
3	UNIX Processes: The Environment of a UNIX Process:Introduction, main function, Process Termination, Command-Line Arguments, Environment List, Memory Layout of a C Program, Shared Libraries, Memory Allocation, Environment Variables, setjmp and longjmp Functions, getrlimit, setrlimit Functions, UNIX Kernel Support for Processes. T1:Ch 7,Ch 8	10
4	Process Control: Introduction, Process Identifiers, fork, vfork, exit, wait, waitpid, wait3, wait4 Functions, Race Conditions, exec Functions, Changing User IDs and Group IDs, Interpreter Files, system Function, Process Accounting, User Identification, Process Times, I/O Redirection. Process Relationships: Introduction, Terminal Logins, Network Logins, Process Groups, Sessions, Controlling Terminal, tcgetpgrp and tcsetpgrp Functions, Job Control, Shell Execution of Programs, Orphaned Process Groups. T1:Ch 9,Ch 10	10
5	Signals and Daemon Processes: Signals: The UNIX Kernel Support for Signals, signal, Signal Mask, sigaction, The SIGCHLD Signal and the waitpid Function, The sigsetjmp and siglongjmp Functions, Kill, Alarm, Interval Timers, POSIX.lb	10

	Timers.Daemon Processes: Introduction, Daemon Characteristics, Coding Rules, Error Logging, Client-Server Model. Interprocess Communication – 1: Overview of IPC Methods, Pipes, popen, pclose Functions, Coprocesses, FIFOs, System V IPC, Message Queues, Semaphores. T1:Ch 11,Ch 12.	
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Note 1: All units will have internal choice

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4 .

Assignment -III from Unit 5

Course Outcomes:

After completion of course students will be able to

CO1 : Understand the fundamentals of UNIX operating system such as the POSIX standards, .

UNIX processes, UNIX file system and Signals.

CO2 :Analyze UNIX kernel level support for UNIX processes, UNIX filesystem and Signals.

CO3 : Demonstrate advanced UNIX features such as signals, Job Control, daemon processes and inter Process communication.

CO4 : Develop UNIX commands, utilities and applications utilizing UNIX System calls.

CO5 : Analyze process control, Deamon characteristics, coding rules and error logging and IPC facilities

COs	Mapping with POs
CO1	PO1,PO3,PO5
CO2	PO2,PO3,PO5
CO3	PO2,PO3,PO5
CO4	PO2,PO3,PO4,PO5
CO5	PO2,PO3,PO4,PO5

TEXT BOOKS:

1. Terrence Chan: UNIX System Programming Using C++, Pearson India, 2015.
2. W. Richard Stevens: Advanced Programming in the UNIX Environment, 3rd Edition, Pearson Education, 2015.

REFERENCE BOOKS / WEBLINKS:

1. Maurice J Bach :Advanced UNIX Programming, 2nd Edition, Pearson Education, 2015.
2. UNIX kernel Internals –UreshVahlia PHI 2010.
3. www.tutorialspoint.com/unix/unix-basic-operators.html
4. <https://www.youtube.com/watch?v=DpcCtaaGxyQ&list=PLd3UqWTnYXOmKXhD-PVqMN1XhNQV-s4lj>

Sub Title : INFORMATION SYSTEMS		
Sub Code:18IS553	No. of Credits:3=3 : 0 : 0 (L-T-P)	No. of lecture hours/week : 4
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours : 52

Course Objectives:

1. Introduce to various types of information systems, issues and concepts related to it.
2. Understand about electronic and enterprise business system management.
3. Familiarize the need and benefits of E-Business, ERP, E-Commence, SCM, DSS.
4. Comprehend the concept of IT planning and Managing the Information Systems.
5. Understand about Security management of IT, Enterprise and Global Management of IT.

UNIT No.	Syllabus Content	No of Hours
1	<p>Foundation concepts – 1: Information Systems in Business: Introduction, The real world of Information Systems, Networks, What you need to know, The fundamental role of IS in business, Trends in IS, Managerial challenges of IT.</p> <p>System Concepts: A foundation, Components of an Information System, Information System Resources, Information System activities, Recognizing Information Systems</p> <p>Foundation Concepts – 2: Fundamentals of strategic advantages: Strategic IT, Competitive strategy concepts, The competitive advantage of IT, Strategic uses of IT, Building a customer-focused business, The value chain and strategic IS, Reengineering business processes, Becoming an agile company Creating a virtual company, Building a knowledge-creating company.</p> <p>T1: Ch 1, Ch 2</p>	10
2	<p>Electronic Business Systems: Enterprise Business Systems: Introduction, Cross-functional enterprise applications, Enterprise application integration, Transaction processing systems, Enterprise collaboration systems.</p> <p>Functional Business Systems: Introduction, Marketing systems, Manufacturing systems, Human resource systems, Accounting systems, Financial management systems.</p> <p>Enterprise Business Systems: Customer relationship management: Introduction, What is CRM? Benefits and challenges of CRM, Trends in CRM.T1: Ch 7, Ch 8</p>	12
3	<p>Enterprise resource planning: Introduction, What is ERP? Benefits and challenges of ERP, Trends in ERP. Supply chain Management: Introduction, What is SCM? The role of SCM, Benefits and challenges of SCM, Trends in SCM. Electronic Commerce Systems: Electronic commerce fundamentals: Introduction, The scope of e-commerce, Essential e-commerce, processes,</p>	10

	and Electronic payment processes. E-commerce application trends, Business-to- Consumer e-commerce, Business-to-Business e-commerce, e-commerce marketplaces T1: Ch 8, Ch 9	
4	Decision Support Systems: Decision support in business: Introduction, Decision support trends, Decision support systems (DSS), Management Information Systems, On-line analytical processing, Using DSS, Executive information systems, Enterprise portals and decision support. T1: Ch 10	10
5	Decision Support Systems contd: Knowledge management systems, Business and Artificial Intelligence (AI). Security management of IT: Introduction, Tools of security management, Internetworked security defenses, Other security measures, System Controls and audits. Enterprise and Global Management of IT: Managing IT: Business and IT, Managing IT, Business / IT planning, Managing the IS function. T1: Ch 10, Ch 13, Ch 14	10

Note 1: All units will have internal choice

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4 .

Assignment -III from Unit 5

Course outcomes:

After completing the course the students are able to:

CO1:Describe the role of information technology and information systems in business

CO2: Apply planning and maintenance strategies to the information systems

CO3:Interpret how to use information technologies such as ERP, E-Business and E-Commerce, m-Commerce, wireless networks, mobile computing etc. to solve business problems

CO4: Understand concepts of a Decision Support System (DSS) and its affect on management

CO5: Identify the threats to information security and protect information resources & to identify and propose Business/IT Solutions to the addressed problems.

COs	Mapping with POs
CO1	PO2,PO4,PO7
CO2	PO2,PO3,PO6,PO7,PO9,PO11
CO3	PO2,PO3,PO6,PO7,PO9,PO11
CO4	PO6,PO7,PO9
CO5	PO6,PO7,PO9,PO11

TEXT BOOK:

1. James A. O'Brien, George M. Marakas - Management Information Systems -10th edition, Tata McGraw Hill, 2010.

REFERENCE BOOKS:

1. Kenneth C. Laudon and Jane P. Laudon - Management Information System, Managing the Digital Firm -, 9th Edition, Pearson Education, 2006.
2. Steven Alter - Information Systems The Foundation of E-Business , 4th Edition, Pearson Education, 2002.
3. W.S. Jawadekar - Management Information Systems -, Tata McGraw Hill 1998.

Sub Title : COMPUTER NETWORKS LAB		
Sub Code: 18ISL57	No. of Credits:1 : 0:0:1(L-T-P)	No. of lecture hours/week :2
Exam Duration : 3 hours	Exam Marks:CIE + SEE = 50 + 50 =100	

Course Objectives:

1. Construct sample networks with different topologies and configurations.
2. Analysis of the network behavior with respect to different parameters and conditions.
3. Build programs to implement error detection techniques and congestion control techniques.
4. Construct programs to build optimal routing table.
5. Build programs to implement the specified security algorithms

I. LIST OF PROGRAMS

PART A

The following experiments shall be conducted using either NS2/OPNET/NCTUNS or any other suitable simulator.

1. Simulate a three nodes point – to – point network with duplex links between them. Set the queue size and vary the bandwidth and find the number of packets dropped.
2. Simulate a four node point-to-point network with the links connected as follows:
n0 – n2, n1 – n2 and n2 – n3. Apply TCP agent between n0-n3 and UDP between n1-n3. Apply relevant applications over TCP and UDP agents changing the parameter and determine the number of packets sent by TCP / UDP.
3. Simulate the transmission of ping messages over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion.
4. Implement simple ESS and with transmitting nodes in wireless LAN by simulation and determine the performance with respect to transmission of packets
5. Simulate an Ethernet LAN using n nodes and set multiple traffic nodes and plot congestion window for different source / destination.

PART-B

Implement the following in Java:

1. Write a program for error detecting code using CRC-CCITT (16- bits).
2. Write a program for distance vector algorithm to find suitable path for transmission.
3. Implement Diffie-Hellman Key exchange algorithm.

4. Write a program for simple RSA algorithm to encrypt and decrypt the data.
5. Write a program for congestion control using leaky bucket algorithm.

II. OPEN ENDED QUESTIONS

Develop/ Simulate the following applications:

1. Shortest Path from source to destination
2. File Transfer
3. Remote Login
4. Any other network and/or security application.
5. Using TCP/IP sockets, write a client – server program to make the client send the file name and to make the server send back the contents of the requested file if present.

NOTE:

1.STUDENT IS PERMITTED TO SUBMIT OPEN ENDED SOLUTION TO ANY OTHER OPEN ENDED QUESTION APART FROM THE LIST ABOVE . BUT IT HAS TO BE APPROVED BY THE STAFF IN CHARGE.

2. STUDENT IS REQUIRED TO SOLVE ONE PROBLEM FROM PART-A AND ONE PROBLEM FROM PART-B. THE QUESTIONS ARE ALLOTTED BASED ON LOTS. BOTH QUESTIONS CARRY EQUAL MARKS.

Course Outcomes:

After completing the course the students are able to:

CO1: Simulate a sample network on a virtual screen.

CO2: Design and analyze the network behavior against various parameters through simulation

CO3: Demonstrate error detection, routing protocol techniques

CO4: Implement an optimal routing table and apply security algorithms for a given network.

CO5: Demonstrate congestion control techniques.

COs	Mapping with POs
CO1	PO1,PO2,PO5,PO9,PO12
CO2	PO1,PO2,PO3,PO12
CO3	PO1,PO2,PO3,PO4,PO12
CO4	PO1,PO2,PO4,PO5,PO12
CO5	PO1,PO2,PO5,PO6,PO12

Sub Title : DATABASE APPLICATIONS LAB		
SubCode: 18ISL58	No. of Credits:1=0: 0 : 1 (L-T-P)	No. of lecture hours/week : 2
Exam Duration : 3 hours	Exam Marks: CIE + SEE = 50 + 50 =100	
Course Objectives: 1. To execute SQL commands. 2. To implement simple exercises on relational database schema. 3. To design a relational database schema for specific database application using SQL. 4. To apply the normalization procedure on relational database schema		

1. Consider the customer-sale scenario given below. The primary keys are underlined and the data types are specified:

CUSTOMER(Cust id : integer, cust_name: string)

ITEM(item_id: integer, item_name: string, price: integer)

SALE(bill_no: integer, bill_data: date, cust_id: integer, item_id: integer, qty_sold: integer)

For the above schema, perform the following:

- a) Create the tables with the appropriate integrity constraints
- b) Insert around 10 records in each of the tables
- c) List all the bills for the current date with the customer names and item numbers
- d) List the total Bill details with the quantity sold, price of the item and the final amount
- e) List the details of the customer who have bought a product which has a price>200
- f) Give a count of how many products have been bought by each customer
- g) Give a list of products bought by a customer having cust_id as 5
- h) List the item details which are sold as of today
- i) Create a view which lists out the bill_no, bill_date, cust_id, item_id, price, qty_sold, amount

- 2 Consider the following schema for a Library Database:

BOOK(Book_id, Title, Publisher_Name, Pub_Year)

BOOK_AUTHORS(Book_id, Author_Name)

PUBLISHER(Name, Address, Phone)

BOOK_COPIES(Book_id, Programme_id, No-of_Copies)

BOOK_LENDING(Book_id, Programme_id, Card_No, Date_Out, Due_Date)

LIBRARY_PROGRAMME(Programme_id, Programme_Name, Address)

Write SQL queries to

- a) Retrieve details of all books in the library – id, title, name of publisher, authors, number of copies in each Programme, etc.
- b) Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2019 to Jun 2019
- c) Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.

d) Partition the BOOK table based on year of publication. Demonstrate its working with a simple query.

e) Create a view of all books and its number of copies that are currently available in the Library.

3. Consider the Employee-pay scenario given below. The primary keys are underlined and the data types are specified:

EMPLOYEE(emp_id : integer, emp_name: string)

DEPARTMENT(dept_id: integer, dept_name:string)

PAYDETAILS(emp_id : integer, dept_id: integer, basic: integer, deductions: integer, additions: integer, DOJ: date)

PAYROLL(emp_id : integer, pay_date: date)

For the above schema, perform the following:

a) Create the tables with the appropriate integrity constraints

b) Insert around 10 records in each of the tables

c) List the employee details department wise

d) List all the employee names who joined after particular date

e) List the details of employees whose basic salary is between 10,000 and 20,000

f) Give a count of how many employees are working in each department

g) Give a names of the employees whose netsalary>10,000

h) List the details for an employee_id=5

i) Create a view which lists out the emp_name, department, basic, dedeuctions, netsalary

j) Create a view which lists the emp_name and his netsalary

4. Consider the following relational schema for the Office of the Controller of Examinations Application.

Student (Rollno, Name, Dob, Gender, Doa, Bcode);

Implement a check constraint for Gender

Branch (Bcode, Bname, Dno);

Department (Dno, Dname);

Course (Ccode, Cname, Credits, Dno);

Branch_Course (Bcode, Ccode, Semester);

Enrolls (Rollno, Ccode, Sess, Grade);

For Example, SESS can take values 'MAY2019', 'DEC2019' Implement a check constraint for

grade Value Set ('S', 'A', 'B', 'C', 'D', 'E', 'U'); Students are admitted to Branches and they

are offered by Departments. A branch is offered by only one department. Each branch has a set

of Courses (Subjects). Each student must enroll during a semester. Courses are offered by

Departments. A course is offered only by one department. If a student is unsuccessful in a course

he/she must enroll for the course during next session. A student has successfully completed a

course if the grade obtained by is from the list (A, B, C, D, and E). A student is unsuccessful if

he/she have grade 'U' in a course. Develop a SQL query to

a) list details of Departments that offer more than 3 branches.

b) list the details of Departments that offer more than 6 courses.

c) list the details of courses that are common for more than 3 branches.

d) list students who got 'S' in more than 2 courses during single enrollment.

- e) Create a view that will keep track of the roll number, name and number of courses, a student has completed successfully.

5. Consider the schema for Movie Database:

ACTOR (Act_id, Act_Name, Act_Gender)

DIRECTOR (Dir_id, Dir_Name, Dir_Phone)

MOVIES (Mov_id, Mov_Title, Mov_Year, Mov_Lang, Dir_id)

MOVIE_CAST (Act_id, Mov_id, Role)

RATING (Mov_id, Rev_Stars)

Write SQL queries to

- a) List the titles of all movies directed by 'Hitchcock'.
 - b) Find the movie names where one or more actors acted in two or more movies.
 - c) List all actors who acted in a movie before 2000 and also in a movie after 2015 (use JOIN operation).
 - d) Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title.
 - e) Update rating of all movies directed by 'Steven Spielberg' to 5.
6. Demonstrate the CRUD operations on MongoDB database.

II. OPEN ENDED QUESTIONS

1. Develop the Database applications for any of the following:
 1. customer-sales
 2. Student Library
 3. Employee-payroll
 4. Video Library
 5. Any Application
2. NO SQL Examples

NOTE :

1. THE EXERCISES ARE TO BE SOLVED IN AN RDBMS ENVIRONMENT LIKE ORACLE OR DB2.
2. STUDENT IS PERMITTED TO SUBMIT OPEN ENDED SOLUTION TO ANY OTHER OPEN ENDED QUESTION APART FROM THE LIST ABOVE . BUT IT HAS TO BE APPROVED BY THE STAFF IN CHARGE.
3. IN THE EXAMINATION EACH STUDENT PICKS ONE QUESTION FROM A LOT OF ALL 5 QUESTIONS AND STUDENT NEED TO DO EXTRA QUERIES ALSO.

Course Outcomes:

After completing the course the students are able to:


CO1: Apply the underlying concepts of database technologies.

CO2: Design and implement a relational database schema for a given problem-domain using SQL/MongoDb.

CO3: Develop sophisticated queries to extract information from large datasets.

COs	Mapping with POs
CO1	PO1,PO2,PO3
CO2	PO3,PO4,PO5,PO9
CO3	PO4,PO5,PO9, PO12

VI SEMESTER

	INTELLECTUAL PROPERTY RIGHTS		
	Subject Code: 18HS62	No. of Credits: 2	No of lecture hours per week: 2 Hrs
	Exam Duration: 2 HOURS	Exam Marks: 50	Total No. of lecture hours: 26hrs

Course Objective:

1. The main objective of the IPR is to make the students aware of their rights for the protection of their invention done in their project work.
2. To get registration in our country and foreign countries of their invention, designs and thesis or theory written by the students during their project work and for this they must have knowledge of patents, copy right, trademarks, designs and information Technology Act.
3. Further teacher will have to demonstrate with products and ask the student to identify the different types of IPR's

Unit No	Syllabus Content	Hours
1	INTRODUCTION TO IPR: Meaning of property, Origin, Nature, Meaning of Intellectual Property Rights, Introduction to TRIPS and WTO. Kinds of Intellectual property rights—Copy Right, Patent, Trade Mark, Trade Secret and trade dress, Design, Layout Design, Geographical Indication, Plant Varieties and Traditional Knowledge.	03
2	PATENT RIGHTS AND COPY RIGHTS— Origin, Meaning of Patent, Types, Inventions which are not patentable, Registration Procedure, Rights and Duties of Patentee, Assignment and licence , Restoration of lapsed Patents, Surrender and Revocation of Patents, Infringement, Remedies & Penalties. COPY RIGHT— Origin, Definition &Types of Copy Right, Registration procedure, Assignment & licence, Terms of Copy Right,Piracy, Infringement, Remedies, Copy rights with special reference to software.	10
3	RADE MARKS— Origin, Meaning & Nature of Trade Marks, Types, Registration of Trade Marks, Domain Names, Infringement & Remedies, Offences relating to Trade Marks, Passing Off, Penalties.	04
4	DESIGN- Meaning, Definition, Object, Registration of Design, Cancellation of Registration, International convention on design, functions of Design. Semiconductor Integrated circuits and layout design Act-2000.	05

5	BASIC TENENTS OF INFORMATION TECHNOLOGY ACT-2000- Cyber crimes, digital signature and E-Commerce.	04
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Course outcomes:

- The students once they complete their academic projects, they get awareness of acquiring the patent
- They also learn to have copyright for their innovative works.
- They also get the knowledge of plagiarism in their innovations which can be questioned legally.

TEXT BOOKS:

1. Intellectual Property Rights and the Law, Gogia Law Agency, by Dr. G.B. Reddy.
2. Law relating to Intellectual Property, Universal Law Publishing Co, by Dr. B.L.Wadehra.
3. IPR by P. Narayanan.
4. Law of Intellectual Property, Asian Law House, Dr.S.R. Myneni.

Sub Title AUTOMATA THEORY AND COMPILER DESIGN		
Sub Code: 18IS61	No. of Credits:4=3 : 1 : 0 (L-T-P)	No. of lecture hours/week : 4
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours : 52

Course objectives:

- 1.Introduce concepts in automata theory and to classify machines by their power to recognize languages.
- 2.To understand and design deterministic and non-deterministic finite automata, Regular languages.
3. To apply ideas and techniques discussed to various software designs. Recognize phases of compiler with respect to design.

Unit No.	Syllabus Content	No. of Hours
1	Introduction to Finite Automata: Introduction to Finite Automata; The central concepts of Automata theory; Deterministic finite automata; Non-deterministic finite Automata; Finite automata with Epsilon-transitions. Regular expressions and Languages, Properties of Regular Languages: Regular expressions; Finite Automata and Regular Expressions; Minimization of automata T1: Ch 1-Ch 4	10
2	Context-Free Grammars And Languages: Context free grammars; Writing a Grammar; Parse trees; Ambiguity in grammars. Normal forms for CFGs: Useless symbols, λ -productions, Unit productions, CNF, GNF. T1:Ch 5: 5.1-5.4; Ch 7: 7.1	10
3	Pushdown Automata: Definition of the Pushdown automata; Acceptance by empty stack and final state methods. Introduction To Turing Machine: The standard Turing machine; Design of Turing machine. T1:Ch 6: 6.1-6.2; Ch 8: 8.2-8.4	10
4	Introduction, Lexical analysis: Language processors; The structure of a Compiler. Lexical analysis: The Role of Lexical Analyzer. Syntax Analysis – 1: Introduction; Top-down Parsing: Recursive descent parser and Predictive parser. T2: Ch 1, T2: Ch 3, Ch 4: 4.1, 4.3-4.4	10
5	Syntax Analysis – 2: Bottom-up Parsing; Introduction to LR Parsing: Simple LR parser; More powerful LR parsers(CLR,LALR) Syntax-Directed Translation: Syntax-Directed definitions; Evaluation order for SDDs.	12

	Intermediate Code Generation: Variants of syntax trees; Three-address code. Code Generation: Issues in the design of Code Generator; The Target language; Basic blocks and Flow graphs; Optimization of basic blocks T2: Ch 4: 4.5-4.9 Ch 5: 5.1-5.2; Ch 6: 6.1-6.2; Ch 8: 8.1-8.5	
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Note 1: All Units will have internal choice.

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2;

Assignment – II from Units 3 and 4 .

Assignment -III from Unit 5

Course Outcomes:

After completion of course students will be able to:

CO1: Analyze concepts in automata theory and classify machines by their power to recognize languages.

CO2: Impart the knowledge of models of computation.

CO3: Design grammar and recognizers for different formal languages.

CO4: Design and solve problems related to Pushdown Automata & Turing Machine.

CO5: Demonstrate the syntax analysis and error correction strategies in Compiler Design.

COs	Mapping with POs
CO1	PO1,PO3, PO5
CO2	PO2,PO3,PO4,PO5
CO3	PO3,PO4,PO5
CO4	PO3,PO4,PO5
CO5	PO2,PO3,PO4

TEXT BOOKS:

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D.Ullman: Introduction to Automata Theory, Languages and Computation, 3rd Edition, Pearson Education, 2009.
2. Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffrey D Ullman, Compilers- Principles, Techniques and Tools - 2nd Edition, Addison-Wesley, 2010.

REFERENCE BOOKS/WEB LINKS:

1. John C Martin: Introduction to Languages and Automata Theory, 3rd Edition, Tata McGraw-Hill, 2007.
2. Nandini Prasad K.S: Automata Theory and Computability, 1st Edition, Cengage Publication, 2019.
3. Peter Linz: An Introduction to Formal Languages and Automata, 5th Edition, Jones and Bartlett, New Delhi, India, 2011.
4. Nandini Prasad K S, Principles of Compiler Design - 3rd Edition, Elsevier Publication, 2014.
5. http://mapmf.pmfst.unist.hr/~milica/Matem_teorija_r/MTR_web/Introduction%20To%20Automata%20Theory.pdf

Sub Title : MACHINE LEARNING		
Sub Code: 18IS62	No. of Credits: 4 =4:0:0:0	No. of lecture hours/week : 4
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours : 52
Course objectives: This course will enable students to: <ol style="list-style-type: none"> 1. Define machine learning and understand about various machine learning applications 2. Differentiate supervised, unsupervised and reinforcement learning methods 3. Apply decision trees, neural networks, Bayes classifier, Kmeans clustering and k-nearest neighbour methods for problems in machine learning 		

Unit No.	Syllabus Content	No. of Hours
1	INTRODUCTION TO MACHINE LEARNING: Introduction; Human learning and types of human learning; What is machine learning?; Types of machine learning; Well-posed learning problems; Designing a learning system; Applications of machine learning; Tools in machine learning; Machine learning activities; Issues in machine learning. CONCEPT LEARNING AND THE GENERAL-TO-SPECIFIC ORDERING: Concept learning task; Concept learning as search; Find-S algorithm; Version spaces and the Candidate-elimination algorithm. T2: Ch 1: 1.1- 1.8 ,T1: 1.1-1.3 ; T1:Ch 2:2.1-2.5 ,T2: 2.2 .	11
2	DECISION TREE LEARNING: Decision tree representation; Appropriate problems for decision tree learning; Basic decision tree learning algorithm; Hypothesis space search in decision tree learning; Inductive bias in decision tree learning; Issues in decision tree learning; T1:Ch 3: 3.2-3.7.	11
3	ARTIFICIAL NEURAL NETWORKS: Introduction; Neural Network representations; Appropriate problems for neural network learning; Perceptrons; Backpropagation algorithm. BAYESIAN LEARNING-I: Introduction; Bayes theorem; Bayes theorem and concept learning; T1`Ch 4: 4.1-4.4 (Only 4.4.1), 4.5 ;T1:Ch 6: 6.1-6.3(Only 6.3.1)	10
4	BAYESIAN LEARNING-II: Bayes optimal classifier; Naive Bayes classifier; Bayesian belief networks. CLUSTERING: Introduction; Kmeans clustering T1:Ch 6: 6.7, 6.9, 6.11	10
5	INSTANCE BASED LEARNING: Introduction; k-nearest neighbor learning	10

	REINFORCEMENT LEARNING: Introduction; Learning task. T1:Ch 8: 8.1-8.3; T1:Ch 13: 13.1-13.3 Use Cases: Applications of Reinforcement Learning in Finance, Banking	
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Note 1: All chapters will have internal choice.

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4 .

Assignment -III from Unit 5

Course Outcomes:

After completion of course students will be able to:

CO1: Identify problems of machine learning and it's methods

CO2: Apply apt machine learning strategy for any given problem

CO3: Design systems that uses appropriate models of machine learning

CO4: Solve problems related to various learning techniques

COs	Mapping with POs
CO1	PO1, PO2
CO2	PO3, PO4
CO3	PO2,PO3, PO5,PO12
CO4	PO4, PO9, PO12

TEXT BOOKS:

1. Tom M. Mitchell, “Machine Learning”, McGraw Hill Education. India Edition 2013.
2. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, “Machine Learning” , Pearson India Education Services Pvt. Ltd., 2019.

REFERENCE BOOKS/WEB LINKS:

1. Ethem Alpaydin, “Introduction to Machine Learning”, 2nd Ed., PHI Learning Pvt. Ltd., 2013.
2. T. Hastie, R. Tibshirani, J. H. Friedman, “The Elements of Statistical Learning”, Springer; 1st edition, 2001.
3. Peter Harrington , “Machine Learning in Action”, MANNING Shelter Island Publication, ISBN 9781617290183, 2012.

Weblinks:

1. [NPTEL course by Balaram Ravindran](#)
2. [FAST.ai course on ML](#)

Sub Title : CLOUD COMPUTING		
SubCode:18IS63	No. of Credits:3=3 : 0 : 0 (L-T-P)	No. of lecture hours/week : 3
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours : 39

Course Objectives:

1. To study the history and the fundamental concepts of Cloud Computing, Parallel, Distributed Computing and Virtualization.
2. To understand the concept of cloud computing architecture and different Cloud models.
3. To impart Cloud offerings which enhances the usage of Cloud.
4. To analyze the Cloud Storage and Security maintenances.
5. To become familiar with the different applications of Cloud Computing.

UNIT No	Syllabus Content	No of Hours
1	Introduction to Cloud Computing: Cloud Computing at a Glance, Historical Developments, Building Cloud Computing Environments Computing Platforms and Technologies. T1: Ch1: 1.1-1.3	7
2	Principles of Parallel and Distributed Computing: Eras of Computing , Parallel vs. Distributed Computing, Elements of Parallel Computing, Elements of Distributed Computing, Technologies for Distributed Computing Virtualization: Introduction, Characteristics of Virtualized Environments, Virtualization and Cloud Computing, Pros & Cons of Virtualization. Technology examples: Xen: paravirtualization, VMware: full virtualization, Microsoft Hyper-V. T1: Ch 2: 2.1-2.5, Ch 3: 3.1-3.6	9
3	Cloud Computing Architecture: Introduction, Cloud Reference Model, types of Clouds, Economics of the cloud, Open challenges. T1: Ch 4: 4.1-4.5	7
4	Cloud offerings: Cloud Analytics, Testing under cloud, Information Security, Virtual Desktop Infrastructure, Storage Cloud. Cloud management: Introduction, Resiliency, Provisioning, Asset management. Cloud governance, High availability and disaster recovery, Charging models, Usage reporting, Billing and metering. T2: Ch 3: 3.1-3.4	7
5	Cloud Platforms in Industry: Amazon Web Services, Google AppEngine. Cloud Applications: Scientific Applications, Business and Consumer Applications. T1: Ch 9: 9.1-9.2, Ch: 10: 10.1-10.2	9

Note 1: All chapters will have internal choice.

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4 .

Assignment -III from Unit 5

Course Outcomes:

After the completion of course, the student will be able to:

CO1: Analyze core concepts and fundamentals of the Cloud Computing.

CO2: Identify systems, protocols and mechanisms to support Cloud Infrastructure.

CO3: Analyze the Software and Hardware necessities for Cloud Computing.

CO4: Develop applications and host on Cloud Environment.

CO5: To manage the Cloud Environment.

COs	Mapping with Pos
CO1	PO4,PO5,PO10,PO11,PO12
CO2	PO1,PO2,PO4,PO7,PO8,PO9
CO3	PO2,PO3, PO4,PO5,PO9,PO10
CO4	PO3,PO4,PO5,PO7,PO8, PO9,PO10,PO11,PO12
CO5	PO4,PO5,PO6,PO7,PO8,PO10,PO11,PO12

TEXT BOOKS:

1. Rajkumar Buyya, Christian Vecchiola, S Thamarai Selvi ,Mastering Cloud Computing , Tata McGraw Hill Education Private Limited, 2013.
2. Dr. Kumar Saurabh , Cloud Computing , Wiley India, 2011.

REFERENCE BOOKS:

1. Dinkar Sitaram, Geetha Manjunath ,Moving to the Cloud. Elsevier Publications, 2011.
2. Barrie Sosinsky, Cloud Computing Bible , Wiley Publishing, Inc, 2011.

Sub Title : ADVANCED JAVA AND J2EE		
Sub Code:18IS641	No. of Credits: 3=3 : 0 : 0 (L-T-P)	No. of lecture hours/week : 3
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours : 39
Course Objectives: <ol style="list-style-type: none"> 1. Identify the need for advanced Java concepts like Enumerations and Collections 2. Construct client-server applications using Java socket API. 3. Make use of JDBC to access database through Java Programs. 4. Adapt servlets to build server side programs. 5. Demonstrate the use of JavaBeans to develop component-based Java software 		

Unit No.	Syllabus Content	No of Hours
1	Enumerations, Autoboxing and Annotations(metadata): Enumerations, Enumeration fundamentals, the values() and valueOf() Methods, java enumerations are class types, enumerations Inherits Enum, example, type wrappers, Autoboxing, Autoboxing and Methods, Autoboxing/Unboxing occurs in Expressions, Autoboxing/Unboxing, Boolean and character values, Autoboxing/Unboxing helps prevent errors, A word of Warning. Annotations, Annotation basics, specifying retention policy, Obtaining Annotations at run time by use of reflection, Annotated element Interface, Using Default values, Marker Annotations, Single Member annotations, Built-In annotations. T1:Ch 12	7
2	The collections and Framework: Collections Overview, Recent Changes to Collections, The Collection Interfaces, The Collection Classes, Accessing a collection Via an Iterator, Storing User Defined Classes in Collections, The Random Access Interface, Working With Maps, Comparators, The Collection Algorithms, Why Generic Collections?, The legacy Classes and Interfaces, Parting Thoughts on Collections. T1: Ch.17	8
3	String Handling : The String Constructors, String Length, Special String Operations, String Literals, String Concatenation, String Concatenation with Other Data Types, String Conversion and toString() Character Extraction,	08

	charAt(), getChars(), getBytes() toCharArray(), String Comparison, equals() and equalsIgnoreCase(), regionMatches() startsWith() and endsWith(), equals() Versus == , compareTo() Searching Strings, Modifying a String, substring(), concat(), replace(), trim(), Data Conversion Using valueOf(), Changing the Case of Characters Within a String, Additional String Methods, StringBuffer , StringBuffer Constructors, length() and capacity(), ensureCapacity(), setLength(), charAt() and setCharAt(), getChars(),append(), insert(), reverse(), delete() and deleteCharAt(), replace(), substring(), Additional StringBuffer Methods, StringBuilder T 1: Ch 15	
4	Background; The Life Cycle of a Servlet; Using Tomcat for Servlet Development; A simple Servlet; The Servlet API; The javax.servlet Package; Reading Servlet Parameter; The 08 javax.servlet.http package; Handling HTTP Requests and Responses; Using Cookies; Session Tracking. Java Server Pages (JSP): JSP, JSP Tags, Tomcat, Request String, User Sessions, Cookies, Session Objects T1: Ch 31, T2: Ch 11	08
5	The Concept of JDBC; JDBC Driver Types; JDBC Packages; A Brief Overview of the JDBC process; Database Connection; Associating the JDBC/ODBC Bridge with the Database; Statement Objects; ResultSet; Transaction Processing; Metadata, Data types; Exceptions. T2: Ch 06	08

Note 1: All Units will have internal choice.

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2;

Assignment – II from Units 3 and 4 .

Assignment -III from Unit 5

TEXT BOOK:

1. Herbert Schildt: JAVA the Complete Reference, 7th/9th Edition, Tata McGraw Hill, 2007.
2. Jim Keogh: J2EE-TheCompleteReference, McGraw Hill, 2007.

REFERENCE BOOKS:

1. Y. Daniel Liang: Introduction to JAVA Programming, 7thEdition, Pearson Education, 2007.
2. Stephanie Bodoff et al: The J2EE Tutorial, 2nd Edition, Pearson Education,2004.
3. Uttam K Roy, Advanced JAVA programming, Oxford University press, 2015.

Course Outcomes:

After the completion of the course students will be able to

CO1: Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs

CO2:Build client-server applications and TCP/IP socket programs

CO3: Illustrate database access and details for managing information using the JDBC API
CO4: Describe how servlets fit into Java-based web application architecture
CO5: Develop reusable software components using Java Beans

COs	Mapping with POs
CO1	PO1,PO2
CO2	PO1,PO2,PO3
CO3	PO1,PO3,PO4
CO4	PO1,PO4
CO5	PO1,PO2,PO3

Sub Title : MOBILE APPLICATION DEVELOPMENT		
Sub Code:18IS642	No. of Credits:3=3 : 0 : 0 (L-T-P)	No. of lecture hours/week : 3
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours : 39
Course Objectives: To understand fundamentals of Android OS, and use appropriate tools for Android Application development. <ol style="list-style-type: none"> To be familiar with managing of application resources to build elegant user interfaces with views, layouts & fragments To design styling, and common design patterns found among applications To understand storing of application data using preferences, files and directories, SQLite, and content providers. Develop, test, debug and publish mobile applications using android Platform. 		

UNIT No	Syllabus Content	No of Hours
1	Platform Overview: Introducing Android – History of Mobile Software Development, The Open Handset Alliance, Android Platform Uniqueness, The Android Platform, Setting Up Your Android Development Environment - Configuring Your Development environment, Exploring the Android SDK. Creating first android application - Testing Your Development Environment, Building Your First Android Application. Application Basics : Understanding Application Components - Mastering Important Android Terminology, The Application Context, Performing Application Tasks with Activities, Organizing Activity Components with Fragments, Managing Activity Transitions with Intents T1: Ch1, Ch2, Ch3,ch4	7
2	Application Basics Continued – Defining the Manifest , Managing Application Resources- What Are Resources?, Adding Simple Resource Values in Android Studio, Working with Different Types of Resources, Working with Layouts, Exploring Building Blocks, Positioning with Layouts, Partitioning with Fragments T1: Ch 5,Ch 6,Ch 7, Ch 8, Ch 9	9
3	Application Design Essentials: Architecting with Patterns-Architecting Your Application's Navigation, Encouraging Action,, Appealing with Style-Styling with Support, Themes and Styles, Colors, Layout, Embracing Material Design-Understanding Material, The Default Material Theme, Designing Compatible Applications -Maximizing	7

	Application Compatibility, Designing User Interfaces for Compatibility, Providing Alternative Application Resources, Targeting Tablets and TVs, Extending Application to Watches and Cars. T1: Ch 10, Ch11, Ch12, Ch 13	
4	Application Development Essentials: Using Android Preferences-Working with Application Preferences, Finding Preferences Data on the File System, Creating Manageable User Preferences, Auto Backup for Android Applications. Accessing Files and Directories: Working with Application Data on a Device, Practicing Good File Management, Understanding Android File Permissions, Working with Files and Directories, Saving with SQLite : Working with Databases Leveraging Content Providers - Exploring Android's Content Providers, Modifying Content Providers Data, Using Third-Party Content Providers T1: Ch 14,Ch15,Ch16, Ch17	9
5	Application Delivery Essentials: Testing Your Applications - Best Practices in Testing Mobile Applications, Android Application Testing Essentials, More Android Automated Testing Programs and APIs, Distributing Your Applications - Choosing the Right Distribution Model, Packaging Your Application for Publication, Publishing to Google Play, Google Play Staged Rollouts, Publishing to the Google Play Private Channel, Translating Your Application, Publishing Using Other Alternatives, Self-Publishing Your Application. T1: Ch 21 and Ch 22	7

Note 1: All units will have internal choice

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4 .

Assignment -III from Unit 5

Course Outcomes:

After completing the course the students are able to:

CO1: Analyze the fundamentals to build Mobile apps by assessing the basic framework by usage of Android SDK.

CO2: Design Android applications using various resources and built-in classes.

CO3: Apply creative skills in designing and deploying sophisticated mobile applications.

CO4: Design and deploy Android applications with compelling User Interfaces and databases.

CO5: Develop and publish the Android Application in the global marketplace for download.

COs	Mapping with POs
CO1	PO1, PO2, PO3, PO4
CO2	PO2, PO3, PO4, PO5, PO7

CO3	PO4, PO5, PO6, PO8, PO9,PO10
CO4	PO5,PO9, PO10,PO11
CO5	PO5, PO7, PO8, PO11, PO12

TEXT BOOK:

1. Joseph Annuzzi, Jr., Lauren Darcey, and Shane Conder - Introduction to Android Application Development - Android Essentials, Fifth Edition, Pearson education, 2016.

REFERENCE BOOKS:

1. Reto Meier: Professional Android 4 Application Development , Wrox Publication,2015
2. Phillips, Stewart, Hardy and Marsicano; Android Programming, 2nd edition - Big Nerd Ranch Guide;2015; ISBN-13 978-0134171494
3. Mark Murphy; Beginning Android 3; Apress Springer India Pvt Ltd. ;1st Edition; 2011;ISBN-13: 978-1-4302-3297-1
4. Eric Hellman; Android Programming – Pushing the limits by Hellman; Wiley; 2013; ISBN 13: 978-1118717370

Sub Title : NETWORK AND CYBER SECURITY		
Sub Code: 18IS643	No. of Credits:3=3 : 0 : 0 (L-T-P)	No. of lecture hours/week : 3
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours :39
Course Objectives: <ol style="list-style-type: none"> 1. To gain knowledge of cryptography 2. To acquire knowledge of application protocols to provide security. 3. To gain knowledge of securing data in transit across networks. 4. To introduce the area of cybercrime and Cyber security to students . 		

UNIT No	Syllabus Content	No of Hours
1	Classical Encryption Techniques : Symmetric Cipher Model: Cryptography, Cryptanalysis and Brute-Force Attack. Substitution Techniques:caeser cipher, monoalphabetic cipher, playfair cipher, hill cipher, polyalphabetic cipher, one-time pad Public-Key Cryptography Principles of public-key cryptosystems: Public-key cryptosystems, Applications for public-key cryptosystems, requirements for public-key cryptosystems, public-key cryptanalysis. RSA algorithm,ECC T1: Ch 1:1,2 Ch 8: 1,2	8
2	Electronic Mail Security: Pretty good privacy, notation, operational; description, S/MIME, RFC5322, Multipurpose internet mail extensions, S/MIME functionality, S/MIME messages, S/MIME certificate processing. T1:Ch 17: 1,2,3	8
3	IP Security: IP Security overview: Applications of IPsec, benefits of IPsec, Routing applications, IPsec documents, IPsec services, transport and tunnel modes. Encapsulating Security payload: ESP format, encryption and authentication algorithms, Padding, Anti replay service, transport and tunnel modes T1 :Ch 18:1,2,3	7
4	Transport Level Security: Web security considerations: Web security threats, Web Traffic security approaches Secure sockets layer: SSL architecture, SSL Record Protocol, Change Cipher Spec Protocol, Alert protocol, hand shake protocol T1 : Ch 15: 1,2,3,4,5	8
5	Introduction to Cybercrime & Cyber security: Introduction,Cybercrime:Definition and Origins of the word. Definition of Cyber Security. Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes. Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective. Cybercrime and the Indian ITA 2000. A Global Perspective on Cybercrimes. Cybercrime Era: Survival	8

	Mantra for the Netizens. Cyberoffenses: How Criminals Plan Them: Introduction, How Criminals Plan the Attacks. Social Engineering, Cyberstalking, Cyber cafe and Cybercrimes. Botnets: The Fuel for Cybercrime. Attack Vector. Cloud Computing. T2 : Ch 1, Ch 2	
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Note 1: All units will have internal choice

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4 .

Assignment -III from Unit 5

Course Outcomes:

After the completion of the above course students will be able to

CO1: Apply the knowledge of symmetric and asymmetric technique for securing data.

CO2: Analyze Email Security aspects and application protocols .

CO3: Analyze security aspects and protocols of IP layer .

CO4: Secure data in transit across network by using appropriate protocol.

CO5: Acquire Knowledge on the cyber security, cybercrime.

COs	Mapping with POs
CO1	PO2,PO3,PO6
CO2	PO2,PO6
CO3	PO2,PO6
CO4	PO3,PO6,PO12
CO5	PO2,PO7,PO8,PO12

TEXT BOOK:

1. William Stallings: Cryptography and Network Security, Principles and Practice Pearson, 6th edition 2014.
2. Sunit Belapure and Nina Godbole, “ Cyber Security: Understandign Cyber Crimes, Computer Forensics And Legal Perspectives”, Wiley India Pvt Ltd, ISBN:978-81-265-2179-1. Publish Date 2013.

REFERENCE BOOKS:

1. Jennifer L. Bayuk, Jason Healey, Paul Rohmeyer, “Cyber Security Policy Guidebook ” Wiley Publications .
2. Behrouz A. Forouzan: Cryptography and Network Security Tata-Macgraw Hill 2007

Sub Title : DATABASE MANAGEMENT SYSTEMS		
Sub Code:18ISE651	No. of Credits:3=3 : 0 : 0 (L-T-P)	No. of lecture hours/week : 3
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours :39
Course Objectives: <ol style="list-style-type: none"> 1. To analyze the basic concepts and architecture of DBMS. 2. To understand the conceptual and relational models to design databases. 3. To Create and manipulate a relational database using SQL. 4. To understand the normalization steps in database design and removal of data anomalies 		

UNIT No	Syllabus Content	No of Hours
1	Introduction: Introduction; Characteristics of Database approach; Actors on the screen; Workers behind the scene; Advantages of using DBMS approach; A when not to use a DBMS. Data models, schemas and instances; Three-schema architecture and data independence; Database languages and interfaces; The database system environment; Classification of Database Management systems. Entity-Relationship Model: Using High-Level Conceptual Data Models for Database Design; An Example Database Application; Entity Types, Entity Sets, Attributes and Keys; Relationship types, Relationship Sets, Roles and Structural Constraints; Weak Entity Types; Refining the ER Design; ER Diagrams, Naming Conventions and Design Issues; Relationship types of degree higher than two.	9
2	Relational Model and Relational Algebra: Relational Model Concepts; Relational Model Constraints and Relational Database Schemas; Update Operations, Transactions and dealing with constraint violations; Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary Relational Operations : JOIN and DIVISION; Additional Relational Operations; Examples of Queries in Relational Algebra. Relational Database Design Using ER-to-Relational Mapping	8
3	SQL :Schema Definition, Basic Constraints and Queries: SQL Data Definition and Data Types; Specifying basic constraints in SQL; Schema change statements in SQL; Basic queries in SQL; More complex SQL Queries. Insert, Delete and Update statements in SQL; Specifying constraints as Assertion and Trigger; Views (Virtual Tables) in SQL;	8
4	DatabaseDesign: Functional Dependencies and Normalization: Informal Design Guidelines for Relation Schemas; Functional Dependencies; Normal Forms Based on Primary Keys; General Definitions of Second and Third Normal Forms; Boyce-Codd Normal Form.	7

5	Transaction Management: Introduction to transaction processing, Transaction and system concepts, Desirable properties of transaction, Characterizing schedules based on recoverability, Characterizing schedules based on Serializability, Transaction support in SQL. Concurrency Control in Databases: Two-phase locking techniques for Concurrency control, Concurrency control based on Timestamp ordering,	7
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Note 1: Each unit will have internal choice.

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4 .

Assignment -III from Unit 5

Course Outcomes:

After completing the course the students are able to:

CO1: Analyze the database concepts and data models for real world applications.

CO2: Design a database schema for database application

CO3 : Design and apply the queries to the database to meet the user requirements.

CO4: Apply normalization techniques to database .

CO5: Analyze the concepts of transaction processing, Concurrency control

COs	Mapping with POs
CO1	PO2, PO4, PO5
CO2	PO2, PO4, PO5, PO6
CO3	PO2, PO3, PO5, PO9
CO4	PO2, PO3, PO5
CO5	PO4, PO6, PO9

TEXT BOOKS:

1. Elmasri and Navathe: Fundamentals of Database Systems, 6th Edition, Pearson Education, 2011.

REFERENCE BOOKS/WEBLINKS:

2. Silberschatz, Korth and Sudharshan: Data base System Concepts, 5th Edition, McGrawHill, 2006.

3. C.J. Date, A. Kannan, S. Swamynatham: A Introduction to Database Systems, 8th Edition, Pearson education, 2006.

4. Raghu Ramakrishna and Johannes Gehrke: Database Management Systems, 3rd Edition, McGraw-Hill, 2003.

5. www.w3resources.com

Sub Title : WEB TECHNOLOGIES		
Sub Code:18ISE652	No. of Credits:3=3: 0 : 0 (L-T-P)	No. of Lecture Hours/Week : 3
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours :39

Course Objectives:

1. To create a web page using XHTML
2. To understand Cascading Style Sheets
3. To do data validation and user interaction using JavaScript

Unit No..	Syllabus Content	No of Hours
1	Fundamentals of web, XHTML – 1: Internet, WWW, Web Browsers, and Web Servers; URLs; MIME; HTTP; Security; The Web Programmers Toolbox. XHTML-1 : Origins and evolution of HTML and XHTML; Basic syntax; Standard XHTML document structure; Basic text markup. XHTML – 2: Images; Hypertext Links; Lists; Tables; Forms; Frames; Syntactic differences between HTML and XHTML.	8
2	CSS: Introduction; Levels of style sheets; Style specification formats; Selector forms; Property value forms; Font properties; List properties; Color; Alignment of text; The Box model; Background images	9
3	Javascript: Overview of JavaScript; Object orientation and JavaScript; General syntactic characteristics; Primitives, operations, and expressions; Screen output and keyboard input; Control statements; Object creation and modification; Arrays; Functions; Constructor; Pattern matching using regular expressions	8
4	Javascript and HTML documents: The Javascript execution environment; The Document Object Model; Element access in Javascript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements; The DOM 2 event model	7
5	Dynamic documents with javascript: Introduction to dynamic documents; Positioning elements; Moving elements; Element visibility; Changing colors and fonts; Dynamic content; Stacking elements; Locating the mouse cursor; Reacting to a mouse click; Slow movement of elements; Dragging and dropping elements	7

Note 1: All Units will have internal choice.

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4 .

Assignment -III from Unit 5

Course Outcomes:

After the completion of the above course students will be able to

CO1: Identify and relate the different terms associated with web technologies.

CO2: Design simple web pages using different tags of XHTML.

CO3: Classify and use different levels of style sheets.

CO4: Validate and provide user functionality using JavaScript (client side data).

CO5: Access the different elements using JavaScript and make use pattern matching concepts

COs	Mapping with POs
CO1	PO2,PO3,PO5
CO2	PO1,PO2,PO3,PO6,PO7,PO9
CO3	PO2,PO3,PO5,PO6
CO4	PO2,PO3,PO5,PO6,PO9
CO5	PO2,PO3,PO5,PO6

TEXT BOOK:

Robert W. Sebesta: Programming the World Wide Web, 6th Edition, Pearson education, 2010

REFERENCE BOOKS / WEBLINKS:

1. M. Deitel, P.J. Deitel, A. B. Goldberg: Internet & World Wide Web How to Program, 5th Edition, Pearson education, 2012.
2. Chris Bates: Web Programming Building Internet Applications, 3rd Edition, Wiley India, 2006.
3. www.w3schools.com

Sub Title : UNIX AND SHELL PROGRAMMING		
Sub Code: 18ISE653	No. of Credits:3= 3: 0 : 0 (L-T-P)	No. of Lecture Hours/Week :3
Exam Duration : 3 hours	Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100	Total No. of Contact Hours : 39

Course Objectives:

1. Understand and execute the different types of unix command related to file, protection and security.
2. Develop shell programs using command substitution, positional parameters and control structures .
3. Implementation of SED and AWK commands.
4. Develop simple programs using PERL and AWK scripts.

Unit No.	Syllabus Content	No of Hours
1	<p>Introduction. The UNIX operating system, UNIX architecture, Features of UNIX, Command usage:- locating commands, internal and external commands, Man Browsing the manual pages ,Understanding the man documentation</p> <p>File system: - the file, what is in a file name?, The parent child relationship ,The HOME variable: the Home directory, Pwd: checking your current directory,Cd: changing the current directory Mkdir : making directories, Rmdir: removing current directories, Absolute pathnames Relative pathnames, Ls :listing directory contents, Unix file system.</p> <p>Basic file attributes: Ls -l: listing file attributes, the -d option: listing directory attributes,File ownership, File permission , Chmode: changing file permission (relative and absolute method), Directory permission, changing file ownership, chown, chgrp.</p> <p>The vi editor: Vi basics, three modes of vi editor ,Input mode –entering and replacing text, Saving text and quitting –the ex mode,Navigation, Editing text,Undoing last editing instructions, Repeating the last command, Searching for a pattern substitution.</p> <p>The shell: The shells interpretive cycle, shell offering, pattern matching. Escaping and quoting: Redirection: the three standard files,/dev/null and dev/tty: two special files,Pipe, Tee: creating a tee, Command substitution, Shell variables</p>	8
2	<p>The process: Process basics, Ps:process status, System process, mechanism of process creation,Internal and external commands, Process states and Zombies, Running jobs in background,Nice: job executing with low priority, Killing processes with signals, Job control , at and batch: execute later,cron:running jobs periodically,Time: timing processes</p> <p>Customizing the environment: The shells, Environmental variables, the common environmental variables,aliases,in-line command editing , The initialization scripts.</p> <p>More file attributes: File systems and Inodes, Hard links,Symbolic links and ln,</p>	8

	<p>The directory,Umask: Default file and directory permission, Modification and access times,Find: locating files,</p> <p>Simple filters: The sample database, Pr:printing files,Head: displaying the beginning of a file, Tail: displaying the end of a file,Cut: slitting a file vertically,Paste : pasting files,Sort: ordering a file, Uniq: locate repeated and non repeated lines, Tr:translating characters.</p>	
3	<p>Filters using regular expression: Introduction,grep: searching for a pattern,Basic regular expression(BRE), Extended regular expression(ERE) and egrep,Sed: the stream editor, Line addressing, using multiple instructions,Context addressingWriting selected lines to a file, Text editing,Substitution, basic regular expression</p> <p>Essential shell programming: Shell script, Read: making scripts interactive, Using command line arguments, Exit and exit status of command, Logical operator && and - conditional execution</p> <p>The if conditional, Using test and [] to evaluate expressions, The case conditional, Expr:computation and string handling , \$ 0: calling a script by different names,While: looping, For : looping with a list , Set and shift :manipulating the positional parameter,The header document , Trap :interrupting a program, Debugging shell script with set -x, Sample validation and entry scripts.</p>	8
4	<p>Awk-advanced filter: Simple awk filtering, Splitting a line into fields, Printf: formatting output,Variables and expressions, The comparison operators, Number processing,Variables, The -f option : storing awk programs in a file,The BEGIN and END section, Built in variables,Arrays, functions,Control flow – the if statement,Looping with for, Looping with while</p>	8
5	<p>Perl-the master manipulator: Perl preliminaries, The chop function, Variables and operators,The string handling functions, Specifying filenames in command line, \$-: the default variable,Current line number (\$) and range operator (..), Lists and arrays, Foreach:looping through a list,Split:, join,dec2bin.pl,grep,associative arrays,Regular expressions and substitution,File handling, file tests, subroutines</p>	7

Note 1: All units will have internal choice

Note 2: Three Assignments are evaluated for 5 marks:

Assignment – I from Units 1 and 2.

Assignment – II from Units 3 and 4

Assignment -III from Unit 5

Note 3: Group Activity is evaluated for 5 Marks

Course Outcomes:

After the completion of the above course students will be able to

CO1: Develop simple command level codes for file, process, redirection, piping, protection and security

CO2: Demonstrate the usage of shell using shell positional parameters and command substitution.

CO3: Demonstrate different types of SED addressing and AWK filtering.

CO4: Develop PERL programs for string usage, file concept and arrays handling.

COs	Mapping with POs
CO1	PO1, PO2,PO3,PO4
CO2	PO1,PO2,PO3,PO4,PO5
CO3	PO1,PO2,PO3,PO4,PO5
CO4	PO1,PO2,PO3,PO4,PO5,PO7

TEXT BOOK:

UNIX –Concepts and Applications, Sumitabha Das, 4 thEdition, Tata Mc GrawHill, 2006.
(Chapters 1,2, 2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 18, 19)

REFERENCE BOOKS:

1. UNIX and Shell Programming, Behrouz A. Forouzan and Richard F. Gilberg, Thomson, 2005.
2. Unix & Shell Programming, M.G. Venkateshmurthy, Pearson Education, 2005.

Sub Title: MACHINE LEARNING LAB		
SubCode: 18ISL66	No. of Credits:1=0: 0 : 1 (L-T-P)	No. of lecture hours/week : 2
Exam Duration : 3 hours	Exam Marks: CIE + SEE = 50 + 50 =100	
Course Objectives : This course will enable students to: <div><div>1.</div><div>Define machine learning and understand about various machine learning applications</div></div> <div><div>2.</div><div>Differentiate supervised, unsupervised and reinforcement learning methods</div></div> <div><div>3.</div><div>Apply decision trees, neural networks, Bayes classifier, K-means clustering and k-nearest neighbor methods for problems in machine learning</div></div>		

LIST OF PROGRAMS

PART-A:

Execute the following programs using Google Colab/Anaconda/Jupyter Notebook:

1. Demonstrate the following:
 - a. Creation of .CSV files
 - b. insert synthetic data manually into .CSV files
 - c. uploading of .CSV files from local drive to python environment.
 - d. uploading of .CSV files from Google drive to python environment.
2. Demonstrate how to generate synthetic datasets(not manual entry) and generate at least 4 features.
3. Demonstrate the working of Find-S algorithm for finding the most specificities hypothesis using appropriate training samples.
4. Implement Candidate Elimination algorithm and display all the consistent hypotheses using appropriate training samples.
5. Create a .CSV file for the datasets containing the following fields(age, income, student, credit_rating, Buys_computer) where Buys_computer is the target attribute and implement ID3 algorithm for the same.
6. Demonstrate the working of XOR gate using Artificial Neural network with Backpropagation method using Tanh activation function.
7. Implement KNN algorithm to classify “iris dataset” using Kaggle or Machine learning repositories.
8. Implement K-means algorithm using suitable dataset from Kaggle repository or any other

Machine Learning repositories.

PART-B: Virtual Lab

1.Implementation of AND/OR/NOT Gate using Single Layer Perceptron. 2.Understanding the concepts of Perceptron Learning Rule.

3.Understanding the concepts of Correlation Learning Rule.

Web link for 1,2 and 3:

http://vlabs.iitb.ac.in/vlabs-dev/labs/machine_learning/labs/index.php

4.Neural networks simulation

Web link for 4: <https://playground.tensorflow.org/>

Course Outcomes:

After completion of course students will be able to:

CO1: Identify problems of machine learning and it's methods

CO2: Apply apt machine learning strategy for any given problem

CO3: Design systems that uses appropriate models of machine learning

CO4: Solve problems related to various learning techniques

COs	Mapping with POs
CO1	PO1, PO2
CO2	PO3, PO4
CO3	PO3, PO5,PO6
CO4	PO4, PO9, PO12

Sub Title : CLOUD COMPUTING LAB		
Sub Code:18ISL67	No of Credits : 0:0:1(L:T:P)	No. of Lecture Hours/Week : 02
Exam Duration : 3 hours	Exam Marks :CIE +SEE = 50 + 50 =100	

Course Objectives:

1. To understand the working and usage of different cloud service models.
2. To study the basic understanding of Installation and Configuration of Cloud environment.
3. To understand the concept of Service Model and its usage in Cloud Computing.
4. To learn development of applications using IaaS, PaaS and SaaS.
5. Understand how Cloud environment works, for various deployment models.

I. LIST OF PROGRAMS

PART A

CLOUD COMPUTING:

1. Demonstrate the working of Google Drive to make spreadsheet and notes.
2. Installation, Configuration and working on Dropbox.
3. Demonstrate the working in Cloudanywhere to demonstrate different development stacks.
4. Demonstrate the working of Google Form to develop event feedback system.
5. Create an application in Salesforce.com to maintain product information.
6. Create an application in Salesforce.com to demonstrate master-child relationship on invoice bill.
7. Develop a Visual Force Page to demonstrate the working of dependent field.
8. Develop a Visual Force Page to demonstrate the working of basic visual components.
9. Demonstrate the working in Codenvy to illustrate Provisioning and Scaling of a Website.
10. Demonstrate Virtualization using VMware/Hypervisor.

II. OPEN ENDED QUESTIONS

1. Installation and Configuration of Cloudsim cloud software.
2. Installation and Configuration of OpenStack or any equivalent cloud software.
3. Design and implement Cloud based application(mini-project)

NOTE:

1. **STUDENT IS PERMITTED TO SUBMIT OPEN ENDED SOLUTION TO ANY OTHER OPEN ENDED QUESTION APART FROM THE LIST ABOVE . BUT IT HAS TO BE APPROVED BY THE STAFF IN CHARGE.**

2. STUDENT IS REQUIRED TO EXECUTE ONE PROGRAM FROM PART A and ONE PROGRAM FROM PART B .

Course Outcomes:

After the completion of course, the students will be able to:

CO1: Analyze the requirements to setup: Cloud Environment using IaaS Environment

CO2: Develop the ability to solve real-world problems through software development on Cloud Environment.

CO3: Implement, compile, test and run Java/Php/Python programs comprising on PaaS to address a particular software problem.

CO4: Design and develop useful Cloud applications with elegant user interfaces using SaaS.

COs	Mapping with POs
CO1	PO1,PO2,PO5,PO7,PO11
CO2	PO1,PO2, PO5, PO7,PO12
CO3	PO1,PO7,PO9,PO10,PO12
CO4	PO1,PO2,PO6,PO9,PO12

Sub Title : MINI PROJECT		
Sub Code:18ISMP68	No. of Credits: 3=0 : 0 : 3 (L-T-P)	No. of lecture hours/week : 3
Exam Duration : 3 hours	Exam Marks: CIE + SEE = 50 + 50 =100	

Sub Title : INTERNSHIP		
Sub Code:18ISMP68	No. of Credits:	No. of lecture hours/week
Exam Marks: CIE + SEE = 50 + 50 =100		