VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD

MINOR DEGREE IN COMPUTER SCIENCE AND ENGINEERING

S.NO	Course Code	Name of the Course	Sem	Scheme of Instruction			Scheme of Examination			
				Hours per Week			Duration in Hrs	Maximum Marks		Credits
				L	T	P		SEE	CIE	
THEORY & PRACTICALS										
1	U23MD510CS	Operating Systems	V	3	-	-	3	60	40	3
2	U23MD511CS	Operating Systems Lab	V	-	-	2	3	50	30	1
3	U23MD610CS	Database Management Systems	VI	3	-	-	3	60	40	3
4	U23MD611CS	Database Management Systems Lab	VI	-	-	2	3	50	30	1
5	U22MD710CS	Full Stack Web Development	VII	3	-	-	3	60	40	3
6	U22MD711CS	Full Stack Web Development Lab	VII	-	-	2	3	50	30	1
7	U22MD719CS	Course Project	VII	-	-	6	3	50	50	3
		TOTAL		**9**	**-**	**12**	-	**380**	**260**	**15**
		GRAND TOTAL		**21**				**640**		
NPTEL course : 12 weeks durations -3 credits										**3**
Total Credits										**18**

List of NPTEL Courses

S.No.	Title of the Course
1	The Joy of Computing using Python
2	Programming in Modern C++
3	Programming In Java
4	Software Engineering
5	Introduction to Internet of Things
6	Software Project Management
7	Data Structure and Algorithms using Java
8	Introduction to Machine Learning
9	Mathematical Foundations for Machine Learning
10	Artificial Intelligence: Search Methods for Problem Solving
11	Introduction to Industry 4.0 and Industrial Internet of Things
12	Data Structures and Algorithms Design

With effect from the Academic Year 2025-26

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

OPERATING SYSTEMS

SYLLABUS FOR MINOR DEGREE IN CSE V-SEMESTER

L:T:P (Hrs./week):3:0:0	SEE Marks:60	Course Code: **U23MD510CS**
Credits: 3	CIE Marks: 40	Duration of SEE: 3 Hours.

Course objective	Course outcomes
At the end of the Course students should be able to:	At the end of the Course students will be able to:
1. Understand different Operating system Structures, Services and apply methods to implement main memory & file system 2. Understand different case studies	1. Differentiate various Operating system structures and describe different services of Operating system 2. Describe different states of a process and illustrate various Process scheduling algorithms 3. Apply various Main memory management techniques 4. Illustrate file system implementation techniques and compare different operating systems

CO-PO and CO-PSO mapping

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1				1				2			1	1	
CO2	3	2		1						2				2	
CO3	3	2	2	1	1								1	2	
CO4	3	2				1				2			1	1	

UNIT-I

Introduction to operating systems: Definition, Clustered and Real time systems, OS System structure, OS Services, Difference between desktop, mobile and server operating system.

UNIT-II

Process: Process concept, Process Scheduling, Operations on process, Threads, Multi threading Models, Multi-core programming.

UNIT-III

Memory Management: Contiguous allocation, Paging, Demand paging, Page replacement algorithms

UNIT-IV

Deadlocks: System model, deadlock characterization, Methods for handling deadlocks, Deadlock Prevention, Deadlock Avoidance, Resource allocation graph, Bankers algorithm

UNIT-V

File System Interface: File Concept, Access Methods

File System Implementation: File-System Structure, File-System Implementation, Allocation Methods

Case Studies: Windows, Linux, Android

Learning Resources:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, 10th Edition Wiley India, 2018.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd Edition, Pearson Education, Asia-2001.
3. Dhananjay M. Dhamdhere, *Operating System-concept based approach*, 3rd edition, Tata McGraw Hill, Asia-2009
4. Robet Love: *Linux Kernel Development*, Pearson Education, 2004
5. Richard Stevens, Stephen Rago, *Advanced Programming in the UNIX Environment*, 3rd Edition, Pearson Education, 2013

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2025-26

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

OPERATING SYSTEMS LAB

SYLLABUS FOR MINOR DEGREE IN CSE V-SEMESTER

L:T:P (Hrs./week):0:0:2	SEE Marks:50	Course Code:**U23MD511CS**
Credits : 1	CIE Marks:30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Apply system calls for process management and file management 2 Implement techniques related to CPU Scheduling, Main memory management	1 Dual boot Operating system and partition the hard disk 2 Implement shell programs for a given task 3 Implement operations on Files and Process by using system calls 4 Implement CPU Scheduling algorithms 5 Implement Page Replacement techniques

CO-PO and CO-PSO mapping															
CO	**PO**												**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	1				1				2			1	1	
CO2	3	2		1						2				2	
CO3	3	2	2	1	1								1	2	
CO4	3	2				1				2			1	1	

Programming Exercise:

1. Building & Booting of Operating system, Disk partitioning and Dual boot of OS
2. Write shell programs by using simple shell commands

3. Write shell programs by using conditional statements
4. Write shell programs to showcase the usage of control loops
5. Write a C program to create a file
6. Write a C program to manipulate the contents of a file
7. Write a C program to create a child process
8. Write a C program to illustrate wait() system call
9. Write a C program to implement CPU scheduling algorithms
10. Write a C program to implement page replacement algorithms

Learning Resources:

1. Kernighan and Pike, UNIX Programming Environment, PHI/ Pearson Education
2. U. Vahalia, UNIX Internals: The New Frontiers, Pearson Education Inc.2003.
3. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, 10th Edition (2018), Wiley India.
4. Richard Stevens, Stephen Rago, *Advanced Programming in the UNIX Environment*, 3rd Edition(2013), Pearson Education
5. http://web.stanford.edu/~ouster/cgi-bin/cs140-spring19/index.php
6. https://nptel.ac.in/courses/106106144/

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DATABASE MANAGEMENT SYSTEMS

SYLLABUS FOR MINOR DEGREE IN CSE VI-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks:60	Course Code:**U23MD610CS**
Credits : 3	CIE Marks:40	Duration of SEE : 3 Hours

Course objective	Course outcomes
Students should be able to	At the end of the course, students will be able to
1. Identify different issues involved in the design and implementation of a database system. 2. Understand transaction processing, concurrency control and recovery techniques.	1. Identify the functional components of database management system. Create conceptual data model using Entity Relationship Diagram. 2. Transform a conceptual data model into a relational model. 3. Apply normalization techniques in database design. 4. Apply No-SQL concepts in the data base design. 5. Apply concurrency control techniques for efficient transaction management

CO-PO and CO-PSO mapping															
CO	**PO**												**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	2		2									1	1		2
CO2	2	1	2										1		2
CO3	3	1	2		3							2	2		3
CO4	3	1	2		3							1	2		3
CO5	3	1	1									1	2		3

UNIT-I

Introduction: Database System Application, Purpose of Database Systems, View of Data, Database Languages, Relational Database, Database Design, Specialty Databases, Data Storage and Querying, Database Users and Administrators.

Database Design and E-R Model: Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams, E-R Design Issues, Extended E-R features, Reduction to Relational Schemas, Other aspects of Database Design.

UNIT-II

Relational Model: Structure of Relation Database, Fundamental Relational Algebra Operations, Additional Relational Algebra Operations, Extended Relational Algebra Operations, Modification of the Database, Relational Calculus

Structured Query Language: Introduction, Basic Structure of SQL Queries, Set Operations, Additional Basic Operations, Aggregate Functions, Null Values, Nested Sub queries, Views, Join Expression.

UNIT-III

Advanced SQL: SQL Data Types, Integrity constraints Authorization, Functions and Procedural Constructs, Recursive Queries, Triggers, JDBC, ODBC and Embedded SQL.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and first Normal form, Decomposition Using Functional Dependencies, functional Dependency Theory.

UNIT-IV

No-SQL: Overview and History of NoSQL Databases. Definition of the Four Types of NoSQL Database, The Value of Relational Databases

Transaction Management: Transaction concept, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation and Atomicity, Serializability, Recoverability.

UNIT-V

Indexing and Hashing: Basic Concepts, Ordered Indices, B+ Tree Index Files, B-Tree Files, Multiple – Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing

Concurrency Control: Lock Based Protocols, Timestamp – Based Protocols Validation Based Protocols, Deadlock Handling.

Learning Resources

1. Abraham Silberschatz, Henry F Korth, Sudharshan S, Database System Concepts, 6th Edition(2011), McGraw-Hill International Edition.
2. Sadalage, P. & Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of
   Polyglot Persistence, Wiley Publications,1st Edition ,2019.

3. Date CJ, Kannan A, Swamynathan S, An Introduction to Database System , 8th Edition(2006) Pearson Education.
4. Raghu Ramakrishna, and Johannes Gehrke, Database Management Systems, 3rd Edition(2003), McGraw Hill.
5. RamezElmasri, Durvasul VLN Somyazulu, Shamkant B Navathe, Shyam K Gupta, Fundamentals of Database Systems, 4th Edition(2006), Pearson Education.
6. Peter rob, Carlos coronel, Database Systems, (2007), Thomoson.
7. http://nptel.ac.in/courses/106106093/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2025-26

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Department of Computer Science & Engineering

DATABASE MANAGEMENT SYSTEMS LAB

SYLLABUS FOR MINOR DEGREE IN CSE VI-SEMESTER

L:T:P (Hrs./week):0:0:2	SEE Marks:50	Course Code:**U23MD611CS**
Credits : 1	CIE Marks:30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Apply SQL commands on a database. 2 Develop an application using forms, reports and PL/SQL.	1 Design and implement a database schema. 2 Apply DDL, DML, DCL and TCL commands on a database. 3 Apply sub queries to get data from given database. 4 Implement PL/SQL programs for creating stored procedures.

CO-PO and CO-PSO mapping

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1		1	1								1	2	
CO2	3	2	2	2	3								1	2	
CO3	3	2	2	3	2	1							2	3	
CO4	3	2	2	1	3	1							2	3	
CO5	3	3	2	3	3	1							2	3	

Programming Exercise:

1. Creation of database tables without constraints.
2. Creating tables using combination of constraints.
3. Usage of Stored Functions.
4. Exercising all types of Joins.
5. Exercising complex Queries.
6. Exercising sub Queries.
7. Exercising sample PL/SQL programs

8. Demonstration of PL/SQL functions
9. Demonstration of PL/SQL Procedures

Learning Resources:

1. Ivan Bayross, SQL, PL/SQL, The Programming Language of Oracle, 4th Edition, PBP Publications.
2. Nilesh Shah, Database Systems Using Oracle, 2nd Edition(2007), PHI.
3. Rick F Van der Lans, Introduction to SQL, 4thEdition(2007), Pearson Education.
4. Benjamin Rosenzweig Elena Silvestrova, Oracle PL/SQL by Example, 3rdEdition(2004), Person Education.
5. Albert Lulushi, Oracle Forms Developer's Handbook, 1st Edition(2006), Pearson Education.
6. https://www.lynda.com/Access-tutorials/Welcome/195854/373426-4.html

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2025-26

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Department of Computer Science & Engineering

FULL STACK WEB DEVELOPMENT

SYLLABUS FOR MINOR DEGREE IN CSE VII-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:**U22DM710CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1. To Develop web application using HTML, CSS, JavaScript and PHP.	1. Design static web pages. 2. Apply styles to the web pages. 3. Create dynamic web pages using JavaScript. 4. Develop server-side components using Node.js.

CO-PO and CO-PSO mapping															
CO	**PO**												**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	1	1	2	1	3				1				2		
CO2	1	2	2	2	3				1				3		
CO3	1	3	2	2	3				1				3	1	
CO4	1	2	2	2	3				1				3	1	1
CO5	1	2	2	2	3				1				3	1	1

UNIT-I: Web Basics and overview: Introduction to Internet, World Wide Web, Web Browsers, Web Servers, URL, MIME, HTTP, Web Programmers Toolbox, Introduction to HTML Purpose of HTML and XHTML, Text Formatting, Hypertext Links, Images, Lists, Tables, Forms and Frames.

UNIT-II: Cascading Style Sheets- Levels of Stylesheet, Style Specification Formats, Selector Formats, Property Value Forms, Font Properties, List Properties, Alignment of Text, Box Model, Background Images, Borders, div and span tags, Conflict Resolution.

UNIT-III: JavaScript - Object Orientation and JavaScript, Primitives, Operations, Expressions, Control Statements, Object Creation, Arrays, Functions- Introduction, Program Modules in JavaScript, Programmer-Defined Functions, Function Definitions, Random-Number Generation, Scope Rules, JavaScript Global Functions, Recursion, Constructors, Regular Expressions, DOM Model, Events, Event Handling in JavaScript, JavaScript objects.

UNIT-IV: Multi-tier Architecture, Web server.

Node.js: Setup, Node Life cycle, REPL, Node Modules- FS, HTTP, URL, NPM, Redirecting Requests, Call backs and events.

UNIT-V: SQL database vs No SQL database.

MongoDB

SQL and NoSQL Concepts, Create and Manage MongoDB, CRUD operations on MongoDB, MongoDB with Node.js, Services Offered by MongoDB.

Learning Resources:

1. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Internet & World Wide Web How to Program, 5th Edition, Pearson Education.
2. Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node, Vasan Subramaniam, Apress, 2019
3. Robert W. Sebesta, "Programming the World Wide Web", Pearson Education.(3rd)
4. Uttam K.Roy, "Web Technologies", Oxford publishers.
5. http://www.w3schools.com

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

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Department of Computer Science & Engineering

FULL STACK WEB DEVELOPMENT LAB

SYLLABUS FOR MINOR DEGREE IN CSE VII-SEMESTER

L:T:P (Hrs./week):0:0:2	SEE Marks:50	Course Code:**U22MD711CS**
Credits : 1	CIE Marks:30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1. Develop web applications. 2. Publish web services.	1. Design a website using HTML. 2. Design webpages by applying CSS. 3. Design dynamic websites using JavaScript. 4. Develop dynamic web applications using server side code

CO-PO and CO-PSO mapping

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2	2	2	3	1			2				2		
CO2	2	2	2	2	3	1			2				3		
CO3	2	2	2	2	3	1			2				3	1	
CO4	2	2	2	2	3	1			2				3	1	1
CO5	2	2	2	2	3	1			2				3	1	1

Programming Exercise:

1. Creation of static website using HTML.
2. Creation of Web Site using HTML Forms.
3. Apply CSS to the Web Site.
4. Apply CSS box model to the Web Site.
5. Create a dynamic website using JavaScript.
6. Demonstrate event handling using JavaScript.
7. Validation of website using JavaScript.
8. Creation of dynamic content in a web Application using Node.
9. Program to perform CRUD operations on Mongo DB.
10. Creation of dynamic content in a web Application using Node and Mongo DB.

Learning Resources:

1. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Internet & World Wide Web How to Program, 5th Edition, Pearson Education.
2. Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node, Vasan Subramaniam, Apress, 2019
3. Robert W. Sebesta, "Programming the World Wide Web", Pearson Education.(3rd)
4. Uttam K.Roy, "Web Technologies", Oxford publishers.
5. http://www.w3schools.com

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

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Department of Computer Science & Engineering

COURSE PROJECT

SYLLABUS FOR MINOR DEGREE IN CSE VII-SEMESTER

L:T:P (Hrs./week): 0:0:6	SEE Marks:50	Course Code:**U22MD719CS**
Credits : 3	CIE Marks:50	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Develop an application in the relevant area of Computer Science. 2 Learn contemporary technologies.	1 Review the literature survey to identify the problem. 2 Design a model to address the proposed problem. 3 Develop and test the solution. 4 Demonstrate the work done in the project through presentation and documentation. 5 Adapt to contemporary technologies.

CO-PO and CO-PSO mapping

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2						2				2	3	1		2
CO2		3				2	2				2		2		2
CO3			3			2	2	3			2		1	3	3
CO4			2	3	3		2	3			2		3	3	3
CO5							1	3	3	3	2		1	1	2

The students are required to carry out a mini project in areas such as Data Structures, Database Management Systems, Operating Systems or any other area relevant to Computer Science and Engineering.

Students are required to submit a report on the mini project at the end of the semester.