

# Faculty of Engineering and Technology (Exclusively for Women) Department of Computer Science and Engineering

# **B.** Tech 3<sup>rd</sup> year (V and VI Semester) Scheme of Teaching and Examination



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

(Effective from the academic year 2024-25)

# Vision and Mission of Faculty of Engineering and

**Technology (Exclusively for Women)** 

VISION OF FACULTY OF ENGINEERING AND TECHNOLOGY (EXCLUSIVELY FOR WOMEN)

We aspire to become global model for women professional through quality education and ethical values in the field of Engineering and Technology.

MISSION OF FACULTY OF ENGINEERING AND TECHNOLOGY(EXCLUSIVELY FOR WOMEN)

- To inspire a research culture, encourage entrepreneurial efforts and empower globally to be great leaders.
- To create technical women's power to meet the current and future demand of the industry.
- To develop women professionals with good academic knowledge, technical skills, strong ethics and above all good human being.

#### VISION OF DEPARTMENT

Aspire to become a centre of excellence for quality technical education and research by keeping pace with new technologies to empower girl students to lead and excel in the field of Computer Science and Engineering along with ethical principles and a sense of social responsibility.

#### **MISSION OF THE DEPARTMENT**

- M1: To impart academic excellence, encourage research and innovation in Computer science and engineering.
- M2: To educate the students with knowledge and skills, encourage students to address societal problems through IT solutions.
- M3: To prepare students to develop entrepreneurship skills with proper ethical values and desire to pursue life-long learning.

#### **PROGRAM EDUCATIONAL OBJECTIVES (PEO'S)**

PEO1	Graduates will possess a strong foundation in Computer Science and Engineering that
	are required for problem solving to excel and succeed in their profession.
PEO2	Graduates will have scientific and engineering breadth to comprehend, analyse, design
	and solve real life problems using the acquired skills and lifelong learning.
PEO3	Graduates will have exposure to emerging cutting-edge technologies and adequate
	training with opportunity to work on multidisciplinary projects.
PEO4	Graduates will be professional with Ethical attitude, Effective communication skills,
	teamwork capability, and relate engineering issues to broader social context.

# **PROGRAM OUTCOMES (PO'S)**

**PO1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and computing to solve Computer Science and Engineering related problems.

**PO2:** Problem Analysis : Identify, formulate, Research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

**PO3:** 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 public health and safety, and cultural ,societal

**PO4:** 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.

**P05:** Modern tool usage :Create, select and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities related to Computer Science and Engineering with an understanding of the limitations.

**PO6:** 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.

**P07:** 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.

**PO8:** Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9:** Individual and Team Work: Function effectively as an individual and as a member or leader to diverse teams, and in multidisciplinary settings.

**P010:** 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 report and design documentation, make effective presentations, and give and receive clear instructions.

**P011:** 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.

**P012:** 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.

#### **PROGRAM SPECIFIC OUTCOME(PSO'S)**

Graduates of the Computer Science and Engineering program will be able to

**PSO1**: Apply principles of basic sciences and Engineering fundamentals in the field of Computer Science and Engineering

**PSO2**: Apply computational, algorithmic, and programming skills to implement solutions for real-life problems in diverse domain adapting to emerging technologies through lifelong learning

**PSO3**: Develop practical abilities, ethical understanding, effective communication and leadership skills for successful careers in industry or academia

			Sharnbasva University, Kalaburagi Scher	me of Teac	hing an	d Exan	ination 2	2022-23				
		[As Per	NEP, Outcome Based Education (OBE) a	nd Choice	Based (	Credit S	System (C	CBCS) S	cheme]			
	(Effective from the academic year 2022-23)											
			Programme:B.Tech:Compu	ter Science	e and Ei	ngineer	ing					
			VSEMI	ESTER	T							
				t	l gH	eachin ours/w	eek		Exai	ninatio	n	
Sl. No		CourseCode	CourseTitle	<b>FeachingDepa</b> ment	Theory	<sup>4</sup> Tutorial	Practical/ Drawing	)uration inHours	CIEMarks	SEEMarks	Total Marks	Credits
		1			L	1	Р		<b>–</b>	•1		<u> </u>
1	HSS	22HSM51	Management and Entrepreneurship Development	CSE	3			3	50	50	100	03
2	PCC	22CS52	System Software and Compiler Design	CSE	2	1		3	50	50	100	03
3	PCC	22CS53	Computer Networks	CSE	3			3	50	50	100	03
4	PEC	22CS54X	Professional Elective Course -I	CSE	3			3	50	50	100	03
5	OEC	22XX55X	Open Elective – I	CSE	4			3	50	50	100	04
6	PCC	22CSL56	System Software and Compiler Design Lab	CSE			2	3	50	50	100	01
7	PCC	22CSL57	Computer Networks Lab	CSE			2	3	50	50	100	01
8	PEC	22CSL58X	Professional Elective Course Lab	CSE			2	3	50	50	100	01
9	PW	22PRJ59	Project-V	Respecti			2	3	50	50	100	01
				ve Branch								
10	AEC	22AXX510 X	Ability Enhancement Course-V	Respecti ve Branch			2	3	50	50	100	01
		Total			15	1	10	30	500	500	1000	21

Note:PCC- Programme Core Course, PEC- Professional Elective Course, PW-Project Work, HSS-Humanity and Social Science, OEC- Open Elective Course, AEC- Ability Enhancement Course.

Project(PRJ): A Batch of 4 students (Same Branch or Different Branches with a Guide, May undertake one project.

	Profe	ssional Elective Course-I	
Coursecodeunder22CS54X	Course Title	Course code under 22CSL58X	Course Title
22C8541	Unix System Programming	22CSL581	Systems Programming Lab
22CS542	Computer Graphics and Fundamentals Image Processing	of 22CSL582	Computer Graphics and Fundamental of Image Processing Lab
22CS543	Cloud Computing	22CSL583	Cloud Computing Lab
22CS544	Advanced Java Programming	22CSL584	Advanced Java Programming Lab
<b>Open Elective Course – I</b>	· · · · · ·		
22CS551	Introduction to Data Structures		
22CS552	Fundamentals of Database Managemen System	it	
	Ability Enha	ncement Course-V	
Coursecodeunder22AEC510X	K Cours	e Title	
22ACS510A	Angula	r and Node JS	
22AAD510B	Microse	oft Power BI	
AICTE Activity Points: In ca the	se students fail to earn the prescribed acti	vity points, eighth semeste	r Grade Card shall be issued only after earning

Required activity points. Student shall be admitted for the award of the degree only after the release of the Eighth semester Grade Card.

	Sharnbasva University, Kalaburagi Scheme of Teaching and Examination 2022-23 [As Per NEP, Outcome Based Education (OBE) and Choice Based Credit System (CBCS) Scheme] (Effective from the academic year 2022-23)											
			Programme: B. Tech: Computer	<mark>r Science and I</mark>	Engine	ering						
			VI SEMES		T Ho k	'eachi ours/w	ng ⁄ee		Exa	minatio	n	
SI. No.	l. Course Code Course Title		Teaching Departme	Theory Lecture	1 Tutorial	ط Practical/ Drawing	Duration in Hours	CIE Marks	SEE Marks	Total Marks	Credits	
1	PCC	22CS61	Software Engineering	CSE	3	-	-	3	50	50	100	03
2	PCC	22CS62	Artificial Intelligence and Machine Learning	CSE	2	1		3	50	50	100	03
3	PEC	22CS63X	Professional Elective Course –II	CSE	3			3	50	50	100	03
4	PEC	22CS64X	Professional Elective Course –III	CSE	3			3	50	50	100	03
5	OEC	22XX65X	Open Elective Course –II	CSE	4			3	50	50	100	04
6	PCC	22CSL66	Software Engineering Lab	CSE			2	3	50	50	100	01
7	PCC	22CSL67	Artificial Intelligence and Machine Learning Lab	CSE			2	3	50	50	100	01
8	PEC	22CSL68X	Professional Elective Course Lab-II Lab	CSE			2	3	50	50	100	01
9	PW	22PRJ69	Project-VI	CSE			2	3	50	50	100	01
10	HSS	22HSM610A	Research Methodology and Intellectual Property Rights	Humanities	1			2	50	50	100	01
11	AEC	22AXX611X	Ability Enhancement Course-VI	CSE			2	3	50	50	100	01
		Total			16	1	10	32	550	550	1100	22

Note: PCC-Professional Core Course, PEC-Professional Elective Course, OEC-Open Elective Course, PW-Project Work, HSS-Humanity and Social Science, AEC- Ability Enhancement Course. Internship-To be carried out during the vacation/s of VI and VII semesters or VII and VIII semesters

Project (PRJ): A Batch of 4 students (Same Branch or Different Branches with a Guide, May undertake one project.

		Protession	al Elective Course-II				
Course code under 22XX63X	Course Title		Course code under 22XXL68X	Course Title			
22CS631	Full Stack Development		22CSL681	Full Stack Development Lab			
22CS632	Cryptography and Network	Security	22CSL682	Cryptography and Network Security Lab			
22AD633	Natural Language Processin	ıg	22ADL683	Natural Language Processing Lab			
22CS634	Mobile Application Develop	pment	22CSL684	Mobile Application Development Lab			
	1	Professional	Elective Course-III				
Course code under 22EC64X		<b>Course Title</b>					
22CS641		Image Processing					
22CS642		Blockchain Technology					
22CS643		Object Oriented Modelling and Design					
22CS644		Cognitive Science					
		Open E	lective Course –II				
22CS651		OOPS with C	++				
22CS652		Java Programming					
		Ability Enl	hancement Course-VI				
22AAD611A		Tableau					
22ACS611B		Devops					
AICTE Activity Points: In case	students fail to earn the pre	escribed activ	vity points, eighth semester Grade	e Card shall be issued only after earning the			
Required activity points. Stude	ent shall be admitted for the	award of the	e degree only after the release of t	the Eighth semester Grade Card			

MANAGEMENT AND	ENTREPRENEUR	SHIP DEVELOPME	NT	
[As per NEP Choi (Effective fr	ce Based Credit Syst	em (CBCS)scheme]		
(Enecuve n	SEMESTER-V	ai 2024-2023)		
Course Code	22HSM51	CIE Marks	50	
Number Lecture	03	SEE Marks	50	
Hour/Week				
Number of Lecture Hours	40	Exam Hours	03	
	CREDITS-03	. 1		
Lunderstand basic skills of Managen	e course is to enable a	students to:		
2 Understand the need for Entreprene	urs and their skills			
3. Identify the Management functions	and Social responsibil	lities.		
4. Distinguish between management a	and administration.			
5. Understand Project identification an	d Selection.			
	Modules			Hours
I	Module `-I			
Management: Introduction-Meaning-N	Nature and characteris	tics of management, S	scope	
and Functional areas of management-	Management as art of	f science, art or profes	sion-	
Management & Administration-Role	s of Management,	Levels of Manager	nent,	
Development of Management The	bught-Early manage	ment approaches-Mo	odern	
management approaches.				08
Planning: Nature Importance and nurnose of planning process objectives-types of				
plans (meaning only)-decision making	y. Importance of plan	nning-steps in planni	19 &	
planning premise- Hierarchy of plans.	5,p		-8	
	<u>, , , , , , , , , , , , , , , , , , , </u>			
Quanizing and Staffings Organi	lodule -11 zation Magning Ch	anatonistica Drocos	of	
Organizing Principles of Organizing Span of Management (meaning and importance)				
only), Departmentalization, Com	nittees–Meaning,	Types of Commi	ttees;	
Centralization Vs Decentralization of A	uthority and Respons	ibility;	,	
Staffing-Need and Importance, Recruit	ment and Selection Pr	ocess.		
				08
Directing: Meaning and Requirements of Effective Direction, Giving Orders;				
Motivation-Nature of Motivation, Motivation Theories (Maslow's Need-Hierarchy				
Ineory and Herzberg's Iwo Factor Theory); Communication – Meaning, Importance				
Approach of Leadership	eadersnip-Meaning,	naracteristics, Benav	/ioral	
Approach of Leadership.	Iodule -III			
<b>Coordination:</b> Coordination-Meaning.	Types. Techniques of	f Coordination:		
<b>Controlling</b> – Meaning, Need for Con	ntrol System, Benefit	s of Control, Essentia	als of	
Effective Control System, Steps in Con	trol Process.	,		
Authority delegation: Meaning, advantage of effective delegation, barriers to effective				08
delegation, guidelines for effective delegation.				
Decentralization: Decentralization of a	uthority meaning, dis	tinction between deleg	ation	
and decentralization, the trade-off of ce	ntralization and decer	itralization.		
Entrepreneurship Definition of E	viouule -4 ntrepreneur Importo	nce of Entrenrenau	rchin	
concepts of Entrepreneurship Characte	ristics of successful I	Entrepreneur Classific	ation	
of Entrepreneurs. Myths of Entrepren	eurship. Entrepreneu	rial Development mo	odels.	08
Entrepreneurial development cycle	p, Endeprened	2 c c c phiene inc		

	1
Modern Small Business Enterprises: Role of Small Scale Industries, Impact of	1
Globalization and WTO on SSIs, Concepts and definitions of SSI Enterprises,	1
Government policy and development of the Small Scale sector in India, Growth and	1
Performance of Small Scale Industries in India, Sickness in SSI sector, Problems for	1
Small Scale Industries, Ancillary Industry and Tiny Industry (Definition only).	1
Module -5	
Projects Management: A Project. Search for a Business idea: Introduction, Choosing	1
an Idea, Selection of product, The Adoption process, Product Innovation, Product	1
Planning and Development Strategy, Product Planning and Development Process.	1
Concepts of Projects and Classification: Introduction, Meaning of Projects,	08
Characteristics of a Project, Project Levels, Project Classification, Aspects of a Project,	1
The project Cycle, Features and Phases of Project management, Project Management	1
Processes. Project Identification: Feasibility Report, Project Feasibility Analysis.	1
Project Formulation: Meaning, Steps in Project formulation, Sequential Stages of	1
Project Formulation, Project Evaluation.	1
Project Design and Network Analysis: Introduction, Importance of Network	1
Analysis, Origin of PERT and CPM, Network, Network Techniques, Need for Network	1
Techniques, Steps in PERT, CPM, Advantages, Limitations and Differences.	ļ

# COURSE OUTCOMES (COS):

CO1	Understand the fundamental concepts of Management and Entrepreneurship and opportunities in order to setup a business.
CO2	Identify a required organizing committee and staffing.
CO3	Understand the techniques of coordinates and authority delegates.
CO4	Design and develop project management and network analysis.
CO5	Develop a entrepreneurial mindset and leadership skills to drive organizationa success

#### **Question paper pattern**

- The question paper will have TEN questions
- Each full question carries 20 marks
- There will be two full questions (with a maximum of THREE sub questions) from each module
- Each full question will have sub questions covering all topics under a module
- The students will have to answer 5 full questions, selecting one full question from each module

#### **Textbooks:**

1.Principles of Management – P.C Tripathi, P.N Reddy, McGraw Hill Education, 6th Edition, 2017. ISBN-13:978-93-5260-535-4.

2.Entrepreneurship Development Small Business Enterprises- Poornima M Charantimath, Pearson Education 2008, ISBN 978-81-7758-260-4.

3.Dynamics of Entrepreneurial Development and Management by Vasant Desai. HPH 2007, ISBN: 978- 81-8488-801-2.

4.Robert D. Hisrich, Mathew J. Manimala, Michael P Peters and Dean A. Shepherd, "Entrepreneurship", 8th Edition, Tata Mc-graw Hill Publishing Co.ltd.-new Delhi, 2012

#### **Reference Books:**

1.Essentials of Management: An International, Innovation and Leadership perspective by Harold Koontz, Heinz Weihrich McGraw Hill Education, 10th Edition 2016. ISBN- 978- 93-392-2286-4.

#### SYSTEM SOFTWARE AND COMPILER DESIGN [As per NEP Choice Based Credit System (CBCS)scheme] (Effective from the academic year 2024-2025) SEMESTER – V

Course Code	22CS52	CIE Marks	50	
Number Lecture Hour/Week	03	SEE Marks	50	
Number of Lecture Hours	40	Exam Hours	03	
		CREDITS-03	I	
Course Objectives: This cours	e will enable stu	idents to:		
• Define System Software.				

- Familiarize with source file, object file and executable file structures and libraries
- To Teach concepts of language translation and phases of compiler design
- To demonstrate the common forms of parsers
- To demonstrate intermediate code using technique of syntax-directed translation

Modules	Hours
Module -I	
Introduction to System Software, Machine Architecture of SIC and SIC/XE. Assemblers: Basic assembler functions, machine dependent assembler features, machine independent assembler features, assembler design options. Basic Loader Functions Text book 1: Chapter 1: 1.1,1.2,1.3.1,1.3.2, Chapter2 : 2.1 to 2.4, Chapter 3 ,3.1	08
Module -II	
<b>Introduction:</b> Language Processors, The structure of a compiler, The evaluation of programming languages, The science of building compiler, Applications of compilertechnology. <b>Lexical Analysis:</b> The role of lexical analyzer, Input buffering, Specifications of token, recognition of tokens. <b>Text book 2:</b> Chapter 1 1.1-1.5 Chapter 3: 3.1 – 3.4	08
Module -III	
Syntax Analysis: Introduction, Context Free Grammars, Writing a grammar, Top- DownParsers, Bottom-Up Parsers <b>Text book 2: Chapter 4 4.1, 4.2 4.3 4.4 4.5</b>	08
Module-IV	
Lex and Yacc –The Simplest Lex Program, Grammars, Parser-Lexer Communication, AYACC Parser, The Rules Section, Running LEX and YACC, LEX and Hand- Written Lexers, Using LEX - Regular Expression, Examples of Regular Expressions, A WordCounting Program, Using YACC – Grammars, Recursive Rules, Shift/Reduce Parsing, What YACC Cannot Parse, A YACC Parser - The Definition Section, The Rules Section, The LEXER, Compiling and Running a Simple Parser, Arithmetic Expressions and Ambiguity. <b>Text book 3: Chapter 1,2 and 3</b>	08

Module-V	
Syntax Directed Translation, Intermediate code generation, Code generation <b>Text book 2: Chapter 5.1, 5.2,</b> <b>5.3, 6.1, 6.2, 8.1, 8.2RBT: L1, L2, L3</b>	08

# COURSE OUTCOMES (COS):

CO1	Understand and apply the fundamental concepts of system software, and the core functions of assemblers and loaders.
CO2	Analyze, design, and implement lexical analyzers, evaluate programming languages, and understand the structure and functioning of compilers.
CO3	Develop Top Down and Bottom Up Parser
CO4	Design and implement lexical analyzers and parsers using Lex and YACC
CO5	Apply syntax-directed translation methods, generate intermediate code, and implement code generation techniques

#### **Question paper pattern**

- The question paper will have TEN questions
- Each full question carries 20 marks
- There will be two full questions (with a maximum of THREE sub questions) from each module
- Each full question will have sub questions covering all topics under a module
- The students will have to answer 5 full questions, selecting one full question from each module

#### **Textbooks:**

- 1. System Software by Leland. L. Beck, D Manjula, 3rd edition, 2012
- Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers-Principles, Techniques and Tools, Pearson, 2nd edition, 2007
- Doug Brown, John Levine, Tony Mason, lex & yacc, O'Reilly Media, October 2012.

#### **Reference Books:**

- 1. Systems programming Srimanta Pal, Oxford university press, 2016
- 2. System programming and Compiler Design, K C Louden, Cengage Learning
- 3. System software and operating system by D. M. Dhamdhere TMG

Compiler Design, K Muneeswaran, Oxford University Press 2013. E-books and Online course materials

1.http://sit.ac.in/html/component/csedept/csecoursematerial/SSCDNotes.pdf

#### **Online Courses and Video Lectures**

1.https://onlinecourses.nptel.ac.in/noc21\_cs07/preview

2.https://www.youtube.com/playlist?list=PL1A5A6AE8AFC187B7

[As per C (Effec	COMPUTER hoice Based Cred tive from the aca SEMES	NETWORKS lit System (CBCS) demic year 2024-2 FER – V	scheme] (025)	
Course Code	22CS53	CIE Marks	50	
Number Lecture Hour/Week	03	SEE Marks	50	
Number of Lecture Hours	40	Exam Hours	03	
	CRED	ITS-03	I	
<ol> <li>Course Objectives:</li> <li>Explore basic concepts of data</li> <li>Understand the working of Data</li> <li>Learn network layer services a</li> <li>Discuss transport layer services</li> <li>Demonstrate the working of di</li> </ol>	communication calink Layer nd IP versions. s and understand U fferent Applicatio	UDP and TCP proton layer protocols.	ocols.	
	Iviodules			Hours
	Modu	ule -I		
Introduction: Data Communications Layering, TCP/IP Protocol suite, Th media, Guided Media, Unguided M	, Networks, Ne	rk Types, Networks M duction to Physical La tching: Packet Switch	Models: Protocol ayer: Transmission ing and its types.	08
	Modu	lle -II		
Data Link Layer: Error Detection an link control: DLC Services: Framing Oriented, Data link layer protocols, H Access, Controlled Access. Check Su	d Correction: Intro , Flow Control, Err High Level Data Lin um and Point to Point Modu	duction, Block Codir for Control, Connecti nk Control. Media Ac nt Protocol	ng, Cyclic Codes. Data onless and Connection ccess Control: Random	08
	Wibuu	к -ш		
Network Layer: Network layer Ser Datagram, Introduction to Routing Unicast Routing protocols: RIP, OS	vices, Packet Swite g Algorithms, Unic PF, BGP, Multicast	ching, IPv4 Address, cast Routing Protoco ing Routing-MOSPF	IPv4 Datagram, IPv6 bls: DVR, LSR, PVR,	08
	Mod	ule-IV		1
Transport Layer: Introduction, Tran Transmission Control Protocol: service control, Congestion control	nsport-Layer Protoc vices, features, segr	cols: Introduction, Us nents, TCP connectio	ser Datagram Protocol, ons, flow control, Error	08
	Modu	ıle-V		·
Application Layer: Introduction, Cli World Wide Web and HTTP, FTP, Secure Shell (SSH)	ient-Server Program Electronic Mail, Do	nming, Standard Clier main Name System (	nt Server Protocols: DNS), TELNET,	08

CO1	Demonstrate basics of communication and computer networks
CO2	Apply the concepts of error detection, correction and datalink layer protocols to real world scenarios
CO3	Analyze the services provided by network Layer
CO4	Comprehend the functionalities of the transport layer
CO5	Develop and manage networked applications for different protocols.

#### **Question paper pattern**

- The question paper will have TEN questions
- Each full question carries 20 marks
- There will be two full questions (with a maximum of THREE sub questions) from each module
- Each full question will have sub questions covering all topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module

#### **Text Books:**

1. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition TMH.

#### **Reference Books:**

1. Computer Networks, Andrew S Tanenbaum, 6th Edition. Pearson Education.

2. Computer Networking: A Top-Down Approach Featuring the Internet. James F. Kurose & Keith W. Ross, 3rd Edition, Pearson Education

3. Data communications and Computer Networks, P.C Gupta, PHI.

4. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education.

#### E-books and Online course materials

1. IEEE Transactions on Networking.

2. Elsevier Journal of Computer Networks

3. Springer Journal of communications and Information networks

#### **Online Courses and Video Lectures**

- 1. https://www.digimat.in/nptel/courses/video/106105183/L01.html
- 2. <u>http://www.digimat.in/nptel/courses/video/106105081/L25.html</u>
- 3. https://nptel.ac.in/courses/10610

UNIX SYSTEM PROGRAMMING [As per Choice Based Credit System (CBCS)scheme] (Effective from the academic year 2023-2024) SEMESTER V				
Course Code	22CS541	CIE Marks	5	50
Number of Lecture				-
Hours/Week	03	SEE Marks	5	50
Total Number of	40	БИ		
Lecture Hours	40	Exam Hours	l (	13
Course Objectives:	CRED	ITS – 03		
<ol> <li>Understand the basic concep</li> <li>Able to analyze the different</li> <li>Students will be use UNIX of</li> </ol>	t of UNIX architect types of files and c commands in solvir	ure and basic UNIX ommands used in UNIX. ag problems.		
	Modules			Hours
	Module I			
Introduction: UNIX and ANSI Standards, Difference between FIPS Standard, The X/Open Sta UNIX and POSIX Development	Standards: The AN ANSI C and C++, indards. UNIX and Environment, API	JSI C Standard, The ANS The POSIX Standards, Th POSIX APIs: The POSIX Common Characteristics.	I/ISO C++ e POSIX.1 APIs, The	08
Unix Basics :UNIX Architectu Attributes, Inodes in UNIX, A Hard and Symbolic Links	re, Files and Dire pplication Program	ctories, File Types, The n Interface to Files, Direc	UNIX File ctory Files,	
	Module II			
UNIX File APIs: General File Device File APIs, FIFO File AF Class for Regular Files, dirfile Class, Symbolic Link File Class UNIX Processes: The Environ Process Termination, Command a C Program, Shared Libraries, and longjmp Functions, getrif	APIs, File and R PIs, Symbolic Link Class for Directory , File Listing Progra ment of a UNIX I I-Line Arguments, I Memory Allocatio imit, setrlimit Fun	ecord Locking, Directory File APIs, General File Cl / Files, FIFO File Class, I am. Process: Introduction, mai Environment List, Memory n, 57 Environment Variab actions, UNIX Kernel S	File APIs, lass, regfile Device File n function, / Layout of les, setjmp upport for	08
	Mod	ule III		
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		08		
	Modı	ıle IV		
Signals and Daemon Processes: Signal Mask, sigaction, The SIC and siglongjmp Functions, Kil Processes: Introduction, Daemo	Signals: The UNE GCHLD Signal and l, Alarm, Interval n Characteristics. (	X Kernel Support for Sign the waitpid Function, The Timers, POSIX.lb Timers Coding Rules, Error Loggi	als, signal, e sigsetjmp s. Daemon ng, Client-	08

Server Model.

Module V		
Interprocess Communication – 1: Overview of IPC Methods, Pipes, popen, pclose Functions, Coprocesses, FIFOs, System V IPC, Message Queues, Semaphores.	08	
Interprocess Communication – 2: Shared Memory, Client-Server Properties, Stream Pipes, Passing File Descriptors, An Open Server-Version 1, Client-Server Connection Functions.		

# Course Outcomes (COs):

CO1	Understand UNIX architecture, POSIX standards, and file management concepts
CO2	Use UNIX file APIs and understand process environment and memory management.
CO3	Apply process control and manage job execution in UNIX.
CO4	Understand and apply signal handling and daemon process management in UNIX
CO5	Implement IPC methods and client-server communication in UNIX

## Question paper pattern

- The question paper will have TEN questions
- Each full question carries 20 marks
- There will be two full questions (with a maximum of THREE sub questions) from each module
- Each full question will have sub questions covering all topics under a module.

The students will have to answer 5 full questions, selecting one full question from each module

# Text Book

1.Terrence Chan: UNIX System Programming Using C++, Prentice Hall India, 1999. (Chapters 1, 5, 6, 7, 8, 9, 10)

2.W. Richard Stevens: Advanced Programming in the UNIX Environment, 2nd Edition, Pearson Education, 2005. (Chapters 7, 8, 9, 13, 14, 15)

## **Reference Books**

1.Marc J. Rochkind: Advanced UNIX Programming, 2nd Edition, Pearson Education, 2005.

2.Maurice J Bach: The Design of the UNIX Operating System, Pearson Education, 1987.58

3. Uresh Vahalia: UNIX Internals: The New Frontiers, Pearson Education, 2001.

E-books and Online course materials:

## http://www.free-ebooks.net/

Online Courses and Video Lectures

https://nptel.ac.in/courses

#### Computer Graphics and Fundamentals of Image Processing [As per NEP Choice Based Credit System (CBCS)scheme] (Effective from the academic year 2024-2025) SEMESTER – V

SEN	ESTER = V		
Course Code	22CS542	CIE Marks	50
Number Lecture Hour/Week	03	SEE Marks	50
Number of Lecture Hours	40	Exam Hours	03

# CREDITS-03

#### **Course Objectives:**

- Overview of Computer Graphics along with its applications.
- Exploring 2D and 3D graphics mathematics along with OpenGL API's. CLO
- Use of Computer graphics principles for animation and design of GUI's .
- Introduction to Image processing and Open CV.
- Image segmentation using Open CV

Modules	Hours
Module -I	
Overview: Computer Graphics hardware and software and OpenGL: Computer Graphics: Video Display Devices, Raster-Scan Systems Basics of computer graphics, Application of Computer Graphics. OpenGL: Introduction to OpenGL, coordinate reference frames, specifying two- dimensional world coordinate reference frames in OpenGL, OpenGL point functions, OpenGL line functions, point attributes, line attributes, curve attributes, OpenGL point attribute functions, OpenGL line attribute functions, Line drawing algorithms (DDA, Bresenham's). Textbook 1: Chapter -1,2,3, 5(1 and 2 only)	08
Module -II	
2D and 3D graphics with OpenGL: 2D Geometric Transformations: Basic 2D Geometric Transformations, matrix representations and homogeneous coordinates, 2D Composite transformations, other 2D transformations, raster methods for geometric transformations, OpenGL raster transformations; OpenGL geometric transformations function, 3D Geometric Transformations: Translation, rotation, scaling, composite 3D transformations, other 3D transformations, OpenGL geometric transformations functions.	08
Textbook 1: Chapter -6, 8	

Module -III	
Interactive Input Methods and Graphical User Interfaces: Graphical Input Data ,Logical Classification of Input Devices, Input Functions for Graphical Data , Interactive Picture-Construction Techniques, Virtual- Reality Environments, OpenGL Interactive Input-Device Functions, OpenGL Menu Functions , Designing a Graphical User Interface. Computer Animation :Design of Animation Sequences, Traditional Animation Techniques, General Computer-Animation Functions, Computer-Animation Languages, Character Animation, Periodic Motions, OpenGL Animation Procedures. Textbook 1: Chapter -11, 18	08
Module-IV	
Introduction to Image processing: overview, Nature of IP, IP and its related fields, Digital Image representation, types of images. Digital Image Processing Operations: Basic relationships and distance metrics, Classification of Image processing Operations. Text book 2: Chapter 3	08
Module-V	
Image Segmentation: Introduction, classification, detection of discontinuities, Edge detection (up to canny edge detection(included)).	08
Text Book 2: Chapter 9: 9.1 to 9.4.4.4	

CO1	Construct geometric objects using Computer Graphics principles and OpenGL APIs.
CO2	Analyze OpenGL APIs and related mathematics for 2D and 3D geometric Operations on the objects.
CO3	Design GUI with necessary techniques required to animate the created objects
CO4	Understanding the basics of Image processing applications.
CO5	Apply Image segmentation techniques for developing simple applications.

#### **Question paper pattern**

- The question paper will have TEN questions
- Each full question carries 20 marks
- There will be two full questions (with a maximum of THREE sub questions) from each module
- Each full question will have sub questions covering all topics under a module.

The students will have to answer 5 full questions, selecting one full question from each module

#### Textbooks

1.Donald D Hearn, M Pauline Baker and WarrenCarithers: Computer Graphics with OpenGL 4th Edition, Pearson, 2014

2.S. Sridhar, Digital Image Processing, second edition, Oxford University press 2016.

#### **Reference Books**

Edward Angel: Interactive Computer Graphics- A Top Down approach with OpenGL,
 5th edition. Pearson Education, 2008

2.James D Foley, Andries Van Dam, Steven K Feiner, John F Huges Computer graphics with OpenGL: Pearson education

#### Web links and Video Lectures (e-Resources):

- 1. https://nptel.ac.in/courses/106/102/106102063/
- 2. https://nptel.ac.in/courses/106/103/106103224/
- 3. https://nptel.ac.in/courses/106/102/106102065/
- https://www.tutorialspoint.com/opencv/ (Tutorial, Types of Images, Drawing Functions)
- 5. https://nptel.ac.in/courses/106/106/106106090/

Cloud Computing [As per Choice Based Credit System(CBCS) scheme] (Effective from the academic year 2024 -2025) SEMESTER – V			
Course Code	22CS543	CIE Marks	50
Number of Contact	03	SEE Marks	50
Hours/Week			
Total Number of Contact Hours	40	Exam Hours	03
	CRE	DITS –03	
Course Objectives: This course wi	ll enable stude	ents to:	
<ul> <li>Access Management (IAM)</li> <li>Create a virtual private cloud (VPC) by using Amazon Virtual Private Cloud (Amazon VPC)</li> <li>Demonstrate when to use Amazon Elastic Compute Cloud (Amazon EC2), AWS Lambda, and AWS Elastic Beanstalk</li> <li>Differentiate between Amazon Simple Storage Service (Amazon S3), Amazon Elastic Block Store (Amazon EBS), Amazon Elastic File System (Amazon EFS), and Amazon Simple Storage Service Glacier (Amazon S3 Glacier)</li> <li>Demonstrate when to use AWS database services, including Amazon Relational Database Service (Amazon RDS), Amazon DynamoDB, Amazon Redshift, and Amazon Aurora</li> <li>Explain the architectural principles of the AWS Cloud</li> <li>Explore key concepts related to Elastic Load Balancing, Amazon CloudWatch, and Amazon</li> </ul>			
	Mod	lules	Hours
	Mo	dule – I	
<b>Cloud Concepts Overview:</b> I of the Cloud, Introduction to <b>Economics and Billing</b> : Introd Ownership, Simple Monthly C Organizations, AWS Billing an	ntroduction AWS, Mo luction Fund Calculator, D d Cost Mana	to Cloud Computing, Advantages ving to the AWS Cloud, <b>Cloud</b> lamentals of Pricing, Total Cost of belaware North Case Study, AWS agement, Billing Dashboard	08
	Module –	Π	
AWS Global Infrastructur Infrastructure, AWS Global Categories, AWS Manageme Introduction, AWS Shared Responsibility Model, AWS Securing a New AWS Acco Accounts, Securing Data, World	re Overvie Infrastructu ent Console I Responsi IAM, AW ount, Introd king to Ensur	w: Introduction, AWS Global re, AWS Services and Service Clickthrough. Cloud Security: ibility Model, AWS Shared S IAM Console Demonstration, uction to AWS IAM, Securing re Compliance	08
	Module – I	II	
Networking and Content Delivery VPC, VPC Networking, Lab	<b>very:</b> Introdu bel This D	action, Networking Basics, Amazon	08

Elastic Beanstalk, AWS Elastic Beanstalk	
Module – IV	
Storage: Introduction, AWS EBS, Amazon Elastic Block Store Console,	08
Demonstration, Working with EBS, AWS S3, AWS S3 Console Demonstration,	
AWS EFS, AWS EFS Console Demonstration, AWS S3 Glacier, AWS S3	
Glacier Console Demonstration, Storage Technology Selection. Databases:	
Introduction, Amazon RDS, Amazon RDS Console Demonstration, Build a	
Database Server, Amazon DynamoDB, Amazon DynamoDB Demonstration,	
Amazon Redshift, Amazon Aurora, Database Case Study	
Module – V	
Cloud Architecture: Introduction, AWS Well-Architected Framework Design,	08
<b>Cloud Architecture:</b> Introduction, AWS Well-Architected Framework Design, Principles, AWS Well-Architected Framework Design, Principles, Operational	08
<b>Cloud Architecture:</b> Introduction, AWS Well-Architected Framework Design, Principles, AWS Well-Architected Framework Design, Principles, Operational Excellence, Security, Reliability Performance Efficiency, Cost Optimization,	08
<b>Cloud Architecture:</b> Introduction, AWS Well-Architected Framework Design, Principles, AWS Well-Architected Framework Design, Principles, Operational Excellence, Security, Reliability Performance Efficiency, Cost Optimization, Reliability & High Availability, AWS Trusted Advisor, Interpret AWS Trusted	08
<b>Cloud Architecture:</b> Introduction, AWS Well-Architected Framework Design, Principles, AWS Well-Architected Framework Design, Principles, Operational Excellence, Security, Reliability Performance Efficiency, Cost Optimization, Reliability & High Availability, AWS Trusted Advisor, Interpret AWS Trusted Advisor Recommendations. <b>Automatic Scaling and Monitoring:</b> Introduction,	08
<b>Cloud Architecture:</b> Introduction, AWS Well-Architected Framework Design, Principles, AWS Well-Architected Framework Design, Principles, Operational Excellence, Security, Reliability Performance Efficiency, Cost Optimization, Reliability & High Availability, AWS Trusted Advisor, Interpret AWS Trusted Advisor Recommendations. <b>Automatic Scaling and Monitoring:</b> Introduction, Elastic Load Balancing, Elastic Load Balancing, Amazon CloudWatch, Amazon	08
<b>Cloud Architecture:</b> Introduction, AWS Well-Architected Framework Design, Principles, AWS Well-Architected Framework Design, Principles, Operational Excellence, Security, Reliability Performance Efficiency, Cost Optimization, Reliability & High Availability, AWS Trusted Advisor, Interpret AWS Trusted Advisor Recommendations. <b>Automatic Scaling and Monitoring:</b> Introduction, Elastic Load Balancing, Elastic Load Balancing, Amazon CloudWatch, Amazon CloudWatch, Amazon EC2 Auto Scaling, Scale & Load Balance your	08

CO1	Analyze the fundamental concepts of cloud computing and its benefits.
CO2	Adapt knowledge of AWS global infrastructure and key AWS services.
CO3	Implement basic networking and content delivery concepts in AWS.
CO4	Collaborate various AWS storage options and manage databases in AWS
CO5	Design well-architected cloud solutions and implement automatic scaling and monitoring using AWS.

#### Question paper pattern

- The question paper will have TEN questions
- Each full question carries 20 marks
- There will be two full questions (with a maximum of THREE sub questions) from each module
- Each full question will have sub questions covering all topics under a module.

The students will have to answer 5 full questions, selecting one full question from each module

#### **Textbook and Reference Books**

1.Mark Wilkins, "Learning Amazon Web Services (AWS): A Hands-On Guide to the Fundamentals of AWS Cloud", Publisher(s): Addison-Wesley Professional, O'Reilly Media 2019.

2."Mastering AWS Cost Optimization: Real-world technical and operational costsaving best practices (Second Edition)", by Eli Mansoor and Yair Green 2020

#### Web links and Video Lectures:

• https://awsacademy.instructure.com/courses/3515/modules

Advanced Java Programming [As per NEP Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2024-2025) SEMESTER – V					
Course Code22CS544CIE Marks50					
Number Lecture Hour/Week	Number Lecture     03     SEE Marks     50       Hour/Week				
Number of Lecture Hours	40	Exam Hours	03		
	CRED	ITS-03	I		
<ul> <li>Course Objectives: This cour</li> <li>Understand fundamentals</li> <li>How to write generic java</li> <li>Understand collection and</li> <li>To learn java servlet</li> <li>Understand JDBC</li> </ul>	<ul> <li>Course Objectives: This course will enable students to</li> <li>Understand fundamentals concepts of Java programming</li> <li>How to write generic java programs.</li> <li>Understand collection and frameworks</li> <li>To learn java servlet</li> <li>Understand JDBC</li> </ul>				
	Modules			Hours	
	Mod	ule -I			
<ul> <li>Enumerations, Autoboxing and Annotations(metadata):</li> <li>Enumerations, Enumeration fundamentals, the values () and valueOf()</li> <li>Methods, java enumerations are class types, enumerations Inherits</li> <li>Enum, example, type wrappers, Autoboxing, Autoboxing and Methods,</li> <li>Autoboxing/Unboxing occurs in Expressions, Autoboxing/Unboxing,</li> <li>Boolean and character values, Autoboxing/Unboxing helps prevent</li> <li>errors, A word of Warning. Annotations, Annotation basics, specifying</li> <li>retention policy, Obtaining Annotations at run time by use of reflection,</li> <li>Annotated element Interface, Using Default values, Marker</li> <li>Annotations, Single Member annotations, Built-In annotations.</li> </ul>			08		
Module -II					
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. Text Book 1: Ch.17			t Changes Classes, Classes in th Maps, lections?, tions.	08	
Module -III					
<b>String Handling:</b> The String Constructors, String Length, Special String Operations, String Literals, String Concatenation, String Concatenation with Other Data Types, String Conversion and toString() Character Extraction, charAt(), getChars(), getBytes() toCharArray(), String Comparison, equals() and equalsIgnoreCase(), regionMatches() startsWith() and endsWith(), equals() Versus == , compareTo() Searching Strings,			08		

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	
Text Book 1: Ch 15	
Module-IV	
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 Javax.servlet.http package;	
Handling HTTP Requests and Responses; Using Cookies; Session	08
Tracking. Java Server Pages (JSP): JSP, JSP Tags, Tomcat, Request	
String, User Sessions, Cookies, Session Objects Text Book 1: Ch 31	
Text Book 2: Ch 11	
Module-V	
The Concept of JDBC; JDBC Driver Types; JDBC Packages; A Brief	
Overview of the JDBC process; Database Connection; Associating the	08
JDBC/ODBC Bridge with the Database; Statement Objects; ResultSet;	
Transaction Processing; Metadata, Data types; Exceptions.	
Text Book 2: Ch 06	

CO1	Interpret the need for advanced Java concepts like enumerations, Auto Boxing and annotations.
CO2	Demonstrate the concept of Collections, Comparators, Legacy classes and Interfaces.
CO3	Understand the use of string handling functions.
CO4	Develop distributed web application using Servlets and JSP.
CO5	Apply the concepts of JDBC, Transaction processing, statement objects and Resultset to perform operations on Database

#### **Question paper pattern**

- The question paper will have TEN questions
- Each full question carries 20 marks
- There will be two full questions (with a maximum of THREE sub questions) from each module
- Each full question will have sub questions covering all topics under a module.

The students will have to answer 5 full questions, selecting one full question from each module

#### **Textbooks:**

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.

#### **Online Courses and Video Lectures**

https://nptel.ac.in/courses/106105191

Introduction to Data Structures				
[As per NEP Choice Based Credit System (CBCS) scheme]				
(Effective from the academic year 2024-2025) SEMESTER – V				
Course Code22CS551CIE Marks50				
Number Lecture Hour/Week	04	SEE Marks	50	
Number of Lecture	50	Exam Hours	03	
Hours				
	CR	EDITS-04		
Course Objectives:				
<ul> <li>Introduce elementary d</li> <li>Understand an interaction</li> </ul>	ata structures.	<b>C</b>		
<ul> <li>Understand pointers for</li> <li>A nalyze Linear Data St</li> </ul>	r indirection re	erence		
<ul> <li>Analyze Linear Data St</li> <li>Analyze Non Linear Data St</li> </ul>	ata Structures: Stac	Trees		
<ul> <li>Anaryze Non-Ellical Da</li> <li>Assess appropriate data</li> </ul>	u structure duri	ing program develo	opment/Proble	m Solving
	Modules	s		Hours
	Μ	odule -I		
	141	ouule -1		
dimensional arrays, initializing two dimensional arrays, Multidimensional arrays. Introduction to Pointers: Pointer concepts, accessing variables through pointers, Dynamic memory allocation, pointers applications. Introduction to structures and unions: Declaring structures, Giving values to members, structure initialization, arrays of structures, nested structure, unions, size of structures.			10	
Textbook 1: Ch 8.3 to 8.15, Ch 12.3 to 12.19				
Textbook 2: Ch 2.1 to2.13,2.51 ,2.80 to 2.98				
	Μ	odule -II		
Linear Data Structures-Stacks and queues: Introduction, Stack representation in Memory, Stack Operations, Stack Implementation, Applications of Stack. Introduction, Queues-Basic concept, Logical representation of Queues, Queue Operations and its types, Queue Implementation, Applications of Queue.			10	
Textbook 2: Ch 6.1 to 6.14 ,Ch 8.1,8.2				
	Mo	odule -III		
Linear Data Structures concept, Logical represent Singly-linked List Operati applications of Linked list.	-Linked List: ation of Linke ons and Imple	Introduction, Linl ad list, Self-Referent mentation, Circula	ked list Basic ntial structure, nr Linked List,	10
Textbook 1: Ch 15.1 ,15.3,15.4,15.8 Textbook 2: Ch 9.2.9.5				

Module-IV	
Non-Linear Data Structures – Trees: Introduction, Basic concept,	
Binary Tree and its types, Binary Tree Representation, Binary Tree	10
Traversal, Binary Search tree, Expression Trees.	
Textbook1: Ch 16.1,16.2	
Textbook2:Ch 10.1,10.2,10.4,10.6.3	
Module-V	
Sorting and Searching, Sorting: Introduction, Bubble sort, Selection	
sort, Insertion sort Searching: Introduction, Linear search, Binary search.	10
Textbook1: Ch 17.1,17.2.2, 17.2.4, 17.3.1,17.3.2	
Textbook2: Ch 11.1.,11.2,11.3,11.7,11.10.1,11.10.2	

CO1	Identify data structures and their operations, and apply structures, unions, pointers, and dynamic memory allocation in C for efficient memory management.
CO2	Implement arrays and stacks, perform basic operations on them, and apply these structures to solve computational problems efficiently.
CO3	Construct and manipulate different types of queues including circular, double- ended, and priority queues, and demonstrate their applications in real-world scenarios.
CO4	Implement and perform insertion, deletion, and traversal operations on singly, circular, and doubly linked lists through programming."
CO5	Illustrate tree and graph structures, and apply BFS and DFS traversal algorithms to solve problems in hierarchical and network-based models.

#### **Question paper pattern**

- The question paper will have TEN questions
- Each full question carries 20 marks
- There will be two full questions (with a maximum of THREE sub questions) from each module
- Each full question will have sub questions covering all topics under a module.

The students will have to answer 5 full questions, selecting one full question from each module

#### Textbooks

1. C Programming and data structures, E Balaguruswamy 4th Edition, 2007, McGraw Hill

2. Systematic approach to Data structures using C, A M Padma Reddy, 7thEdition 2007, Sri Nandi Publications.

#### **Reference Books**

1. Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures in C, 2nd Ed,

Universities Press, 2014.

2. Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014

#### Weblinks and Video Lectures (e-Resources):

- 1. https://www.youtube.com/watch?v=DFpWCl\_49i0
- 2. <u>https://www.youtube.com/watch?v=x7t\_-ULoAZM</u>
- 3. <u>https://www.youtube.com/watch?v=I37kGX-nZEI</u>
- 4. <u>https://www.youtube.com/watch?v=XuCbpw6Bj1U</u>
- 5. https://www.youtube.com/watch?v=R9PTBwOzceo
- 6. https://www.youtube.com/watch?v=qH6yxkw0u78

Fundamenta [As per NEP (Effec	als of Databa Choice Base ctive from the SEL	se Management S ed Credit System ( e academic year 20 MESTER – V	ystem CBCS) scheme] )24-2025)	
Course Code	22CS552	CIE Marks	50	
Number Lecture Hour/Week	04	SEE Marks	50	
Number of Lecture Hours	50	Exam Hours	03	
	CI	REDITS:04		
Course Objectives:				
<ul> <li>Describe the features of c</li> <li>Differentiate between dat</li> <li>Conceptual modelling too conceptual model.</li> <li>Write queries in relationa</li> <li>Normalize a given databation</li> </ul>	atabase mana abase system ols like ER dia al algebra / SQ ase schema.	gement systems. s and file systems. agrams and design c pL.	latabase schemas basec	l on the
	Mod	lule I		Hours
<b>Introduction:</b> Introduction to data independence and data al tools	o database, rel ostraction, DE	ational data model, 3A, database users,	DBMS architecture, end users, front end	10
	Мо	dule II		I
<b>Data Modelling:</b> Entity typrelation types, ER diagrams, o	bes, entity se latabase desig Mo	et, attribute and ke gn using ER diagram <b>dule III</b>	ey, relationships, n	10
<b>Relational Data Model</b> : A primary and foreign key, can <b>Data redundancy, Normaliz</b>	Relational m didate key, alt zation: 1NF, 2	odel concepts, re ternate, composite, 2NF, 3NF.	lational constraints, super-key.	10
	Mo	dule IV		
<b>Structured Query Language</b> (DDL) and Data create a data base, drop a queries like inserting data in table, filter data.	ge: Introducti Manipulation database, cre a table, upd	on to SQL, concer n Language (DMI ate table, drop tab ate in a table, del	ots of Data Definition L), DDL queries like ble, alter table, DML ete data from a	10
	]	Module V		
Structured Query Languag tables, auto increment, check average, sum, nested sub- q operations - inner, left join, r of forms and reports.Introd System concepts, Desirable	e (continued x, Null values ueries, group ight join, natu uction to Tu properties of	): Create relations by, aggregate function by, having, exists and join and Cartes cansaction Proces f Transactions, Ch	hips between database ons - min, max, count, , case, order by. Join ian product. Overview <b>sing,</b> Transaction and aracterizing schedules	10

based on recoverability, Characterizing schedules based on Serializability, Transaction support in SQL

#### **Course Outcomes(COs):**

CO1	Illustrate the fundamental concepts of databases, DBMS architecture and the roles of
	various types of database users.
CO2	Design and interpret Entity-Relationship (ER) models to represent real-world data
	scenarios and apply them for effective database design.
CO3	Analyze relational data models and apply normalization techniques (1NF, 2NF, 3NF) to
	minimize data redundancy and improve data integrity.
CO4	Write and execute basic SQL queries
CO5	Perform advanced SQL operations including joins, subqueries, grouping, and
	transactions

#### **Question paper pattern:**

- The question paper will have ten questions.
- There will be 2 questions from each module.
- Each question will have questions covering all the topics under a module.

The students will have to answer 5 full questions, selecting one full question from each module.

#### **Text Books:**

- 1. Bayross, I. (2010) SQL, Pl/SQL the Programming Language of Oracle. 4th edition. BPB Publications.
- 2. Elmsasri, R., & Navathe, S.(2017). Fundamentals of Database Systems. 7th edition. Pearson Education.
- 3. Silberschatz, A., Korth, H. F., & Sudarshan, S. (2011), Database System Concepts. 6th edition. Tata McGraw-Hill Education.

#### **Reference Books:**

1.Date, C.J., Kanman, A. & Swamynathan, S. (2006). An Introduction to Database Systems. 8th edition. Pearson Education.

2.Ramakrishnan, R. Gehrke, J. (2014), Database Management Systems. 3rd edition. Tata McGraw Hill Education.

3.MWidenius, M., Axmark, D., Cole, J., Lentz, A., & Dubois, P. (2002). MySQL Reference Manual.O'Reilly Community Press.

## E-books and Online course materials

- 1. SQL and Relational Theory
- 2. (How to Write Accurate SQL code), C.J. Date, O'REILLY Publication 2
- 3. SQL A Beginner's Guide, Andy Oppel, Robert Sheldon, McGraw Hill Publication

## **Online Courses and Video Lectures**

- 1. <u>https://nptel.ac.in/courses/106/105/106105175/</u>
- 2. <u>https://onlinecourses.nptel.ac.in/noc21\_cs04/</u>
- **3.** <u>https://nptel.ac.in/courses/106/106/106106093/</u>
- 4. https://www.tutorialspoint.com/dbms/index.htm

SYSTEM SOFTWARE AND COMPILER DESIGN LAB			
[As per NEP Choice	Based Credit Sys	stem (CBCS) scheme]	
(Effective fro	m the academic y	ear 2024-2025)	
	SEMESTER -	V	
Course Code	22CSL56	CIE Marks	50
Number of Lecture	02	SFF Morks	50
Hours/Week	02		50
<b>Total Number of Lecture Hours</b>	30	Evam Hours	03
	50	Exam nours	05
CREDITS-01			

#### Course Objectives:

- To make students familiar with Lexical Analysis and Syntax Analysis phases of Compiler Design and implement programs on these phases using LEX & YACC tools and/or C/C++/Java
- To understand the various phases in the design of a compiler.
- To understand the design of top-down and bottom-up parsers.
- To understand syntax directed translation schemes.

#### PART-A

#### Execute the following programs using LEX:

**1.** a.Program to count the number of characters, words, spaces and lines in a given input file.

b.Program to count the numbers of comment lines in a given C program. Also eliminate them and copy the resulting program into separate file.

**2.**a.Program to recognize a valid arithmetic expression and to recognize the identifiers and operators present. Print them separately.

b.Write a LEX program to scan reserved words and identifiers of C language

#### Execute the following programs using YACC:

3.Program to evaluate an arithmetic expression involving operators +, -, \* and /.
4.Program to recognize a valid variable, which starts with a letter, followed by any number of letters or digits.

**5.**a.Program to recognize strings 'aaab', 'abbb', 'ab' and 'a' using the grammar (anbn,  $n \ge 0$ ).

b.Program to recognize the grammar (anb,  $n \ge 10$ ).

## PART -B

**6.**Design, develop and implement program to construct Predictive / LL(1)Parsing Table for the grammar rules:  $A \to \alpha B \alpha$ ,  $B \to b B | \varepsilon$ . Use this table to parsethe sentence: abba\$

7.Design, develop and implement program to demonstrate Shift Reduce Parsing technique for the grammar rules:  $E \rightarrow E + T ||TT \rightarrow T * F||F$ ,  $F \rightarrow (E) ||td|$  and parse the sentence: id + id \* id.

**8.**Design, develop and implement syntax-directed definition of "if E then S1" and "if E then S1 else S2"

**9.**Write a yacc program that accepts a regular expression as input and produce its parse tree as output.

**10.**Design, develop and implement a program to generate the machine code usingTriples for the statement A = -B \* (C + D) whose intermediate code in three-addressform:

$$T1 = -B$$
$$T2 = C + D$$
$$T3 = T1 + T2$$
$$A = T3$$

CO1	Demonstrate theoretical concept of System Software and Compiler Design through series of experiments
CO2	Develop a program using software tools.
CO3	Debug and troubleshoot issues effectively.
CO4	Analyze the data and interpret the results.
CO5	Prepare a well-organized laboratory report.

#### **Conduct of Practical Examination:**

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

SEE are mentioned here, writeup-15%, Conduction procedure and result in -70%, Viva-voce 15% of maximum marks. SEE for practical shall be evaluated for 50 marks

	Computer Ne	etworks Lab	
[As per (	Choice Based Credi	it System (CBCS) schem	e]
(Effe	ective from the acad	lemic year 2024-2025)	
	SEMEST	CER – V	
Course Code	22CSL57	CIE Marks	50
Number of Laboratory	02	SEE Marks	50
Hours/Week			
Total Teaching	30	Exam Hours	03
hours			
	CREDI	ΓS – 01	
<b>Course Objectives:</b> This cours	e will enable student	ts	

1.Understand and implement the fundamentals of socket programming.

2. To analyze the traffic flow and the contents of protocol frames.

3. Learn and apply cryptographic algorithms.

4. To understand the network simulator environment and visualize a network topology and observe its performance

1. Using TCP/IP Socket programming implement a program to transfer the contents of a requested file from server to the client using TCP/IP sockets.

2. Implement the data link layer farming methods such as character stuffing and bit stuffing.

3. Implement on a data of set of characters the three CRC polynomials-CRC 12, CRC 16 and CRC CCIP.

4. Write a program for frame sorting techniques used in buffers.

5. Write a program for Hamming Code generation for error detection and correction.

6. Take an example subnet graph with weights indicating delay between nodes. Now obtain routing table at each node using distance vector routing algorithm.

7. Using bucket algorithm, design a program to achieve traffic management at flow level by implementing closed loop control technique.

8. Using RSA algorithm encrypt a text data and decrypt the same.

9. a.Write a NS3 program to connect two nodes with a point-to-point link, which have unique interface. Analyze the network performance using UDP client server.

b.Write NS 3 Program to configure two nodes on an 802.11b physical layer, with 802.11b NICs in Ad hoc mode, and by default, sends one packet of 1000 (application) bytes to the other node. The physical layer is configured to receive at a fixed RSS (regardless of the distance and transmit power); therefore, changing position of the nodes has no effect. Analyze the performance.

10. a Configure network topology using switch and router (LAN, Internet).

b.Configure network topology to implement VLAN using packet tracer.
## **Course Outcomes (COs):**

CO1 Demonstrate understanding of fundamental networking concepts including protocols, error control, routing algorithms, and traffic shaping mechanisms.	
CO2 Design and implement network-based solutions using programming, simulation	n
tools like NS-3, and Packet Tracer to analyze and optimize network performa-	nce.
CO3 Debug and troubleshoot issues effectively.	
CO4 Analyze and interpret the performance of network systems and algorithms	using
appropriate metrics	
CO5 Prepare a well-organized laboratory report.	

#### **Conduct of Practical Examination:**

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

SYSTEM [As per NEP Cl (Effectiv	IS PROGRAMMIN hoice Based Credit e from the academ	NG LAB System (CBCS) sch ic vear 2024-2025)	eme]
	SEMESTER-	- V	
Course Code	22CSL581	CIEMarks	50
Number of Lecture Hours/Week	02	SEEMarks	50
Total Number of Lecture Hours	30	Exam Hours	03
CREDITS: 01			

#### **Course Objectives:**

- To be able to introduce Unix System Programming basics and program design with functions.
- To understand a range of Object-Oriented Programming, as well as in-depth data, file and communication processing techniques.
- To understand the high-performance programs designed to strengthen the practical expertise.

1. Write a C/C++ POSIX compliant program to check the following limits:

- (i) No. of clock ticks
- (ii) Max. no. of child processes
- (iii) Max. path length
- (iv) Max. no. of characters in a file name
- (v) Max. no. of open files/ process

2. Write a C/C++ POSIX compliant program that prints the POSIX defined configuration options supported on any given system using feature test macros.

3. Consider the last 100 bytes as a region. Write a  $C/C^{++}$  program to check whether the region is locked or not. If the region is locked, print pid of the process which has locked. If the region is not locked, lock the region with an exclusive lock, read the last 50 bytes and unlock the region.

4. Write a C/C++ program which demonstrates interprocess communication between a reader process and a writer process. Use mkfifo, open, read, write and close APIs in your program.

5. a) Write a C/C++ program that outputs the contents of its Environment list.b) Write a C / C++ program to emulate the UNIX ln command.

6. Write a C/C++ program to illustrate the race condition.

7. Write a C/C++ program that creates a zombie and then calls system to execute the ps command to verify that the process is zombie.

8. Write a C/C++ program to avoid zombie process by forking twice.

9. Write a C/C++ program to implement the system function.

10. Write a C/C++ program to set up a real-time clock interval timer using the alarm API.

## **Course Outcomes (COs):**

CO1	Understand fundamental POSIX system concepts such as process control, file handling, inter-process communication, and system limits in a UNIX environment.
CO2	Design and develop POSIX-compliant system programs
CO3	Debug and troubleshoot issues effectively.
CO4	Analyze the data and interpret the results.
CO5	Prepare a well-organized laboratory report.

## **Conduct of Practical Examination:**

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

	COMPUTER G	RAPHICS AND	FUNDAMENTALS O	F
INAGE L'KUUESSING LAB [As ner NEP Choice Based Credit System (CRCS) scheme]				
(Effective from the academic year 2024-2025)				
	×	SEMESTER-	- V	
Course	Code	22CSL582	CIEMarks	50
Numbe Hours/	er of Lecture Week	02	SEEMarks	50
Total N Hours	Number of Lecture	30	Exam Hours	03
		CREDI	TS 01	
Course	Objectives:	~*		
• Den	nonstrate the use of Ope	n GL.		
<ul><li>Den</li></ul>	nonstrate the different ge	cometric object di	awing using openGL	
<ul> <li>Den</li> <li>Den</li> </ul>	honstration of $2D/3D$ transferred to a stration of lighting of	nsiormation on s	imple objects.	
<ul> <li>Den</li> <li>Den</li> </ul>	ionstration of Image pro	cessing operation	is on image/s.	
	followed of mugo pro	eessing operation	is on mage, s.	
٠	Installation of OpenGL	/OpenCV/ Pytho	n and required headers	
•	Simple programs using	OpenGL (Drawir	ig simple geometric objec	et like line,
	circle, rectangle, square)			
•	Simple programs using	OpenCV (operati	on on an image/s)	
Progra	ms list			
1.	Develop a program to d	raw a line using l	Bresenham's line drawing	g technique
2.	Develop a program to d	emonstrate basic	geometric operations on	the 2D object
3.	Develop a program to d	emonstrate basic	geometric operations on	the 3D object
4.	Develop a program to d	emonstrate 2D tr	ansformation on basic ob	ojects
5.	Develop a program to d	emonstrate 3D tr	ansformation on 3D obje	cts
6.	Develop a program to d	emonstrate Anim	ation effects on simple o	bjects.
7.	Write a Program to read quadrants, up, down, rig	l a digital image. ht and left.	Split and display image	into 4
8.	Write a program to show	w rotation, scalin	g, and translation on an in	mage.
9.	Read an image and exusing	tract and display	low-level features such	as edges, textures
	filtering techniques.			
10.	Write a program to blur	and smoothing a	n image.	
11.	Write a program to con-	tour an image.		
12.	Write a program to dete	ect a face/s in an i	mage.	

## **Course Outcomes (COs):**

CO1	Understand the fundamental concepts of computer graphics and image processing, including 2D/3D transformations, rendering algorithms, filtering, and basic computer vision techniques.
CO2	Apply computer graphics and image processing techniques through programming to create, manipulate objects and digital images.
CO3	Debug and troubleshoot issues effectively.
CO4	Analyze 2D/3D objects, digital images and interpret the results.
CO5	Prepare a well-organized laboratory report.

## **Conduct of Practical Examination:**

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

Cloud Computing Lab [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2023-2024)			
	SEMESTI	$\mathbf{E}\mathbf{R} - \mathbf{V}\mathbf{I}$	
Course Code	22CSL583	CIE Marks	50
Number of Lecture	0.2	OPE	50
Hours/Week	02	SEE	50
		Marks	
Total Number of LectureHours	30	Exam	03
		Hours	
	CREDIT	S – 01	·
Course Objectives: This course will e	nable students		
Designed to give you a comprehensive	understanding of the t	foundational services of	fered by AWSincluding
compute storage networking databas	e and identity & acce	rest management (IAM)	forea by ITT Sinoraanig
compute, storage, networking, databas		ss management (17101).	
	PAF	KT A	
Illustration of the following services.			
<ul> <li>Application Auto Scaling</li> </ul>	$\square$ AWS	S Key Management Ser	vice (KMS)
Amazon Aurora		S Lambda	
AWS Cloud9     Amagan ClaudEarmatian		zon Lex	
Amazon CloudFormation			
Amazon Cloud Front     Amazon Marketplace Subscriptions (Amazon ML)     Amazon Dolly			riptions (Amazon ML)
* AWS Cloud Shell		Zon Polly	
* Aws Cloud I fall * Amazon Cloud Watch		zon Recognition	a Samuina (PDS)
* AWS Code Commit		Zoli Kelatioliai Databas	a Editor
* Aws Code Commit		S Resource Oroups & T	ag Eultoi
♦ Amazon Cognito	$\Box AW$	zon Sage Maker	
♦ Allazon Comprehend ♦ AWS Deep Racer	$\square A W$	S Secrets Manager	
♦ A way on DynamoDB	$\square$ $\Delta W$	S Security Token Servic	re(STS)
<ul> <li>Amazon EC2 Auto Scaling</li> </ul>	$\Box$ AW	S Service Catalog	
AWS Elastic Beanstalk	$\Box$ Ama	zon Simple Notification	n Service (SNS)
<ul> <li>Amazon Elastic Block Store (El</li> </ul>	$(3S) \square Ama$	zon Simple Queue Serv	vice (SOS)
<ul> <li>Amazon Elastic Compute Cloud</li> </ul>	(ÉC2) 🗌 Ama	zon Simple Storage Ser	vice (S3)
<ul> <li>Amazon Elastic Container Regis</li> </ul>	stry (ECR) 🛛 🗆 Ama	zon Simple Storage Ser	vice Glacier (S3 Glacier)
♦ Amazon Elastic File System (EF	$FS$ ) $\Box$ AWS	S Step Functions	· · · · · ·
<ul> <li>Amazon Elastic Inference</li> </ul>	AWS	S Systems Manager (SS	M)
<ul> <li>Elastic Load Balancing</li> </ul>		zon Extract	,
<ul> <li>Amazon Event Bridge</li> </ul>	🗆 Ama	zon Translate	
<ul> <li>Amazon Forecast</li> </ul>	$\square$ AWS	S Trusted Advisor	
* AWS Glue		zon Virtual Private Clo	ud (Amazon VPC)
AWS Glue Data Brew	$\square AWS$	S Well-Architected Too	4
♦ A w S Identity and Access Mana	igement (IAM)		
	PAI	KT B	
1. Introduction to AWS IAM			

- 2. Build Your VPC and Launch a Web Server
- 3. Introduction to Amazon EC2
- Working with Amazon EBS
   Build Your DB Server and Interact with Your DB Using an App.

CO#	COURSE OUTCOMES
CO1	Demonstrate various AWS services
CO2	Implement different scenario of real-world problem using AWS service.
CO3	Debug and troubleshoot issues effectively.
CO4	Analyze the data and interpret the results.
CO5	Prepare a well-organized laboratory report.

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

ADVANCED JAVA PROGRAMMING LAB [As per NEP Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2024-2025) SEMESTER– V			
Course Code	22CSL584	CIEMarks	50
Number of Lecture Hours/Week	02	SEEMarks	50
Total Number of Lecture Hours	30	Exam Hours	03
	CREDITS	.01	1
<ul> <li>Course Objectives:</li> <li>Develop students' skills in building GUI-based applications using Java AWT and Swing components.</li> <li>Provide practical exposure to Java applets, event handling, and exception handling mechanisms.</li> <li>Enable students to design interactive applications such as calculators, forms, and multi-frame interfaces.</li> </ul>			
Programs list			
<ol> <li>a) Write a Java program to create an Applet that displays student information and also set foreground and backgrounds.</li> <li>b) Write a Java Program to create an applet that scrolls a message from left to right</li> <li>c) Write a Java program to create an Applet that reads Employee information using parameters and displays name of employee ,designation ,salary and tax.</li> <li>a. Write a java program to draw Lines, ovals, filled ovals and arcs, filled arcs?</li> <li>b. Write a java program to draw rectangle, filled rectangle and rounded rectangle and filled rounded rectangle with any two colors.</li> <li>c) . Write a java program to create an Applet that displays 4buttons each represents different colors.if a user click on particular button then that color is set as back ground to applet.</li> <li>b. Write a Java program to create an Applet that displays 2buttons .if a user click on one button then change name of another button and display the button clicked and vice-versa</li> <li>c. Write a Java program to create an Applet that displays 2TextFields and labels User Name and Password . Display Text Field entered and display selected text in username &amp; display password</li> <li>d. Write a Java program that displays 4buttons and also count Number of button clicks on each button</li> </ol>			
<ul> <li>4. Write a Java program divisions. The user ente The division of Num1 a Divide button is clicked would throw a Number would throw an Arithm dialog box.</li> <li>5. Write a Java program the to arrange buttons for the total of the second se</li></ul>	that creates a use rs two numbers in the and Num2 is display. If Num1 or Num2 v Format Exception. In the digits and for the	er interface to perform ne text fields, Num1 and ved in the Result field wh were not an integer, the p f Num2 were Zero, the p play the exception in a n e calculator. Use a grid la	integer Num2. hen the rogram nessage yout
text field to display the r 6. Write a Java Program a	result.	ich reads the name of a u	ser and

	mail id in Text fields, select gender with radio buttons, and selects some Known languages using checkboxes, and also enters an address in a text area. After filling details whenever a user press the "submit" button, then displays all the information about the user input.
7.	Write a Java Program to create multiple frames, which create a Frame2 with a 'back 'button, such that when a user click 'back' button, Frame 2 is closed and we see the Frame1 only
8.	Write a Java Program to create a student table, which includes name, roll no, branch and age or DOB
9.	Write a Java Program to create a tabbed pane with two tabs. In the first tab sheet, display some push buttons with names of Branches. In second tab sheet, display checkboxes with names of subjects.
10.	A) Write a java program to create a menu with several menu items by implementing JMenu.
	B)Write a java program to create a combo box with some name of some places. The user can select any one name from the list and the selected country name is displayed in the frame? (Use JComboBox)
	C)Write a java program to select multiple places and displayed in Frame using JList?

CO#	COURSE OUTCOMES
CO1	Understand the fundamental concepts of Java programming, including applets, AWT, Swing,
	and exception handling.
CO2	Design and implement Java programs using GUI components and event-driven programming
	techniques.
CO3	Debug and troubleshoot issues effectively.
CO4	Analyze the data and interpret the results.
CO5	Prepare a well-organized laboratory report.

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

PROJECT-V [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2024-25) SEMESTER – V			
Course Code	21PRJ59	CIE Marks	50
Number of Lecture Hours/Week	02	SEE Marks	50
Total Number of Lecture Hours	30	Exam Hours	03
Credits – 01			

## **Course Objectives:**

1.Identify real-world problems across programming, databases, and networking domains and understand their business and technical implications.

2. Apply systematic methodologies to design, implement, and optimize solutions.

3.Resolve technical challenges through debugging, research, and collaboration.

4. Take responsibility for specific roles in a team and collaborate effectively to achieve project goals.

5. Present project progress and findings clearly and confidently to both technical and non-technical audiences.

6.Document the entire project in a structured, professional laboratory report.

#### Project Guidelines:

- Project work shall preferably be batch wise.
- Evaluation is based on concept clarity, system design, implementation, testing, presentation, and documentation quality, with a focus on proper coding standards, teamwork, and effective communication.
- Viva-voce examination in project work shall be conducted batch-wise.
- Minimum requirement of CIE marks for Project work shall be 50% of the maximum marks.
- Students failing to secure a minimum of 50% of the CIE marks in Project work shall not be eligible for the SEE Project examination.
- For a pass in a Project/Viva-voce examination, a student shall secure a minimum of 40% of the maximum marks prescribed.

CO#	COURSE OUTCOMES
CO1	Identify the topic from various domains (example programming databases,
	networking) to real world problems.
CO2	Develop methodology for the problem.
CO3	Resolve issues that arise during the project.
CO4	Learn to assign and accept roles and responsibilities within a team and
	write a good technical reports.
CO5	Exhibit skills in presenting their project findings & progress orally

Angular and Node JS [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2023-2024) SEMESTER – VI				
Course Code	22ACS510A	CIE Marks	50	
Number of Lecture Hours/Week	02	SEE Marks	50	
Total Number of LectureHours	30	Exam Hours	03	
	CREDI	<b>ΓS – 01</b>		
<ul> <li>Course Objectives: This course will enable students</li> <li>To learn the basics of Angular JS framework.</li> <li>To understand the Angular JS Modules, Forms, inputs, expression, data bindings and Filters</li> <li>To gain experience of modern tool usage (VS Code, Atom or any other) in developing Web applications</li> </ul>				
	List of Pr	rograms		
<ol> <li>Forgam experience of modern tool usage (VS Code, Arom or any other) in developing web applications         List of Programs     </li> <li>Develop Angular JS program that allows user to input their first name and last name and display their full name.         Note: The default values for first name and last name may be included in the program.     </li> <li>Develop an Angular JS application that displays a list of shopping items. Allow users to add and remove items from the list using directives and controllers.Note: The default values of items may be included in the program.     </li> <li>Develop a simple Angular JS calculator application that can perform basic mathematical operations (addition, subtraction, multiplication, division) based on user input.</li> <li>Write an Angular JS application that can calculate factorial and compute square based on given user input.</li> <li>Develop AngularJS application that displays a details of students and their CGPA. Allow users to read the number of students and display the count. Note: Student details may be included in the program.</li> <li>Develop an AngularJS program to create a simple to-do list application. Allow users to add, edit, and delete tasks.Note: The default values for tasks may be included in the program.</li> <li>Write an AngularJS program to create a simple CRUD application (Create, Read, Update, and Delete) for managing users.</li> <li>DevelopAngularJS application that displays a list of employees and their salaries. Allow users to search for employees by name and salary. Note: Employee details may be included in the program.</li> </ol>				

CO#	COURSE OUTCOMES
CO1	Understand the core concepts of AngularJS including data binding, directives, controllers, expressions, and form validation for building dynamic web
	applications.
<b>CO2</b>	Design and develop interactive and responsive web applications using AngularJS
	features
CO3	Debug and troubleshoot issues effectively.
<b>CO4</b>	Analyze the data and interpret the results.
CO5	Prepare a well-organized laboratory report.

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

Microsoft Power BI [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2023-2024) SEMESTER – VI				
Course Code	22AAD510B	<b>CIE Marks</b>	50	
Number of Lecture Hours/Week	02	SEE Marks	50	
Total Number of LectureHours	30	Exam Hours	03	
	CREDI	ΓS – 01		
<ol> <li>Course Objectives: This course will enable students         <ol> <li>Understand the fundamentals of Power BI and its role in business intelligence and data visualization.</li> <li>Learn how to prepare and clean data within Power BI Desktop, ensuring data quality for effective analysis.</li> <li>Explore different methods of importing and loading data from various sources into Power BI Desktop.</li> <li>Understand and apply DAX functions to perform powerful data analysis and calculations in Power BI.</li> <li>Learn how to publish reports and dashboards, and share them securely with stakeholders via Power BI</li> </ol> </li> </ol>				
	List of P	rograms		
Implement the following using Micro	osoft Power BI tool	•		
1. Getting Started With power BI				
2. Preparing Data in Power BI Deskto	op			
3. Loading Data in Power BI Desktop				
4. Data Modeling in Power BI Deskto	pp			
5. Advanced Data Modeling in Power	BI Desktop			
6. Using simple DAX queries in Power BI Desktop				
7. Using complex DAX queries in Power BI Desktop				
8. Designing a Report in Power BI De	esktop			
9. Data Analysis in Power BI Desktop				
10. Publishing and Sharing Power BI Content				

CO#	COURSE OUTCOMES
CO1	Utilize classical and modern cryptographic algorithms to implement secure data encryption decryption and key exchange mechanisms
	eneryption, deeryption, and key exchange meenanishis.
CO2	Apply cryptographic hash functions and bitwise operations for secure data processing and integrity verification.
CO3	Debug and troubleshoot software issues effectively
CO4	Analyze the data and interpret the results
CO5	Prepare a well-organized laboratory report

- Experiment distribution
  - a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
  - b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

Software Engineering [As per NEP Choice Based Credit System (CBCS)scheme] (Effective from the academic year 2024-2025) SEMESTER – VI				
Course Code	22CS61	CIE Marks	50	
Number of Lecture Hours/Week	03	SEE Marks	50	
Number of Lecture Hours	40	Exam Hours	03	
	CREI	DITS-03		
<ul> <li>Course Objectives:</li> <li>Understand fundamental of</li> <li>Provide comprehensive un modeling techniques.</li> <li>Impart knowledge of arch</li> <li>Understand the basics of s</li> <li>Learn modern software de</li> </ul>	concepts of softw nderstanding of itectural and obj software project evelopment prac	ware engineering. the requirements of eng ect-oriented design pri management for effect tices and testing techni	ineering process and nciples. ive project delivery. ques.	l system
	Module	S	•	Hours
	Modu	la I		
	Iviouu	10 -1		
<b>Introduction:</b> Need for software engineering, Professional and ethical responsibility, case studies, Software Process models, Process Iteration, Process Iteration continued, Process Activities, Software requirements: Functional and Non-functional requirements, User requirements, System requirements, Interface specification, The software requirements document.			08	
	Module	-II		
Requirements engineering pro analysis, Requirements validation System models: Context model Structured methods.	ocess: Feasibilit n, Requirements els, Behavioral	y studies, Requiremen management. models, Data model	nt's elicitation and s, Object models,	08
	Module	e -III		
Architectural Design: Archite System organization, Modular De Object oriented design: Object Design evolution.	ectural Design ecomposition sty s and Object C	Decisions, Desing an vles, Control styles. lasses, An object-orien	nd implementation ted design process	08
	Modu	lle-IV		
Software Project Managemer project, The W5HH principle, Cr Project estimation, Decompositio Project Scheduling: Basic Cor patwork Scheduling	<b>it:</b> The Manag itical practices, on Techniques, E acepts, Project 3	ement Spectrum, Pro Estimation for Softwar Empirical Estimation mo Scheduling, Defining	duct, process and e Project: Software odels Task set and Task	08
<b>Risk Management</b> : Reactive identification, Risk mitigation, m	versus proac onitoring and m Moo	tive strategies, Software anagement, The RMM Iule-V	vare Risks, Risk M plan.	
Rapid software development: A development Software evolution: Legacy syste Verification and Validation: Pla	gile methods, Ex em evolution nning verificatio	xtreme programming, F on and validation, Softw	Rapid application	08
Automated static analysis, Verific	ation and forma	l methods		

Software testing: System testing, Component testing, Test case design, Test automation.	
Question paper pattern:	
• The question paper will have ten questions.	
• There will be 2 questions from each module.	
• Each question will have questions covering all the topics under a module.	

The students will have to answer 5 full questions, selecting one full question from each module.

# TEXTBOOKS

- 1. Software Engineering- Sommerville, 10<sup>th</sup> edition, Pearson Education.
- 2. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.

## **REFERENCE BOOKS:**

- 1. Software Engineering theory and Practice Shari Lawrence Pflieger, Joanne M Atlec 3<sup>rd</sup> edition Pearson Education.
- 2. Software Engineering Principles and Practice Waman S Javadekar 1<sup>st</sup> edition Tata McGraw Hill.

CO#	COURSE OUTCOMES
CO1	Apply software engineering concepts for software systems.
CO2	Demonstrate understanding of engineering requirements and apply system
	modeling techniques to analyze, specify, and represent software system
	requirements.
CO3	Utilize architectural and object-oriented design principles to create well-
	structured software systems.
CO4	Apply software project management skills to deliver projects effectively.
CO5	Implement software development strategies, and testing techniques to ensure
	quality and adaptability in software projects.

#### Artificial Intelligence and Machine Learning [As per NEP Choice Based Credit System (CBCS)scheme] (Effective from the academic year 2024-2025) **SEMESTER – VI Course Code** 22CS62 **CIE Marks** 50 Number of Lecture 03 SEE Marks 50 Hours/Week Number of Lecture Hours Exam Hours **40** 03 **CREDITS-03 Course Objectives:** To study the concept of Artificial Intelligence and problem solving. Get to know approaches of inference, perception, Uncertain Knowledge and Reasoning To figure out advanced problem-solving paradigms and knowledge representation. To enable students to evaluate machine learning models To explore neural networks, build neural networks to solve various classification problems. Modules Hours Module-I Introduction, Problem Solving: state space search and control strategies: Introduction, General problem solving, Characteristics of problem, Exhaustive Searches, Heuristic Search 08 Techniques, Interative Deepening, Constant satisfaction Module-II Problem reduction and Game playing, Logic concepts and logic programming: Introduction, Problem reduction, Game playing, Bounded look ahead strategy and Use of, Alpha-Beta Pruning, Two -player perfect information games. Propositional calculus, Propositional logic, 08 Natural Deduction system, Axiomatic system, Semantic tableau system in propositional logic, resolution refutation in propositional logic, Predicate logic, Logic programming Module-III Advanced problem-solving paradigm: planning- types of planning systems, Block world problem, logic based planning, Linear planning using a goal 08 stack, Means-ends analysis, Non –linear planning strategies. Knowledge representation: Approaches to knowledge representation, knowledge representation **Module-IV** Uncertainty Measure: Probability Theory, Bayesian Belief Networks, Machine Learning Paradigms: Machine learning system, supervised and unsupervised learnings, Inductive, 08 deductive learning, Clustering **Module-V** Support vector Machine, case-based reasoning and learning. ANN: Single Layer, Multilayer. RBF, Design issues in ANN, Recurrent Network 08 Question paper pattern The question paper will have TEN questions, Two questions from each module.

• The students will have to answer 5 full questions, selecting one full question from each module.

• Each full question carries 20 marks.

Each full question will have sub questions covering all topics under a module.

## Textbooks

1. Artificial Intelligence, Saroj Kaushik Cengage Learning 2014 Edition.

## **Reference:**

1 .Artificial Intelligence: Structures and Strategies for Complex Problem Solving, George F Luger Pearson Addison Wesley 6 th Ed, 2008.

2. Artificial Intelligence, E Rich, K Knight, and S B Nair Tata Mc-Graw Hill 3rd Ed, 2009.

3. Artificial Intelligence: A Modern Approach, Stuart Russell and Peter Norvig Prentice Hall 3rd, 2009.

CO#	COURSE OUTCOMES
CO1	Understand the fundamentals of problem-solving in AI, including state space
	Search.
CO2	Apply problem reduction techniques and logic concepts.
CO3	Apply predicate logic to represent complex real-world problems& distinguish
	between different machine learning paradigms.
CO4	Analyze the concept learning and decision tree learning approaches.
CO5	Understand the theory and architecture of artificial neural networks.

Full Stack Development [As per NEP Choice Based Credit System (CBCS)scheme] (Effective from the academic year 2024-2025) SEMESTER – VI				
Course Code	22CS631	CIE Marks	50	
Number of Lecture	03	SEE Marks	50	
Hours/Week				
Total Number of Lecture Hours	40	Exam Hours	03	
	CRED	DITS – 03		
<ul> <li>Course Objectives:</li> <li>Explain the use of learns</li> <li>Make use of rapid applid</li> <li>Illustrate Models, Views development.</li> <li>Demonstrate the use of solution</li> <li>Design and implement I</li> </ul>	ing full stack web o cation developmen s and Templates w state management Diango apps contai	development. t in the design of responsiv ith their connectivity in Dja and admin interfaces autom ning dynamic pages with S	e web pages. ingo for full stack nation in Django. OL databases.	c web
	Module	s	(	Hours
	Modu	e I		
<b>MVC based Web Designing:</b> Views, Mapping URL to Views, in Django, Wild Card patterns in	Web framework, Working of Djang URLS.	MVC Design Pattern, Dja go URL Confs and Loose C	ango Evolution, Coupling, Errors	08
Textbook 1: Chapter 1 and Chap	ter 3	J., J. TT		
Django Templates and Models Basic Template Tags and Filter Inheritance, MVT Development Models, Basic Data Access, Ad Selecting and deleting objects, S Textbook 1: Chapter 4 and Chap	s: Template Syster s, MVT Developn Pattern. Configuri ding Model String chema Evolution ter 5	n Basics, Using Django Te nent Pattern, Template Loa ng Databases, Defining an Representations, Inserting	Emplate System, Iding, Template d Implementing /Updating data,	08
	Moc	lule III		
<b>Django Admin Interfaces and</b> Interfaces, Customizing Admi Processing, Creating Feedback custom validation, creating Mo Textbook 1: Chapters 6, 7 and 8	Model Forms: A n Interfaces, Rea forms, Form su odel Forms, URLO	activating Admin Interfaces asons to use Admin Int bmissions, Conf Ticks, Including Oth	s, Using Admin terfaces. Form ter URLConfs.	08
Conoria Views and Diango S	N100 tata Darsistanaa:	Iule IV Using Conoria Viaus, Ca	morio Viewa of	08
Generic Views and Django S Objects, Extending Generic Vi Generating Non-HTML conten Sitemap framework, Cookies, S Textbook 1: Chapters 9, 11 and	ews of objects, I nts like CSV an Sessions, Usersand 12	Extending Generic Views, Ge Extending Generic Views. d PDF, Syndication Fee d Authentication.	MIME Types, ed Framework,	08
		dule V		00
JQuery and AJAX Integration in Response, HTML, CSS, JSON, iFr jQuery AJAX Facilities, Using jQu Textbook 2: Chapters 1, 2 and 7 Question paper pattern	a <b>Django:</b> Ajax Sol ames, Settings of Ja ery UI Autocomplete	ution, Java Script, XHIML I va Script in Django, jQuery a e in Django	Http Request and and Basic AJAX,	Uð

- The question paper will have TEN questions, Two questions from each module.
- The students will have to answer 5 full questions, selecting one full question from each module.
- Each full question carries 20 marks.

Each full question will have sub questions covering all topics under a module.

## Text Books:

- 1. Adrian Holovaty, Jacob Kaplan Moss, The Definitive Guide to Django: Web Development Done Right, Second Edition, Springer-Verlag Berlin and Heidelberg GmbH & Co. KG Publishers, 2009
- 2. Jonathan Hayward, Django Java Script Integration: AJAX and jQuery, First Edition, Pack Publishing, 2011

## **Reference Books:**

- 1. Aidas Berborites, Jake Kronika, Django 3 Web Development Cookbook, Fourth Edition, Packet Publishing, 2020
- 2. William Vincent, Django for Beginners: Build websites with Python and Django, First Edition, Amazon Digital Services, 2018
- **3.** Antonio Mele, Django3 by Example, 3rd Edition, Pack Publishers, 2020
- 4. Arun Ravindran, Django Design Patterns and Best Practices, 2nd Edition, Pack Publishers, 2020.
- 5. Julia Elman, Mark Lavin, Light weight Django, David A. Bell, 1st Edition, Oreily Publications, 2014

## Books and Online course materials:

1.MVT architecture with Django: https://freevideolectures.com/course/3700/django-tutorials

2. Using Python in Django: https://www.youtube.com/watch?v=2BqoLiMT3Ao

3.Model Forms with Django: https://www.youtube.com/watch?v=gMM1rtTwKxE 4.Real time Interactions in Django: https://www.youtube.com/watch?v=3gHmfoeZ45k

5.AJAX with Django for beginners: https://www.youtube.com/watch?v=3VaKNyjlxAU

CO#	COURSE OUTCOMES
CO1	To introduce the concept of web frameworks and the MVC/MVT design patterns using
	Django.
CO2	To develop skills in creating dynamic web applications using Django's Template and
	Model systems.
CO3	To train students to use Django's Admin Interface and implement form processing and
	model forms.
CO4	To make students proficient in using Django's Generic Views and handling state
	persistence (cookies, sessions and authentication).
CO5	To integrate frontend technologies like jQuery and AJAX with Django for enhanced
	web functionality.

Ci [As per NEP Cho (Effect	ryptography an ice Based Cred tive from the ac SEMES	d Network Security it System (CBCS)schen eademic year 2024-2025 STER – VI	ne] 5)	
Course Code	22CS632	CIE Marks	50	
Number of Lecture Hours/Week	03	SEE Marks	50	
Number of Lecture Hours	40	Exam Hours	03	
	CREI	DITS-03	•	
<ul> <li>Course Objectives:</li> <li>To understand basics of C</li> <li>To be able to secure a measing to be able t</li></ul>	Cryptography and ssage over insec intain Confident otocols for netwo	d Network Security. ure channel by various n ciality, Integrity and Ava ork security to protect ag	neans. ilability of data. ainst the threats i	in the
networks.	Modules			Hours
	Mo	lule -I		nours
Security Concepts: Introduction, of security, Types of Security atta for Network Security. Cryptography Concepts and T substitution techniques, transposit and asymmetric key cryptography of attacks	The need for so tacks, Security se <b>Eechniques:</b> Int tion techniques, , steganography	ecurity, Security approa ervices, Security Mechan roduction, plain text a encryption and decrypt , key range and key size	ches, Principles nisms, A model nd cipher text, tion, symmetric , possible types	08
	Mod	lule -II		
<b>Symmetric key Ciphers:</b> Block Block cipher operation, Stream cip <b>Asymmetric key Ciphers:</b> Prin Elgamal Cryptography, Diffie-Hel	Cipher principl bhers, RC4. ciples of publi lman Key Excha	es, DES, AES, Blowfis c key cryptosystems, H ange, Knapsack Algorith	h, RC5, IDEA, RSA algorithm, im.	08
	Mod	ule -III		
Cryptographic Hash Functions (SHA-512), Message authentication codes: signatures, Elgamal Digital Signat Key Management and Distribut Asymmetric Encryption, Distribut Service, Public – Key Infrastructur	s: Message Au Authentication ure Scheme. tion: Symmetric tion of Public re.	ithentication, Secure H requirements, HMAC, c Key Distribution Usin Keys, Kerberos, X.509	lash Algorithm CMAC, Digital g Symmetric & Authentication	08
	Mo	dule-IV		
<b>Transport-level Security:</b> Web Transport Layer Security, HTTPS, <b>Wireless Network Security:</b> Wi Wireless LAN, IEEE 802.11i Wire	security cons Secure Shell (S reless Security, eless LAN Secur	iderations, Secure Soc SH). Mobile Device Security rity.	ket Layer and y, IEEE 802.11	08
	Moo	iuie-v		

E-Mail Security: Pretty Good Privacy, S/MIME IP Security: IP Security overview, IP				
Sec	urity architecture, Authentication Header, Encapsulating security payload, Combining			
secu	irity associations, Internet Key Exchange.			
Cas	e Studies on Cryptography and security: Secure Multiparty Calculation, Virtual	08		
Elec	ctions, Single sign On, Secure Inter-branch Payment Transactions, Cross site Scripting			
Vul	nerability.			
TF	EXTBOOKS			
1.	Cryptography and Network Security - Principles and Practice: William Stallings, Pe	arson		
	Education, 6th Edition.			
2.	Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 3rd Edition.			
RE	FERENCE BOOK:			
1.	Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley			
2.	India, 1st Edition.			
3.	Cryptography and Network Security: Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition.			
4.	Information Security, Principles, and Practice: Mark Stamp, Wiley India.			
5.	Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH.			
6.	Introduction to Network Security: Neal Krawetz, CENGAGE Learning.			
7.	Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.			
Que	stion paper pattern			
	• The question paper will have TEN questions, Two questions from each module.			
	• The students will have to answer 5 full questions, selecting one full question from each mo	dule.		
	• Each full question corrige 20 marks			

Each full question carries 20 marksEach full question will have sub questions covering all topics under a module.

CO#	COURSE OUTCOMES
CO1	Implement encryption methods like Caesar Cipher and DES.
CO2	Analyze algorithms like RSA and Diffie-Hellman.
CO3	Apply key distribution techniques, manage key control, and ensure confidentiality and authentication in secure communications.
CO4	Assess and verify secure authentication methods, including different protocols.
CO5	Evaluate email security measures and secure IP communications using protocols.

	Natural Lano	uage Processing		
[As per ]	NEP Choice Based (	Credit System (CBCS)scheme	e]	
	(Effective from the	academic year 2024-2025)		
~ ~ ~	SEME	STER-VI		
Course Code	22AD633	CIE Marks	50	
Number of Lecture	03	SEE Marks	50	
Hours/Week	40			
I otal Number of Lecture Hours	40	Exam Hours	03	
	CR	EDITS-03		
Course Objectives: This cours	e will enable students.			
• Will be able to under	stand the wide spect	rum of problem statements, tas	sks, and soluti	on
approaches within NL	P.	1	,	
• Will be able to impleme	ent and evaluate differe	ent NLP applications		
Evaluate various algori	thms and approaches	for the given task, dataset, and s	stage of the N	LP
product	unit und approaches	for the ground tash, dataset, and t	suge of the fit	<b></b>
Understand best practic	es opportunities and	the roadman for NLP from a busi	iness and produ	let
leader's perspective	es, opportunities, und		iness and produ	aet
	Module	\$		Hours
	1,104416	5		nours
	Μ	odule-I	· · · · ·	
Overview and language me	odeling: Overview:	Origins and challenges of NL	P Language	
and Grammar-Processing In	idian Languages- N	LP Applications Information	n Retrieval.	08
Language Modeling: Vario	us Grammar- based	Language Models-Statistica	I Language	
Model.	Madula	11		
	wiodule	-11		
Word level and syntactic	analysis. Word Lev	vel Analysis: Regular Express	sions Finite-	
State Automata-Morphologi	cal Parsing- Spellin	g Error Detection and correct	ction-Words	08
and Word classes-Part-of S	peech Tagging. Sy	ntactic Analysis: Context-free	e Grammar-	
Constituency- Parsing-Proba	bilistic Parsing.	5		
	Modu	le-III	· · · · ·	
<b>Extracting Relations from</b>	n Text: From Wo	ord Sequences to Depende	ency Paths:	
Introduction, Subsequence K	ernels for Relation I	Extraction, A Dependency-Pat	h Kernel for	
Relation Extraction and Expe	erimental Evaluation			08
Mining Diagnostic Text	Reports by Lear	ning to Annotate Knowle	dge Roles:	
Introduction, Domain Know	ledge and Knowledg	ge Roles, Frame Semantics and	nd Semantic	
Role Labeling, Learning to A	Innotate Cases with	Knowledge Roles and Evaluati	lons.	
	Modul	e-Iv		
Evaluating Self-Explanatio	ns in I start: Word	Matching, Latent Semanti	c Analysis,	
and lopic Models: Introd	luction, I start: Fee	edback Systems, I start: Ev	aluation of	
Analysis to Massure the	Signatures: Identify	ing Text-Types Using Laten	Cabagian	08
Analysis to Measure the Conesion of Lext Structures: Introduction, Cohesion,				
Results of Experiments	Automatic Docum	ent Senaration: A Comb	ination of	
Probabilistic Classification	and Finite_State SA	auence Modeling. Introducti	on Related	
Work, Data Preparation Do	cument Separation a	s a Sequence Manning Proble	m. Results	
Evolving Explanatory Nov	el Patterns for Ser	nantically-Based Text Minir	ng: Related	
Work, A Semantically Guide	d Model for Effectiv	re Text Mining.	8	

	Module-V	
INFO	RMATION RETRIEVAL AND LEXICAL RESOURCES	
Inform	nation Retrieval: Design features of Information Retrieval Systems-Classical, Non	
classic	al, Alternative Models of Information Retrieval – valuation Lexical Resources:	08
World	Net-Frame 0Net- Stemmers-POS Tagger- Research Corpora.	
Questi	on paper pattern	
•	The question paper will have TEN questions, Two questions from each module.	
•	The students will have to answer 5 full questions, selecting one full question from each mo	dule.
•	Each full question carries 20 marks.	
	ill question will have sub questions covering all topics under a module.	
l extb		. 111
l.	Tanveer Siddiqui, U.S. Tiwary, "Natural Language Processing and Information Retr	neval",
	UXIOrdUniversity Press, 2008.	• •,
2.	Anne Kao and Stephen R. Poteet (Eds), "Natural Language Processing and Text Mill	ning",
Dofor	Springer-Verlag London Linned 2007.	
	Danial Jumpfalmy and Jamas II Martin, "Snaach and Language Dracessing, An intro	duction to
1.	Damer Julaisky and James H Martin, Speech and Language Processing. An inte	
	Natural Language Processing, Computational Linguistics and Speech Recogn	$100^{10}, 2^{10}$
	Edition, Prentice Hall,2008.	
2.	James Allen, "Natural Language Understanding", 2 <sup>nd</sup> edition, Benjamin/Cummings	publishing
	company, 1995.	
3.	James Allen," Natural Language Understanding", Benjamin/Cummingsp ublishing	g company.
	2nd edition, 1995.	
4.	Gerald J. Kowalski and Mark.T. Maybury," Information Storage and Retrieva	ıl system".
	Information Storage and Retrieval system 2000	<i>j</i> ,
5	Steven Bird Ewan Klein Edward Loner" Natural Language Processing with Dutha	n" 2009
<i>S</i> .	Christenber D. Manning, and Hinrich Calutter? Essendations of Statistical Network	II, 2009.
6.	Christopher D.Manning and Hinrich Schutze," Foundations of Statistical Natural	Language

0.	Christopher D.Manning and Hinren Schutze,	Foundations	01	312
	Processing, MIT Press" 1999			

CO#	COURSE OUTCOMES
CO1	Understand the fundamental concepts and techniques in NLP and evaluate their
	unique challenges in language modeling
CO2	Evaluate part-of-speech tagging and explore syntactic analysis through context-
	free grammar and probabilistic parsing.
CO3	Investigate the extraction of relations from text by analyzing word sequences and
	dependency paths.
CO4	Develop evolving explanatory novel patterns for semantically-based text mining
	through a guided model approach.
CO5	Design and evaluate features of information retrieval systems by comparing
	classical, non-classical, and alternative models of information retrieval.

[As per N (Eff	Mobile Application Dev EP Choice Based Credit S fective from the academic SEMESTER-V	velopment ystem (CBCS)scheme] year 2024-2025) VI		
Course Code	22CS634	CIE Marks	50	
Number of Lecture Hours/Week	03	SEE Marks	50	
Total Number of Lecture Hours	40	Exam Hours	03	
	CREDITS - 0	3		
Course Objectives:		•		
<ul> <li>Learn to set up an Android</li> <li>Illustrate user interfaces for</li> <li>Interpret tasks used in han</li> </ul>	application development or interacting with apps and dling multiple activities.	environment. triggering actions.		
• Identify options to save pe	ersistent application data.			
• Appraise the role of security	ity and performance in And	roid applications		
	Modules			Hours
	Module I			
Get started: Build your first app: 1 Layouts, Views and Resources, T Activities: Understanding Activit Debugging and using support libr Android Support Library.	Introduction to Android, Cr ext and Scrolling Views, R ies and Intents, Activities a aries: The Android Studio	eate Your First Android esources to Help You L nd Implicit Intents, Test Debugger, Testing your	l App, earn, ing, App, The	08
Ligar Interaction: Ligar Input Cont	rola Manua Saraan Navia	tion Popular View D	alightful	00
user experience: Drawable, Styles Adaptive Layouts, Testing your U	s, and Themes, Material De II: Testing the User Interfact Module III	sign, Providing Resourc	ces for	00
Background Tasks: AsyncTask ar Receivers, Services, Triggering, s Scheduling Alarms, Transferring	nd AsyncTaskLoader, Conn cheduling and optimizing b Data Efficiently	eet to the Internet, Broa background tasks: Notifi	dcast cations,	08
Scheduling Humis, Humsterning				
All about data, Preferences and So Storing data using SQLite: SQLit with content providers: Share Dat Loaders.	ettings: Storing Data, Share e Primer, SQLite Database, a Through Content Provide	d Preferences, App Sett Sharing data ers, Loading data using I	ings, Loaders:	08
	Module V			
Permissions, Performance and Se	curity, Firebase and AdMo	b, Publish		08
Question paper pattern         • The question paper will have         • The students will have to an         • Each full question carries 2         Each full question will have sub quest         Textbooks:         1. Google Developer Training, "A	ve TEN questions, Two questi nswer 5 full questions, selectin 0 marks. stions covering all topics under android Developer Fundam	ons from each module. ng one full question from e er a module. entals Course – Concept	each module. t Reference",	Google
Developer Training Team, 2017.				
Reference Books:				
<ol> <li>Erik Hellman, "Android Progra</li> <li>Dawn Griffiths and David Grif Publishers, 2015.</li> </ol>	mming – Pushing the Limi fiths, "Headfirst Android D	ts", 1st Edition, Wiley I evelopment", 1st Editio	ndia Pvt Ltd, on, O'Reilly S	2014. PD

3. J F DiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126565580

4. Anubhav Pradhan, Anil V Deshpande, "Composing Mobile Apps" using Android, Wiley 2014, ISBN: 978-81-265-4660-2

# E-books and Online course materials

https://www.gitbook.com/book/google-developer-training/android-developerfundamentals-course-concepts/details (Download pdf file from the above link)

**Online Courses and Video Lectures** 

https://www.youtube.com/watch?v=aS\_\_9RbCyHg

CO#	COURSE OUTCOMES
CO1	Create, test and debug Android application by setting up Android development
	environment.
CO2	Implement adaptive, responsive user interfaces that work across a wide range of
	devices.
CO3	understand long running tasks and background work in Android applications
CO4	Demonstrate methods in storing, sharing and retrieving and Analyze data in
	Android applications.
CO5	Describe the steps involved in publishing Android application to share with the
	world

DOT NET FRAMEWORK FOR APPLICATION DEVELOPMENT [As per Choice Based Credit System (CBCS)scheme] (Effective from the academic year 2023-2024) SEMESTER – VI					
Course Code	22CS641	CIE Marks	50		
Number of Lecture Hours/Week	Number of Lecture         03         SEE Marks           Hours/Week         03         03         03				
Total Number of40Exam Hours					
Lecture Hours					
	CR	EDITS – 03			
<ol> <li>Build applications on Visual</li> <li>Demonstrate Object Oriented</li> <li>Design custom interfaces for complex applications.</li> <li>Illustrate the use of generics a</li> <li>Compose queries to query in-</li> </ol>	<ul> <li>Course Objectives:</li> <li>1. Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C#</li> <li>2.Demonstrate Object Oriented Programming concepts in C# programming language</li> <li>3. Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications.</li> <li>4.Illustrate the use of generics and collections in C#</li> </ul>				
	Modules		Hours		
	Module	I			
Introducing Microsoft Visual C# and Microsoft Visual Studio 2015:Welcome to C#, Working with variables, operators and expressions, Writing methods and applying scope, Using decision statements, Using compound assignment and iteration statements, Managing errors and exceptions08					
	Ν	Iodule II			
Understanding the C# object model:Creating and Managing classes and objects, Understanding values and references, Creating value types with enumerations and structures, Using arrays08					
	Μ	lodule III			
Understanding parameter arrays defining abstract classes, Using	Understanding parameter arrays, Working with inheritance, Creating interfaces and defining abstract classes, Using garbage collection and resource management08				
	Μ	lodule IV			
<b>Defining Extensible Types</b> indexers, Introducing generics,	Defining Extensible Types with C#:Implementing properties to access fields, Using indexers, Introducing generics, Using collections08				
	Ν	Iodule V			
Defining Extensible Types with C#:Implementing properties to access fields, Using indexers, Introducing generics, Using collections08					
Question paper pattern: The question paper will have ten questions each question is set for 20 marks. There will be 2 full questions from each module each of the questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module. The students have to answer 5 full questions, selecting one full question from each module. Marks scored by the student shall be proportionally scaled down to 50 Marks.					
Text Books: John Sharp, Microsoft Visual (	C# Step by Step,	8th Edition, PHI Learning Pvt. Ltd. 2016			
<b>Reference Books:</b> Christian Nagel, "C# 6 and .NE	T Core 1.0", 1st	Edition, Wiley India Pvt Ltd, 2016. Andrew S	Stellman		

and Jennifer Greene, "Head First C#", 3rd Edition, O"Reilly Publications, 2013.

CO#	COURSE OUTCOMES
CO1	Build applications on Visual Studio .NET platform by understanding the syntax
	and semantics of C#
CO2	Demonstrate Object Oriented Programming concepts in C# programming
	language
CO3	Design custom interfaces for applications and leverage the available built-in
	interfaces in building complex applications.
CO4	Illustrate the use of generics and collections in C#
CO5	Compose queries to query in-memory data and define own operator behavior

[As per N (Ef	Blockchain To EP Choice Based Cre fective from the acade SEMESTE	echnology dit System (CBCS)sc emic year 2024-2025) R – VI	heme]	
Course Code	22CS642	CIE Marks	50	
Number of Lecture	03	SEE Marks	50	
Hours/Week Total Number of Lecture	40	Fyom Hours	02	,
Hours	40		03	
	CREDITS	8 - 03		
Course Objectives:				
<ul> <li>and distributed system limitations.</li> <li>Explores decentralization and full ecosystem decosystem decosymmetric and asymm</li> <li>Bitcoin's fundamentals examines alternative contrates and the system and</li></ul>	challenges. It explores ion through blockchain centralization. It also ex- etric encryption, digita s, including transaction oins, their theoretical fr cts, including their def blockchain structure, k tunity to know the imp	blockchain types, ap , covering decentraliz amines cryptographic l signatures, and key r s, blockchain, and net oundations of alternat inition and Ricardian key components, and p lementation of this tec	ed organization c foundations, i management. work structure ive coins. contracts. It als precompiled co chnology in var	efits, and ns, DAOs, ncluding . It also ontracts. rious
fields. Modules			Hours	
	Withdies			ii vui s
	Modul	e I		
Blockchain 101: Distributed Consensus, History of blockc blockchain, Features of block Types of blockchain, and block	systems, CAP theore chain, Introduction to cchain, application of cchain, Benefits and lin	em, Byzantine Gener blockchain, Generic blockchain, Tiers o nitations of blockchain	rals problem, elements of f blockchain, 1	08
Decentralization and Cryptog decentralization, Routes to decentralization. Decentralize Decentralized autonomous Cryptography and Technica cryptography-stream ciphers, trees, DHTs, Digital Signature keys- RSA, ECC.	graphy: Decentralizatio decentralization, E d organizations, Decen corporations, Decen al Foundations: Cryp block ciphers, AES, I e, ECDSA, Asymmetri	Module on using blockchain, Blockchain and ful tralized autonomous otographic primitives DES, SHAs, Merkle ic cryptography, Publi	Methods of l ecosystem organizations, us societies. - symmetric Tree, Patricia ic and private	08
	Module	III		
Bitcoin and Alternative Coins A: Bitcoin, Transactions, Blockchain, Bitcoin Network. Alternative Coins, Theoretical foundations, Bitcoin limitations, Namecoin, Litecoin, Primecoin, Zcash			08	
	Module	IV		
Smart Contracts and Ethereum Ethereum 101: Introduction blockchain, Precompiled contr	m 101: Smart Contrac n, Ethereum blockcha racts.	ts: Definition, Ricard ain, Elements of the	ian contracts. ne Ethereum	08
	Module			
Alternative Blockchains: Blo Things, Government, Health,	ckchains Blockchain- Finance, Media.	Outside of Currencie	s: Internet of	08

#### Question paper pattern

- The question paper will have TEN questions, Two questions from each module.
- The students will have to answer 5 full questions, selecting one full question from each module.
- Each full question carries 20 marks.

Each full question will have sub questions covering all topics under a module.

#### Text Books:

1.Mastering Blockchain - Distributed ledgers, decentralization and smart contracts explained, Imran Bashir, Packt Publishing Ltd, Second Edition, ISBN 978-1-78712-544-5, 2017

## **Reference Books:**

- Bitcoin and Cryptocurrency Technologies, Arvind Narayanan, Joseph Bonneau, Edward Felten, 2016
- Blockchain Basics: A Non-Technical Introduction in 25 Steps, Daniel Drescher, Apress, First Edition, 2017
- Mastering Bitcoin: Unlocking Digital Cryptocurrencies, Andreas M. Antonopoulos, O'Reilly Media, First Edition, 2014

CO#	COURSE OUTCOMES
CO1	Describe the foundational concepts of blockchain, including its evolution, types,
	CAP theorem implications, and the benefits and limitations of blockchain in
	distributed systems.
CO2	Apply decentralization methods and demonstrate the use of cryptographic primitives such as public and private keys in blockchain systems.
CO3	Analyze the architecture and transaction flow of Bitcoin and evaluate the limitations and innovations introduced by alternative coins
CO4	Develop and test smart contracts using Ethereum by understanding its
	blockchain components and contract models.
CO5	Evaluate the application of blockchain technology beyond cryptocurrencies in
	sectors such as 101, government, finance, and healthcare

Object [As per NEP Choic (Effective	t Oriented Mod ce Based Credit from the acade	eling and Design System (CBCS)scheme mic year 2024-2025)	]	
	SEMESTE	$\frac{R-VI}{CEE}$	=0	
Course Code	22CS643	CIE Marks	50	
Number of Lecture	03	SEE Marks	50	
Number of Lecture Hours	40	Evam Hours	03	
			03	
	CKEDII	3-03		
<ul> <li>Course Objectives:</li> <li>Describe the concepts involved ir</li> <li>Demonstrate the concept of use problem.</li> <li>Explain the facets of the unified p</li> <li>Translate the requirements into in</li> <li>Choose an appropriate design pat</li> </ul>	n Object-Oriente e-case model, so process approach nplementation fo tern to facilitate	d modelling and their ber equence model and state to design and build a So or Object Oriented desigr development procedure.	nefits. e chart model i ftware system. n.	for a given
	Modules			Hours
	Module	-I		
Advanced object and class concepts; Asso classes; Multiple inheritance; Metadata; I Modeling: Events, States, Transistions and Textbook-1: 4, 5	ciation ends; N- Reification; Con d Conditions, Sta	ary associations; Aggreg straints; Derived Data; F ate Diagrams, State diagr	ation; Abstract Packages. State am behaviour.	08
	Module	-11		
Use Case Modelling and Detailed Requirements: Overview; Detailed object-oriented Requirements definitions; System Processes-A use case/Scenario view; Identifying Input and outputs-The System sequence diagram; Identifying Object Behaviour-The state chart Diagram; Integrated Object-oriented Models.			08	
· · · · · · · · · · · · · · · · · · ·	Module-	III		
Process Overview, System Conception an stages; Development life Cycle; System concept; preparing a problem statement. I model: Domain state model; Domain 1:Chapter- 10,11,and 12	nd Domain Ana Conception: De Domain Analysi interaction mod	lysis: Process Overview vising a system concept s: Overview of analysis; lel; Iterating the analys	: Development ; elaborating a Domain Class sis. Textbook-	08
	Module	-IV		
Use case Realization: The Design Discipline within up iterations: Object Oriented Design-The Bridge between Requirements and Implementation; Design Classes and Design within Class Diagrams; Interaction Diagrams-Realizing Use Case and defining methods; Designing with Communication Diagrams; Updating the Design Class Diagram; Package Diagrams-Structuring the Major Components; Implementation Issues for Three-Layer Design. Textbook-2: Chapter 8: page 292 to 346				08
	Module	-V		
Design Patterns: Introduction; what is a do of design patterns, Organizing the catalog select a design patterns, how to use a desi (only); structural patterns adaptor and pro 1.8,Ch-3,Ch-4.	esign pattern? D ue, How design gn pattern; Crea xy (only). Textb	escribing design patterns patterns solve design pro tional patterns: prototype ook-3: Ch-1: 1.1, 1.3, 1.4	, the catalogue oblems, how to e and singleton 4, 1.5, 1.6, 1.7,	08

#### Question paper pattern

- The question paper will have TEN questions, Two questions from each module.
- The students will have to answer 5 full questions, selecting one full question from each module.
- Each full question carries 20 marks.

Each full question will have sub questions covering all topics under a module.

#### Textbooks

1. Michael Blaha, James Rumbaugh: Object Oriented Modelling and Design with UML,2nd Edition, Pearson Education,2005

2. Satzinger, Jackson and Burd: Object-Oriented Analysis & Design with the Unified Process, Cengage Learning, 2005.

3. Erich Gamma, Richard Helm, Ralph Johnson and john Vlissides: Design Patterns –Elements of Reusable Object-Oriented Software, Pearson Education,2007.

#### **Reference:**

1. Grady Booch et. al.: Object-Oriented Analysis and Design with Applications, 3rd Edition, Pearson Education, 2007.

2. Frank Buschmann, RegineMeunier, Hans Rohnert, Peter Sommerlad, Michel Stal: Pattern – Oriented Software Architecture. A system of patterns, Volume 1, John Wiley and Sons.2007.

3. Booch, Jacobson, Rambaugh : Object-Oriented Analysis and Design with Applications, 3rd edition, pearson, Reprint 2013

CO#	COURSE OUTCOMES
CO1	Understand and apply advanced object-oriented modeling to represent system behavior
	effectively using UML.
CO2	Develop detailed object-oriented requirements models using use cases, sequence diagrams,
	and state charts to capture system behavior and interactions.
CO3	Analyze and define system requirements through domain analysis, class modeling, and
	interaction modeling to prepare foundational models for object-oriented development.
CO4	Design object-oriented solutions using interaction and class diagrams.
CO5	Apply design patterns to solve common software design problems

Cognitive Science [As per NEP Choice Based Credit System (CBCS)scheme] (Effective from the academic year 2024-2025) SEMESTER – VI				
Course Code	22CS644	CIE Marks	50	
Number of Lecture	03	SEE Marks	50	
Hours/Week				
Total Number of Lecture Hours	40	Exam Hours	03	
	CREDITS -	- 03		
Course Objectives:				
<ul> <li>Explores the foundations of cognitive science, including its historical roots, computational theories, and linguistic analysis.</li> <li>Examine cognitive systems, brain anatomy, and computational modeling in neural processing.</li> <li>Explores information-processing models, including physical symbol systems, the language of thought, and machine learning.</li> <li>Explores neural networks and distributed information processing in cognition, covering single-layer, multilayer models, and key processing features.</li> <li>Examine the organization of cognitive systems, intelligent agent architectures, and machine learning.</li> </ul>				
	Modules			Hours
Module I				
Introduction : The prehistory of cognitive science, The reaction against behaviorism in psychology, The theory of computation and the idea of an algorithm, Linguistics and the formal analysis of language, Information-processing models in psychology, The discipline matures: Three milestones: Language and micro-worlds, How do mental images represent?, An interdisciplinary model of vision.				08
	Module I	1		
The turn to the brain : Cognitive systems as functional systems, The anatomy of the brain and the primary visual pathway, Extending computational modeling to the brain, Mapping the stages of lexical processing, THE INTEGRATION CHALLENGE, Cognitive science and the integration challenge; Cognitive science: An interdisciplinary endeavor, Levels of explanation: The contrast between psychology and neuroscience, The integration challenge.			08	
	Module I	Π		
Information-Processing Models of the Mind : Physical symbol systems and the language of thought ; The physical symbol system hypothesis , From physical symbol systems to the language of thought , The Chinese room argument , Applying the symbolic paradigm ;Expert systems, machine learning, and the heuristic search hypothesis , ID3: An algorithm for machine learning , WHISPER: Predicting stability in a block world.				08
Module IV				
Neural networks and distributed in information processing, Single-la networks, Information processing models of cognitive processes; La processing models, Language lear physical reasoning in infancy, reasoning.	nformation process ayer networks and in neural networks anguage and rules: rning in neural net Neural network r	ing : Neural inspired Boolean functions, :: Key features, Neur The challenge for in works, Object perma nodels of children'	models of Multilayer al network formation nence and s physical	08

Module V	
The Organization of The Mind : How are cognitive systems organized?; Architectures for intelligent agents, Fodor on the modularity of mind, The massive modularity hypothesis, Strategies for brain mapping; Structure and function in the brain Studying cognitive functioning: Techniques from neuroscience	08
Ouestion paper pattern	
• The question paper will have TEN questions, Two questions from each module.	
• The students will have to answer 5 full questions, selecting one full question from each	module.
• Each full question carries 20 marks.	
Each full question will have sub questions covering all topics under a module.	
Textbooks	
1.Cognitive Science : An Introduction to the Science of the Mind, Jose Luis Bermudez	,Cambridge
University Press, Second Edition 2020.	-
Reference Books:	
1. José Luis Bermúdez, Cognitive Science: An Introduction to the Science of the Mind,	Cambridge
University Press	-
2. Michael R. W. Dawson, Mind, Body, World: Foundations of Cognitive Science, UBC	C Press

2. Michael K. W. Dawson, Mind, Body, World: Foundations of Cognitive Science, UBC Press
3. Daniel Kolak, William Hirstein, Peter Mandik, Jonathan Waskan, Cognitive Science, An Introduction to Mind and Brain, Routledge Taylor and Francis Group
4. Amit Konar – Artificial Intelligence and Soft computing: Behavioral and Cognitive Modeling of the Human Brain, CRC Press

CO#	COURSE OUTCOMES
CO1	Describe the foundational developments that led to the emergence of cognitive science,
	including key theories in psychology, linguistics, and computation
CO2	Explain how brain anatomy and function relate to cognitive processes and analyze the
	interdisciplinary challenges in integrating psychology and neuroscience
CO3	Apply symbolic models and learning algorithms to represent cognitive tasks.
CO4	Compare neural and symbolic models in simulating cognitive processes.
CO5	Identify cognitive system architectures and basic brain mapping techniques.

	00	DPS with C++		
As per NE.	P Choice Based Affective from the	Credit System (CBCS) ie academic year 2024-	scheme] 2025)	
	SEI	MESTER – VI		
Course Code	22CS651	CIE Marks	50	
Number of Lecture	04	SEE Marks	50	
Hours/Week Total Number of Lecture	50	Exam Hours	03	
Hours			05	
Course Objectives:	C	REDITS – 04		
<ul> <li>Covers C++ program and function concept</li> <li>Introduces classes an with functions and allocation and deallo</li> <li>Covers basics such a inheritance concepts,</li> <li>Covers stream handl fstream class, and fi class hierarchy.</li> <li>Introduces exception try/throw/catch con machanisms</li> </ul>	nming basics, in s. nd objects in C+ arrays. It also cation technique s operator overla- including functi- ling in C++, inc le pointers. It a handling in C+- structs. It also	+, covering member fu explores dynamic men s. bading, type conversion ion overriding and acces cluding text and binary lso explores random ac +, covering error handlir explores the limitat	arison, console I/O, nctions, data, and in nory management, constructors, destru s control in C++. I/O, file operations cess file handling a g using C-style and ions of exception	variables, iteractions including actors, and using the nd stream C++-style handling
mechanisms.		Modules		Hours
		Module I		
Introduction to C++: Pro Programming System, Com Variables in C++, Referen Overloading.	cedure-Oriented parison of C+- nce Variable i	Programming System + and C, Console Inp n C++, Function Pro	n, Object-Oriented ut/Output in C++, totyping, Function	10
		Module II		
Classes and Objects: Intro member data, objects and management: introduction, d	oduction to clas d functions, c ynamic memory	sses and objects, mem objects and arrays. I allocation, dynamic me	ber functions, and <b>Dynamic memory</b> mory deallocation.	10
		Module III		
<b>Operator overloading, Typ</b> overloading, overloading the <b>Destructors:</b> constructors, d class and Derived class point access specifier.	be Conversion, various operat estructors. Inhe ters, function ov	New Style Casts, ar tors, type conversion . eritance: Introduction t rerriding, base class init	<b>d RTTI:</b> operator <b>Constructors and</b> o Inheritance, Base ialization, protected	10
		Module IV		
<b>Stream Handling:</b> streams, input/output, opening and clearned on access files.	, class hierarch osing files, files	y for handling system as objects of fstream of	s, text and binary class, file pointers ,	10
		Module V		
<b>Exception Handling:</b> Introc style solution-try/throw/catch	luction , C-Styl construct, limita	e handling of Error-gen ations of exception hand	neration code, C++ ling.	10

#### Question paper pattern

- The question paper will have TEN questions, Two questions from each module.
- The students will have to answer 5 full questions, selecting one full question from each module.
- Each full question carries 20 marks.

Each full question will have sub questions covering all topics under a module.

# Textbook/ Textbooks:

Object Oriented Programming with C++, Sourav Sahay.

Reference Books:

Object Oriented Programming with C++, E. Balaguruswamy, TMH,6<sup>th</sup> Edition,2013.

CO#	COURSE OUTCOMES		
CO1	Understand the fundamentals of C++ programming and apply concepts like function		
	overloading and reference variables.		
CO2	Implement classes, objects, and dynamic memory management to build modular and		
	reusable programs.		
CO3	Apply operator overloading, constructors, destructors, and inheritance to enhance code		
	flexibility and reusability.		
CO4	Perform file input and output operations using C++ stream classes and manage file pointers		
	for data access.		
CO5	Use exception handling constructs in C++ to manage runtime errors effectively		
[As per NE (Eff	Java Progran CP Choice Based Credit Sective from the academ	nming System (CBCS)scheme iic year 2024-2025)	]
--	--	---	--
	SEMESTER	-VI	=0
Course Code	22CS652	CIE Marks	50
Number of Lecture	04	SEE Marks	50
Hours/ week Total Number of	50		02
I otal Number of Lecture Hours	50	Exam Hours	03
	CREDITS -	_ 04	
Course Objectives: This course v	will enable students		
<ul> <li>To impart the basic conce</li> <li>To understand concepts a</li> <li>To understand basic conce</li> <li>To enable them to write a structures</li> </ul>	epts of data structures an bout searching and sorti epts about stacks, queue llgorithms for solving pr Modules	d algorithms. ng techniques. s, lists, trees and graphs. oblems with the help of f	undamental data
	Module I		
<b>Introduction to Java</b> History Differences between C, C++ and and Running Java Program, Jav Objects: Class Fundamentals, Ob Specifiers.	of Java, Bytecode, Fe I Java, Principles of Obj va Tokens, Data Types ject creation; Type Con	eatures of Java, Java A ject Oriented Programmi , Variables, Operators, wersion and Casting, Arr	Applications, ng, Building <b>10</b> Classes and rays, Access
	Module II		
Control Statements, Methods, C Control Statements: Java Sele Methods: Method Definition, N overloading; Constructors: Cons overloading;Using this keyword,	Constructors ection Statements, Itera Iethod accessing, Methor structor Definition, Para Instance variable hiding;	tive Statements, Jump od That Takes Paramete meterized Constructors, Java static keyword.	Statements; rs, Method 10 Constructor
	Module I	II	
Inheritance, Polymorphism Inl and Multi-level Inheritance, Usin Run-time Polymorphism- Meth class and final keyword	<b>neritance :</b> Inheritance g super keyword, the ca nod overriding, Dynam	basics, Types of Inherita ll of Constructors ; <b>Poly</b> ic Method Dispatch; U	morphism : 10 sing abstract
	Module IV		
Packages, Interfaces, String H Importing Packages; Interfaces String Handling : String Con CharacterExtraction	andling Packages : D : Defining and Implem astructors, String Oper	efining Package, Access enting Interfaces, Nester rations: Concatenation,	Protection, d Interfaces, Conversion; 10
	Module	V	
<b>Exception Handling, Multith</b> Fundamentals, Handling Exception Thread Creation, Creating Multi	reading Exception ons using keywords, Nes ple Threads, Thread Pr	<b>Handling</b> : Exception ted try statements, <b>Mult</b> iorities, Synchronization	n Handling i <b>threading :</b> , Interthread <b>10</b>

Communication: Producer Consumer Problem

## Question paper pattern

- The question paper will have TEN questions, Two questions from each module.
- The students will have to answer 5 full questions, selecting one full question from each module.
- Each full question carries 20 marks.

Each full question will have sub questions covering all topics under a module.

## Textbooks:

1. Herbert Schildt, Java The Complete Reference, 7th Edition, Tata McGraw Hill

## **Reference Books:**

- 1. Mahesh Bhave and Sunil Patekar, "Programming with Java", First Edition, Pearson Education, 2008, ISBN:9788131720806.
- 2. Rajkumar Buyya,S Thamarasi selvi, xingchen chu, Object oriented Programming with java, Tata McGraw Hill education private limited.
- 3. E Balagurusamy, Programming with Java A primer, Tata McGraw Hill companies. Anita Seth and B L Juneja, JAVA One step Ahead, Oxford University Press, 2017..

CO#	COURSE OUTCOMES
CO1	Differentiate structured programming and object oriented programming and know the concepts
	of classes, objects, members of a class.
CO2	Apply the concept of classes, control statements, constructor and develop Simple Java
	Programs.
CO3	Develop Simple Java Programs using inheritance and Polymorphism
CO4	Apply the concepts of packages, interfaces, and string handling in Java to design and implement
	solutions for real-world programming problems
CO5	Illustrates the concepts of Multi Threaded Programming and Exception handling

[As per NEP Cho (Effecti	Software Eng bice Based Cred ve from the aca SEMEST	ineering Lab it System (CBCS)scher demic year 2024-2025) `ER – VI	me]
Course Code	22CSL66	CIE Marks	50
Number of Lecture Hours/Week	02	SEE Marks	50
Total Number of Lecture Hours30Exam Hours03			
CREDITS – 01			

**Course Objectives:** 

- To understand the software engineering methodologies for project development
- To design and implement complex software systems
- To apply Agile software development methodologies in real-world projects
- To integrate automated testing into the development lifecycle
- To develop secure, scalable, and efficient applications
- To deploy, maintain, and scale software systems.

### **Experiments:**

- 1. Online Course Registration System, and Student marks analyzing system.
- 2. Health Care (Expert system to prescribe medicines for given symptoms, Remote Diagnostics, Patient/Hospital Management System).
- 3. Banking System (ATM/Net Banking,).
- 4. E-Commerce (Various online shopping portals like Flipkart /Amazon/Myntra) system.
- 5. Logistics (Postal /Courier) System.
- 6. Tourism Management System.
- 7. Social Networking System.
- 8. Customer Support System.
- 9. Booking/Ticketing System.
- 10. Develop basic calculators using Agile Method. Test each feature using automated unit tests

CO#	COURSE OUTCOMES
CO1	Identify and formulate research or societal problems
CO2	Design and develop solution to the problem
CO3	Analyse for optimization solutions
CO4	Implement and execute
CO5	Write effective technical report and demonstrate through presentation

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

Artificial Intelligence and Machine Learning Lab [As per NEP Choice Based Credit System (CBCS)scheme] (Effective from the academic year 2024-2025) SEMESTER – VI						
Cours	Course Code 22CSL67 CIE Marks 50					
Numb	per of Lecture	02	SEE Marks	50		
Hours	5/Week	02				
Total	Number of Lecture Hours	30	Exam Hours	03		
		CREDI	rs – 01			
Cours	e Objectives:					
	• Able to understand the c	oncepts of Sear	ching algorithms and imp	plementing them with a		
	code					
	<ul> <li>Able to understand the ANN and back propagation algorithms by experimenting on</li> </ul>					
	atasets	nlomontation	of plotting graphs by im-	orting cortain packages		
No	Able to understand the in	ipiementation	or protring graphs by init	Joi ting certain packages		
1	Implement AO* search algo	rithm				
1. 2	Implement and Demonstrate the Travelling Salesman Problem					
2.	Write a program to implement Alpha-Beta Pruning using Python					
з. л	Write a program to implement Tip Tap Tap game using with an					
4.	write a program to implement ric-rac-roe game using python					
5.	write a program to implement Hill Climbing algorithm					
6.	Implement Resolution principle on FOPL related Problem.					
	Build an Artificial Neural Network by implementing the Back propagation algorithm and test					
7.	7. the same using appropriate data sets.					
8.	<b>8.</b> Write a Program to implement 8-Queens Problem using Python.					
	Write a program to impleme	ent k-Nearest N	eighbor algorithm to clas	ssify the iris data set. Print		
9.	both correct and wrong pr	edictions Java	Python ML library cla	sses can be used for this		
			i juich will notary ofa	used call be used for this		
	problem.					
10.	Implement the non-parame	etric Locally W	eighted Regression algo	rithm in order to fit data		
	points. Select appropriate d	ata set for your	experiment and draw gr	aphs		

CO1	Apply theoretical knowledge of Artificial Intelligence and Machine Learning by designing, conducting, and analyzing a series of experiments
CO2	Develop a program using python and essential machine learning libraries in spyder/jupyter
CO3	Diagnose, debug, and troubleshoot common issues in AI and ML workflows
CO4	Analyze the data and interpret the results.
CO5	Prepare a well-organized laboratory report.

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

				Full Stack Dev	elopment Lab	
[As per NEP Choice Based Credit System (CBCS)scheme]						
(Effective from the academic year 2024-2025)						
				SEMEST	TER – VI	
Cours	Course Code22CSL681CIE Marks50		50			
Numb	per of Lectur	·e		02	SEE Marks	50
Hours	s/Week			02		
Total Hours	Number	of	Lecture	30	Exam Hours	03
IIour	3			CREDI	<b>ΓS – 01</b>	
Cours	se Objectives	5:				
•	Explain the	use c	of learning	full stack web de	velopment.	
•	Make use of	f rapi	d application	on development i	in the design of responsi	ive web pages.
•	Illustrate M	odels	, Views an	d Templates with	their connectivity in D	jango for full stack
	web develop	pmen	t.			
•	Demonstrat	e the	use of state	e management an	d admin interfaces auto	mation in Django.
•	Design and	imple	ement Djar	igo apps containi	ng dynamic pages with	SQL databases
No.	List of Exp	erim	ents:			
1.	Installation o	f Pytł	ion, Django	and Visual Studio	code editors can be demo	onstrated.
2.	Creation of virtual environment, Django project and App should be demonstrated.					
3.	Develop a Django app that displays current date and time in server.					
4.	Develop a Django app that displays date and time four hours ahead and four hours before as an offset of current date and time in server.					
5.	Develop a simple Django app that displays an unordered list of fruits and ordered list of selected students for an event					
6.	Develop a layout.html with a suitable header (containing navigation menu) and footer with copyright and developer information. Inherit this layout.html and create 3 additional pages: contact us, About Us and Home page of any website.					
7.	<ul> <li>Develop a Django app that performs student registration to a course. It should also display list of students registered for any selected course. Create students and course as models with enrolment as Many to Many field.</li> </ul>					
8.	For student and course models created in Lab experiment for Module2, register admin interfaces, perform migrations and illustrate data entry through admin forms.					
9.	Develop a M duration with	/lodel 1 a mo	form for s del called p	tudent that contain roject.	ins his topic chosen for	project, languages used and
10.	For students students and	enro detail	lment devel view that d	oped in Module isplays student det	2, create a generic class ails for any selected stude	view which displays list of ent in the list.
11.	Develop exa previous labo	mple prator	Django ap y componen	p that performs ( t.	CSV and PDF generation	n for any models created in
12.	Develop a re AJAX.	gistra	tion page fo	or student enrolme	nt as done in Module 2 b	ut without page refresh using

CO#	COURSE OUTCOMES
CO1	Demonstrate theoretical knowledge of Full Stack Web Development by conducting a series of hands-on experiments.
CO2	Develop a Program using Python/Django.
CO3	Debug and troubleshoot issues effectively.
CO4	Analyze the data and interpret the results.
CO5	Prepare a well-organized laboratory report.

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

	Cryp [As per NEP Choic	tography and N e Based Credit S	etwork Security Lab System (CBCS)scheme]		
	(Effective from the academic year 2024-2025)				
		SEMEST	ER – VI		
Cours	e Code	22CSL682		50	
		02	SEE WIARKS	50	
Total	Number of Lecture Hours	30	Exam Hours	03	
		CREDIT	rs – 01		
Cours	e Objectives:				
	Able to understand the c	oncept of XOR ,	AND operators experime	enting with the character	
	strings.	-	· ·	-	
	• Able to know the algorith	ims of encryptio	n and decryption and im	plementing them	
	• Able to understand the se	ecurity factors s	uch as message digests a	algorithms.	
No.	List of Experiments:				
	Write a C program that c	ontains a string	g (char pointer) with a	value 'Hello world'. The	
1.	program				
•	snould XUK each character in this string with 0 and displays the result.				
2.	program should AND or and	VIII a String	ctor in this string with 1	27 and display the result	
2	Write a Java program to perform encryption and decryption using the following algorithms				
J.	a. Ceaser cipher b. Substitution cipher c. Hill Cipher				
4.	4. Write a C/JAVA program to implement the DES algorithm logic.				
		-			
5.	Write a C/JAVA program to	implement the	Blowfish algorithm logic	2.	
6.	Write a C/JAVA program to	implement the	Rijndael algorithm logic		
_	Write the RC4 logic in Java Using Java cryptography; encrypt the text "Hello world" using				
1.	Blowfish. Create your own I	key using Java k	ey tool.		
8.	Implement the Diffie-Hellm	an Key Exchang	e mechanism using HTM	ML and JavaScript.	
9.	Calculate the message diges	t of a text using	the SHA-1 algorithm in	JAVA.	
10.	Calculate the message diges	st of a text using	the MD5 algorithm in JA	AVA.	

CO1.	Utilize classical and modern cryptographic algorithms to implement secure data encryption, decryption, and key exchange mechanisms.
CO2	Apply cryptographic hash functions and bitwise operations for secure data processing and integrity verification.
CO3	Debug and troubleshoot software issues effectively
CO4	Analyze the data and interpret the results
CO5	Prepare a well-organized laboratory report

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

• Marks Distribution

	Natu	ral Language Processing ]	Lab	
	(Effective f	from the academic year 20 SEMESTER – VI	)24-2025)	
Cour	se Code	22ADL683	CIE Marks	50
Num	ber of Lecture	02	SEE Marks	50
Hour	s/Week	20		02
l otal	Number of LectureHours		Exam Hours	03
C		CREDITS-01		
Cour	se Objectives:	1:1-1-6-6	£ 1 NI D 1'	
•	Be able to discuss the current and	likely luture performance of managements	of several NLP application	ions.
•	such as morphological processing	amental technique for proce	ssing language for sev	erai subtasks,
•	Implement parsing word sense di	sambiguation etc		
•	Understand how these techniques	draw on and relate to other	areas of computer scie	ence.
•	Understand the basic principles of	designing and running an I	NLP experiment.	
No.	List of Experiments:		•	
	a. Write a python program to pe	erform tokenization by word	d and sentence using r	ltk.
1.	b Write a python program to el	iminate ston words using n	ltk	
	c. Write a python program to pe	erform stemming using nltk		
2.	a. Write a python program to pe	rform Parts of Speech taggi	ng using nltk.	
_	b. Write a python program to	perform lemmatization us	ing nltk.	
2	a. Write a python program for c	hunking using nltk.		
з.	b. Write a python program	to perform Named Entit	ty Recognition using n	ltk.
4.	a. Write a python program to IDF).	o find Term Frequency a	nd Inverse Document	Frequency (TF-
	b. Write a python program for <b>Chart Parsing.</b>	or CYK parsing (Cocke-	- Younger-Kasami P	arsing) or
5.	a. Write a python program to fin	nd all unigrams, bigrams an	d trigrams present in t	he given
	corpus.			
	b. Write a python program to fin	nd the probability of the giv	ven statement "This is	my cat" by
(	taking the an exmple corpus int	o consideration.	mizor to outroot o	ntitios from the
6.	documents Use it programmat	ically and output	it for each	document which
	named entities it contains a	and of which type.		
	Choose any corpus available	e on the internet freely	. For the corpus, for	each document,
7.	count how many times eac	h stop word occurs a	nd find out which	are the most
	frequently occurring stop wor	ds. Further, calculate the t	erm frequency and in	verse document
	frequency as The motivation be	ehind this is basically to fir	id out how important a	a document is to
	a given query. For e.g.: If the q	uery is say: "The brown crown in the brown crown is say: "The brown crown is a say in the brown is a say in th	ow . The is less imp	ortant. Brown
	high. Hence we multiply it by i	df. by knowing how comm	on	ia, its ti will be
	it is to reduce its weight.	, eg inte tring noti commi		
8.	Write the python code to perfor	m sentiment analysis using	NLP.	
	r	,8		
1				

9.	Write the python code to develop Spam Filter using NLP
10.	Write the python code to detect Fake News using NLP

CO#	Course Outcomes
CO1	Understand and apply foundational NLP techniques such as tokenization, stemming, lemmatization, POS tagging, and chunking using Python and NLTK.
CO2	Design and implement NLP applications including sentiment analysis, spam filtering, fake
	news detection, and information extraction using machine learning and text processing tools.
CO3	Debug and troubleshoot issues effectively.
<b>CO4</b>	Analyze the data and interpret the results.
CO5	Prepare a well-organizedlaboratory report.

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.
- Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

Mobile [As per NEP Choice] (Effective fr	Application Develo Based Credit Syster rom the academic y SEMESTER VI	pment Lab m (CBCS)scheme] year 2024-2025)	
Course Code	22CSL684	CIE Marks	50
Number of Lecture	02	SEE Marks	50
Hours/Week	-		
Total Number of Lecture Hours	30	Exam	03
		Hours	
	CREDITS- 01		

**Course Objectives:** 

- Learn and acquire the art of android programming
- Configure Android studio to run the applications.
- Understand and implement android's user interface functions.
- Create, modify and query on SQlite database.
- Inspect different methods of sharing data using services.

# PART-A

 Create an Android application to design a visiting card. The Visiting card should have a company logo at the top right corner. The company name should be displayed in Capital letters, aligned to the center. Information like the name of the employee, job title, phone number, address, email, fax and the website address is to be displayed. Insert a horizontal line between the job title and the phone number
 Develop an android application using controls like Button, TextView, EditText for designing a calculator having basic functionality like addition, subtraction, Multiplication and division.
 Create a SIGN up activity with Username and password. Validation of password should happen

based on the following rules:

□ Password should contain uppercase and lowercase letters.

 $\hfill\square$  Password should contain letters and numbers.

 $\square$  Password should contain special characters.

 $\Box$  Minimum length of the password(the default value is 8)

On successful SIGN UP proceed to the next login activity. Here the user should SIGN IN using the Username and Password created during signup activity. If the Username and password are matched then navigate to the next activity which displays a message saying "Successful Login" or else display a toast message saying "Login Failed". The user is given only two attempts and after that display a toast message saying "Failed Login Attempts" and disable the SIGN IN button. Use bundle to transfer information from one activity to another.

4. Develop an application to set an image as wallpaper. On click of a button, the wallpaper image should start to change randomly every 30 seconds.

5. Write a program to create an activity with two buttons START and STOP. On pressing of the START button, the activity must start the counter by displaying the numbers from one and the counter must keep on counting until the STOP button is pressed. Display the counter value in a TextView control.

6. Create two files of XML and JSON type with values for City\_Name, Latitude, Longitude, Temperature and Humidity. Develop an application to create an activity with two buttons to parse the XML and JSON files which when clicked should display the data in their respective layouts side by side.

7. Devlop a simple application with one EditText so that the user can write some text in it. Create a button called "Convert Text to speech" that converts the user input text into voice.

8. Create an activity like a phone dialer with CALL and SAVE buttons. On pressing the CALL button, it must call the phone number and on pressing the SAVE button it must save the number to the phone contacts.

### PART-B

1. Write a program to enter Medicine Name, Date and Time of the Day as input from the user and store it in the SQLite

2.Develop a content provider application with an activity called "Meeting Schedule" which takes date, Time and Meeting Agenda as input from the user and store this information into the SQLite database. Create another application with an activity called "Meeting Info" having Date Picker control, which on the selection of a date should display the Meeting agenda information for that particular date, else it should display a toast message saying "No Meeting on this Date".

3. Create an application to receive an incoming SMS which is notified to the user. On clicking this SMS notification, the message content and the number should be displayed on the screen. Use appropriate emulator control to send the SMS message to your application.

4. Write a program to create an activity having a text box, and also save, open and create buttons. The user has to write some text in the text box. On pressing the create button the text should be saved as a text file in MkSDcard. On subsequent changes to the text, the save button should be pressed to store the latest content to the same file. On pressing the open button, it should display the contents from the previously stored files in the text box. If the user tries to save the contents in the Textbox to a file without creating it, then a toast message has to be displayed saying "First create a File".

5. Create an application to demonstrate a basic media player that allows the user to farward, backward, play and pause an audio, also, make use of the indicator in the seek bar to move the audio forward or backward as required.

6. Develop an application to demonstrate the use of asynchronous tasks in android. The asynchronous task should implement the functionality of a simple moving bannr. On pressing the Start task button, the banner message shuld stop. Let the banner message be "Demonstration of Asynchronous Task".

7. Develop an application that makes use of the clipboard framework for copying and pasting of the text. The activity consists of two EditText controls and two buttons to trigger the copy and paste functionality.

8. Create an AIDL service that calculates car Loan EMI. The formula to calculate EMI is

E = P \* (r(1+r)n)/((1+r)n-1)

Where

E= The EMI payable on the car loan amount

P=The car loan principal amount

r = the interest rate value computed on a monthly basis

n = the loan tenure in the form of months

The down payment amount has to be deducted from the principal amount paid towards buying the car. Develop an application that makes use of this AIDL service to calculate the EMI. This application should have four EditText to read the Principal amount, Down payment, Interest rate, loan term(in months) and a button named as "CalculateMonthly EMI". On click of this button, the result should be shown in a TextView. Also, calculate the EMI by varying the Loan term and interest rate values.

CO#	Course Outcomes
CO1	Demonstrate Create, test and debug android application by setting up android development environment
CO2	Implement adaptive, responsive user interfaces that work across a wide range of devices.
CO3	Debug and troubleshoot issues effectively.
<b>CO4</b>	Analyze the data and interpret the results.
CO5	Prepare a well-organized laboratory report.

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

PROJECT-VI [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2024-25) SEMESTER – VI				
Course Code	22PRJ69	CIE Marks	50	
Number of Lecture Hours/Week	02	SEE Marks	50	
Total Number of Lecture Hours	30	Exam Hours	03	
Credits – 01				

### **Course Objectives:**

1.Identify real-world problems across programming, databases, and networking domains and understand their business and technical implications.

2. Apply systematic methodologies to design, implement, and optimize solutions.

3.Resolve technical challenges through debugging, research, and collaboration.

4. Take responsibility for specific roles in a team and collaborate effectively to achieve project goals.

5. Present project progress and findings clearly and confidently to both technical and non-technical audiences.

6.Document the entire project in a structured, professional laboratory report.

### Project Guidelines:

- Project work shall preferably be batch wise.
- Evaluation is based on concept clarity, system design, implementation, testing, presentation, and documentation quality, with a focus on proper coding standards, teamwork, and effective communication.
- Viva-voce examination in project work shall be conducted batch-wise.
- Minimum requirement of CIE marks for Project work shall be 50% of the maximum marks.
- Students failing to secure a minimum of 50% of the CIE marks in Project work shall not be eligible for the SEE Project examination.
- For a pass in a Project/Viva-voce examination, a student shall secure a minimum of 40% of the maximum marks prescribed.

CO#	COURSE OUTCOMES
CO1	Identify the topic from various domains (example programming databases,
	networking) to real world problems.
CO2	Develop methodology for the problem.
CO3	Resolve issues that arise during the project.
CO4	Learn to assign and accept roles and responsibilities within a team and
	write a good technical reports.
CO5	Exhibit skills in presenting their project findings & progress orally

Research	Methodology and Intelled	ctual Property Rights		
[As per NEP Choice Based Credit System (CBCS)scheme] (Effective from the academic year 2024-2025)				
	SEMESTER – V	VI		
Course Code	22HSM610A	CIE Marks	50	
Number of Lecture Hours/Week	01	SEE Marks	50	
Total Number of	20	Exam Hours	03	
Lecture Hours				
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	CREDITS – 0	1		
Course Objectives:	uladas on haging of magazenah	and its types		
• To Understand the know	Literature Paviay Technic	and its types.	Citations	
• To learn Ethics in Engir	Literature Review, reclinic	al Reading, Attributions and	Citations.	
To learn Ethics in Englis     To Discuss the concepts	of Intellectual Property Ric	this in engineering		
	Modules			
	Mod	lule I	Hours	
Introduction: Meaning of I	Research, Objectives of I	Engineering Research, and	04	
Motivation in Engineering Re	search, Types of Engineer	ring Research, Finding and		
Solving a worthwhile Problem	Ethics in Engineering Res	Ethical Language Delated to		
Authorship	Research Misconduct,	Ethical Issues Related to		
Autorship.	Module II			
Literature Review and Techr	<b>ical Reading.</b> New and Ex	xisting Knowledge, Analysis	04	
and Synthesis of Prior Art Bibliographic Databases, Web of Science, Google and				
Google Scholar, Effective S	earch: The Way Forward	Introduction to Technical		
Reading Conceptualizing Resea	rch, Critical and Creative R	eading, Taking Notes While		
Reading, Reading Mathematic	s and Algorithms, Reading	g a Datasheet. Attributions		
and Citations: Giving Credit	Wherever Due, Citations	: Functions and Attributes,		
Impact of Title and Keywords	on Citations, Knowledge F	low through Citation, Citing		
Datasets, Styles for Citations,	Acknowledgments and At	tributions, what Should Be		
Acknowledgments	ments m, books Diss	sertations, Dedication of		
Ackilowicugilients.	Module III			
Introduction To Intellectual	<b>Property:</b> Role of IP in	the Economic and Cultural	04	
Development of the Society, I	P Governance, IP as a Glo	bal Indicator of Innovation,	-	
Origin of IP History of IP in Ir	ndia. Major Amendments in	IP Laws and Acts in India.		
Patents: Conditions for Obtain	ing a Patent Protection, To	Patent or Not to Patent an		
Invention. Rights Associated v	vith Patents. Enforcement of	of Patent Rights. Inventions		
Eligible for Patenting. Non-Pa	atentable Matters. Patent In	nfringements. Avoid Public		
Disclosure of an Invention before Patenting. Process of Patenting. Prior Art Search.				
Choice of Application to be r	Pre-grant Opposition Eva	mination Grant of a Patent		
Validity of Patent Protection	Post-grant Opposition. Exa	numercialization of a Patent		
Need for a Patent Attorney/Agent. Can a Worldwide Patent be Obtained. Do I Need				
First to File a Patent in India. Patent Related Forms. Fee Structure. Types of Patent				
Applications. Commonly Used Terms in Patenting. National Bodies Dealing with				
Patent Affairs. Utility Models	s. Process of Patenting. Pr	rior Art Search. Choice of		
Application to be Filed. Pate	ent Application Forms. Ju	risdiction of Filing Patent		
Application. Publication. Pre-	grant Opposition. Examin	nation. Grant of a Patent.		

Validity of Patent Protection. Post-grant Opposition. Commercialization of a Patent.	
Need for a Patent Attorney/Agent. Can a Worldwide Patent be Obtained. Do I Need	
First to File a Patent in India. Patent Related Forms, Fee Structure. Types of Patent	
Applications Commonly Used Terms in Patenting National Bodies Dealing with	
Patent Affairs Utility Models	
Module IV	
Convrights and Related Rights: Classes of Convrights Criteria for Convright	04
Ownership of Convright Convrights of the Author Convright Infringements	04
Convright Infringement is a Criminal Offence Convright Infringement is a Cognizable	
Offence Fair Use Doctrine Convrights and Internet Non-Convright Work Convright	
Registration Judicial Powers of the Registrar of Convrights Fee Structure Convright	
Symbol Validity of Convright Convright Profile of India Convright and the word	
'Publish' Transfer of Convrights to a Publisher Convrights and the Word	
'Adaptation' Convergence and the Word 'Indian Work' Joint Authorship Convergence	
Society Converget Board Converget Enforcement Advisory Council (CEAC)	
International Convergent Agreements Conventions and Treaties Interesting Convergents	
Coses Trademarks: Eligibility Criteria Who Can Apply for a Trademark Acta and	
Laws Designation of Trademark Symbols, Classification of Trademarks, Registration	
of a Trademark is Not Compulsory Validity of Trademark Types of Trademark	
Registered in India Trademark Registry Process for Trademarks Registration Prior	
Art Search Famous Case Law: Coca Cola Company vs Bisleri International Put I td	
Module V	
Industrial Designs: Eligibility Criteria Acts and Laws to Govern Industrial Designs	04
Design Rights Enforcement of Design Rights Non-Protectable Industrial Designs	04
India Protection Term Procedure for Registration of Industrial Designs Prior Art	
Search Application for Registration Duration of the Registration of a Design	
Importance of Design Registration Cancellation of the Registered Design Application	
Forms Classification of Industrial Designs Designs Registration Trend in India	
International Treaties Famous Case Law: Apple Inc. vs. Samsung Electronics Co.	
Geographical Indications: Acts I aws and Rules Pertaining to GI Ownership of GI	
Rights Granted to the Holders Registered GL in India Identification of Registered GL	
Classes of GI Non-Registerable GI Protection of GI Collective or Certification	
Marks Enforcement of GL Rights Procedure for GL Registration Documents Required	
for GL Registration GL Ecosystem in India Case Studies on Patents Case study of	
Curcuma (Turmeric) Patent Case study of Neem Patent Case study of Basmati natent	
IP Organizations In India Schemes and Programmes	
Textbooks.	
1 Dinankar Deb • Rajeeb Dev Valentina E. Balas "Engineering Research Methodology	" ISSN 1868-
4394 ISSN 1868-4408 (electronic). Intelligent Systems Reference Library ISBN 978-	981-13- 2946-3
ISBN 978-981-13-2947-0 (eBook), https://doi.org/10.1007/978-981-13-2947-0	01 10 2010 0
2. Intellectual Property A Primer for Academia by Prof. Runinder Tewari Ms. Mamta Bl	nardwa
	iuru () u
Reference Book:	
1. David V. Thiel "Research Methods for Engineers" Cambridge University Press, 978	8-1-107-03488-
4 – 2. Intellectual Property Rights by N.K.Acharya Asia Law House 6th Edition. ISBN:	978-93- 81849-
30-9	
Question paper pattern	
• The question paper will have TEN questions, Two questions from each module.	
• The students will have to answer 5 full questions, selecting one full question from	m each
module.	
• Each full question carries 20 marks.	
• Each full question will have sub questions covering all topics under a module.	
84	

CO#	COURSE OUTCOMES
CO1	To introduce engineering research, develop problem-solving skills, and emphasize research ethics.
CO2	To explore literature review, technical reading, and proper citation practices in research.
CO3	To understand IP's role in development and the patenting process, including rights, protection, and commercialization.
CO4	To examine copyrights and trademarks, including ownership, registration, infringement, and related laws.
CO5	To study industrial designs and geographical indications, including registration, rights, protection, and related laws.

LAs por NEP Choir	Table	au System (CRCS)schemel	
(Effectiv	e from the acade	emic year 2024-2025)	
Course Code	SEMESTE	R – VI CIF Marks	50
Number of Lecture	02	SEE Marks	50
Hours/Week			
Total Number of LectureHours	30	Exam Hours	03
	CREDIT	<u>S – 01</u>	
Course Objectives:			
• Develop practical skills in dat	ta visualization us	ing Tableau software.	
• Understand the Tableau inter	face and its basic	functionalities.	
• Learn about creating different	t types of advance	ed charts.	
Learn to integrate multiple vie	ews into a single	interactive dashboard.	
• Learn now story terning in dat	a visualization us	ilig Tableau.	
List of Experiments.			
1. Introduction to Tableau and	installation.		
2. Data connections in tableau inter	. Data connections in tableau interface		
3. Calculations using Tableau.			
4. Organizing and Simplifying Dat	. Organizing and Simplifying Data		
5. Preparing data for visualization	on in Tableau.		
6. Creating Dashboard			
7. Building Different Chart Types.			
8. Advanced Chart Types			
10. Storytelling in Tableau.			
<b>Textbooks:</b> 1. "Learning Tableau" by Joshu visualizations, dashboards, and 1	a N. Milligan: C more.	breat for beginners, it covers	how to create data
2. "Tableau Your Data": by Dan M and want to take their Tableau sl	Iurray: Ideal for pe kills to the next lev	ople who already have some da el.	ta analysis background
Online Resources:			

- 1. <u>https://youtube.com/playlist?list=PLO9LeSU\_vHCU\_DHaLzEvsLxFdmB3Qcao\_&si=AV8QQMRCCZr</u> <u>mF5Xs</u>
- 2. <u>https://youtube.com/playlist?list=PLWPirh4EWFpGXTBu8ldLZGJCUeTMBpJFK&si=tzJVKC3r2DfEnuSx</u>

CO#	COURSE OUTCOMES
CO1.	Utilize Tableau to connect, import, and prepare various data sources for effective data visualization
CO2	Apply Tableau features to create interactive worksheets, dashboards, and stories for insightful data communication.
CO3	Debug and troubleshoot software issues effectively
CO4	Analyze the data and interpret the results
CO5	Prepare a well-organized laboratory report

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

Marks Distribution

Course	Code	22ACS611B	<b>CIE Marks</b>	50
Number	r of Lecture	02	SEE Marks	50
Fotal N	umber of LectureHours	20	Exam Hours	03
		<u>30</u> CREDITS – 01		
Course	e Objectives:			
• (	Understand the agile relation	ship between developme	ent and IT operations.	
• 5	Study the different Version c	ontrol tools like Git and	Git hub.	
• 1	Enable students to implement	t DevOps practices and t	ools for modern softwar	e development.
• 1	Enable students to automate s	system updates and mana	age the full DevOps lifed	cycle for efficie
List of	'Exneriments.	e denvery.		
1	1. Write code for a simple u	ser registration form for	an event.	
-	2 Explore Git and GitHub o	commands		
- -	3 Practice Source code mar	agement on GitHub Fx	periment with the source	e code written it
-	evercice 1		perment with the source	
,	I Janking installation and g	otum overlage the onviron	mont	
-	5. Demonstrate continuous		ant main a Laulting	
-	5. Demonstrate continuous i	ntegration and developh	nent using Jenkins.	
(	5. Explore Docker command	ds for content manageme	ent.	
7	7. Develop a simple contain	erized application using	Docker.	
8	8. Integrate Kubernetes and	Docker		
ç	9. Automate the process of r	running containerized ap	plication developed in e	xercise 7 using
	Kubernetes.			
1	10. Install and Explore Selen	ium for automated testin	g.	
]	11. Write a simple program i	n JavaScript and perform	n testing using Selenium	
	12. Develop test cases for the	above containerized app	plication using selenium	

- Free Code Camp DevOps Course: <u>https://www.freecodecamp.org/news/devops-tutorial</u>
- Docker Official Docs https://docs.docker.com

CO#	COURSE OUTCOMES
CO1.	Utilize Devops Tools to Automate Software Development, Integration, And Deployment Processes.
CO2	Apply Automated Testing Techniques to Ensure The Reliability And Functionality Of Web Applications In A Devops Pipeline.
CO3	Debug And Troubleshoot Software Issues Effectively
CO4	Analyze The Data And Interpret The Results
CO5	Prepare A Well-Organized Laboratory Report

• Experiment distribution

- a) For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- b) For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

• Change of experiment is allowed only once and marks allotted for procedure to be made zero

of the changed part only.

Marks Distribution