MALNAD COLLEGE OF ENGINEERING, HASSAN

(An Autonomous Institution Affiliated to VTU, Belagavi)



Autonomous Programme Bachelor of Engineering

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SYLLABUS

V Semester & VI Semester (2022-23 Admitted Batch)

Academic Year 2024-2025

VISION

To become a prominent department of Computer Science & Engineering producing competent professionals with research and innovation skills, inculcating moral values and societal concerns.

MISSION

- 1. Impart world class engineering education to produce technically competent engineers.
- 2. Provide facilities and expertise in advanced computer technology to promote research.
- 3. Enhance Industry readiness and entrepreneurial abilities through innovative skills
- 4. Nurture ethical values and social responsibilities

PROGRAM EDUCATIONAL OBJECTIVES

- PEO 1 : Graduates will be efficient software developers in diverse fields and will be successful professionals and/or pursue higher studies.
- PEO 2 : Graduates will be capable to adapt to new computing technology for professional excellence and Research and will be lifelong learners.
- PEO 3 : Graduates will work productively exhibiting ethical qualities for the betterment of society.
- PEO 4 : Graduates will possess leadership qualities, work harmoniously in a team with effective communication skills.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

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

PROGRAM SPECIFIC OUTCOMES (PSOs)

Upon graduation, students with a degree B.E. in Computer Science & Engineering will be able to:

PSO – 1: To make the students industry ready by facilitating them with software tools in recent technologies

PSO – 2: To develop IT based solutions for problems in diverse domains

Admitted Batch : 2022-23 Academic Year : 2024-25 Scheme & Syllabus for III Year

	FIFTH SEMESTER													
Course Category	Course Code	Course Title	L-T-P (Hours)	Credits	Contact Hours									
HSMC	22CS501	Technology Management and Entrepreneurship	3-1-0	3	4									
PCC	22CS502	Software Engineering and Project Management	3-2-0	4	5									
PCC	22CS503	Data Communications	3-0-0	3	3									
IPCC	22CS504	Computer Graphics and Visualization	3-0-2	4	5									
PCC	22CS505	Web Programming	0-0-4	2	4									
PEC	22CS55X	Professional Elective Course - I	3-0-0	3	3									
AEC	22RIP	Research Methodology and IPR	3-0-0	3	3									
HSMC	22EVS	Environmental Studies	0-0-2	1	2									
			Total	23	29									
The course	Analytical ab	ility & soft skills 22ASK will be conducted by	the TAP co	ordinator o	luring the									

vacation period of fifth semester for one credit. The Marks for the same will be entered in sixth semester grade card.

SI	Pr	Professional Elective Course - I							
No.	Course Code	Course Title							
1.	22CS551	Digital Image Processing							
2.	22CS552	Data Mining and Warehousing							
3.	22CS553	Internet of Things							
4.	22CS554	Object Oriented Modelling and Design							
5.	22CS555	Advance Java							
6.	22CS556	Operations Research							

	SIXTH SEMESTER												
Course Category	Course Code	Course Title	L-T-P (Hours)	Credits	Contact Hours								
IPCC	22CS601	Machine Learning	3-0-2	4	5								
IPCC	22CS602	Computer Networks	3-0-2	4	5								
PCC	22CS603	Finite Automata and Formal Languages	3-1-0	3	4								
PI	22CS604	Mini Project	0-0-4	2	4								
PI	22CS605	Main Project Phase - I	0-0-4	2	4								
AEC	22CS606X	Ability Enhancement Course	0-0-2	1	2								
PEC	22CS66X	Professional Elective Course - II	3-0-0	3	3								
OEC	22OECS6X	Open Elective – I	3-0-0	3	3								
OEC	22SWY	SWAYAM (NPTEL Only)	-	AUDIT	-								
AEC/SDC	22ASK	Analytical Ability and Soft Skills	0-0-2	1	2								
			Total	23	32								

22CS604 - Mini Project: Student must develop a web based application using the concepts learnt in the courses - Database Management System (22CS404) and Web Programming (22CS505)

GI	Professional Elective Course - II								
SI. No.	Course Code	Course Title							
1.	22CS661	Introduction to Computer Vision							
2.	22CS662 Artificial Intelligence								
3.	22CS663	Wireless Networks							
4.	22CS664	Software Architecture							
5.	22CS665	C# Programming and .NET							
6.	22CS666	Management Information System							

SL No		Open Electives					
51. INO.	Course Code	Course Title					
1.	220ECS61	Introduction to Cloud Computing					
2.	220ECS62	Introduction to JAVA programming					

SL No	Abi	Ability Enhancement Course						
51. INO.	Course Code	Course Title						
1.	22CS606A	Application Development Laboratory						
2.	22CS606B	Full Stack Web Development						

Course Title TECHNOLOGY MANAGEMENT AND ENTREPRENEURSHIP											
Cours	se Code	22CS501		L-T-P-C	(3-1-0)3						
Exam	Hrs.	3		Hours/Week	4						
SEE	SEE 50Marks Total Hours										
Cours	Course Objective: To lead and manage teams, become entrepreneur and to prepare project proposal.										
Cours	Course Outcomes(COs):Upon completion of the course, students shall be able to:										
#		Course Outcomes		to POs	to PSOs						
1.	Explore co	rporate culture and management pri	nciples.	1	-						
2.	Build profi	le and project proposal		3,10,11,12	2						
3.	Acquire sk	ills for Entrepreneurship, Startups a	nd IPR	1,12	-						
4.	Document	on Industry visit.		8,10	-						
Cours	se Contents	:									
		MODULE-1			10 Hrs						
Motiv Previe the Re and o (IPR).	vating & Le ew. Motivati esearch Func organization .Creativity.	MODULE–2 eading Technical People and Cont on. Leadership. Motivating and lead ctions: Preview. Product and technol . Selecting R&D projects .Prot	trolling: Motivatin ding technical prof logy life cycles .Na tection of ideas.	g and leading tea essionals (metho ture of R&D. Re Intellectual Pr	10 Hrschnical people:ods). Managingsearch strategyopertyRights						
		MODULE-3			10 Hrs						
Entre an En ,Chara proces barrier Defini of SSI	Entrepreneurship: Meaning Evolution of the concept, functions of an Entrepreneur , Characteristics of an Entrepreneur , types of entrepreneurs , Intrepreneur. Entrepreneurship :Concept of Entrepreneurship , Characteristics of Entrepreneurship ,Development of Entrepreneurship ,Stages in Entrepreneurial process ,Role of Entrepreneurs in economic development, Entrepreneurship in India, Entrepreneurship barriers, Women entrepreneur – Concept & steps to develop Women Entrepreneur. Small Scale Industry: Definition ,Characteristics ,Objectives ,Scope and role of SSI in economic Development, Advantages of SSI, Problems of SSI ,Steps to start an SSI.										
MODULE-4 10 Hrs											
Gover Agence and T Conce Projec Analy	Government Policy towards SSI; Different Policies of SSI, Introduction to GATT/ WTO. Supporting Agencies of Government for SSI: Meaning, Nature of support; Objectives, functions. Ancillary Industry and Tiny Industry. Institutional Support: Different Schemes: SSIDC, SSIB, DICs/ Single Window Concept, TCOs, ICICI, NSIC, SIDO, IDBI, SIDBI, SFCS, IFCI. Preparation of Project: Meaning, Project identification ,Project selection ,Project Report Need of Project, Contents ;formulation, Network Analysis Errors of project report ,Project Appraisal ,Feasibility Study-										

MarketFeasibilityStudy,TechnicalFeasibilityStudy,FinancialFeasibilityStudy,SocialFeasibilityStudy

Text Books:

- 1. Daniel Babcock & Lucy C. Morse "Managing Engineering and Technology", PHI, 6thedition, 2014.
- 2. Management and Entrepreneurship-N. V. RNaidu, T Krishna Rao.

Reference Books:

- 1. Entrepreneurship Development, Small Business Enterprises Poornima .M. Charantimath, Pearson Education–2006.
- 2. Dynamics of Entrepreneurial Development & Management-Vasant Desai, Himalaya ublishing House.
- 3. Management Fundamentals-Concepts, Application, Skill Development –Rober Lousier, Thomson.
- 4. Principles of Management-P. C . Tripathi, P .N. Reddy-Tata Mc Graw Hill.

MOOCs:

1.https://nptel.ac.in/courses/110/106/110106141

2.https://nptel.ac.in/courses/127/105/127105007

Tutorial

- 1. Resume building
- 2. Brainstorming session: Frame vision and mission statements
- 3. Preparing a project proposal
- 4. SWOC analysis exercises

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	1	-	-	-	-	-	-	2	3	2	-	1
CO3	1	-	-	-	-	-	-	-	-	-	-	3	-	-
CO4	-	-	-	-	-	-	-	2	-	3	-	-	-	-

Course Title	SOFTWARE ENGINEERING AND PROJECT MANAGEMENT									
Course Code	22CS502	(L-T-P)C	(3-2-0)4							
Exam	3 Hrs.	Hours/Week	5							
SEE	50 Marks	Total Hours	40L+10T							

Course Objective: Use Software Engineering Principles for Application development **Course outcomes:** At the end of course, student will be able to:

#	Course Outcomes	Mapping to PO's	Mapping to PSO's
1.	Explore diverse software development process	1	2
2.	Construct SRS for a given scenario	1	2
3.	Design and validate a software product	3,5	2
4.	Apply appropriate project estimation and management techniques	9,11	2
	MODULE – 1		10 Hrs.

Introduction: Professional Software Development, Software Engineering Ethics. Case studies: An insulin pump control system, Software Processes: Software Processes models, Process activities, coping with change, The Rational Unified Process. Agile Software Development: Agile Methods, Plan- driven and Agile Development, Extreme programming. Agile Project Management. Scaling Agile Methods. Self-Study: Case Studies- A patient information system for mental health care, A wilderness weather station

MODULE -2**Requirements Engineering:** Functional and non-functional requirements. The software Requirements Document. Requirements Specification, Requirements Engineering Processes. Requirements Elicitation and Analysis. Requirements validation. Requirements Management. System Models: Context models. Interaction models. Structural models. Behavioural models. Model-driven engineering.

Self-Study: Behavioral models as applied to case study.

MODULE -3

10 Hrs. Design and Implementation: Object-oriented design using the UML, Design patterns, Implementation issues, Open source development. Software Testing: Development testing, Test-driven development, Release testing, User testing. Software Evolution: Evolution processes, Program evolution dynamics. Software maintenance.

Self-Study: Legacy system management

MODULE -4

10 Hrs.

10 Hrs.

Software Project Management: Software Project Management Complexities, Responsibilities of a software project Manager, Project Planning and Metrics for project size estimation, Project estimation techniques, Empirical estimation techniques, Scheduling, Organization and Team Structures. Self-Study: COCOMO-A Heuristic Estimation Technique, Scrum tool.

Text Books:

- 1. Ian Sommerville, "Software Engineering", 9th Edition, Person Education, 2014. (Chapters:1,2,3,4,5,7,8,9)
- Fundamentals of Software Engineering, Rajib Mall, 2015, Prentice-Hall Of India Pvt. Ltd., 2. (Chapter 3)

Reference Books:

- 1. Roger S. Pressman, "Software Engineering A Practitioners Approach", 7th Edition, McGraw-Hill, 2007.
- 2. Waman S. Jawadekar, "Software Engineering Principles and Practice", Tata McGraw-Hill, 2004.
- 3. Software Engineering: A Concise introduction to Software Engineering by Pankaj Jalot, Springer.

MOOC Course:

https://nptel.ac.in/courses/106/105/106105182/

Tutorial:

- 1. Requirement specification for (functional and nonfunctional) for the specified scenario.
- 2. Write sequence diagram for the given case.
- 3. Write a SRS document for the given case study.
- 4. Discuss on ethical and professional issues and why they are of concern to Software Engineers.
- 5. Write behavioral model and interaction model for the given scenario.
- 6. By referring to embedded device depict requirement specification.
- 7. Employ software testing tool to address a given problem.
- 8. Practice scrum tool for the Project management.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	2
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	2
CO3	-	-	3		2	-	-	-	-	-	-	-	-	2
CO4	-	-	-	-	-	-	-	-	3	-	-	2	-	2

Cou	ırse Title	DATA C	OMMUNICATIO	NS						
Cou	irse Code	22CS503		L-T-P-C	(3-0-0)3					
Exa	m Hrs.	3	Но	ırs / Week	3					
SEF	£	50 Marks	Tot	al Hours	40					
Cou	Course Objective: Students able to gain knowledge of TCP/IP Protocol Model and Functionalities									
of D	of Data link Layer and Physical Layer									
Course Outcomes (COs): Upon completion of the course, students shall be able to:										
#		Mapping to POs	Mapping to PSOs							
1.	Perceive the responsibility	e different types of Networks and ty each layers of TCP/IP protocol s	demonstrate the uite.	1,12	-					
2.	Analyse the transmission	performance of different techniqu	es for data/signal	2	-					
3.	Investigate available ne	the standard network componen twork resources	ts to utilize the	2	-					
4.	Formulate a different fra	and design error detection/ corre ming formats, and medium Access	ction algorithms, control Methods	3,4	-					
Cour	rse Contents:									
Cour		MODULE-1			10 Hrs.					
Intro	oduction: Da	ata Communications; Networks;	Network Types; N	etwork Mod	els: Protocol					
Laye	ring; TCP / IF	P Protocol Suite; Physical Layer: In	ntroduction to Physi	cal Layer, Dat	a and Signals;					
Perio	dic Analog S	ignals; Digital Signals; Transmissic	on impairment; Data	a rate limits;						
		MODULE-2			10 Hrs					
Digit	al Transmis	sion:Digital-to-Digital conversion	: Line Coding, Lir	e Coding Scl	hemes, Block					
Codii Modi	ng, and Scraulation(DM);	Multiplexing: FDM, WDM, TDM	sion: Pulse Code I , Multiplexing ; Sp	Modulation (pread spectrum	PCM), Delta					
		MODULE-3			10 Hrs					
Tran Micro Packo Link- Deteo Polyr Other	asmission M owaves, Infra et Switching: layer Addres ction and C nomials, Cycl r Approaches	Tedia: Twisted pair cable, Coax red. Switching: Introduction; Circu Datagram Networks: Virtual Circui ssing: Three Types of Addresses, Correction: Introduction; Block c ic Code Encoder using Polynomia to the Checksum; Forward Error C	ial cable, Fiber-O it-Switched Networ t Networks; Introdu Address Resolutio oding: Error Detects ls, Cyclic Code Anso orrection.	ptic cable, F ks: Three Phas iction to Data on Protocol (ction; Cyclic alysis, Checks	Radio waves, ses and Delay; -Link Layer: ARP); Error codes: CRC, um: Concept,					
		MODULE-4			10 Hrs					
Data Orien Proto CSM Text	Data Link Control: DLC Services: Framing, Flow and Error control, Connectionless and Connection Oriented; Data Link Layer Protocols: Simple, Stop & Wait, Piggybacking; HDLC; Point to Point Protocol: Services and Framing; Media Access Control: Random Access: ALOHA, CSMA, CSMA/CD, CSMA/CA; Controlled Access: Reservation, Polling, Token Passing; Text Book:									
Dof:	Denrouz A. Edition.(Chap	bers 1.1,1.2,.1.3, 2, 3, 4.1,4.2, 6, 7,	8, 9, 10, 11,12, 13)	, rata McG	iaw-Hill, Sth					
1. 2 2.	 Reference Books: Alberto Leon-Garcia and Indra Widjaja, "Communication Networks–Fundamental Concepts and Keyarchitectures", Tata McGraw- Hill, 2nd Edition. William Stallings, "Data and Computer Communication", Pearson Education, 8th Edition 									
MO	OC: http://nptel.ac	.in/keyword_search_result.php?wo	rd=data+communic	ation						

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	2	-	-	-	-	-	-	-	-	-	-

Course TitleCOMPUTER GRAPHICS AND VISUALIZATIONCourse Code22CS504L-T-P-C(3-0-2)4											
Cour	rse Code	L-T-P-C	(3-0-2)4								
Exar	n Hrs.	3	He	ours / Week	5						
SEE	1	50 Marks	1	Fotal Hours	40L + 12P						
Cou	rse Objecti	ve: To learn the concepts of computer gra	phics to design	a 2D and 3D	scene using						
Oper	nGL.										
Cou	rse Outcom	es (COs): Upon completion of the course, s	students shall be	e able to:							
#		Course Outcomes		Mapping to POs	Mapping to PSOs						
1.	Describe c	ore concepts of computer graphics with Op	enGL.	1	-						
2.	2. Apply concepts of geometric transformations, projections, and illumination to render image. 2, 3, 4										
3.	Analyze 1	ine clipping and polygonal clipping algorit	thms	2, 3							
	Decien o	$\frac{2D}{2D}$ image using graphical across	ata through	2245	-						
4.	OpenGL	2D/3D image using graphical concep	pts through	2, 3, 4, 5	2						
Cour	openol.	a.									
Cour	rseContent	s: MODULE –	1		17 Hrs						
Intre	aduction	Applications of computer graphics: A	ranhias sustar	n. Imagaal I	12 IIIS						
The recur Input and r inter	OpenGL (rsion; The th it and Inte modeling; P active progr	MODULE – Continued): Color; Viewing; Control func- nree-dimensional gasket. raction: Interaction; Input devices; Client rogramming event-driven input; Menus, D rams.	2 ctions; The Gas ts and Servers; Design of Intera	sket program; Display lists ctive program	12 Hrs Polygons and Display lists as, Animating						
		MODULE –	3		12 Hrs						
Geor prim Rota trans	metric Ob itives; Coo ition, transla sformations;	jects and Transformations: Scalars, rdinate systems and frames; Modeling a tion and scaling. Transformations in hom OpenGL transformation matrices	points, and ve a colored cube aogeneous coor	ectors Three; ; Affine tran dinates; Cond	dimensional sformations; catenation of						
MODULE – 4 12 Hrs											
View Simp Ligh shad	ving: Classi ole projection ting and S ing; Light s lementation	cal and computer viewing; Viewing with ons; Projections in OpenGL; Hidden-surface Shading: Light and matter; Light source ources in OpenGL; Specification of mater n: Clipping; Line- Segment Clipping; Bresent	a computer; ce removal, s; The Phong ials in OpenGL nam's algorithm	Positioning o lighting mod	f the camera el; Polygona						
Text	Fext Book: Edward Angel, "Interactive Computer Graphics A Top-Down Approach with OpenGL", Addison-Wesley, 5thEdition, 2013. (Chapters 1, 2, 3, 4, 5, 6, 7)										

Reference Books:

- 1. F.S. Hill, Jr, "Computer Graphics Using OpenGL", Pearson education, 2nd Edition, 2011.
- 2. James D Foley, Andries Van Dam, Steven K Feiner, John F Hughes, "Computer Graphics", Addison-wesley.

Activity:

Write C program using OpenGL functions to

- 1. Recursively subdivide a tetrahedron to from 3D Sierpinski gasket. The number of recursive steps is to be specified by the user.
- 2. Draw a Rocket and allow the user to change the color.
- 3. Create robot face using display list.
- 4. Generate square for right click and to exit for left click using mouse function.
- 5. Draw box at each location on the screen where the mouse cursor is located.
- 6. Create hierarchical menus.
- 7. Create a house like figure and rotate it about a given fixed point using OpenGL functions.
- 8. Create a Rotating Square.
- 9. Draw a color cube and spin it using OpenGL transformation matrices.
- 10. Clip the line segment A(-4,2) and B(-1,7) in a window defined by left bottom corner at (-3,1) and upper right corner at (2,6). Find the visible portion of the line segment using Cohen Sutherland line clipping algorithm.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	3	3	-	-	-	-	-	-	-	-	3	-
CO3	-	3	3		-	-	-	-	-	-	-	-	3	-
CO4	-	3	3	3	3	-	-	-	-	-	-	-	-	2

Course	Title		WEB PROGRAMMING							
Course	Code	22CS505		L-T-P-C	(0-0-4)2					
Exam H	Irs.	3	Hou	rs / Week	4					
SEE		50 Marks	Tot	al Hours	28P					
Course	Objecti	ve: Create web pag	es with client side and server-side scripting							
Course	urse Outcomes (COs): Upon completion of the course, students shall be able to :									
#	Course Outcomes Mapping to POs to PSOs									
1.	Create v	webpages using HT	ML/XHTML and CSS.	3,12	2					
2.	Develop	o client-side script t	o design webpage	3,5,12	2					
3.	Develop	o server-side script	to create webpage	3,5,12	2					
Course	Content	ts:								
1. W 2. Do or	 Write a XHTML document to create web page with forms, links, image Develop and demonstrate a XHTML document that illustrates the use of external style sheet (CSS), ordered list, table, borders, padding, color and the tag. 									
3. Ci di	Create a JavaScript that prompts the user for a number and then counts from 1 to that number displaying only the odd numbers using alert window.									

- 4. Write a java script to validate the following fields in a registration page
 - Name (should contains alphabets and the length should not be less than 6 characters)
 - Password(should not be less than 6 characters)
 - E-mail(should not contain invalid addresses)
- 5. Develop and demonstrate, using JavaScript script, a XHTML document that collects the USN (the valid format is: A digit from 1 to 4 followed by two upper-case characters followed by two digits followed by two upper-case characters followed by three digits; no embedded spaces allowed) of the user. Event handler must be included for the form element that collects this information to validate the input. Messages in the alert windows must be produced when errors are detected.
- 6. Develop and demonstrate, using JavaScript, a XHTML document that contains three short paragraphs of text, stacked on top of each other, with only enough space of each showing so that the mouse cursor can be placed over some part of them. When the cursor is placed over the exposed part of any paragraph, it should rise to the top to become completely visible.
- 7. Write an XML file which displays the book details that includes the following:
 - Title of book
 - Author name
 - Edition
 - Price

Write a DTD to validate the above XML file and display the details using XSL.

- 8. Write XHTML form and PHP to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table.
- 9. Write a PHP program to store current date-time in a COOKIE and display the Last visited on date-time on the web page upon reopening of the same page.
- 10. Create a XHTML form with Name, Address and E-mail text fields and use PHP script to store the values in MySQL table and to Retrieve and display the data based on Name.

Activity :

Mini project (Carry out a mini project in a team of 2 to 4 members)

Text Book :

Robert W. Sebesta: Programming the World Wide Web, 8th Edition, Pearson Education, 2014.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	3	-	-	-	-	-	-	-	-	2	-	2
CO2	-	-	3	-	2	-	-	-	-	-	-	3	-	2
CO3	-	-	3	-	2	-	-	-	-	-	-	2	-	2

Cou	rse Title	DIGITAL	IMAGE PROCES	SING	
Cou	rse Code	L-T-P-C	(3-0-0)3		
Exai	n Hrs.	3]	Hours / Week	3
SEE		50 Marks		Total Hours	40
Cou	rse Objectiv	re: To study the image fundament imageprocessing	als and mathematic	al transforms r	necessary for
Cou	rse Outcome	s (COs): Upon the completion of the	he course the studen	ts will be able to):
#		Course Outcomes		Mapping to POs	Mapping to PSOs
1.	Explain the	basic principles of Digital image pro	ocessing	1	-
2.	Apply concernstoration,	cepts of Digital image processing compression and segmentation	g, transformation,	2,3	-
3.	Analyze ima	age processing algorithms		2	-
4.	Develop ima	age processing application for real ti	ime problems	3,4,5,9,10	1,2
Cou	rse Contents	:			
		MODULE – 1			10 Hrs
Inter inter Histo	nsity Trans sity transfor ogram Proces	MODULE – 2 formations and Spatial H mations and spatial filtering, So ssing. Fundamentalsof spatial filter convolution. ImageRestoration :	Filtering: Backgr ome basic intensity ring: The mechanics A model of the in	ound: The y transformatic s of spatial filte age restoration	10 Hrs basics of on functions, ering, Spatial o/degradation
proc	ess. Noise M	odels:Spatial and Frequency propert	ties of Noise.		0
		MODULE – 3			10 Hrs
Imag of no Imag Fund Meas	ge Restoration bise parameter geProcessing damentals: suring image	on: Some important noise probabil ers, Restoration in the presence of N color fundamentals, Color model Coding redundancy, Spatial and information, Fidelity Criteria.	ity density functions loise only- Spatial F ls: The RGB color n Temporal redundar	s, Periodic noise iltering, Mean F nodel. Image C ncy, Irrelevant	e, Estimation Filters. Color ompression: information,
		MODULE – 4			10 Hrs
Ima Bit_l Line Basic Grad Role Thre	ge Compres Plane coding , and EdgeD c EdgeDetec lient with Th of Noise i sholding.	ssion: Some basic compression , Digital image watermarking. I Detection, Background, Detection of tion: The Image Gradient and its resholding, Thresholding: Foundati in Image Thresholding, The Rol	methods: Arithme Image Segmentati f Isolated Points, L Properties, Gradier on, The Basics of le of Illumination	etic coding, L on : Fundame ine Detection, E it Operators, Co Intensity Thresh and Reflectand	ZW coding, entals, Point, Edge Models, ombining the holding, The ce in Image

Text Book:

1. Rafael C. Gonzales, Richard E. Woods, "Digital Image Processing", 4th Edition, Pearson publications, 2018

Reference Books:

- 1. A.K. Jain, "Fundamentals of Digital Image Processing", Pearson2nd Edition, 2018.
- 2. B. Chanda , Dutta Majumdeer, "Digital Image Processing and Analysis", Prentice-Hall of India Pvt.Ltd., 2nd Edition, 2011.
- 3. "Introduction to Digital Image Processing with Matlab", Rafael C. Gonzales, Richard E. Woods, Steven L.Eddins, Mcgraw Higher Ed, 2nd Edition, 2010.

MOOC:

http://nptel.ac.in/courses/106105032

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	-	2	-	-	-	-	-	-	-	-	-	-	-	
CO4	-	-	2	1	3	-	-	-	3	3	-	-	3	2

Cou	Course Title DATA MINING AND WAREHOUSING									
Cou	rse Code	22CS552		L-T-P-C	(3-0-0)3					
Exa	m Hrs.	3	Hours	s / Week	3					
SEE		50 Marks	Tota	al Hours	40					
Cou	rse Objecti	ve: Students will be able to select appropriate	riate Data mining and ware	housing tech	niques for					
real-t	ime applica	ation								
Cour	rse Outcom	es (COs): Upon completion of the course,	students shall be able to:							
#	# Course Outcomes Mapping to POs to PSOs									
1.	1. Describe the fundamentals of data mining and data preprocessing techniques 1,3									
2.Acquire the knowledge of Data Warehouse design, Modelling, and usage11										
3.	3. Use the process of Classification, Clustering and Association Analysis for a 1,2 -									
4.	Implemen	t appropriate data mining algorithm for a	given scenario	3,5,9	2					
Cou	rse Conten	ts:								
		MODULE – 1			10 Hrs					
Intro	oduction: [Data: Why Data Mining? What is Data Mi	ining? What kinds of data c	an be mined	? What kinds					
of pa	ttern can be	mined?, Which technologies are used? M	lajor issues in data mining.	Getting to kno	w your data:					
Data	objects and	l attribute types, Basic statistical description	on of data: measuring the ce	ntral tendenc	y, Measuring					
the d	ispersion of	f data, measuring data similarity and dissi	milarity		C C					
		MODULE – 2			10 Hrs					
Data	Pre-proce	essing: Data Pre-processing: An overview	w, Data cleaning, Data inte	egration, Dat	a Reduction:					
over	view of da	ta reduction strategies, wavelet transform	ms, Principal component a	analysis, attri	butes subset					
selec	tion, Data	Fransformation: min-max normalization a	nd Z-score normalization.							
Data	Warehou	se and online Analytical processing: 1	Data Warehouse: Basic Co	oncepts ,Data	Warehouse					
mode	elling : Data	a cube and OLAP, Data warehouse design	n and usage: A business and	alysis frame v	work for data					
ware	house desig	gn, Data warehouse design process, Data v	warehouse usage for inform	ation process	ing.					
		MODULE – 3			10 Hrs					
Clas	sification:]	Preliminaries, General Approach to Solvir	ng a Classification Problem	, Decision Tr	ee Induction,					
Rule	-based class	sification, K- Nearest-neighbour Classifier	r. Mining frequent patterns.							
Ass	ociation ar	nd correlations: Basic Concepts and M	lethods: Basic Concepts, H	Frequent item	n set mining					
meth	ods: Aprior	i Algorithm, generating association rules	from frequent item sets, In	nproving the	efficiency of					
Apri	ori, A Patte	rn growth Approach for Mining Frequent	item sets.							
		MODULE – 4			10 Hrs					
Che	ster Analys	is: Basic Concepts and Methods. Cluster	Analysis, Partitioning Metho	ods. Agglome	rative versus					
divi	sive hierar	chical clustering, DBSCAN, Data Mir	ning Trends and research	frontiers: I	Data Mining					
App	lications. D	Data mining and society. Data mining trend	ls.	inomitero: i	Juiu Mining					
Tevt	Booke.									
1. Pa	ang-Ning T	Can, Michael Steinbach, Vipin Kumar,	Introduction to Data Min	ing, 1st Edit	ion (Reprint)					
2. Jia	awei Han a	and Micheline Kamber. Data Mining –	- Concepts and Techniqu	es, Morgan	Kaufmann.					
3r	dEdition, 2	2012.	- more and roomingu	,	,					
L	,									

Reference Books:

- 1. K.P. Soman, Shyam Diwakar, V.Ajay, Insight into Data Mining Theory and Practice, PHI, 2006.
- 2. G. K. Gupta: Introduction to Data Mining with Case Studies, 3rd Edition, PHI, New Delhi, 2009.

MOOCs:

- 1. http://nptel.ac.in/courses/110106064/
- 2. http://nptel.ac.in/courses/106106093/
- 3. https://www.edx.org/course/analytics-for-decision-making

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	2	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	2	-	-	-	2	-	-	-	-	-

Cour	Inse Title INTERNET OF THINGS Irse Code 22CS553									
Cour	se Code	22CS553		L-T-P-C	(3-0-0)3					
Exam	n Hrs.	3	Но	ours / Week	3					
SEE		50 Marks]	Fotal Hours	40					
Cour	se Objec	tive: Explore the interconnection, integ applications.	gration of the physic	al world and	design IOT					
Cour	se Outco	mes (COs) : Upon the completion of the	e course the students	will be able to):					
#		Course Outcomes		Mapping to POs	Mapping to PSOs					
1.	Explain IoT arc	the impact and challenges posed by IoT hitectures	networks, compare	1	-					
2.	2. Illustrate smart objects and IoT Access Technologies to leverage 1 -									
3. Design IoT interface module using RaspberryPi for a given 2,3 2										
Cour	se Conte	nts:								
		MODULE – 1			10 Hrs					
Challe Comp Stack	enges, Io paring Io •t Object	T Network Architecture and Design, T Architectures, A Simplified IoT Arch MODULE – 2 S: The "Things" in IoT, Sensors, Act	Drivers Behind Ne hitecture, IoT Data I uators, and Smart (w Network A Management a Dbjects, Sense	Architectures, and Compute 10 Hrs or Networks,					
Conn 802.15	ecting Sr 5.4g and II	nart Objects: Communications Criteria EEE 802.15.4e.	, IoT Access Techno	ologies: IEEE 8	302.15.4, IEEE					
		MODULE - 3			10 Hrs					
IP as for Io Appli	the IoT oT, Profi cation Tr	Network Layer: The Business Case following the second compliances. Application P ansport Methods.	r IP, The need for O rotocols for IoT:	ptimization, C The Transpor	Dptimizing IP t Layer, IoT					
		MODULE-4			10 Hrs					
IoT I Raspt Raspt Secur OCT Text I 1. E F E	 IoT Physical Devices and Endpoints - RaspberryPi: Introduction to RaspberryPi, Exploring the RaspberryPi Board; Operating System setup on RaspberryPi, RaspberryPi commands, Programming RaspberryPi with Python. Securing IoT: A Brief History of OT Security, Common Challenges in OT Security, How IT and OT Security Practices and Systems Vary, Formal Risk Analysis Structures: OCTAVE and FAIR, The Phased Application of Security in an Operational Environment. Text Books: David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978-9386873743). Srinivasa K G, Siddesh G M Hanumantha Raiu R "Internet of Things". CENGAGE Leaning India. 									
2	2017.			,-1, 0, 101 1						

Reference Books:

- 1. Internet of Things A Hands on Approach, Arshdeep Bahga and Vijay Madisetti Universities Press, 2015.
- 2. Olivier Hersent, David Boswarthick, Omar Elloumi, The Internet of Things: Key Applications and Protocols, 2nd Edition, Wiley ISBN: 978-1-119-99435-0, 370 pages, January 2012.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	2	-	-	-	-	-	-	-	-	-	-	2
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Cours	Course Title OBJECT ORIENTED MODELING AND DESIGN										
Cours	se Code	22CS554			L-T-P-C	(3-0-0)3					
Exam	h Hours	3			Hours / Week	3					
SEE		50 Marks			Total Hours	40					
Cours	se Objecti	ve: Describe o	bject oriented mod	leling concept and apply t	them to solve th	e problems.					
Cours	Course Outcomes (COs) : Upon completion of the course, students shall be able to:										
COsStatementMapping to POsMapping to PSOs											
1.	Explore t	he basic conce	epts of object orient	ted modeling.	1,2	-					
2.	Design the class and	he state diagra state models.	ams and identify the	ne relationship between	3	-					
3.	Design u	se case models	s, sequence models	and activity models.	3	1					
4.	Identify a	appropriate des	sign pattern for a gi	iven problem.	2	-					
Cours	Course Contents:										
	MODULE 1 10 Hrs										
Intro develo	Introduction, Modeling Concepts, Class Modeling: What is Object Orientation? What is OO development? OO themes; Evidence for usefulness of OO development; Modeling as Design										

development? OO themes; Evidence for usefulness of OO development; Modeling as Design Technique: Modeling; abstraction; The three models. Class Modeling: Object and class concepts; Link and associations concepts Generalization and inheritance; A sample class model; Navigation of class models; Practical tips. **Advanced Class Modeling, State Modeling:** Advanced Class Modeling: Advanced class concepts; Association ends; N-ary associations; Aggregation; Abstract classes. Multiple inheritance; Metadata; Reification. Constraints; Derived data; Packages; Practical tips, State Modeling: Events, States, Transitions and Conditions; State diagrams; State diagram behavior; Practical tips.

MODULE 2

10 Hrs

Advanced State Modeling, Interaction Modeling: Advanced State Modeling: Nested state diagrams; Nested states; Signal generalization; Concurrency; A sample state model; Relation of class and state models; Practical tips, Interaction Modeling: Use case models; Sequence models; Activity models. Use case relationships.

Interaction Modeling: Process Overview, System Conception: Procedural sequence models; Special constructs for activity models. Process Overview: Development stages; Development life cycle. System Conception: Devising a system concept; Elaborating a concept; preparing a problem statement.

MODULE 3

10 Hrs

Domain Analysis, Application Analysis, System Design: Domain Analysis: Overview of analysis; Domain class model; Domain state model; Domain interaction model; Iterating the analysis. Application Analysis: Application interaction model; Application class model; Application state model; Adding operations, Overview of system design; Estimating performance; Making a reuse plan; Breaking a system in to sub-systems; Identifying concurrency; Allocation of sub-systems.

System Design , Class Design: Management of data storage; Handling global resources; Choosing a software control strategy; Handling boundary conditions; Setting the trade-off priorities; Common architectural styles; Architecture of the ATM system as the example, Class Design: Overview of class design; Bridging the gap; Realizing use cases; Designing algorithms. Recursing downwards, Refactoring; Design optimization; Reification of behavior; Adjustment of inheritance; organizing a class design; ATM example.

MODULE 4

Class Design (contd..), Implementation Modeling, Legacy Systems:. Class Design: Implementation Modeling: Overview of implementation; Fine-tuning classes; Fine-tuning generalizations; Realizing associations; Testing. Legacy Systems: Reverse engineering; Building the class models; Building the interaction model; Building the state model; Reverse engineering tips; Wrapping; Maintenance.

Design Patterns: What is a pattern and what makes a pattern? Pattern categories; Relationships between patterns; Pattern description. Communication Patterns: Forwarder-Receiver; Client-Dispatcher-Server; Publisher-Subscriber, Management Patterns: Command processor; View handler. Idioms: Introduction.

Text Books

- 1. Michael Blaha, James Rumbaugh, Object- Oriented Modeling and Design with UML, Pearson Education, 2nd Edition, 2005. (Chapters 1 to 17, 23).
- 2. Frank Buschmann, Regine Meunier, Hans Rohnett, Peter Sommerlad, Michael Stal, Pattern-Oriented Software Architecture- A System of Patterns, Volume 1, John Wiley and Sons, 2006. (Chapters 1,3.5,3.6,4).

Reference Books

- 1. Grady Booch et al, Object-Oriented Analysis and Design with Applications, Pearson, 3rd Edition, 2007.
- 2. Booch G. Runbaugh J, Jacobson. I, The Unified Modeling Language User Guide, Pearson, 2nd Edition, 2005.

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2
CO1	3	2		-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-	1	-
CO4	-	3	-	-	-	-	-	-	-	-	-	-	-	-

ADVANCE JAVA											
Cours	se Code	22CS555			LTPC	(3-0-0)3					
Exam	. Hours	3		Ηοι	ırs / Week	3					
SEE:		50 Marks		T	otal hours	40					
Cours	se Objectiv	ve: Students should	d be able to use J2EE con	cepts to create an appl	ication.						
Cours	se Outcom	es(COs): Upon c	completion of the course	e, students shall be a	ble to :						
COs		С	ourse Outcomes		Mapping to POs	Mapping to PSOs					
1.	Explain a auto boxin	nd use java enu ng in developing	merations, collections, modular programs	type wrapper and	1	-					
2.	Design G	UI using swings a	and applets		3	-					
3.	Build data	2,3	-								
4.	Develop d	listributed web ap	pplication using Servlet	s and JSP.	2,3	-					
Course Contents:											
MODULE – 1											
Enumeration and Autoboxing: Enumeration fundamentals, values() and valuesOf() Methods, Java Enumerations are class types, example, Type Wrappers, Autoboxing and Autounboxing. Event Handling The delegation event model; Event classes; Sources of events; Event listener interfaces; Using the delegation event model; Adapter classes											
			MODULE – 2			10 Hrs					
User simple and Ir	Interface e swing exa nageIcon, J	components wit ample, Event Ha Itextfield The Sw	th Swing Components ndling, Creating a swin ring buttons, JTabbedPa	and containers, La g applet, Exploring ne, JScrollPane, JLi	yout manage Swing Contr st, JCombob	ers, A first rols-JLabel ox.					
			MODULE – 3			10 Hrs					
The classe Types Objec	Collections s, Accessir s, JDBC Pa ts, Result S	s Framework – ng collection via a ackages, A Brief Set	Collections overview, an iterator. Database A Overview of the JDBC	The collection Intr ccess - The Concept C process, Database	erfaces, The of JDBC, JE Connection,	collection DBC Driver Statement					
			MODULE – 4			10 Hrs					
 Servlets and JSP - Lifecycle of a sevelet, A simple servlet, The Servlet API, javax.servlet Package, Reading Servlet parameters, The javax.servlet.http Package, Handling HTTP Request and Responses, Using Cookies, Session tracking. Java Server Pages (JSP): JSP, JSP Tags, User Sessions, Cookies, Session Objects. RMI Java Remote Method Invocation: Remote Method Invocation concept; Server side, Client side. Text Books: Herbert Schildt: Java The Complete Reference Eighth Edition, McGraw Hill, 2013. Jim Keogh: J2EE The Complete Reference, Tata McGraw Hill, 2007. 											
Refer	Reference Books:										

- 1. Advanced Java Programming ,Uttam.K.Roy , Oxford Press,2015
- 2. Java Fundamentals Herbert Schildt Dale Skrien, McGrawHill 2013
- 3. "Head First Servlets and JSP" by Shroff,2nd Edition, O,Reilly Publications ,2008.

MOOCs

- 1. http://www.nptelvideos.com/java/java_video_lectures_tutorials.php
- 2. https://www.youtube.com/watch?v=0KL_zftem4g/

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO3	-	2	3	-	-	-	-	-	-	-	-	-	-	-
CO4	I	2	3	I	I	-	1	I	I	-	-	-	-	-

Course Title OPERATIONS RESEARCH											
Cours	se Code	22CS556	L-T	C-P-C	(3-0-0)3						
Exam	Hrs.	3	Hours / V	Week	3						
SEE		50 Marks	Total H	Iours	40						
Cours	se Objectiv	ve: Solve optimization problems using va	rious methods								
Cours	se Outcom	tes (COs): Upon completion of the course	e, students shall be able t	0:							
#		Carrent	Мар	ping	Mapping						
		Course	to P	POs	to PSOs						
1	Develop	mathematical model for a given problem		1							
1.	Apply to	abridues of Operations Pasagrah	•	ו ר	-						
2.	2. Apply techniques of Operations Research. 2 3. Solve prediction and estimation problems. 1.2										
<u> </u>	Solve pre	discuon and estimation problems.	1.	, Z =	-						
4.	Expose to	the significance of various scientific too	18.	5	-						
Cours	se Conten				10 11						
		MODULE – I			10 Hrs						
Resea Mode Imple	rch Model l; Deriving mentation	ing Approach: Defining the Problem and G g Solutions from the Model; Testing th	athering Data; Formulati e Model; Preparing to	ing a M Apply	athematical the Model;						
Linea of LP	r Program, Addition	nming – 1: Prototype example; The Line al Examples	ar Programming (LP) M	odel, A	ssumptions						
MODULE – 2 10 Hrs											
Algeb Metho Simp imple	ora of the S od lex Methor mentation	Simplex Method; The Simplex Method in od – 2: Adapting to other Model Form	Tabular Form; Tie Break	ting in t	the Simplex, Computer						
		MODULE – 3			10 Hrs						
Revis Funda Duali Relat of ser	ed Simple amental Ins ity Theory ionships, A nsitivity an amming; T	Ex Methods: Foundations of the Simplex sight The Essence of Duality Theory; Econo Adapting to other primal forms, The role of alysis; Applying sensitivity analysis, Th The upper bound technique.	Method, The revised s mic Interpretation of Du of duality in sensitive and e dual simplex method	implex 1ality. I alysis; ; Paran	method, A Primal-Dual The essence netric linear						
		MODULE – 4			10 Hrs						
Trans Defin Algor Text 1. Fr M 2. H 20 Refer W Te	sportation ition of th ithm. Assi Books: rederick S (cGrawHill amdy A Ta 005. (Chapt ence Book Yayne L. V echnology	a Model: e Transportation Model, Nontraditional gnment Model and Network Models : 7 . Hillier and Gerald J. Lieberman, "Int l, 9th Edition, 2012. (Chapters: 1.1 to 1.3, aha, "Operations Research: An Introducti ers: 5, 6.4) x: Winston, "Operations Research Applica 4th Edition 2003	Transportation Models, The Assignment Model, troduction to Operation 2, 3.1 to 3.3, 4.1 to 4.7, on", Prentice Hall India, tions and Algorithms",	The Tr CPM a s Rese 5, 6.1 , 8th Thom	ransportation nd PERT arch", Tata to 6.7, 7.1) Edition, son Course						

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-		-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-	-	-

Course Title	RESEA	ARCH METHODOLOGY & INTELLECTUAL PROPERTY R	IGHTS										
Course Code	22RIP	RIP L-T-P (3-0-0) 3											
CIE	50	Hours/Week	3										
SEE	50	Total Hours	40										
Course Objective: To give an overview of technical research activities and patenting methodology.													

Course outcomes: At the end of course, student will be able to:

#	Course Outcomes	Mapping to PO's	Mapping to PSO's					
1.	Carry out Literature Review and write technical paper	2,3,4,8,12	-					
2.	Describe the fundamentals of patent laws and the patent drafting procedure.	6,8,10,12	-					
3.	Elucidate the copyright laws and subject matters of copyright	6,8, 10,12	-					
MODULE-1								

Introduction: Meaning of Research, Objectives of Engineering Research, and Motivation in Engineering Research, Types of Engineering Research. Ethics in Engineering Research: Ethics in Engineering Research Practice, Types of Research Misconduct, Ethical Issues Related to Authorship.

Literature Review and Technical Reading, New and Existing Knowledge, Analysis and Synthesis of Prior Art ,Bibliographic Databases, Web of Science, Google and Google Scholar, Effective Search: The Way Forward, Introduction to Technical Reading Conceptualizing Research, Critical and Creative Reading.

MODULE-2	10 Hrs.							
Attributions and Citations: Giving Credit Wherever Due, Citations: Functions and Attributes	, Impact of							
Title and Keywords on Citations, Knowledge Flow through Citation, Citing Datasets, Styles for Citations,								
Acknowledgments and Attributions.								
Technical Writing and Publishing : Free Writing and Mining for Ideas, Attributes and F	Reasons of							
Technical Writing, Patent or Technical Paper?-The Choice, Writing, Journal Paper: Str	ucture and							
Approach: Title, Abstract, and Introduction, Methods, Results, and Discussions, Table	, Figures,							
Acknowledgments, and Closures								
MODULE-3	10 Hrs.							
Introduction To Intellectual Property: Role of IP in the Economic and Cultural Developm	nent of the							
Society, IP Governance, IP as a Global Indicator of Innovation, Origin of IP, Major Amendments	in IP Laws							
and Acts in India.								
Patents: Conditions for Obtaining a Patent Protection, To Patent or Not to Patent an Invention	on. Rights							
Associated with Patents. Enforcement of Patent Rights. Inventions Eligible for Patenting. Non-	-Patentable							
Matters. Patent Infringements.								
Process of Patenting: Prior Art Search. Choice of Application to be Filed. Patent Application	ion Forms.							
Jurisdiction of Filing Patent Application. Publication. Pre-grant Opposition. Examination. Grant of	of a Patent.							
Validity of Patent Protection. Post-grant Opposition. Do I Need First to File a Patent in India. Pate	ent Related							

Forms. Fee Structure. Types of Patent Applications.

MODULE-4 Copyrights and Related Rights: Classes of Copyrights. Criteria for Copyright. Ownership of Copyright. Copyrights of the Author. Copyright Infringements. Copyright Infringement is a Criminal Offence. Copyright Infringement is a Cognizable Offence. Copyrights and Internet. Non-Copyright Work. Copyright Registration. Judicial Powers of the Registrar of Copyrights. Fee Structure. Copyright Symbol. Validity of Copyright. Copyright Profile of India. Copyright and the word 'Publish'. Transfer of Copyrights to a

10 Hrs

Publisher. Copyrights and the Word 'Adaptation'. Copyrights and the Word 'Indian Work'. Joint Authorship. Copyright Society. Copyright Board. Copyright Enforcement Advisory Council (CEAC).

Trademarks: Eligibility Criteria. Who Can Apply for a Trademark. Acts 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.

Self study: Case Studies on Patents. Case study of Curcuma (Turmeric) Patent, Case study of Neem Patent, IP Organizations In India.

Text Books:

- 1. Dipankar Deb, Rajeeb Dey, Valentina E, Balas, "Engineering Research Methodology", Springer, 2019.
- 2. Prof. Rupinder Tewari, Ms. Mamta Bhardwa, "Intellectual Property", Professor Gurpal Singh Sandhu Honorary Director, Publication Bureau, Panjab University, 2021.

Reference Books:

- 1. David V. Thiel, "Research Methods for Engineers", Cambridge University Press, 2014.
- 2. N.K.Acharya, "Intellectual Property Rights", Asia Law House, 8th Edition, 2021.

MOOC:

https://onlinecourses.swayam2.ac.in/ntr24_ed08/preview

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	2	3	-	-	-	2	-	-	-	3	-	-
CO2	-	-	-	-	-	3	-	2	-	3	-	3	-	-
CO3	-	-	-	-	-	3	-	2	-	3	-	3	-	-

Course Title ENVIRONMENTAL STUDIES											
Cou	urse Code	22EVS				L-T-P	(0-0-2	2) 1			
Exa	ım	3 Hrs.			Ho	ours/Week	2				
CII	E	100 Marks			To	otal Hours	20				
Cou	arse Objec	tive: To create	environmen	tal awareness among the studer	nts.						
Coi	arse Outco	mes: At the end	d of the cour	se, student will be able to:			1				
#			Course Out	comes (CO)		Mapping to POs	Mapp to PS	oing Os			
1.	Acquire a problems	an awareness of	sensitivity t	o the total environment and its a	allied	7, 9,12	-				
2.	Develop	strong feelings	of concern,	sense of ethical responsibility for	or the	6.8	_				
	environm	it.	0,0								
3.	Analyze terms of	ons in ctors.	6, 7,8, 9	-							
			MOI	DULE-1			5 Hi	rs			
Env	vironment:	Definition, Ec	ıman a	ctivities on	environ	nent					
Agr	iculture Ho										
MODULE-2											
Nat	Natural Resources: Water resources, Availability and Quality, Water borne diseases, Water induced										
dise	eases, Fluor	ide problem in	drinking wa	tter. Mineral Resources - Fores	t Reso	ources - Ma	terial Cy	cles			
- Ca	arbon, Nitro	gen and Sulph	ur Cycles.								
D-I	L-4		MOL	DULE-3	11	NT - 1	5 H	rs			
POL	lution: EIIe	ects of pollution	1 - water po	llution - Air pollution Land pol	llution	- Noise po	liution.				
C	mont Envir	anmantal issue	MUL ag af imnar	JULE-4	damlati	on Donulo	5 H	rs			
	rent change	and Global w	es of import	ironmental Impact Assessment	and S	on - Popula ustainable I	lion Gro Develop	will,			
Ens	vironmental	Protection - L	arning. Env	Water Act and Air Act	and S	ustamable i	Jevelopi	nem			
Тех	t Books:		zgui uspeciis.	water riet and rin riet.							
102	1. Enviror	mental Studies	s - Dr. D.L N	Aniunath. Pearson Education -	-2006						
	2. Enviror	mental Studies	s - Dr. S. M.	Prakash - Elite Publishers - 20	06						
Ref	erence Boo	oks:									
	1. Enviror	nmental Studies	s - Benny Jo	seph - Tata McGraw ill- 2005							
	2. Princip	les of Environn	nental Scien	ce and Engineering P. Venugo	pala R	ao, Prentice	Hall of				
	India.										
	3. Environmental Science and Engineering - Meenakshi, Prentice Hall India.										
Ass	essment St	rategy						,			
	CIE	Sche	dule	Assessment Method	Mai	rks Du (N	ration /lin.)				
	CIE I	At the end	of 8 weeks	Objective Questions	2	5	60				
	CIE II	At the end of	of 11 weeks	Objective Questions	25	5	60				
	Project	At the end of	50)	-						

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	3	-	3	-	-	-	-	-
CO2	-	-	-	-	-	3	-	3	-	-	-	-	-	-
CO3	-	-	-	-	-	3	3	3	2	-	-	-	-	-

Cours	Course Title MACHINE LEARNING									
Cours	se Code	22CS601		L-T-P-C	(3-0-2) 4					
Exam	n Hrs.	3	Ho	ours / Week	5					
SEE		50 Marks	Т	Cotal Hours	40L + 10P					
Cour	se Objectiv	e: To apply the techniques of machi	ne learning for real time	e projects.						
Cour	se Outcome	es (COs): Upon completion of the c	ourse, students shall be	able to:						
#		Course Outcomes		Mapping to POs	Mapping to PSOs					
1.	Describe concept lea	and Apply preprocessing, Mode arning for the given problem.	ling, Evaluation and	2, 3	-					
2.	Design and learning al	d Develop various supervised and points for solving the given prob	unsupervised machine lem	3, 5	1, 2					
3.	3.Illustrate the Neural networks, Bayesian learning and other forms of learning for the given problem3, 4, 5									
4.	Implement	3, 5	1, 2							
Cour	se Contents	3		L						
		MODULE - 1			10 Hrs					
Applie Explo Mode	Introduction to Machine learning: Human learning and its types, Machine learning and its types, Applications, tools and issues in machine learning, Activities in machine learning, Types of data, Exploring structure of data, Data quality and Preprocessing. Modelling and Evaluation: Introduction, Selecting a model, training a model, model representation and intermetability. Evaluation: and formation of a model									
MODULE – 2 10 Hrs										
Learr system Induct Super Comm	ning Proble ns, Concept tive bias. rvised Lear non algorithm	ms and Concept Learning: Well Learning Tasks, Search, Find-S, Ver ning: Introduction, example, class ms – KNN, Decision Tree, and Ran MODULE - 3	Posed learning proble rsion Spaces and Candid ification model, classif dom forest model.	ms, Designir late Eliminati ication learni	ng a Learning on Algorithm, ng steps, and 10 Hrs					
Super Assum Unsuj Assoc	rvised Lear nptions in R pervised Le tiation rule.	ning (contd): SVM, Regression-S egression analysis. earning: Supervised Vs Unsupervis	imple linear regression, sed, Application, cluster	Multiple line	ear regression, pattern using					
		MODULE – 4			10 Hrs					
Basic imple Bayes Netwo Other Assoc Pract 1. Do 2. Do 3. Im on 4. Fo	MODULE – 4 10 Hrs Basics of Neural Networks: Exploring the artificial neuron, Types of activation function, Early implementations of ANN, Architectures of NN, Learning process in ANN, Backpropagation algorithm. Bayesian learning: Introduction, Bayes theorem, Bayes theorem and concept learning, Bayesian Belief Networks. Other types of Learning – Representation learning, Active Learning, Instance based Learning, Association rule Learning, Ensemble learning Practical Component: 1. Demonstration of Python Libraries for Machine Learning-Pandas, Sklearn, numpy, matplotlib. 2. Demonstration of Exploratory Data Analysis and Data Visualization. 3. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.									

Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.

- 5. Write a program to implement *k*-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
- 6. Write a program to demonstrate the working of the decision tree based ID3 **algorithm**. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
- 7. Implement a clustering algorithm using K-means clustering for the given dataset.
- 8. Build an Artificial Neural Network by implementing the **Back propagation algorithm** and test the same using appropriate data sets.
- 9. Write a program to implement the **naïve Bayesian classifier** for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.

Text Books:

- 1. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, Machine Learning, Pearson, 2019
- 2. Tom M. Mitchell, Machine Learning, McGraw-Hill Education (INDIAN EDITION), 2013.

Reference Books:

- 1. T. Hastie, R. Tibshirani, J. H. Friedman, The Elements of Statistical Learning, Springer; 1st edition, 2001
- 2. Bishop, C., M., Pattern Recognition and Machine Learning, Springer, 2006
- 3. Yegnanarayana B. Artificial Neural Netwroks PHI Learning Pvt., Ltd.
- 4. Ethem Alpaydin, Introduction to Machine Learning, 2nd Ed., PHI Learning Pvt. Ltd., 2013

MOOCS:

- 1. https://swayam.gov.in/nd1_noc19_cs52/preview
- 2. https://www.coursera.org/learn/machine-learning/
- 3. https://nptel.ac.in/courses/106105152

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	2	-		-	-	-	-	-	-	-	-	-
CO2	-	-	2	-	3	-	-	-	-	-	-	-	2	3
CO3	-	-	3	3	3	-	-	-	-	-	-	-	3	
CO4	-	-	3	-	3	-	-	-	-	-	-	-	2	3

Cour										
Cours	se Code	22CS602]	L-T-P-C	(3-0-2)4					
Exam	n Hrs.	3	Hours	s / Week	5					
SEE		50 Marks	Tota	al Hours	40L+12P					
Cours Addre	se Object ess Mechan se Outcom	ive: Acquire knowledge of working mec nisms and Protocols.	hanisms of differ	rent types of	Networks,					
#		Course Outcomes		Mapping to POs	Mapping to PSOs					
1.	Recogni different	ze the importance of the Network I versions of IP and Network addressing me	Layer Services, echanisms	1,2	-					
2.	Analyse algorithr	the performance of Unicast and M ns and their uses	ulticast routing	2,4,5	-					
3.	Design services.	and apply the Transport Layer Protoco	ols for different	2,4,5	-					
4.	Apply a applicati	nd Investigate the use of different QoS n ons	nodels and their	1, 2,4	-					
Course	e Content		I							
		MODULE-1			12 Hrs					
Unica Addro Vecto Routi Versi MUL Inform INTR Link PRO Gene Servi Appli	Network Layer: Network Layer Services, IPV4 Addresses: Address Space, Classifit Addressing, Classless Addressing, DHCP, NAT; Network Layer Protocols: Internetwork Protocol: Datagram format, Fragmentation, Options, Security of IPV4 Datagrams; ICMPv4: Messages, Mobile IP: Addressing, Agents, Three Phases, Inefficiency in Mobile IP. MODULE-2 12 Hrs Unicast Routing: Introduction: General Idea, Least Cost Routing; Routing Algorithms: Distance Vector, Link-State Routing, Path-Vector Routing; Unicast Routing Protocols: Internet Structure, Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Border Gateway Protocol Version 4 (BGP4); Multicast Routing: Introduction: Unicasting, Multicasting, Broadcasting; MULTICASTING BASICS: Multicast Addresses, Delivery at Data-Link Layer, Collecting Information about Groups, Multicast Forwarding, Two Approaches to Multicasting. MODULE-3 12 Hrs INTRADOMAIN MULTICAST PROTOCOLS: Multicast Distance Vector (DVMRP), Multicast Link State (MOSPF) Protocol Independent Multicast (PIM); INTERDOMAIN MULTICAST PROTOCOLS: IGMP: Messages, Propagation of Membership Information, Encapsulation; Next Generation IP: IPV6 Addressing ,The IPV6 Protocol; Transport Layer protocols: Introduction: Services, Port Numbers, User Datagram Protocol(UDP): User Datagram, UDP Services, UDP									
Tran Wind Strea Assoc Scheo SERV Proto Text Be	Applications. MODULE-4 12 Hrs Transmission Control Protocol: TCP Services, TCP Features , Segment, A TCP Connection, Windows in TCP ; Flow Control, Error Control, TCP Congestion Control; TCP Timer and Options; Stream Control Transmission Protocol (SCTP): Services, Features, Packet Format and Association; Quality of Services: Data Flow Characteristics; Flow Control to Improve QoS: Scheduling, Traffic Shaping or Policing, Resource Reservation, Admission Control; INTEGRATED SERVICES (INTSERV): Flow Specification, Admission, Service Classes, Resource Reservation Protocol (RSVP). DIFFERENTIATED SERVICES (DFFSERV). Text Book: Bebrouz A Forouzan Data Communications and Networking, Tata McGraw-Hill 5th Edition									

Reference Books:

- 1. Alberto Leon-Garcia and Indra Widjaja, "Communication Networks–Fundamental Concepts and Keyarchitectures", Tata McGraw-Hill, 2nd Edition.
- 2. William Stallings, "Data and Computer Communication", Pearson Education, 8th Edition.

3. Nader F. Mir, Computer and Communication Networks, Pearson Education, 2014.

MOOCs:

- 1. http://nptel.ac.in/courses/106105081/
- 2. https://www.edx.org/course/computer-networks-internet-kironx-fhlcnx

Laboratory Programs

- 1. Learn Networking Commands
- 2. Simulation of error correction code (like CRC).
- 3. Simulate the transmission of ping messages over a network topology consisting of 6 nodes.
- 4. Simulate a three nodes point to point network with duplex links between them. Set the queue size and vary the bandwidth and find the number of packets dropped.
- 5. Simulate a three nodes point to point network with duplex links between them. Set the queue size and vary the bandwidth and find the number of packets sent with different types of traffic.
- 6. Implement distance vector algorithm to find the suitable path for transmission between sender and receiver.
- 7. Simulation of Link State Routing algorithm.
- 8. Simulation of Routing Information Protocol.
- 9. Simulate an Ethernet LAN using n nodes, change error rate and data rate and compare throughput.
- 10. Simulate an Ethernet LAN using n nodes and set multiple traffic nodes and plot congestion window for different source / destination.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	3	3	-	-	-	-	-	-	-	-	-
CO3	-	3	-	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	-	2	-	-	-	-	-	-	-	-	-	-

Cou	ırse Title	FINITE AUTOMA	TA AND FORMAL LA	NGUAGES	
Cou	ırse Code	22CS603		L-T-P-C	(3-1-0)3
Exa	m Hrs.	3	Hou	ırs / Week	4
SEI	E	50 Marks	Τα	otal Hours	40L+10T
Cou	ırse Objectiv	: To design grammar production fo	r the programming constr	ucts.	
Cou	irse Outcome	es (COs) : Upon Completion of the c	course, students shall be a	ble to:	
#		Course Outcomes		Mapping to POs	Mapping to PSOs
1.	Describe va	rious automata to write grammar pro	oductions	1	-
2.	Apply appro	opriate automata to obtain grammar	productions	1,2	-
3.	Design auto	omata for a given programming cons	truct	3	-
4.	Construct a simulation t	n automata and grammar for a g	given scenario using a	3,5	1,2
Cou	irse Contents	:			
		MODULE – 1			10 Hrs
The Fini Dete	ory. te Automata: erministic Fin gular Express	An Informal Picture of Finite Autor ite Automata, Finite Automata with MODULE – 2 ions and Languages: Regular Expr	nata, Deterministic Finite Epsilon-Transitions. ressions, Finite Automata	e Automata,	on- 10 Hrs Expressions,
Pro	perties of Re	gular Languages: Proving Langua ular Languages, Equivalence and M	ges Not to Be Regular – inimization of Automata.	Pumping Ler	nma, Closure
		MODULE – 3			10 Hrs
Con Con Pus PDA	ntext-Free Gra atext-Free Gra hdown Autor A's and CFG's	rammars and Languages: Conte mmars, Ambiguity in Grammars an mata: Definition of the Pushdown s, Deterministic Pushdown Automat	ext-Free Grammars, Para d Languages. Automata, The languages a.	se Trees, Ap	pplications of Equivalenceof
		MODULE – 4			10 Hrs
Pro Use (CN Intr Prog	perties of C less symbols, IF), Griebach coduction to gramming Tec	ontext-Free Languages: Normal Eliminating epsilon productions, El Normal Form (GNF). Turing Machines: Problems tha chniques for Turing Machines.	Forms for Context-Free iminating Unit production t Computers cannot Sol	e Grammars- ns, Chomsky I lve, The Tur	Eliminating Normal Form
Tex J	t Book: John E. Hoper and Computat	oft, Rajeev Motwani, Jeffrey D. Ullion, 3 rd Edition, Pearson Education,	lman, Introduction to Aut 2013.	tomata Theor	y, Languages

Reference Books:

- 1. Peter Linz, An Introduction to Formal Languages and Automata, IV Edition, Narosa Publishing House, 2011.
- 2. John C Martin, Introduction to Languages and Automata Theory, 3rd Edition, Tata McGraw-Hill, 2007.

MOOCs

http://elearning.vtu.ac.in

Activity:

- 1. Designing of DFA, NFA, Grammar productions using JFLAP tool.
- 2. Solve real time application problems like:
 - a. Assume a scenario of an online shopping store which uses electronic money. Identify the events and states for this scenario and design an automata individually for
 - i. Customer
 - ii. Bank
 - iii. Store
 - b. Design an automata to verify the authentication of the user before allowing them to access the confidential information.(Assume the user password is 101101)
 - c. Construct a Finite Automata to search your name in your class attendance list.
 - d. Assume you go for shopping a trouser searching for particular fabric and of particular color. Design grammar for the above scenario.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-		-	-	-	-	-	-	-	-	-	-	-
CO2	2	2		-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	3	-	-	-	-	-	-	-	2	2

	MINI PROJECT											
Course	Code	22CS604		L-T-P-C	(0-0-4)2							
Exam H	Irs.	3	Hou	rs / Week	4							
SEE		50 Marks	Tot	al Hours	52							
Course Objective: Design and implement solution for an identified real world problem.												
Course	Course Outcomes (COs): Upon completion of course the students will be able to:											
#	Course Outcom		es	Mapping	Mapping							
				to POs	to PSOs							
1.	Identi	fy the requirements of a chosen real w	orld problem	1,2,6,7	-							
2.	Desig	n the solution for the chosen problem	and document the same.	1,3,4,10	1,2							
3.	3.Implement the design using appropriate tools3,5,8,1											
4.	Demo	onstrate the project work along with a	1, 5,10	1,2								
5.	Demo	onstrate the ability to work effective	ely as a project member.	1,9	-							

• A team of **FOUR** students must develop the mini project. However, during the final evaluation, each student must demonstrate the project individually.

• The team must submit a **Brief Project Report** (25 to 30 Pages) after completion with the following contents

- Introduction
- Requirements
- Development Process and Models Adopted
- Analysis and Design Models
- Implementation
- Testing
- The project report will be evaluated for 25 marks, Demonstration for 50 marks and Viva Voce for 25 marks.

Rubrics for Evaluation of Mini Project

Phase I (Project Proposal Submission and Evaluation Scheme):

After finalizing the topic with the guidance of Supervisor, students should submit the project proposal along with Synopsis not exceeding 10 pages. Approval of synopsis is done for 15 marks by concerned project committee.

SI. No	Performance Indicators	Needs Improvement (0-1 mark)	Average (2-3 marks)	Good (4-5 marks)	Max marks
1	Literature Survey	Survey of literature is not recent or no literature survey	Survey of literature is not clear	Literature survey is sufficient.	5
2	Synopsis writing	Objective of the work is not identified.	Objective of the work is identified but no evidence of Inter disciplinary approach found.	Objective of the work is identified with evidence of Inter disciplinary approach found.	5
3	Presentation	Contents not delivered completely.	Contents not delivered clearly.	Contents delivered clearly with confidence.	5
	15				

Phase II (Project Progress):

Evaluation of project phase II is carried out by evaluation committee.

Sl. No.	Performance Indicators	Needs Improvement (0-1 marks)	Average (2-3 marks)	Good (4-5 marks)	Max marks
1.	System design and development	System specification is not identified.	System specification is identified but not satisfactory.	System specification is identified correctly.	5
2.	Identification of appropriate tool for application	Application tools are not identified.	Application tools identified but not used.	Application tools identified and used.	5
3.	Oral presentation	Entire contents not delivered.	Contents not delivered clearly.	Contents delivered clearly with confidence.	5
				Total	15

Phase III (Project Demonstration with Report):

Evaluation of this phase is done by evaluation committee.

Sl. No	Performance Indicators	Needs Improvement (0-1 marks)	Average (2-3 marks)	Good (4-5 marks)	Total marks allocated
1.	Design and Implementation	Not done	Incomplete.	Complete.	5
2.	Demonstration	Incomplete	Complete but not satisfactory.	Complete and satisfactory	5
3.	Documentation	Organization and clarity of report and technical content is not clear and complete	Organization and clarity of report and technical content is clear but not complete.	Organization and clarity of report and technical content is clear and complete.	5
4.	Oral presentation	Presentation with ppt is not clear.	Presentation with ppt is clear but not satisfactory	Presentation with ppt is clear and satisfactory.	5
				Total	20

Semester End Evaluation

Evaluation committee consists of panel of examiners containing external as well as internal evaluators. This evaluation is carried out for 50 marks.

SN	Performa	ance Indicator	s	Marks allocated	Marks awarded			
	D • .		Project specification	5				
	Project e	xecution	Progress	5				
	Mathada	1	System Design	5				
	Analysis	logy/Result	System Implementation	5				
	Analysis		System Testing	5				
			Organization and Clarity	.5				
	Project R	Report	Technical content	5				
			5					
Final	presentatio	on		10				
Total	Marks			50				
Rubric	s for Sem	ester End Ex	am					
	Marks	Overall crite	eria					
1.	48-50	Project is re	eaching professional standards.					
2	40.47	Project is ex	cellent and may contain publishal	ble material. Presen	tation is			
۷.	40-47	excellent.						
3.	35-39	Project and	presentation are very good. All de	esign aims are met.				
4.	30-34	Project and	gn aims are met.					
5.	25-29	Minimum c	ore of design aims has been met. I	Presentation is satist	factory.			
6.	20-24	24 Design aims and implementation are met partially. Presentation is moderate.						
7.	0-20	Most design not satisfact	n aims are not met and implementation ory.	ation does not work	. Presentation is			

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	-	-	2	2	-	-	-	-	-	-	-
CO2	3	-	3	3	-	-	-	-	-	3	-	-	3	3
CO3	-	-	3	-	3	-	-	2	-	-	2	-	3	3
CO4	3	-	-	-	3	-	-	-	-	3	-	-	3	3
CO5	3	-	-	-	-	-	-	-	3	-	-	-	-	-

Cou	rse Title		MAIN PROJECT PHASE	- I						
Cou	rse Code	22CS605		L-T-P-C	(0-0-4)2					
Exa	m Hrs.	3		Hours / Week	4					
SEE	E	50 Marks		Total Hours	-					
Cou	rse Objecti	ive:	To be able to identify a relevant problem that requires technical solution and conduct survey for the same.							
Cou	rse Outcon	nes (COs):	Upon the completion of the course the stude	ents will be able	to:					
#			Course Outcomes	Mapping to POs	Mapping to PSOs					
1.	Identify a publication	problem, the	rough Extensive literature Survey leading to y paper.	1,2	-					
2.	Plan & des	ign the soluti	on to the chosen problem	3	2					
3.	Make oral	presentation a	and documentation of the work carried out	9,10	-					

Course Contents:

During VII semester, candidates in consultation with the guides shall carry out literature survey to finalize the topic of the project. *The same project will be continued in Eighth semester*. Students are expected to present the project synopsis, system analysis, requirements specification and **should publish a technical paper on** Literature Survey. The evaluation will be carried out in three stages

- Project Stage 1 Team Formation, Topic Selection & Guide allotment (No marks)
- Project Stage 2 Extensive Literature Survey , Problem Definition
- Project Stage 3 Preliminary Design, Report Preparation and Publication

The evaluation of the project phases shall be carried out by the evaluation committee comprising of project guide & other faculty members. The committee will be constituted by the project coordinator in consultation with the Head of the department. *For Multidisciplinary projects guides will be allotted from each concerned branch*.

Performance Indicators	Low (40%)	Medium(70%)	High(100%)		
Literature Survey and Problem Definition (20 Marks)	Literature Survey not pertaining to the title of the project (8)	Incomplete literature survey and improper problem definition (14)	Extensive literature survey with clear state of the art problem definition (20)		
Preliminary Design (10 Marks)	Has no coherent strategies for problem Solving (4)	Has some strategies for problem – solving, but does not apply them consistently (7)	Formulates strategies for solving problems (10)		
Presentation (10 marks)	Disorganized and ineffective presentation (4)	Organized, but ineffective presentation (7)	Effective organized presentation (10)		
Report Preparation (30 Marks)	Disorganized and contents are not sufficient	Organized but not good content wise	Effectively organized and well framed contents		
Paper Publication (20 Marks)	Paper submitted & awaiting results (8)	National conference International Conference (14)	Journal (20)		

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	-	-	-	-	-	-	-	-	2	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	3
CO3	-	-	-	-	-	-	-	-	3	3	-	-	-	-

Course Title Course Code	APPLICATION DEVELOP	MENT LABOR	APPLICATION DEVELOPMENT LABORATORY									
Course Code	22CS606A	L-T-P-C		(0-0-2)1								
Exam Hrs.	3	Hours / V	Veek	2								
SEE	50 Marks	Total Ho	al Hours 14									
Course Object Course Outco	tive: Design and develop apps for android dev mes (COs): Upon completion of the course, s	vices. tudents shall be a	able to:									
#	Course Outcomes	Ma to l	apping POs	Mapping to PSOs								
1. Develop compone	simple applications, using built-inwi ents of android studio.	dgets and	3,5,9	1,2								
2. Docume	nt the apps designed.		10	1								
 password If the email 3. Assume you Develop ap 4. Design an arin first active total number 5. Develop and should disp 6. Assume you the order for 7. Design an aring Open, Save 8. Design an aring 9. Develop aring information 10. Consider aring implement 11. Develop aring 2. Develop aring 3. Develop aring 4. Develop aring<!--</th--><th>I: rtWi2p_10 /password is invalid display a Toast with an er- pu are accepting employee details: Name, pp that displays an alert message if phone num- pp that displays the names of all planets in our vity should display all the planet's names in second planets to first activity. QUIZ app that displays a question with four a play whether the selected option is right or wro- n need to accept order online for fast food iter or multiple items and displays the total amoun- pp to display menu options on clicking a buttor android application to list all the engineering n of any department which the user clicks on i scenario where you need to send an emai the same. android application to display a gallery view n android application to display a gallery view n android application to render the text data</th><th>rror message Designation, Sa iber entered is more r universe. Clicking second activity and answers as option ong. ms. Design an appendent of the paid on plon "FILE". The me hould display the och programmation g branches of MC n a separate page I to multiple use (Grid View) of a</th><th>lary, Pl ore than ing on "S and it sho as. Click op such acing the acing the enu opti relevan cally. E and d s. ers. Desi it least 10</th><th>none number. 10 digits. Solar System" buld return the king an option that it accepts e order. tons are: New, t information. isplays a brief ign an app to 0 images.</th>	I: rtWi2p_10 /password is invalid display a Toast with an er- pu are accepting employee details: Name, pp that displays an alert message if phone num- pp that displays the names of all planets in our vity should display all the planet's names in second planets to first activity. QUIZ app that displays a question with four a play whether the selected option is right or wro- n need to accept order online for fast food iter or multiple items and displays the total amoun- pp to display menu options on clicking a buttor android application to list all the engineering n of any department which the user clicks on i scenario where you need to send an emai the same. android application to display a gallery view n android application to display a gallery view n android application to render the text data	rror message Designation, Sa iber entered is more r universe. Clicking second activity and answers as option ong. ms. Design an appendent of the paid on plon "FILE". The me hould display the och programmation g branches of MC n a separate page I to multiple use (Grid View) of a	lary, Pl ore than ing on "S and it sho as. Click op such acing the acing the enu opti relevan cally. E and d s. ers. Desi it least 10	none number. 10 digits. Solar System" buld return the king an option that it accepts e order. tons are: New, t information. isplays a brief ign an app to 0 images.								

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	3		3	-	-	-	3	-	-	-	2	2
CO2	-	-	-	-	-	-	-	-	-	3	-	-	2	-

Co	urse Title	FULL STACK DEVELOPMENT LABORATORY									
Co	urse Code	22CS606B		L-T-P-C	(0-0-2)1						
Exa	ım Hrs.	3		Hours / Week	2						
SE	E	50 Marks		Total Hours	14P						
Co	ırse Objecti	ve: To gain knowledge of full-stack develop	nent.								
Co	arse Outcon	nes (COs): Upon completion of the course, s	udents shall	be able to:							
#		Course Outcomes		Mapping to POs	Mapping to PSOs						
1.	Impleme	2, 5	-								
2.	Develop	3, 5, 9, 12	-								
Co	urse Conten	ts:									
1.	HTML and	CSS Webpage:									
 2. 3. 4. 5. 6. 7. 8. 9. 10. 	 Develop a complete web application for a given scenario 3, 5, 9, 12 Course Contents: HTML and CSS Webpage: Create a simple webpage that showcases your favorite hobby. Use HTML to structure the content and CSS to style the page, including adding colors, fonts, and images. JavaScript Form Validation: Develop a web form with fields for name, email, and password. Implement JavaScript validation to ensure that all fields are filled correctly before submitting the form. Node.js Server with Express: Build a basic server using Node.js and Express. Create routes to handle HTTP requests like GET and POST and respond with simple JSON data. Database Integration: Extend the previous Node.js server by integrating a database (e.g., SQLite or MongoDB). Implement endpoints to perform CRUD operations on a dataset. RESTful API: Design and implement a RESTful API using Node.js, Express, and a database of your choice. Define endpoints for managing resources, such as creating, reading, updating, and deleting data. React Component Library: Create a library of reusable React components. Build components like buttons, cards, and modals and use them in a sample React application. Write a program to create a simple calculator Application using React JS. Full-Stack Task Manager: Develop a task manager application with React on the front end and Node.js/Express on the back end 										
10.	Build a rea back end. E	l-time chat application using React for the f Enable users to send and receive messages in	ront end and real-time.	l Node.js with Soc	ket.IO for the						

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	2	-	-	3	-	-	-	-	-	-	-	-	-
CO2	-	-	3	-	3	-	-	-	3	-	-	2	-	-

Cours	se Title	INTRODUCI	TION TO COMPUTER	VISION							
Cours	se Code	22CS661		L-T-P-C	(3-0-0)3						
Exam	h Hrs.	3	Hou	rs / Week	3						
	SEE	50 Marks	Т	'otal Hours	40						
Cour Cours	se Objectiv e Outcome:	e: To learn basic principles of in different algorithms for recogn Upon completion of the course, stu	nage formation, image p ition from single or multi idents shall be able to:	processing algorithm and a ple images (v	gorithms and video).						
#		Course Outcomes		Mapping to POs	Mapping to PSOs						
1.	Explain Im	hage formation process		1	-						
2.	Perform sh	ape analysis		3	-						
3.	Develop a	2	-								
4.	Explain vi	deo processing and motion computation	ation	1	-						
Cour	se Content										
		MODULE – 1			10 Hrs						
Perspe Geom Early Frequ Textu	and transformations, Photometric image formation, The digital camera. Pinnole Perspective, Weak Perspective, Cameras with Lenses, The Human Eye, Intrinsic Parameters and Extrinsic Parameters, Geometric Camera Calibration. MODULE – 2 10 Hrs Early Vision – One Image: Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing, Filters as Templates, Local Image Features, Texture. MODULE - 3 10 Hrs										
Early	Vision – M	(id-level Vision: Segmentation by C	Clustering, Grouping and	Model fitting	, Tracking.						
		MODULE – 4			10 Hrs						
High - Image	level Vision es, Recogniti	h: Registration, Smooth Surface ar	nd their Outlines, Range	Data Detecti	ng Objects in						
Text I 1. Con- htt 2. Co Refer 1. R. 2. D. 3. Ima 4. Sim- 20 5. Intr 6. Bu Exa	 Text Books: 1. Computer Vision: Algorithms and Applications (CVAA), Richard Szeliski, Springer, 2nd edition, 2020, http://szeliski.org/Book/ 2. Computer Vision – A modern approach, by D. Forsyth and J. Ponce, Prentice Hall, 2nd edition, 2012 Reference Books: 1. R. C. Gonzalez, R. E. Woods. Digital Image Processing. Addison Wesley Longman, Inc., 1992. 2. D. H. Ballard, C. M. Brown. Computer Vision. Prentice-Hall, Englewood Cliffs, 1982. 3. Image Processing, Analysis, and Machine Vision. Sonka, Hlavac, and Boyle. Thomson. 4. Simon J. D. Prince, Computer Vision: Models, Learning, and Inference, Cambridge University, Press, 2012 5. Introductory Techniques for 3D Computer Vision, by E. Trucco and A. Verri, Publisher: Prentice Hall. 6. Building Computer Vision Applications Using Artificial Neural Networks - With Step-by-step Examples in OpencvAndTensorflow With Python, Shamshad Ansari, Apress, 2020 										

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	-

Cours	se Title	ARTIFICIAL INTELLIGENCE									
Cours	se Code	22CS662		L-T-P-C	(3-0-0)3						
Exam	n Hrs.	3	H	Hours / Week	3						
SEE		50 Marks		Total Hours	40						
Cour	se Objective:	Students will be able to apply the concernment of knowledge-based.	oncepts of Artificia	l Intelligence t	o construct						
Cours	se Outcomes	(COs): Upon completion of the cours	se, students shall be	able to:							
#		Course Outcomes		Mapping to POs	Mapping to PSOs						
1.	Describe dif strategies.	1	-								
2.	Analyze dif	ferent search strategies for a given pr	oblem.	2	-						
3.	Design simp	ble knowledge-based systems using fi	rst-order logic.	2,3	2						
4.	Analyze dif	ferent learning techniques.		2	-						
Cours	se Contents:										
		MODULE – 1			10 Hrs						
agents Unifo	s. Example pr rm- cost searc	oblems; Searching for solution; Unir ch.	formed search strat	tegies: Breadth	-first search,						
Uninf first so Strate Heuri	cormed search earch, Bidirec gies: Greedy stic functions	ch strategies: Depth-first search, Depth-first search, Comparing uninformed best-first search, A* search, Optima s; Local Search Algorithms and C	epth-limited search, l search strategies; I lity of A*, Memory optimization Proble	Iterative deep nformed (Heur z-bounded heur ems: Hill-clim	bening depth istic) Search ristic search; bing search,						
Simul	lated annealin	g, Local beam search, Genetic algori MODULE 3	thms.		10 Urs						
On-lin online world first-o	ne search age e local search, ; First-Order order logic, Ki	ents and unknown Environments: O learning in online search, Logical A Logic: Representation revisited; Syn nowledge engineering in first-order le	nline search proble gents: Knowledge-l ntax and semantics ogic.	ems, Online se based agents; T of first-order	arch agents, The Wumpus logic; Using						
		MODULE – 4			10 Hrs						
Learn Practi likelih reinfo	ning from H cal Machine nood paramete rcement learn	Examples: Forms of Learning; sup Learning. Statistical and Reinforcen er learning, Bayesian parameter, lea ing.	pervised learning; nent learning: Stati rning, passive reint	Learning dec stical learning forcement learn	ision trees; , maximum ning, active						
Text I A P	BOOK: Artificial Intel Pearson, 2014.	ligence - A Modern Approach, Stu	art Russell and Per	ter Norvig, Th	ird edition,						
Refer 1. An M 2. In	rence Books: rtificial Intell cGraw- Hill I troduction to	ligence, Elaine Rich, Kevin Knigh Education, 2015. Artificial Intelligence and Expert Sys	tt and Shivashanka tems, Dan W Patter	ar B Nair, Th son, Pearson, 2	nird edition,						

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	-	3	-	-	-	-	-	-	-	-	-	-	-	-

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Cours	Course Title WIRELESS NETWORKS											
Cours	se Code	22CS663	L-T-P-C	(3-0-0)3								
Exam	Hrs.	3	Hours/Week	3								
SEE		50Marks	Total Hours	40								
Course Objective: Gain knowledge of various terminology, principles, devices, schemes, concepts,												
algorithms and different methodologies used in Wireless Communication Networks.												
Cours	CourseOutcomes(COs): Uponcompletionofthecourse, studentsshallbeableto:											
#		Course Outcomes	Mapping To POs	Mapping To PSOs								
1.Explain fundamentals of wireless communications.1												
2.	1. Analyse security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks. 2											
3.	Demonst	rate basic skills for cellular networks design.	3	-								
4.	Apply k networki	mowledge of TCP/IP extensions for mobile and wireless ng.	1	-								
Cours	se Content	ts:										
		MODULE-1		10 Hrs								
Introc Transr Freque	Introduction: Wired Network vs. Wireless Network, Overview of Wireless Applications, Wireless Transmission: Path loss, Multi-path propagation, Doppler shift, Fading, Time Division Multiplexing, Frequency Division Multiplexing, Code, Spread Spectrum Technique, Satellite Communication;											
		MODULE–2		10 Hrs								
Globa Code Manag manag	Il System Division gement-Lo gement sch	for Mobile communication (GSM) Network, General Pack Multiple Access (CDMA 2000), Cordless System, Wirele ocation Management, HLR-VLR scheme, Hierarchical schemes;	et Radio Servi ess Local Loc neme, Predicti	ice (GPRS), p, Mobility ve location								
		MODULE-3		10 Hrs								
WIRI Protoc Wirele	WIDULE-3I0 HrsWIRELESS NETWORK: Protocols: Media Access Protocol, Mobile IP, Mobile Transport Layer Protocol, Wireless Access Protocol, Ad-Hoc Networks and Routing, Standards: IEEE 802.11, Wi-Fi, Wireless Broadband-Wi-MAX, Bluetooth, IEEE 802.15, Security in Wireless Network, Hyper LAN.											
		MODULE-4		10 Hrs								
MOBILE COMPUTING: Mobile Computing, Issues: Resource Management, Interference, Bandwidth, Cell Splitting, Frequency reuse, Mobile Data Transaction Models, File Systems, Mobility Management, Security.												
 Text Books: 1. William Stallings, "Wireless Communications & Networks", 2/E, Pearson Education India, Reprint 2007. 2. Jochen Schiller, "Mobile Communications," 2/E, Pearson Education India, reprint 2007. 												
2. Jot Refer	2. Jochen Schnier, Mobile Communications , 2/E, Pearson Education India, reprint 2007 Reference Books:											
1. Sar 2. T S	ndeep Sing S Rappapo	thal, "The Wireless Application Protocol", Addison Wesley, " rt, "Wireless Communications: Principles & Practice". 2/E. Pe	India, reprint 2 earson Educatio	001 on, 2002.								
~	11.1	· · · · · · · · · · · · · · · · · · ·										

3. C E Perkins, "Ad Hoc Networking", Addison Wesley, 2000.

MOOCs:

https://onlinecourses.nptel.ac.in/noc20_ee61/preview

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-		-	-	-	-	-	-	-	-	-	-	-

Course Title	SOFTWARE ARCHITECTURE									
Course Code	22CS664	L-T-P-C	(3-0-0)3							
Exam Hrs.	3	Hours / Week	3							
SEE	50 Marks	Total Hours	40							

Course Objective: Learn the principles and concepts of applying various design patterns in designing a wide variety of software systems.

Course Outcomes (COs): Upon the completion of the course the students will be able to :

#	Course Outcomes	Mapping to POs	Mapping to PSOs
1.	Identify the significance of software architecture.	1	-
2.	Apply quality attributes to create an architecture for the given application.	2	-
3.	Analyze the architectural pattern to build the system from components.	2	-
4.	Create documentation relevant to the chosen architecture.	1,10	2

Course Contents:

MODULE -1

What Is Software Architecture? : What Software Architecture Is and What It Isn't; Architectural Structures and Views; Architectural Patterns; What Makes a "Good" Architecture? Why Is Software Architecture Important? Inhibiting or Enabling a System's Quality Attributes; Reasoning About and Managing Change; Predicting System Qualities; Enhancing Communication among Stakeholders; Carrying Early Design Decisions ; Defining Constraints on an Implementation; Influencing the Organizational Structure ; Enabling Evolutionary Prototyping Improving Cost and Schedule Estimates ;Supplying a Transferable, Reusable Model; Allowing Incorporation of Independently Developed Components; Restricting the Vocabulary of Design Alternatives; Providing a Basis for Training; The Many Contexts of Software Architecture: Architecture in a Technical Context, Architecture in a Project Life-Cycle Context, Architecture in a Business Context, Architecture in a Professional Context, Stakeholders, How Is Architecture Influenced?, What Do Architectures Influence?, Quality Attributes Understanding Quality Attributes; Architecture and Requirements; Functionality; Quality Attribute ;Considerations ; Specifying Quality Attribute; Requirements ; Achieving Quality Attributes through Tactics, Guiding Quality Design Decisions.

MODULE - 2	10 Hrs
Availability: Availability General Scenario; Tactics for Availability; Modifiability: M	odifiability
General Scenario; Tactics for Modifiability Performance: Performance General Scenario;	Tactics for
Performance; Security: Security General Scenario; Tactics for Security;	
MODULE – 3	10 Hrs
Architectural Patterns – 1: Introduction; from mud to structure: Layers, Pipes and Filters.	
Architectural Patterns – 2: Distributed Systems: Broker;	

MODULE - 4

10 Hrs

10 Hrs

Architectural Patterns – 3: Adaptable Systems: Microkernel; Some Design Patterns: Structural decomposition: Whole – Part;

Documenting Software Architectures: Uses and Audiences for Architecture; Documentation; Notations forArchitecture; Documentation; Views; Choosing the Views; Combining Views; Building the Documentation Package; Documenting Behavior; Architecture Documentation and Quality Attributes; Documenting Architectures That Change Faster Than You Can Document Them.

Text Books:

- 1. Len Bass, Paul Clements, Rick Kazman: Software Architecture in Practice, 3rd Edition, Addison-Wesley, 2013.
- 2. Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal: Pattern-Oriented Software Architecture, A System of Patterns, Volume 1, John Wiley and Sons, 2009.

Reference Books:

- 1. Mary Shaw and David Garlan: Software Architecture-Perspectives on an Emerging Discipline, PHI, 2008.
- 2. E. Gamma, R. Helm, R. Johnson, J. Vlissides: Design Patterns- Elements of Reusable Object-Oriented Software, Addison-Wesley, 1995.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	2	-	-	-	2

Cour	rse Title	C# PROGRA	MMING AND .NET							
Cour	se Code	22CS665		L-T-P-C	(3-0-0)3					
Exam	n Hrs.	3	Н	lours/Week	3					
SEE		50 Marks	T	Fotal Hours40						
Cour	se Objecti	ve: Students will be able to develop van	rious console and wind	dows applicat	ions.					
Cour	se Outcom	nes(COs):Upon completion of the cour	se, students shall be al	ble to:						
#		Mapping to POs	Mapping to PSOs							
1.	Develop	3	-							
2.	Design applications using classes, methods, interfaces and 1, 3									
3.	Create de	elegates, packages and manage database	е.	2, 3	-					
4.	Demonst application	rate windows application system anons	nd build their own	3	1					
Cour	se Conten	ts:								
		MODULE – 1			10 Hrs					
Over Retur Comr	view of C ning a Valu nand Line	#: Introduction , A Simple C# Progra e, Using Aliases for Namespace Classes Arguments, Main with a Class, Prov	im, Namespaces , Ad s, Passing String Objec iding Interactive Inpu	lding Comme ts to WriteLin 1t, Using Ma	ents, Main e Method, thematical					
Funct Introd Varia	Functions, Multiple Main Methods, Compile Time Errors. Literals, Variables and Data Types: Introduction, Literals, Variables, Data Types, Value Types Reference Types, Declaration of Variables, Initialization of Variables, Default Values, Constant Variables, Scope of Variables,									
Boxin Opera Condi Expre Assoc	Boxing and Unboxing. Operators and Expressions : Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operator, Bitwise Operators , Special Operators ,Arithmetic Expressions, Evaluation of Expressions ,Precedence of Arithmetic Operators, Type Conversions ,Operator Precedence and Associatively. Mathematical Functions. Decision Making and Branching: Introduction, Decision									
Makin The e	ng with if S else if Lao	tatement, Simple if Statement, The if Ider. The Switch Statement The?	else Statement, Nesting Operator. Decision M	g of if else S /Iaking and	tatements, Looping:					

Intervention in C#: Intervention Statement The? : Operator. Decision Making and Looping: Introduction, The while Statement The do Statement, The for Statement, The foreach Statement. Methods in C#: Introduction, Declaring Methods, The Main Method, Invoking Methods, Nesting of Methods, Method Parameters, Pass by Value, Pass by Reference, The Output Parameters, Variable Argument Lists, Methods Overloading. Handling Arrays: One-Dimensional Arrays, Creating an Array, Two- Dimensional Arrays, Variable- Size Arrays, the System. Array Class. Manipulating Strings : Creating Strings, String Methods, Inserting Strings, Comparing Strings, Finding Substrings, Mutable Strings, Arrays of Strings

MODULE – 2

10 Hrs

Classes and Objects :Introduction, Basic principles of OOP, Defining a Class, Adding Variables and Methods, Member Access Modifiers, Creating Objects, Accessing Class members, Constructors, Overloaded Constructors, Static Members, Static Constructors, Private Constructors, Copy Constructors, Destructors, Member Initialization. **Inheritance and Polymorphism:** Introduction, Classical Inheritance, Containment Inheritance, Defining a Subclass, Visibility Control, Defining Subclass Constructors, Multilevel Inheritance, Hierarchical Inheritance, Overriding Methods, Hiding Methods, Abstract Classes, Abstract Methods, Sealed Classes: Preventing Inheritance, Sealed Methods, The this reference, Nesting of Classes, Constant Members, Read-only Members, Properties, Indexers. Polymorphism, **Interface:** Multiple Inheritance, Multiple Inheritance: Introduction, Defining an Interface, Extending an Interface, Implementing Interfaces, Interfaces and Inheritance, Explicit Interface Implementation, Abstract Class and Interfaces.

Operator Overloading: Introduction, Over loadable Operators, Need for Operator Overloading, Overloading Unary Operators, Overloading Binary Operators, Overloading Comparison Operators Delegates and Events: Introduction, Delegates, Delegate Declaration, Delegate Methods, Delegate Instantiation, Delegate Invocation, Using Delegates, Multicast Delegates, Events. Managing Errors and Exceptions: Introduction, What is Debugging? Types of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch statements, The Exception Hierarchy, General Catch Handler, Using Finally statement, Nested Try Blocks, Throwing our Own Exceptions, Checked and Unchecked Operators, Using Exceptions for Debugging.

MODULE – 3

10 Hrs

Understanding. NET: The C# Environment: Building a Better Window (Introducing Windows Forms): Overview of the System. Windows. Forms Namespace, Working with the Windows Forms Types, The Role of the Application Class, The Anatomy of a Form, The Functionality of the Control Class, The Functionality of the Form Class, Building Windows Applications with Visual Studio 2005, Working with MenuStrips and ContextMenuStrips, Working with StatusStrips.

Programming with Windows Forms Controls: The World of Windows Forms Controls, Adding Controls to Forms by and, Adding Controls to Forms Using Visual Studio 2005, Working with the Basic Controls, Configuring the Tab Order, Setting the Form's Default Input Button, Working with More Exotic Controls, Building Custom Windows Forms Controls, Testing the CarControl Type, Building a Custom CarControl Form Host.

MODULE-4

Data Access with ADO.NET: A High-Level Definition of ADO.NET, Understanding, DO.NET Data Providers, Additional ADO.NET Namespaces, The System. Data Types, Abstracting Data Providers Using Interfaces, Increasing Flexibility Using Application, Configuration Files, The .NET 2.0 Provider Factory Model, The <connectionStrings> Element Installing the Cars Database, Understanding the Connected Layer of ADO.NET, Working with Data Readers, Modifying Tables Using Command Objects, Working with Parameterized Command Objects, Executing a Stored Procedure Using DbCommand, Asynchronous Data Access Under .NET 2.0,Understanding the Disconnected Layer of ADO.NET.

ASP. NET Web Pages and Web Controls: The Role of HTTP, Understanding Web Applications and Web Servers, The Role of HTML, The Role of Client-Side Scripting, Submitting the Form Data (GET and POST), Building a Classic ASP Page, Problems with Classic ASP, The ASP.NET 2.0 Namespaces, The ASP.NET Web Page Code Model, Details of an ASP.NET Website Directory Structure, The ASP.NET 2.0 Page Compilation Cycle, The Inheritance Chain of the Page Type, Interacting with the Incoming HTTP Request, Interacting with the Outgoing HTTP Response, The Life Cycle of an ASP.NET Web Page, Understanding the Nature of Web Controls

Text Books :

- 1. Andrew Troelsen , "Pro C# and the .NET 3, Special edition, A Press, 2012
- 2. E. Balagurusamy," Programming in C# A Primer", 3rd edition, TMH, 2010.

Reference Book:

1. Tom Archer: Inside C#, WP Publishers, 2001.

MOOCs:

- 1. https://www.udemy.com/course/c-net-for-beginners/
- 2. https://www.udemy.com/course/aspnet-webforms/

Course Articulation matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	2	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-	3	-

10 Hrs

Course Title MANAGEMENT INFORMATION SYSTEMS								
Course	Code	22CS666		L-T-P-C	(3-0-0)3			
Exam I	Hrs.	3	H	Iours / Week	3			
SEE		50 Marks		Total Hours	40			
Course	Object	ive: To describe the role of information techn business.	nology and dec	cision support	systems in			
Course	Outcon	nes (COs) : Upon completion of the course, stude	ents shall be able	e to:				
#		Course Outcomes		Mapping to POs	Mapping to POs			
1.	Describ manage	e basic concepts and technologies used in ment information systems.	the field of	1, 11	-			
2.	Compar systems	re the processes of developing and implementin	g information	1, 2	-			
3.	Outline systems	the role of the ethical, social, and security issues of the security	of information	1,8	-			
4.	Apply organiz	information systems to accomplish the obje ation.	ectives of an	1, 10	-			
Course (Contents	:		L				
		MODULE – 1			10 Hrs			
Manage System System System	ement In , Impac , MIS: , MIS: (formation System (MIS): Concept, MIS: Definit t of the Management Information System, MIS A Support to the Management, Management E Organisation Effectiveness, MIS for a Digital Fin	ion ,Role of the and the User , ffectiveness an rms	Management Management a d MIS , Organ	Information as a Control isation as a			
		MODULE – 2			10 Hrs			
System System the exis	Enginee Complex ting syst	ering-Analysis and design: System Concepts, System, Classes of Systems, General Model of MIS, New em, System analysis of a new requirements, System	ystem control, ' ed for system ar tem Developme	Types of system nalysis, System ent Model.	m, Handling analysis of			
		MODULE – 3			10 Hrs			
Decision Support Systems and Knowledge Management: Decision Support Systems (DSS): Concept and Philosophy ,DSS Models: Behavioural, Management Science and Operations Research Models ,Group Decision Support System (GDSS) ,Artificial Intelligence (AI)system, Knowledge based Expert System (KBES) , DSS Application in E-enterprise , MIS and the Benefits of DSS.								
		MODULE – 4			10 Hrs			
Techno Informa Factors of IT D	logy of ation system and User ecision,	information system: Data processing, Transac tem processing, OLAP for Analytical Information r Interface, Real Time Systems and Good Design Evaluation and Feasibility of IT Solutions, MIS	ction processin on ,TQM of Inf , Case Tools ar S: Choice of the	g ,application formation Systen Id I-Case , Strat finformation T	processing, em, Human tegic Nature 'echnology'			

Text Book:

1. Jawadekar, W.S., "Management Information Systems", Tata McGraw Hill Private Limited, New Delhi, 2013,5th edition.

Reference Books:

- 1. Goyal, D.P.: "Management Information System", MACMILLAN India Limited, New Delhi, 2008.
- 2. Mahadeo Jaiswal, Monika Mital: "Management Information System", Oxford University Press, New Delhi.
- 3. Kenneth C. Laudon and Jane P. Laudon: "Management Information Systems" 9/e, Pearson Education, New Delhi.

Course Articulation matrix	
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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		-	-	-	-	-	-	-	-	2	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	2	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	2	-	-	-	-

Cou	rse Title	e Title INTRODUCTION TO CLOUD COMPUTING									
Cou	rse Code	22OECS61	I	и- Т-Р-С	(3-0-0)3						
Exa	m Hrs.	3	Hou	rs / Week	3						
SEE		50 Marks	Tota	l Hours	40						
Cou	rse Object	ive: To expose students to from	tier areas of cloud com	puting service	models and						
Cou	rse Outcom	nes (COs): Upon completion of the	course, students shall be a	able to:							
#		Course Outcomes	:	Mapping to POs	Mapping to PSOs						
1.	1	-									
2.	2. Recognize the different virtualization techniques, architecture and types of clouds 2										
3.	Ascertain services an	different cloud platforms and a d tools in real life scenarios.	dopt Cloud Computing	2,7	-						
4.	Integrate r at differen	new standards for access managem t levels of cloud services	ent, security and privacy	6,8	-						
5.	Develop a	nd deploy an application for cloud	platform	5,9,10,12	1,2						
Cou	rse Conten	ts:									
		MODULE – 1			10 Hrs						
Eras distr	of comput ibuted comp	ing, parallel vs. Distributed com puting, technologies for distributed	puting, elements of parallel a computing.	and Distribute	, elements of						
		MODULE – 2			10 Hrs						
Virt techi Clou thec	ualization: niques, virtu 1d Comput loud, open c	Introduction, characteristics of v alization and cloud computing, pro ing architecture: Introduction, C hallenges.	irtualized environments, os and cons of virtualization loud reference model, typ	Taxonomy of on technology. pes of clouds,	virtualization economics of						
		MODULE – 3			10 Hrs						
Clou Adv Fede	Cloud platforms in industry: Amazon Web Services, Google AppEngine, Microsoft Azure. Advanced topics in cloud computing: Energy efficiency in clouds, Market based management of clouds, Federated clouds/Inter clouds, Third party cloud services.										
	MODULE – 4 10 Hrs										
Infr Iden defin serv Secu avai	Intrastructure security, IAM: Intrastructure security: network level, host level, application level, Identity and Access management: trust boundaries and IAM, why IAM? IAM challenges, IAM definitions, IAM architecture and practices, getting ready for cloud, IAM standards and protocols for cloud services, IAM practices in the cloud, cloud authorization management; Security management in the cloud: security management standards, security management in the cloud, availability management, Saas, Paas. Iaas availability management, access control, security vulnerability, patch and configuration management Primery What is primery? What is data life available? What are the law										
pate priva	h and config acy concerns	uration management. Privacy: When s in cloud? who is responsible for p	nat is privacy? What is data protecting privacy?	a life cycle? Wl	hat are the key						

Text Books:

- 1. Mastering Cloud Computing, McGraw Hill publication, Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi
- 2. Cloud security and privacy an enterprise perspective on risks and compliances,2013, Tin Mather, Subra Kumarswamy, Shahed Latif

Reference Books:

- 1. Cloud Computing: Theory and Practice, Dan C Marinescue, first edition, MK publishers.
- 2. Cloud Computing- A practical approach, McGraw Hill publication, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter.

MOOCs:

- 1. https://www.youtube.com/watch?v=Eg4AAGCE7X4
- 2. https://www.coursera.org/learn/cloud-computing
- 3. https://www.edx.org/course/introduction-cloud-computing-microsoft-cloud200x

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-		2	-	-	-	-	-	-	-
CO4	-	-	-	-	-	2	-	2	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	3	2	-	2	3	2

Course Title		INTRODUCTION TO JAVA PROGRAMMING									
Course Code		22OECS62	L-T-P-C	(3-0-0)3							
Exam Hrs.		3 Hours / Week									
SEE Q QL: 4		50 Marks	Total Hours	40							
Course ()bject	ive: Develop java application programs using objective (CO_{2}) .	ect-oriented concepts.								
Course	Jutcor	nes (COS): Upon completion of the course, stude	nts shall be able to:								
#		Course Outcomes	Mapping to POs	Mapping to PSOs							
1	Exp prog	Explain Object Oriented concepts and basics of java 1									
2	Ana	Analyze the given code snippet 2									
3	Dev	elop a java program for the given problem.	3	-							
Course C	onten	ts:									
		MODULE – 1		10 Hrs							
Java Key Data Typ Arithmetic and Castin	words, es and c, Bitw	Identifiers in Java. I Operators: Java's Primitive Types, The Scope ise, Relational, Boolean Logical, Assignment Operators Strings	and Lifetime of Variable ators, the '?' Operator, Typ	s, Operators: be conversion							
	ig, Ana	MODULE – 2		10 Hrs							
continue. Introducin Variables, constructo Classes.	ng Cla Meth rs, Arg	usses, Objects and Methods: Class Fundamentals ods, Constructors, the "This" keyword, Garbage ument Passing, Returning Objects, Access Control,	s, Declaring Objects, Objection, Overloading I Understanding Static, Nes	ct Reference Methods and ted and Inner							
		MODULE – 3		10 Hrs							
Inheritar super to Multileve Method (Abstract (nce: In C all I Hier Overrio Classe	heritance Basics, Member Access and Inheritance Superclass constructors, Using super to Acce archy, When are Constructors Executed, Supercl ling, Overridden Methods support polymorphis s, Using final.	e, Constructors and inherit ess Superclass Members ass References and Subc m, Why overridden Met	tance, Using Creating a lass Objects, hods, Using							
		MODULE – 4		10 Hrs							
Interface Multiple Packages Exception and Catch, Text Boo Java –	es: Inte Interfa n Han , Multi ok: -The c	erface Fundamentals, Creating an Interface, Implaces, Packages: Package Fundamentals, Package dling: Exception-Handling Fundamentals, Exception ple catch Clauses, throw, finally.	ementing an Interface, Ir ges and Member Access n Types, Uncaught Exception	nplementing , Importing ons, Using try Education							
Reference 1. Progra 2. Java P. 3. Deitel	ce Boo mming rogran and D	ks: g in JAVA2, Dr K Somasundaram ,Jaico publicat nming ,Hari Mohan Pandey, Pearson Education, eitel – "Java How to Program" – 6th Ed. – Pearso	ions 2012. on.								

MOOCs:

- http://nptel.ac.in/courses/106106147/
 http://www.nptelvideos.com/java/java_video_lectures_tutorials.php
 https://www.youtube.com/watch?v=0KL_zftem4g
 https://www.coursera.org/specializations/object-oriented-programming

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-	-	-

se Title	ANALYTICAL AI	BILITY AND SOFT S	KILLS							
se Code	22ASK	L-T-P	(0-0-2)1							
1	1	Hours/Week	2							
	50 Marks		Total Hours	24						
course wi se Object se outcon	Il be conducted at the end of fifth sen ive: To Enhance problem solving skills nes: At the end of course, student will b	nester for two weeks k and communication sk be able to:	y TAP depar ills	tment.						
	Course Outcomes	Mapping toPO's	Mapping to PSO's							
Apply	methods to solve numerical and reasoni	2,3	-							
Lead a	team in corporate offices	8,9	-							
Comm	unicate effectively in professional ambi	ence	10 -							
se Conter	ıt									
	MODULE	2 – 1								
Skills: est/Compo ons, Direc	Speed/Distance, Probability, Pe ound Interest, Number theories, Nu tions, Clock, Calendar. Logical reasoni	rmutations/Combination mber/Letter series, C ng problems	ns, Profit/Lo Coding/Decodi	oss, Simple ng, Blood						
	MODULE	2-2								
Soft Skills: Basic grammar, Spotting errors, Sentence formation, Email writing, Public speaking, Client communication, Leadership, Managerial skills, Stress management, Presentation Skills										
	MODULI	E -3								
nical Skil	ls: Review of C programming, Simple	coding, Syntax rules, N	ICQs on C lan	guage.						
	MODULI	E -4								
	se Title se Code course wi se Object se outcon Apply Lead a Communical Skills: Skills: B communical Skil	se Thte ANALY FICAL AT se Code 22ASK 1 50 Marks course will be conducted at the end of fifth ser se Objective: To Enhance problem solving skills se outcomes: At the end of course, student will b Course Outcomes Apply methods to solve numerical and reasoni Lead a team in corporate offices Communicate effectively in professional ambi se Content MODULE Skills: Speed/Distance, Probability, Pe st/Compound Interest, Number theories, Nu ons, Directions, Clock, Calendar. Logical reasoni MODULE Skills: Basic grammar, Spotting errors, Senter t communication, Leadership, Managerial skills, MODULI mical Skills: Review of C programming, Simple	See Title ANALYTICAL ABILITY AND SOFTS. see Code 22ASK a 1 50 Marks seourse will be conducted at the end of fifth semester for two weeks be objective: To Enhance problem solving skills and communication sk se outcomes: At the end of course, student will be able to: Course Outcomes Apply methods to solve numerical and reasoning problems Lead a team in corporate offices Communicate effectively in professional ambience See Content MODULE – 1 Skills: Speed/Distance, Probability, Permutations/Combinations/Compound Interest, Number theories, Number/Letter series, Cons, Directions, Clock, Calendar. Logical reasoning problems MODULE – 2 Skills: Basic grammar, Spotting errors, Sentence formation, Email vert communication, Leadership, Managerial skills, Stress management, Pr MODULE -3 MODULE -4	See Title ANALY HEAL ABILITY AND SOFT SKILLS see Code 22ASK L-T-P 1 Hours/Week 50 Marks Total Hours course will be conducted at the end of fifth semester for two weeks by TAP departs So Marks course will be conducted at the end of fifth semester for two weeks by TAP departs So Marks course outcomes: At the end of course, student will be able to: Course Outcomes Mapping toPO's Apply methods to solve numerical and reasoning problems 2,3 Lead a team in corporate offices 8,9 Communicate effectively in professional ambience 10 se Content MODULE - 1 Skills: Speed/Distance, Probability, Permutations/Combinations, Profit/Lc st/Compound Interest, Number theories, Number/Letter series, Coding/Decodingons, Directions, Clock, Calendar. Logical reasoning problems MODULE - 2 Skills: Basic grammar, Spotting errors, Sentence formation, Email writing, Public to communication, Leadership, Managerial skills, Stress management, Presentation Skill MODULE -3 MODULE -3 nical Skills: Review of C programming, Simple coding, Syntax rules, MCQs on C land						

Activities: GD, JAM, Mock Interview, Pick and speak, Presentation

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	2	-	-	-	-	-
CO3	-	-	-	-	-	-	-	I	-	3	-	-	-	-