	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
			AY	2022-23						
			Course l	Information						
Progra	amme		B.Tech. (Comput	er Science and Engine	ering)					
Class,	Semester		Third Year B. Te	ch., Sem V						
Cours	e Code		5CS301							
Cours	e Name		Compiler Design							
Desire	d Requisi	tes:	Formal Language	and Automata Theory	, Discrete Math	ematics				
					,					
	Teaching	Scheme		Examination Sche	me (Marks)					
Lectur	re	3 Hrs/week	MSE	ISE	ESE	Total				
Tutori	al	-	30	20	50	100				
				Credits:	3	100				
					<u> </u>					
			Course	Objectives						
1	To intro	luce fundamenta	uls of compiler desi	on and various tools up	ed to design a c	ompiler				
	To incul	cate role of var	ious phases involv	ved during design of	a compiler and	impart in depth				
2	working	of each phase	I	6 6	r · · ·	I				
3	To exerc	ise design of var	ious phases of a co	ompiler using compiler	design tools and	d techniques				
4										
Course Outcomes (CO) with Bloom's Taxonomy Level										
At the	end of the	course, the stud	ents will be able to	,						
со		Course	e Outcome Statem	ent/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description				
C01	Discuss	the need of a co	mpiler, fundamenta	al concepts and variou	5 п	Understanding				
	tools use	d to design a con	mpiler.							
CO2	Demonst	rate role and v	working of each j	phase involved during	g III	Applying				
<u> </u>		1011 the working of y	various phases of o	omniler	IV	Analyzing				
C03	Analyze	arious phases of	compiler using co	mpiler design tools and	1 V	Fyaluating				
	techniqu	es	complicit using con	inplier design tools and	V	Lituruung				
	i					1				
Modu	le		Module C	ontents		Hours				
	Mod	ule 1: Fundame	entals of Compiler							
I	Over two p Lexio recos	view- Structure bass compiler. cal analysis - T mition of tokens	of a compiler, ap he role of a lexic , LEX.	plications of compiler al analyzer, specifica	one pass and ion of tokens,	6				
П	Mod Conte parse toker	ule 2 Syntax Ar ext-free gramma trees and amb us, top-down pa m-up parsing of	nalysis ar, writing gramn iguity, role of par ursing, recursive d	nars for context free ser, specification and lescent and predictive parsing LR SLR and	environments, recognition of parsers (LL), LALR parsers	9				
III	Mo Synta attrib langu passi alloc	dule 3 Syntax D ax-directed defin uted and L-att lage issues, sto- ng, symbol tal ations.	precedence pirected Translatio nitions, evaluation tributed SDDs, corage organization ple organizations	on & Run time environ orders for attributes onstruction of syntax and allocation strateg and generations, dy	nments of an SDD, S- a tree, source ies, parameter namic storage	6				

	Module 4 Intermediate Code Generation	
	Intermediate languages, declarations, different intermediate representations –	
IV	quadruples, triples, trees, flow graphs, SSA forms, and their uses; assignment	6
	statements and Boolean expressions, case statements, back patching,	
	procedure calls.	
	Module 5 Code Optimization	
	Sources of optimization, basic blocks and flow graphs, optimization of basic	_
V	blocks, loops in flow graphs, loop optimization, machine-independent	6
	optimization, machine-dependent optimization, dead-code Elimination, code	
	Module 6 Code Generation	
	Issues in the design of a code generator run time storage management:	
	simple code generator- register and address descriptors, code generation	
VI	algorithm, design of the function getReg, DAG, peephole optimization,	6
	register allocation and assignment, selection of instruction, register	
	allocation, parallel compilation, Just-in-Time compiler, study of compiler	
	construction tools.	
	Textbooks	
1	A.V. Aho, R. Shethi and J.D. Ullman, "Compilers - Principles, Technique	ues and Tools",
	Pearson Education, Second Edition, 2007.	
2	D.M. Dhamdhere, "Systems Programming and Operating Systems", Tata	McGraw- Hill
	Publishing Company limited, New Delm, Second revised Edition, 2005.	
	D Č	
1	References	Edition 2011
	Iohn I Donavan "System Programming" Tata McGraw Hill Publishing C	ompany limited
2	New Delhi	Sinpany minted,
3	Sumitabha Das, "Unix Concepts and Administration", TMGH, 3rd Edition	
4	A.V. Aho, R. Shethiand J.D. Ullman, "Compilers - Principles, Techniqu	ies and Tools".
	Addison Wesley Publishing Company, 2007	,
	Useful Links	
1	https://onlinecourses.nptel.ac.in/noc21_cs07/preview	
2	https://nptel.ac.in/courses/106108052	

	CO-PO Mapping													
		Programme Outcomes (PO) PS										50		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2												2	
CO2	3												3	
CO3		3												
CO4	2	2											3	
The stren	The strength of mapping is to be written as 1: Low, 2: Medium, 3: High													
Each CO	of the c	course	must m	ap to a	t least o	one PO.								

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
			AY	2022-23						
			Course 1	Information						
Progra	amme		B.Tech. (Comput	ter Science and Enginee	ring)					
Class,	Semester		Third Year B. Te	ch., Sem V						
Cours	e Code		5CS302							
Cours	e Name		Design and Analy	ysis of Algorithm						
Desire	ed Requisi	tes:	Data structure							
	Teaching	Scheme		Examination Scher	ne (Marks)					
Lectu	re	3 Hrs/week	MSE	ISE	ESE	Total				
Tutor	ial	-	30	20	50	100				
				Credits:	3					
		1	<u> </u>							
			Course	Objectives						
1	To illustr	rate and apply th	e algorithm analys	is techniques.						
2	To discu	ss the efficient a	lgorithm for variou	ıs problem						
3	To expla	in and demonstr	ate different algori	thm techniques for real	world problem					
4	To comp	ute and prove co	omplexity class of v	various algorithm techn	iques					
A (1	1 6 1	Course	Outcomes (CO) w	vith Bloom's Taxonom	y Level					
At the	end of the	course, the stud	lents will be able to),	Dla am ?a	Dla am?a				
со		Taxonomy Level	Taxonomy Description							
CO1	CO1 Discuss the fundamentals of algorithm design and analysis II II									
CO2	CO2 Apply knowledge of computing and mathematics to algorithm III									
CO3	Critically given pro	y analyze the vanalyze the vana	arious algorithm d	lesign techniques for a	IV	Analyzing				
CO4	Classify Complete	computational e.	problems into P, 1	NP, NP-Hard and NP-	V	Evaluating				
CO5	Design of algorithm	efficient algorith	hms to improve c	complexity of existing	VI	Creating				
Modu	ıle		Module C	Contents		Hours				
I	Intro Intro opera Case Recu and F	duction duction to Algor ttions and Comp Complexities- rrence Equation Recursion Tree N	tithm Analysis Tim putation of Time (Complexity C s: Solution of Rec Aethods. Master's t	ne and Space Complexity Complexity-Best, wors Calculation of simple currence Equations –Ite theorem for complexity	ty, Elementary and Average algorithms. ration Method computation.	6				
II	Divic Binar Integ Mult	le and conquer by Search, Merg ers, Closest-Pa iplication.	ge sort, Quick sort ir and Convex,	, Heap Sort, Multiplica Hull Problems, Stra	ation of Large ssen's Matrix	7				
III	Gree Greed deadl patter	dy Technique dy Technique ines, Minimum rn, Huffman Tre	 Container load cost spanning trees es. 	ing problem, Job sec s, Knapsack problem, C	uencing with Optimal Merge	6				
IV	Dyna Princ Coeff Trees	imic Programm iple of optimal ficient – Floyd's s – 0/1 Knapsack	ling ity – Coin changi algorithm – Multi problem and Men	ng problem, Computir stage graph – Optimal nory functions.	g a Binomial Binary Search	7				

	Backtracking	6
	Backtracking-General method, applications The 4, 8-queen problem, sum of	Ũ
	subsets problem, graph coloring, Hamiltonian cycles.	
	Graph Traversal Techniques & Class of problem	
	Techniques for Graphs – Breadth First Search & Traversal, Depth First	
VI	Search & Traversal, Topological sorting of DAGs AND/OR graphs,	7
	Connected components P, NP, NP- Complete and NP Hard Problems,	7
	Approximation Algorithms for NP-Hard Problems.	
	Textbooks	
1	Ellis Horowitz, Sartaj Sahni and Rajasekaran "Fundamentals of Compute	r Algorithms",
1	Galgotia Publications, 2nd Edition.	
2	Aho, Hopfcraft and Ullman, Addison Wesley "Design and Analysis of Algorit	hms",
3		
4		
	References	
1	Thomas Cormen, Leiserson, Rivest, and Stein "Introduction to Algorithms",	PHI Publication.
	3rd Edition, 2009	
2	Goodman, "Introduction to Design and Analysis of Algorithm", McGraw Hill.	
3	R.C.T. Lee, S.S. Tseng, R.C. Chang, "Introduction to the Design and Analysis	s of Algorithm",
	Tata	
4		
	Useful Links	
1	https://online.stanford.edu/courses/soe-ycsalgorithms1-algorithms-design-and-a	analysis-part-1
2		
3		
4		

CO-PO Mapping														
		Programme Outcomes (PO)											PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2													
CO2	3	1												
CO3		3		2										
CO4				2										
- CE 1	.1 0	•	• • •	•		-	a b c b	• •	TT' 1					

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
	AY 2022-23									
	Course Information									
Progra	amme		B.Tech. (Comput	er Science and Engi	neering)					
Class,	Iass, Semester Third Year B. Tech., Sem V									
Cours	Course Code 5CS351									
Cours	e Name		Design and Analy	sis of Algorithm La	ıb					
Desire	d Requisi	tes:	Data structure							
,	Teaching	Scheme		Examination S	Scheme (N	Marks)				
Practi	cal	2 Hrs/ Week	LA1	LA2	Lab E	ESE	Total			
Intera	ction	-	30	30	40		100			
				Cree	lits: 1					
			Cours	se Objectives						
1	1 Learn key techniques for designing and analyzing algorithms.									
2	Study fur	ndamental conce	epts and notations	used in Algorithm d	esign.		1			
3	Study an dynamic	d apply differen programming a	t algorithm design nd backtracking.	methods namely, gr	reedy met	hod, divide ar	nd conquer,			
4	Study the	e Parallel archite	ectures for designin	ng parallel algorithm	ıs.					
5	Design a	nd analyze the c	complexities of var	ious algorithms folle	owing					
A	1.6.1	Cours	e Outcomes (CO)	with Bloom's Taxo	onomy Le	evel				
At the	end of the	course, the stud	ients will be able to),		Dloom?g	Dlaam?a			
со		Cou	rse Outcome State	ement/s		Bloom's Taxonomy Level	Taxonomy Description			
CO1	Practice	different algorit	hm techniques for	given problem.		III	Applying			
CO2	Identify approach	appropriate data	a structure to impl	ement selected algo	rithmic	IV	Analyzing			
CO3	Design polynom	and Implemen ial time.	t an algorithm	for complex prob	lem in	VI	Creating			
CO4	Exhibit t accompli	echnical and pr shed algorithmi	ofessional skill to c solution.	demonstrate and co	onvince	III	Applying			
]	List of Experimen	ts / Lab Activities/	Fopics					

List of Lab Activities:

Students will be given hands-on experience to design and implement efficient and effective algorithms for various problems based on syllabus covered in the course Design and Analysis of Algorithm in the practical hours using any suitable programming language like C, C++, Java. The List of experiments may include 12 to 14 experiments from among the following-

1. To implement sorting algorithm using array as a data structure and analyse its time complexity for different values of n. The large number of elements may be generated using Random Number generator or may be stored in a file. (Quick Sort, Merge Sort)

2. To implement different search techniques using array and/or trees and analyze their time complexity. (Linear, Binary, Binary recursive)

To implement Fractional Knapsack problem and activity selection problem using Greedy method.
 Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's& Prim's algorithm and compare.

5. To apply Greedy method to solve problems of

a) Job sequencing with deadlines

b) Optimal storage on tapes

6. Implement the following using Dynamic Programming

a) Matrix-chain multiplication

b) Longest common subsequence

c) Optimal binary search trees

7. To implement Strassen's matrix multiplication algorithm

8. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.

9. Find a subset of a given set $S = \{s1, s2,, sn\}$ of n positive integers whose sum is equal to a given positive integer d. For example, if $S = \{1, 2, 5, 6, 8\}$ and d = 9 there are two solutions $\{1, 2, 6\}$ and $\{1, 8\}$. A suitable message is to be displayed if the given problem instance doesn't have a solution. 10. Implement any scheme to find the optimal solution for the Traveling Salesperson problem and then solve the same problem instance using any approximation algorithm and determine the error in the approximation.

11. Implement the following using Back Tracking

a) 8-Queen's problem

b) Hamiltonian cycle

c) Graph coloring Problem

12. Write a program to

a) Print all the nodes reachable from a given starting node in a digraph using BFS method.

b) Check whether a given graph is connected or not using DFS method.

13. Implement All-Pairs Shortest Paths Problem using Floyd's algorithm. Parallelize this algorithm by creating multiple threads and determine the speed-up achieved.

14. Compare and evaluate the performance of different Randomization and Approximation algorithms

Textbooks									
1	Ellis Horowitz, Sartaj Sahni and Rajasekaran "Fundamentals of Computer Algorithms", Galgotia								
1	Publications, 2nd Edition.								
2	Aho, Hopfcraft and Ullman, Addison Wesley "Design and Analysis of Algorithms",								
3									
4									

References									
1	Thomas Cormen, Leiserson, Rivest, and Stein "Introduction to Algorithms", PHI Publication. 3 rd Edition, 2009								
2	Goodman, "Introduction to Design and Analysis of Algorithm", McGraw Hill.								
3	R.C.T. Lee, S.S. Tseng, R.C. Chang, "Introduction to the Design and Analysis of Algorithm", Tata								
4									
	Useful Links								
1	https://online.stanford.edu/courses/soe-vcsalgorithms1-algorithms-design-and-analysis-part-1								

	CO-PO Mapping													
	Programme Outcomes (PO)										PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1			2											
CO2		3		2										
CO3			3	1										
CO4				2				2	2	2		2		
TT1 /	.1	<u>с ·</u>	• ,	1 .		1 2 2	1 1	т	2 14	1. 2	TT' 1			

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO, and preferably to only one PO.

		Assessment							
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%									
AssessmentBased onConducted byTypical ScheduleMarks									
	Lab activities,		During Week 1 to Week 8						
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30					
	journal		Week 8						
	Lab activities,		During Week 9 to Week 16						
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30					
LA2	journal		Week 16						
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19						
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40					
	performance	applicable	Week 19						
Week 1 indicate	es starting week o	f a semester. Lab activities/	Lab performance shall include performance	rming					
experiments, m	ini-project, preser	ntations, drawings, program	ming, and other suitable activities, a	s per the					
nature and requ	irement of the lab	course. The experimental	lab shall have typically 8-10 experim	ents and					
related activitie	es if any.								

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
				AY 2022-23						
Course Information										
Progr	amme		B.Tech. (Comput	er Science Engineer	ring)					
Class,	Semester		Third Year B. Te	ch., Sem V						
Cours	e Code		5CS352							
Cours	Course Name Programming Laboratory-3									
Desired Requisites: Basics of Object-Oriented Programming										
	Teaching S	Scheme		Examinat	ion Sch	eme (Mar	ks)			
Practi	cal	2 Hrs/ Week	LA1	LA2	Lab 1	ESE		Total		
Intera	oction	-	30	30	40)		100		
					Credits	:1				
			(Course Objectives						
1	to inculca	te understandi	ng of World Wide	Web, Internet, the co	oncepts o	of web app	olicati	ions		
	development and web programming languages.									
2 to introduce selection of appropriate concepts of internet and web programming such as HTML, CSS, JavaScript, and other server-side scripting languages.										
2	to infuse skills of combining different components and technologies to design a web application									
3	³ for real world problem.									
4					T					
At the	and of the	<u>course</u> the stu	donts will be able to	CO) with Bloom's	Taxono	my Level				
At the		course, the stu	dents will be able to	J,		Bloom	's			
CO		Cou	rse Outcome State	ement/s		Taxono Level	my	Bloom's Taxonomy Description		
CO1	summariz developm	the different technologi	t concepts and co es and web security	mponents of WWW	V, web	II		Understanding		
CO2	illustrate	the concepts	of different web	development techn	ologies	III		Applying		
CO3	test the c	omponents of	WWW. HTML ta	gs. CSS properties.	client-					
	side and formats a tools.	server-side pro and AJAX co	pgramming concept mponents using d	ifferent web develo	entation opment	IV		Analyzing		
CO4	classify t client-side representa and meas	he component e and server ation formats, ures.	s of WWW, HTI r-side programmi AJAX components	ML tags, CSS pro ng concepts, web s and web security	perties, o data threats	V		Evaluating		
CO5	build a w different for real w	veb applicatio web developm orld problems	n, individually or ent technologies a using different web	in a team by con nd web security mo development tools	nbining easures	VI		Creating		
			List of Experi	iments / Lab Activi	ities/Top	oics				

Module 1: Introduction to World Wide Web

Client, Server, Communication, Protocols, Ports, Client-Server Architectures, Internet, World Wide Web,

HTTP, HTTP Status Codes, Web Clients/Browsers, and Web Servers.

Experiments:

- 1. Describe client, server, communication, ports, protocols, HTTP, browsers and web servers.
- 2. Distinguish between client and server, Internet, WWW, and client-server architectures.
- 3. Get header information of a web page using browser"s developer mode.
- 4. Installation of web server.

Module 2: Markup Languages and Building Web Pages

Introduction to Markup Languages, Introduction to HTML and HTML5, Fundamental HTML Elements,

HTML Forms, HTML Media, HTML Graphics, HTML APIs, HTML Web Components.

Experiments:

1. Design and develop web pages using fundamental HTML elements, such as head, title, body, header, comment, etc.

2. Design and develop web pages using HTML Formatting elements, such as abbr, address, etc.

3. Design and develop HTML Forms using HTML Form and Input elements, such as form, input, textarea, etc.

4. Design and develop web pages that embed images and client-side maps, audio and video and links, lists and tables.

5. Design and develop web pages with styles, semantics and layouts, such as header, footer, section, data, div, etc.

6. Design and develop web pages to embed YouTube videos, graphics using canvas and SVG.

7. Design and develop web pages using HTML APIs, web components.

Module 3: Style sheet Languages and Presentation of Web Pages

Introduction to style sheet languages, Introduction to Cascading Style Sheet (CSS), Text Formatting, Colours and Backgrounds, Borders and Margins, Floating and Positioning, Page Layout, Navigation Bars and Dropdowns, CSS Selectors.

Experiments:

1. Design and develop web pages by applying CSS text formatting properties, such as Text Alignment,

Text Decoration, Text Transformation, Text Spacing, Text Shadow, Font Family, Font Style, Font Size, etc.

2. Design and develop web pages by applying CSS colors and backgrounds properties, such as colour, RGB, HEX, HSL values, background image, background color, etc.

3. Design and develop web pages by applying CSS borders and margin properties, such as Border Width, Border Color, Margins, etc.

4. Design and develop web pages by applying CSS floating, overflow and positioning properties, such as float, overflow, position, etc.

5. Design and develop web pages by applying CSS page layout properties, such as display, padding, height, width, max-width, align, etc.

6. Design and develop web pages by applying CSS properties to links, lists and tables.

7. Design and develop web pages by using CSS navigation bars and dropdowns.

8. Design and develop web pages by using CSS Selectors.

9. Design and develop web pages by using inline CSS, internal CSS and external CSS.

Module 4: Client-side Programming

JavaScript: Introduction to JavaScript, Basic Syntax, Variables, Data Types, Statements, Operators, Conditions, Loops, Functions, Arrays, Objects, Form Validation, DOM, JavaScript Objects, JavaScript Functions, Asynchronous JavaScript and any one of the state-of-the-art JavaScript libraries.

Experiments:

1. Implement a script using JavaScript that changes HTML content, HTML attributes hides and show HTML elements, HTML output and window alert box for web pages.

2. Implement a script using JavaScript that shows use of JavaScript variables, data types and statements for web pages.

3. Implement a script using JavaScript that shows use of JavaScript Arithmetic, Assignment and String Concatenation operations for web pages.

- 4. Implement a script using JavaScript that shows use of JavaScript conditionals and loops for web pages.
- 5. Implement a script using JavaScript that shows use of JavaScript Functions, Arrays, and Objects for web pages.
- 6. Implement a script using JavaScript that shows use of Asynchronous JavaScript.

7. Design and develop web pages and insert JavaScript in head tag, body tag, external file, external URL and external folder.

8. Implement a script using JavaScript library.

Module 5: Server-side Programming

Introduction to Server-side Programming, Installation of Web and database Server, Process user input, Efficient storage and delivery of information to and from databases, File handling and controlled access to the content, store session/state information, cookies, notifications and communication.

Note:

1. One of the following server-side scripting languages can be used for the implementation: PHP, Node.js, or other state-of-art scripting languages.

2. One of the following databases can be used for data storage and retrieval: MySQL, MongoDB, Firebase or other state-of-art databases.

Experiments:

1. Installation and configuration of web server and database server.

2.Implement basic functionalities of server-side scripting language, such as data types, operators, conditionals, and loops.

- 3. Implement basic functionalities of server-side scripting language, such as objects, arrays, and functions.
- 4. Implement web page form validations using server-side scripting language.
- 5. Implement file handling using server-side scripting language.
- 6. Implement cookies using server-side scripting language.
- 7. Implement sessions using server-side scripting language.
- 8. Implement CRUD operations on database using server-side scripting language.

Module 6: Representation of Web Data, AJAX and Web Security

XML: Introduction to XML, Basics of XML, DTD, Namespaces, XHTML, XPath, XLinks, XQuery and XSLT.

JSON: Introduction to JSON, JSON vs XML, Syntax, Data Types, Parse, Stringify, Objects and Arrays, JSON in HTML.

AJAX: Introduction to AJAX, XMLHttpRequest, AJAX XML, AJAX PHP, and AJAX Database. Web Security: Introduction, types of web threats, and prevention measures.

Experiments:

- 1. Create a XML file and display in the browser.
- 2. Create a XML file with the help of namespaces and display in the browser.
- 3. Create a DTD file and display in the browser.
- 4. Create and display XSLT file using XML and display in the browser.
- 5. Create XSLT file using XPath and XPointer and display in the browser.
- 6. Create a hyperlink using XLinks and display in the browser.
- 7. Create and display JSON files in HTML.
- 8. Create a JSON file using basic concepts and use it in HTML.
- 9. Extract and display the information using XQuery.
- 10. Implement an AJAX Request-Response with server.
- 11. Implement an AJAX Request-Response using PHP.
- 12. Implement an AJAX Request-Response with database.
- 13. Implementing basic security measures in web development.

Textbooks									
1	Jennifer Niederst Robbins, "Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and								
	Web Graphics", O'Reilly Media, 5th Edition, 2018, ISBN-13: 978- 1491960202.								
2	Robin Nixon, "Learning PHP, MySQL & JavaScript with j Query, CSS & HTML5", O"Reilly Media, 5th								
	Edition, 2018, ISBN-13: 978-9352130153								

References								
1	Robert W. Sebesta, "Programming the World Wide Web", Pearson, 8th Edition, 2015, ISBN-							
1	13: 9780133776058							
2	Terry Ann Felke-Morris, "Basics of Web Design: HTML5 & CSS", Pearson, 5th Edition, 2019, ISBN-13:							
	9780133970746							
2	Elliotte Harold, W. Means, "XML in a Nutshell, A Desktop Quick Reference", O'Reilly Media 3rd Edition,							
5	2004, ISBN-13: 9780596007645.							
	Useful Links							
1	https://www.w3schools.com/							
2	https://www.javatpoint.com/							
3	https://developer.mozilla.org/en-US/docs/Web							

	CO-PO Mapping												
	Programme Outcomes (PO)										PSO		
	1 2 3 4 5 6 7 8 9 10 11 12 1										2		
CO1	2	1				1							
CO2	3	2	2	3	3							1	
CO3		3		2	2								
CO4		2		2	3	1							
CO5	CO5 3 2 3 1 3 2												
The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High													
Each CO	O of the	e course	e must 1	map to	at least	one PC), and p	referab	ly to or	nly one	PO.		

	Assessment								
There are three components of lab assessment, LA1, LA2 and Lab ESE.									
IMP: Lab ESE	is a separate head	of passing.(min 40 %), LA	1+LA2 should be min 40%						
Assessment	Based on	Conducted by	Typical Schedule	Marks					
	Lab activities,		During Week 1 to Week 8						
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30					
	journal		Week 8						
	Lab activities,		During Week 9 to Week 16						
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30					
	journal		Week 16						
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19						
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40					
	performance	applicable	Week 19						
Week 1 indicate	es starting week o	f a semester. Lab activities/	Lab performance shall include perfo	rming					

experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Walchand College of Engineering, Sangli										
AY 2022-23										
	Course Information									
Progra	amme		B.Tech. (Compute	er Science Enginee	ring)					
Class,	Semester		Third Year B. Tec	ch., Sem V						
Cours	e Code		5CS345							
Cours	e Name		Mini Project – 1							
Desire	Desired Requisites: Nil									
'	Teaching	Scheme		Examination	Scheme (1	Marks)				
Practi	cal	2 Hrs/ Week	LA1	LA2	Lab I	ESE	Total			
Intera	ction	-	30	30	40)	100			
				Cre	dits: 1					
			C							
1	Towerl	toot design - 1	davalarment to 1	e Objectives						
2	To use la	uest design and	uevelopment tools	and project design	nrincinle	s				
$\frac{2}{3}$	To imple	ment the project	t with appropriate r	programming langu	ages and	testing tools.				
4	To devel	op analytical vis	sion and skills to an	alyse, compare the	outcome	with other tec	hniques.			
		Course	e Outcomes (CO)	with Bloom's Tax	onomy Le	evel	-			
At the	end of the	course, the stud	lents will be able to),						
CO		Com	rsa Autooma Stata	montla		Bloom's	Bloom's			
		Cou	ise Outcome State	anent/s		Level	Description			
C01	Demonst presentat	rate present t ion.	echnological trend	ds through semin	har and	I	Remember			
CO2	Demonst impleme	rate the approp ntation.	priate selection of	software tool for	project	II	Understand			
CO3	Work ir developn	n teams and nent.	participate in gro	oup activity of	software	III	Apply			
<u>CO4</u>	Develop	a software prod	uct and demonstrat	e its significance .		V	Evaluate			
		1	ist of Exponimon	ta / Lab Activition	Topics					
Listof	Topics(A	nnligghla for li	ntersection mode):	is / Lab Activities/	Topics					
	Topics(A									
List of	Lab Acti	vities:								
	 The theme of Mini Project 1 should be based on current or previous semester courses completed, focus should be more on the courses which don't have lab courses. Students should maintain a project log book containing weekly progress of the project At the end of the semester the project group should achieve all the proposed objectives of the problem statement. 									
	 Fine work should be completed in an aspects of design, implementation and testing. Project report should be prepared and submitted in soft and hard form along with all the code and datasets. Group should demonstrate the work with various test cases and results obtained and explain 									
of our should demonstrate the work with various test cases and results obtained and explain future scope.7. The group should participate in technical symposiums, paper presentations to demonstrate their work and findings in technical community.										
			Те	extbooks						
	Nil									
			D	formas						
1	Nil		ĸ							

1 Nil

	CO-PO Mapping													
		Programme Outcomes (PO)										PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2												3	3
CO2	2	3											3	3
CO3		2		3	2								2	
CO4	CO4 2 3 3													
The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High														
Each CO	O of the	e course	e must i	map to	at least	one PC), and p	referab	ly to or	nly one	PO.			

		Assessment							
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%									
Assessment Based on Conducted by Typical Schedule Mark									
	Lab activities,		During Week 1 to Week 8						
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30					
	journal		Week 8						
	Lab activities,		During Week 9 to Week 16						
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30					
	journal		Week 16						
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19						
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40					
	performance	applicable	Week 19						
Week 1 indicate	es starting week o	f a semester. Lab activities/	Lab performance shall include perfo	rming					
experiments, m	ini-project, preser	ntations, drawings, program	ming, and other suitable activities, a	s per the					
nature and requ	irement of the lab	course. The experimental	lab shall have typically 8-10 experim	ients and					
related activitie	es if any.								

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
AY 2022-23										
			Course	Information						
Progra	Programme B.Tech. (Computer Science Engineering)									
Class,	Class, Semester Third Year B. Tech., Sem V									
Cours	Course Code 5CS346									
Cours	e Name		Mini Project – 2							
Desire	Desired Requisites: Nil									
			1							
	Teaching	Scheme		Examination	Scheme (N	Marks)				
Practi	cal	2 Hrs/ Week	LA1			CSE	Total			
Intera	ction	-	30	30	40		100			
				Cre	eaits: 1					
			Cours	o Objectives						
1	Tousela	test design and	development tools	e Onjectives						
2	To use la	go project man	agement techniques	s and project design	n principles	s.				
3	To imple	ement the project	t with appropriate	programming langu	ages and t	testing tools.				
4	To devel	op analytical vi	sion and skills to ar	nalyse, compare the	e outcome	with other te	chniques.			
A ()1	1.6.1	Cours	e Outcomes (CO)	with Bloom's Tax	onomy Le	evel				
At the	end of the	course, the stud	ients will be able to),		Bloom's	Bloom's			
со		Cou	rse Outcome State	ement/s		Taxonomy	Taxonomy			
						Level	Description			
CO1	Demonst presentat	rate present t tion.	echnological tren	ds through semin	nar and	Ι	Remember			
CO2	Demonst impleme	rate the appropriation.	priate selection of	software tool for	project	II	Understand			
CO3	Work ir developn	n teams and nent.	participate in gro	oup activity of	software	III	Apply			
CO4	Develop	a software prod	uct and demonstrat	e its significance.		V	Evaluate			
]	List of Experimen	ts / Lab Activities	Topics					
List of List of	f Topics(A f Lab Acti	pplicable for I vities:	nteraction mode)	:	-					
	 Mini speci Thin task) Study 	Project 2 shoul ific, major focus gs (Preference s). ents should mai	d be on customer s s should be on Mac should give to the c ntain a project log	pecific requiremen hine learning / Ima ourse which are no book containing we	ts useful to age Process of covered i eekly prog	o real life or i sing / Interne in previous M ress of the pr	ndustry t (Web) of Iini Project 1 oject			
	 At the prob The second se	he end of the ser lem statement. work should be	nester the project g completed in all as	roup should achiev pects of design, im	e all the property of the prop	roposed obje	ctives of the			
	 Project report should be prepared and submitted in soft and hard form along with all the code and datasets. Group should demonstrate the work with various test cases and results obtained and explain 									
	6. Group should demonstrate the work with various test cases and results obtained and explain future scope.7. The group should participate in technical symposiums, paper presentations to demonstrate their work and findings in technical community.									
			T	extbooks						
1	Nil									
			Re	eferences						

1	Nil
	Useful Links
1	Nil

	CO-PO Mapping													
	Programme Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2												3	3
CO2	2	3											3	3
CO3		2		3	2								2	
CO4	2										3			3
The stre	The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High													
Each CO	O of the	e course	e must i	nap to	at least	one PC), and p	referab	ly to or	nly one	PO.			

	Assessment									
There are three	There are three components of lab assessment, LA1, LA2 and Lab ESE.									
IMP: Lab ESE	is a separate head	of passing.(min 40 %), LA	1+LA2 should be min 40%							
Assessment	Based on	Conducted by	Typical Schedule	Marks						
	Lab activities,		During Week 1 to Week 8							
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30						
	journal		Week 8							
	Lab activities,		During Week 9 to Week 16							
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30						
	journal		Week 16							
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19							
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40						
	performance	applicable	Week 19							

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
	AY 2022-23									
			С	ourse Informati	on					
Progra	Programme B.Tech. (Computer Science and Engineering)									
Class,	Class, Semester Third Year B. Tech., Sem V									
Cours	e Code		5HS302							
Cours	e Name		Humanities 1: H	Human Relations	at Work					
Desire	d Requis	ites:	Nil							
]	Feaching	Scheme		Examir	nation Scl	neme (Marks	5)			
Practi	cal		LA1	LA2	Lab	ESE	Total			
Intera	ction	3 Hrs/ Week	30	30	2	40	100			
	Credits: 3									
			(Course Objective	es					
1	To incul interacti	cate awareness on with people	of human relation at work.	ns at work its rela	tionship v	vith self and t	he processes involved in			
2	To provi building	ide relevant kno , ethical values	wledge to addres and challenges at	s human relations work	s at work	by exposure t	o personal growth, team			
3	To infus support	e the ability to particular to a shared purpos	positively conside e or goal.	er other's views a	nd to wor	k effectively	with others in team and to			
		Co	urse Outcomes ((CO) with Bloom	n's Taxon	omy Level				
At the	end of the	e course, the stu	dents will be able	e to,						
		C	Ot			Bloom's	Bloom's			
CO		Cours	e Outcome State	ement/s		I axonom	y I axonomy Description			
CO1	Explain	human relations	s including divers	ity, attitudes, self-	-esteem.		Description			
001	and inter	rpersonal skills	important at worl	kplace.	,	II	Understanding			
CO2	O2 Identify the challenges in decision making, team building, ethical values and effects of stress in the workplace.						Understanding			
CO3	CO3 Describe how theories of motivation, team work and human II Understanding Understanding						Understanding			
					· · · ·		· · · · · · · · · · · · · · · · · · ·			
			List of Exper	iments / Lab Act	tivities/To	opics				

List of Topics (Applicable for Interaction mode):

1. Human Relations and Personal Growth

Introduction to Human Relations, Understanding and Managing Yourself and Human Relations, Self-Esteem, Self-Confidence, Self-Motivation and Goal Setting, Emotional Intelligence, Attitudes, Happiness, Values, Ethics, Improving Personal and Organizational Communication, Problem Solving and Creativity.

2. Challenges in Human Relations

Dealing effectively with People, Communication in the Workplace, Specialized tactics for getting along with others in the workplace, Becoming an effective leader, Motivating Others, Diversity and Cross-Cultural Competence. Managing or Resolving Conflict and Dealing with Difficult People, A Life Plan for Effective Human Relations

3. Teamwork

Definition, Importance, Benefits of teamwork, Promoting effective teamwork at workplace, Elements of Teamwork, Team Building.

4. Personal Strategies for improving Human Relations

Staying Physically Healthy: Yoga, Pranayama and Exercise, Motivating Yourself, Improving Interpersonal Relations, Achieving Emotional Balance in a Chaotic world, Finding Your Emotional Balance, Building Stronger Relationships with Positive Energy.

5. Individual Career Management

Staying psychologically healthy: Managing Stress and Personal Problems, Meditation. Developing Career Thrust, Getting Ahead in Your Career, Learning and Developing Individual Strategies, Environmental Awareness, Career Goals, Career Strategies, Career Appraisal, Individual Career Management

6. Measures for Successful Human Relations

Developing Good Work Habits. Responding and managing to work related stress, Self-Improvement Plan, Valuing work load, The changing roles of men and women, Sexual harassment of women at workplace, Respect to employees (men, women and transgender).

	Textbooks
1	Shiv Khera, (2014), You Can Win, New edition published by Bloomsbury 2014.
2	John Adair, (2007), The Art of Creative thinking, Kogan Page, Britain and United States.
3	Mathew Allen, (2004), Smart Thinking (2 nd edition), Oxford University Press.
4	
	References
1	Greenberg, J. S. (2017). Comprehensive stress management (14th edition). New York: McGraw Hill
C	Dubrien, A. J. (2017). Human Relations for Career and Personal Success: Concepts, Applications and
2	Skills, (11 th edition) Upper Saddle River, NJ: Pearson.
3	Alder Ronald B, (2010), Communicating at Work, (10th edition), New York: McGraw Hill
4	
	Useful Links
1	u
2	https://www.youtube.com/watch?v=HkP5VWCxcP0
3	https://www.youtube.com/watch?v=WfWgThjXpXo
4	https://www.youtube.com/watch?v=B7T5rITvMJY
5	https://www.youtube.com/watch?v=4duPBWzf46E
6	https://www.youtube.com/watch?v=KWpGEj2dSR0
7	https://www.youtube.com/watch?v=r8LJ5X2ejqU
8	https://www.youtube.com/watch?v=o1UwpMoHILQ
9	https://www.youtube.com/watch?v=RSlc9IxdBw8
10	https://www.youtube.com/watch?v=cDHGpfpw9kY&list=PLxNHpNhDaEFITDZXhEdybTxMOeh206-
10	Nb

	CO-PO Mapping													
	Programme Outcomes (PO) PSO													
	1	1 2 3 4 5 6 7 8 9 10 11 12 1 2												
CO1							2			2				
CO2								2	3					
CO3	CO3 3													
The stre	ength of	fmappi	ng is to	be wri	tten as	1,2,3; v	where, 1	l: Low,	2: Med	lium, 3	: High			
	0 04				. 1 .	DC	\ 1	C 1	1 /	1	DO			

Each CO of the course must map to at least one PO, and preferably to only one PO.

Assessment												
There are three	There are three components of lab assessment, LA1, LA2 and Lab ESE.											
IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%												
Assessment	Assessment Based on Conducted by Typical Schedule Marl											
	Lab activities,		During Week 1 to Week 8									
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30								
	journal		Week 8									
	Lab activities,		During Week 9 to Week 16									
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30								
	journal		Week 16									
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19									
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40								
	performance	applicable	Week 19									
Week 1 indicate	es starting week o	f a semester. Lab activities/	Lab performance shall include perfo	rming								
experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the												
nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and												
related activitie	es if any.											

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)												
	AY 2022-23												
			Course	2022-23									
Drogr	ommo		B Tech (Comput	ar Science and Engineer	ing)								
Close	Somester		D. Tech. (Comput	ah Sam V	ing)								
Class,	Semester		5CS211										
Cours	e Code		Elective 1. Image	Duccoccina									
	$\frac{e \text{ Name}}{1 \text{ D}}$	4	Elective 1: Image		• ``								
Desire	d Requisi	tes:	B.Tech. (Comput	er Science and Engineer	1ng)								
	T 	C - h	Examination Scheme (Marks)										
Tester	Teaching	Scheme	MCE	Examination Schem	e (Marks)	T-4-1							
Lectur	re	3 Hrs/week	MSE		ESE	100							
lutor		-	30		50	100							
				Credits: 3									
			<u> </u>	Objection									
1	T. 1	6	Course	Objectives									
	To learn	the concents of	digital image proce	essing	omprossion at	and apply the							
2	algorithn	compression en	and apply the										
3	To comp	on.											
4	To creat	To create initial background of the area of Image Processing to excel in this stream for further											
5	To develop engineering skills and intuitive understanding of the tools used in Image												
	10 00 01	Course	Outcomes (CO) w	vith Bloom's Taxonomy	Level	<u>, </u>							
At the	end of the	course, the stud	lents will be able to),									
со		Course	e Outcome Statem	nent/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description							
CO1	Discuss g	general terminol	ogy of digital imag	ge processing.	II	Understanding							
CO2	Apply an	nd demonstrate	image processing	algorithms in practical	III	Applying							
CO3	Illustrate	and critique	different techniqu	ies employed for the		Evaluating							
	enhancer	nent, segmenta	tion, morphology	and compression of	V								
	images												
Modu	ıle		Module C	Contents		Hours							
Ι	Digi Intro Con Digi Sam image	ital Image Fund oduction and aponents of Imagital Image Fund apling and Quan- es	applications, F applications, F ge Processing Syste lamentals: Image A tization, Imaging C	fundamental Steps an em Acquisition, A simple ir Geometry, Different types	nd nage model, s of digital	6							
п	Ima 2D sy Unita	ge Transforms ystems and Nec ary Transforms, 2	essary Mathematic KL-Transforms, Ha	cal preliminaries, 2D Or adamard Transforms	thogonal and	6							
III	Ima Point Spatia	ge Enhanceme Processing, Ba al domain Filter	nt sic Gray Level Tra ing, Frequency dor	6									
IV	Ima Edg dete Bou Segi regio	ge Segmentation e Detection – us ctor, ndary Extraction mentation – n growing, region	on and Analysis sing first and secon n – Connectivity, H on splitting and men	d order derivatives, LoG Heuristic Graph Search, I rging, Feature Extraction	, Canny edge Region-based	8							

	Morphological Image Processing	
	Mathematical Morphology, Erosion and Dilation, Opening and Closing,	
V	Hit-or-Miss transformation, Basic morphological algorithm: Boundary	7
	extraction, Hole filling, Extracting of	/
	connected components. Thinning, Thickening	
	Image Compression	
	Fundamentals, Compression model, Lossless Vs Lossy	
VI	Compression, Fundamentals of Information Theory, Run-length coding,	
	Huffman coding, Dictionary-based compression, Image Compression	6
	Standards	0
	Textbooks	
1	R. C. Gonzalez, R. E. Woods, Digital Image Processing, 4th Edition. 2018, PH	I
2	A. K. Jain, Fundamentals of Digital Image Processing, PHI	
	References	
1	Milan Sonka, Vaclav Hlavac, Boyle, Digital Image Processing and Computer	Vision, Cengage
1	Learning	
2	S. Jayaraman, S. Esakkirajan, T. Veerkumar, Digital Image Processing, Tata M	cGrawHill
2	Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, Digital Image Proc	essing Using
5	MATLAB, 2nd ed.	
	Useful Links	
1	NPTEL course: Link	
2	NPTEL course: Link	

CO-PO Mapping															
	Programme Outcomes (PO)													PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1		2													
CO2	3		2												
CO3	1			2											
CO4															
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High															
Each CO	Each CO of the course must map to at least one PO.														

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

		Walc	hand College (Government Aidea	of Engineering, San Autonomous Institute)	gli								
AY 2022-23 Course Information													
	Course Information												
Programme B.Tech. (Computer Science and Engineering)													
Class, Semester Third Year B. Tech., Sem V													
Course Code 5CS312													
Course Name Elective 1: Artificial Intelligence and Machine Learning													
Desire	d Requisi	tes:											
Desireu Requisites:													
	Teaching	Scheme		Examination Scheme	(Marks)								
Lectu	re	3 Hrs/week	MSE	ISE ISE	ESE SE	Total							
Tutor	iol	J IIIS/ WEEK	30	20	100								
1 0101	141	-	50	Credita: 2	50	100							
				Creans: 5									
			0										
			Course	Objectives	•								
1	To acquaint students with the meaning, purpose, scope, stages, applications, and effects of AI												
2	2 To share the basic tasks and algorithms in Machine Learning												
3	To provid	le understanding	g of how system lea	arns in supervised learning	3								
4	To under	stand how mach	ine learning algori	thms works for real life pr	oblems								
<u> </u>	and of the	Course	Outcomes (CO) w	ith Bloom's Taxonomy I	Level								
At the	end of the	course, the stud	ents will be able to	,	Dloom's	Dloom's							
CO		Cours	e Outcome Stater	nent/s	DIUUIII S Tayonomy	Diooin's Taxonomy							
		Cours	e Outcome Staten	iiciiu s	Level	Description							
CO1	Explain f	undamental con	cepts and challenge	es in AI and ML	II	Understand							
CO2	Create re	presentations o	of the domain of i	nterest and reason with	TTT	Apply							
	these rep	resentations			111								
CO3	Apply se	arch methods th	at agents can emplo	oy for problem solving.	III, IV	Apply, Analyze							
CO4	Recreate	machine learni	ng algorithms to	solve real life problems		Create,							
	and comp	oare the results		-	V1, 1V	Analyze							
Modu	ıle		Module (Contents		Hours							
I	Intro Introc State Branc	duction luction, Reinfo space search, 1 ch & Bound, A*	rcement learning Heuristic Search, , Admissibility of A	, Intelligent agents, Seard Backtracking, Finding O A*, A9 Algorithm.	ch Strategies- ptimal Paths:	7							
II	Branch & Bound, A*, Admissibility of A*, A9 Algorithm. Supervised Learning Machine Learning Paradigms, Predictive Modelling- Classification & II Regression, Classification types, Classification Algorithms- Decision Trees, Naïve Bayes, Support Vector Machine, Neural Networks, Performance metrics Handling Imbalanced Datasets												
III	Know Introc Forwa	v ledge Represe luction to Forma ard Chaining, Pi	ntation & Reasoni al Logics, Propositi ogramming in a Ru	ing onal Logic, Syntax, Sema ule Based language.	ntics,	6							
IV	Regro Linea Multi invert regula	ession r Regression wi ple Variables, ibility, Logisti arization, Perfor	th One Variable, C Polynomial Re c Regression, Im mance measures.	Gradient Descent, Gradien egression, Normal Equipact of scaling, learni	t Descent for ation Non- ng rate and	7							

V	Unsupervised Learning Unsupervised Learning: Introduction, K-Means Algorithm, Optimization Objective, Random Initialization, Choosing the Number of Clusters, KNN Clustering Algorithm, Dimensionality Reduction with PCA.	6
VI	Game Playing Game Theory, Board Games and Game Trees, Algorithm Minimax, AlphaBeta and SSS*, Automated Planning: Domain Independent Planning, Blocks World, Forward & Backward Search, Goal Stack Planning, Plan Space Planning	6
	Textbooks	
1	Bell J., "Machine Learning Hands-On for Developers and Technical Profess 2015	ionals", Wiley
2	Mitchell T. M., "Machine Learning", MGH	
3	Marsland S., "Machine Learning: An Algorithmic Perspective", Chapman & edition 2014.	Hall/CRC, 2 nd
4	Khemani D., "A First Course in Artificial Intelligence", McGraw Hill Education	(India), 2013.
		· · · · ·
	References	
1	Khemani D., "Artificial Intelligence: Knowledge Representation and Reasoning Lecture Notes.	", IIT Madras,
	Useful Links	
1	Artificial Intelligence: Knowledge Representation and Reasoning Course on NPT	TEL: Link
2	Introduction to Machine Learning Course on NPTEL: Link	
3	Machine Learning Course on CourseEra: Link	
4	Artificial Intelligence Search Methods for Problem Solving Course on NPTEL: I	Link

	CO-PO Mapping														
	Programme Outcomes (PO)													PSO	
	1	1 2 3 4 5 6 7 8 9 10 11 12 1 2													
CO1	1												1		
CO2		2												2	
CO3			2										2		
CO4			2												
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High															
Each CO of the course must map to at least one PO.															

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

Assessment

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

		Walc	hand College	of Engineering, San	ngli								
	(Government Aided Autonomous Institute) AY 2022-23												
	A 1 2022-25 Course Information												
			Course	Information									
Progra	amme		B.Tech. (Comput	ter Science and Engineeri	ng)								
Class,	Semester		Third Year B. Te	'hird Year B. Tech., Sem V									
Cours	e Code		5CS313										
Cours													
Desire	d Requisi	tes:	Basic programm	ing knowledge									
Lectu	re	3 Hrs/week	MSE	ISE	ESE	Total							
Tutor	ial	_	30	20	50	100							
				Credits: 3									
				Creation of									
			Course	Objectives									
1	To illustr	ate the basic con	ncepts of Internet of	of Things.									
2	To demo	nstrate working	of Ardino and Ras	pberry pi.									
3	To devel	op the skill of p	oviding solution for	or real life problem using	IOT.								
		Course	Outcomes (CO) w	vith Bloom's Taxonomy	Level								
At the	end of the	course, the stud	ents will be able to),									
со		Bloom's Taxonomy Level	Bloom's Taxonomy Description										
CO1	1 Explain how to design and develop Applications in IOT.												
CO2	To Illusti	rate how IOT de	vices works		III	Apply							
CO3	To acces	s different opera	tions using IOT ap	plications.	V	Evaluate							
CO4	To produ	ce a program to	solve a real-world	problem.	VI	Create							
Modu	le		Module	Contents		Hours							
I	Intro Introc Techi	duction to Inte luction, Physica nology.	rnet of Things al design of IOT, 1	Logical Design of IOT,	IOT Enabling	07							
П	IOT a Basic to Ma	and Communic s of Networking achine Commun	cation Protocols g, Communication ications	Protocols, Sensor Netwo	rks, Machine-	06							
III	Inter Introc Introc	operability in I luction to Ardu luction to Raspl	oT ino Programming, perry Pi, Implemen	Introduction to Python tation of IoT with Raspbe	programming, erry Pi.	06							
IV	Data Apacitime	Analytics for I he Hadoop, Apa Data analysis.	OT ache Oozie, Apach	ne Spark, Using Apache	Storm for real	06							
V	Indus Introc Platfo	s trial IoT luction to IIOT orm	, AWS-IOT, Intro	duction to Lora-wan, No	de MCU IOT	07							
VI	Doma Home Agric	ain Specific IO' e Automation, culture, Industry	T Case Studies Smart Cities, Er Health and Lifest	nvironment, Energy, Re yle.	tail, Logistic,	07							
				4									
1	0.35	A 34 11 1		ktbooks									
	S. M1	sra, A. Mukherj	ee, and A. Roy, 20	120 . Introduction to 10° .	amoriage Univ	of Things and							
2	Indus	try 4.0. CRC Pr	ess.			or rnings and							

	References										
	1	Arashdeep Bahga, Vijay Madisetti Internet of Things an Hands on Approach, University Press.									
ĺ		Useful Links									
ſ	1	https://onlinecourses.nptel.ac.in/noc21_cs17									

CO-PO Mapping														
	Programme Outcomes (PO)													50
	1 2 3 4 5 6 7 8 9 10 11 12 1 2													
CO1		3	3										2	
CO2	1		2										2	
CO3	3	3	2										2	
CO4		2	1										2	
The street	ath of n	nonnin	a ia ta l	a minite	on og 1	I am	2. Mad	in 2.	ILinh					

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)								
			AY 2022-23						
	Course Information								
Progra	amme		B.Tech. (Computer Science and Engineerin	ıg)					
Class.	Semester		Third Year B. Tech., Sem V	6,					
Cours	e Code		5CS314						
Cours	o Nomo		Flective 1: Computer Graphics						
Doging	d Doguiai	toge	Elective 1. Computer Oraphies $C/C + Programming Data Structures & Ei$	lag Lava Drogr	ammina				
Desired Requisites.									
	T I. !	C - L	E						
.	Teaching	Scheme	Examination Scheme	(Marks)					
Lectur	re	3 Hrs/week	MSE ISE	ESE	Total				
Tutori	ial	-	30 20	50	100				
			Credits: 3						
			Course Objectives						
1	To introc	luce the use of the	ne components of a graphics system and becc	ome familiar w	ith building				
-	approach	of graphics sys	tem components and algorithms related with	them.					
2	To learn	the basic princip	bles of 3- dimensional computer graphics						
3	Provide a	an understanding	g of how to scan convert the basic geometrica	al primitives, h	ow to				
	transform	the shapes to f	It them as per the picture definition.		alianing and				
4	provide a	in understanding	g of mapping from world coordinates to device	ce coordinates,	chipping, and				
	To be ab	le to discuss the	application of computer graphics concepts in	the developm	ent of				
5	computer	games inform	application of computer graphics concepts in ation visualization and business applications	i the developin					
	To comp	rehend and anal	vze the fundamentals of animation, virtual re	ality, underlyi	ıσ				
6	technolog	gies, principles,	and applications.		-0				
	,,	Course	Outcomes (CO) with Bloom's Taxonomy I	Level					
At the	end of the	course, the stud	ents will be able to,						
				Bloom's	Bloom's				
CO		Cours	e Outcome Statement/s	Taxonomy	Taxonomy				
		(1 C 1 ()		Level	Description				
$\frac{COI}{CO2}$	Perceive	ifferent transfor	a concepts of Computer Graphics						
C02	Execute	2D Clipping Ale	mation algorithms.		Apply				
C03	Appraise	acquired trans	formations with projection using modern	111	Apply				
0.04	tools	acquired trans	formations with projection using modern	IV	7 mary 20				
CO5	Rehash t	echnique of con	nputer animation and its relationship with	T X 7	Analyze				
	image an	d storage		IV	2				
Modu	ıle		Module Contents		Hours				
	Intro	duction to con	nputer Graphics Definition, Input and ou	tput Devices,					
	Intro	luction to grap	phics primitives such as points, lines, po	olygons, etc.;					
I I	repre	sentation of pic	tures using primitives; storage & retrieval	l of pictures;	6				
-	Raste	rization technic	ques: Line – DDA; Bradenham''s genera	lized integer	0				
	versi	on; Mid-point ra	asterization. Circle – Bradenham ^w s algorithm	m; Mid-Point					
		nd 3D introduce	tion 2D Scan conversion & polygon filling:	Activo Edgo					
	List (vbucket) scan o	non 2D Scall conversion & polygon mining: onversion of lines & polygons: Edge _fill_s	ximple Seed					
	fill 2	s Scan —line	seed _fill algorithms 2D Geometric tra	nsformations.					
п	Intro	auction to repr	esentation of 2D objects as matrices tr	ansformation	7				
	matri	ces for scaling.	shear, rotation, reflection 3D Geometric tra	nsformations:					
	Intro	luction to repr	esentation of 3 D objects as matrices; the	ransformation					
	matri	ces for scaling, s	shear, rotation, reflection						

III	2D Clipping Clipping against regular window – Explicit line clipping; Sutherland & Cohen line clipping, Mid-point subdivision line clipping; Sutherland & Hodgemann polygon clipping	5
IV	Projection Introducing the idea of projecting 3D object on to 2D plane; broad classification – parallel & perspective projection; different types of parallel projection & examples of each; formal definition of 3D to 2D projection and derivation of projection matrix; 1-point, 2-point & 3-point perspective projection; formal derivation of vanishing point(s) and physical implication of the same.	5
V	Computer Animation Introduction , Key frame animation, Construction of an animation sequence, Motion control methods, Procedural animation, Keyframe animation vs. Procedural animation, Introduction to Morphing, Wraping techniques, Three dimensional morphing.	7
VI	Image Manipulation and Storage What is an Image? Digital image file formats, Image compression standard – JPEG, Image Processing - Digital image enhancement, contrast stretching, Histogram Equalization, smoothing and median Filtering	6
	Textbooks	
1	"Mathematical Elements for Computer Graphics", David F. Rogers, J Alan, A 2nd Edition	dams, TMGH,
2	"Procedural Elements for Computer Graphics", David F. Rogers, TMGH, 2nd Ed	lition
3	"Interactive Comp. Graphics, A Top-Down Approach using OpenGL", E Pearson, 5 th Edition	dward Angel,
	References	
1	Procedural Elements for Computer Graphics by David F.Rogers, TMH publication	on
2	Mathematical Elements for Computer Graphics by David F. Rogers and J. A. Publication	Adams, TMH
3	Computer Graphics, principles & practices by J.D. Foley, A. van Dam, S.K. I Huges, Addison Wesley	Feiner and J.F.
4	Computer Graphics, C version, by D. Hearn and M.P. Baker, Pearson Education	
5	Computer Graphics, a programming approach, by S. Harrington, TMH publication	on
6	Computer Graphics by A.N. Sinha and A.D. Udai, TMH publication	
	Useful Links	
	https://www.geekstorgeeks.org/	
$\frac{2}{2}$	https://nptel.ac.in/courses/106/106/106/06090/	V1.
3	nttps://www.youtube.com/playlist?list=PLcZUy0j06PrGTnQUDUfucj6pG5alC4	KIO

	CO-PO Mapping													
		Programme Outcomes (PO)											PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	2	-	-	-	-	-	-	-	-	-	-	1	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-	1	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-
CO4	1	2	2	-	3	-	-	-	-	-	-	-	-	-
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High														
Each CO	of the c	course	must m	ap to at	t least o	one PO.								

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)							
			AY	2022-23				
			Course 2	Information				
Progra	amme		B.Tech. (Comput	er Science and Engineerin	ng)			
Class,	Semester		Third Year B. Te	ch., Sem V				
Cours	e Code		5CS316	· · · · · · · · · · · · · · · · · · ·				
Cours	e Name		Elective 1: MOO	C on Introduction to Gam	e Theory and N	Mechanism		
			Design		2			
Desire	d Requisi	tes:	Basic knowledge	of probability, algorithms	and (very bas	sic)		
	1		computational co	,				
				1 2				
	Teaching	Scheme		Examination Scheme	(Marks)			
Lectu	re	3 Hrs/week	MSE	ISE	ESE	Total		
Tutor	ial	_	30	20	50	100		
				Credits: 3				
		1	1					
			Course	Objectives				
	To provi	le a foundation	of game theory to l	nelp students apply game	heory to probl	em solving in		
1	a rigorou	s way.	0	1 1190	5 1	8		
2	To get in	sights of applica	ations of game theo	ry in social decision maki	ng.			
		Course	Outcomes (CO) w	ith Bloom's Taxonomy	Level			
At the	end of the	course, the stud	lents will be able to),				
		C	O -4		Bloom's	Bloom's		
0		Cours	se Outcome Stater	nent/s	I axonomy	Laxonomy Description		
CO1	To Identi	fy and explain a	common game theo	ry concepts	II	Understand		
CO2	To desig	n interactions	between agents in	order to achieve good		Apply		
	social ou	tcomes.	C	U	111			
CO3	To desig	n and analyse o		eoretic solutions to solve real-world				
	It design and analyse game theoretic solutions to solve real-world IV							
	problems		ame theoretic solu	tions to solve real-world	IV	Analyze		
Modu	lle		Ame theoretic solu	tions to solve real-world	IV	Analyze Hours		
Modu	le Intro	duction to Gan	Module (me Theory	tions to solve real-world Contents f abase theorem normal f	IV	Analyze Hours		
Modu	le Intro	duction to Gan	Module (Module (ne Theory le of chess, proof o uilibrium Maxmi	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination	IV orm games	Analyze Hours 07		
Modu	lle Introd Strate	duction to Gan luction, the gam nance, Nash ec gies, preservati	Ame theoretic solu Module The Theory are of chess, proof o pulibrium, Maxmi on of pure Nash	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n	IV orm games of dominated natrix games,	Analyze Hours 07		
Modu	lle Intro Domi strate relation	duction to Gan luction, the gam nance, Nash ec gies, preservati	Module (Module (ne Theory te of chess, proof o quilibrium, Maxmi on of pure Nash min and PSNE in p	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n matrix games	IV orm games of dominated natrix games,	Analyze Hours 07		
Modu	Ile Intro Intro Domi strate relative Mixe	duction to Gan luction, the gam nance, Nash ec gies, preservati on between max d strategies	Ame theoretic solu Module The Theory are of chess, proof o quilibrium, Maxmi on of pure Nash min and PSNE in t	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n matrix games	IV orm games of dominated natrix games,	Analyze Hours 07		
Modu	lle Intro Intro Domi strate relati Mixe Mixe	duction to Gan luction, the gam nance, Nash ec gies, preservati on between max d strategies d strategies, mi	Ame theoretic solu Module (ne Theory le of chess, proof o juilibrium, Maxmi on of pure Nash min and PSNE in p xed strategy Nash	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n matrix games equilibrium (MSNE), fin	IV orm games of dominated natrix games, nding MSNE,	Analyze Hours 07		
Modu I II	Ile Intro Intro Domi strate relati Mixe MSN	duction to Gan luction, the gam nance, Nash ec gies, preservati on between max d strategies d strategies, mi E characterizatio	Module (Module (me Theory le of chess, proof o juilibrium, Maxmi on of pure Nash min and PSNE in r xed strategy Nash on theorem, algorit	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n matrix games equilibrium (MSNE), fin hm to find MSNE	IV orm games of dominated natrix games, nding MSNE,	Analyze Hours 07 06		
Modu I II	Ile Intro Intro Domi strate relati Mixe MSN Corre	duction to Gan luction, the gam nance, Nash ec gies, preservati on between max d strategies d strategies, mi E characterization lated equilibriu	Module (Module (me Theory le of chess, proof o juilibrium, Maxmi on of pure Nash min and PSNE in m xed strategy Nash on theorem, algorit m (CE), computin s of subgame perfe	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n matrix games equilibrium (MSNE), fin hm to find MSNE g CE, extensive form gan ct Nash equilibrium	IV orm games of dominated natrix games, nding MSNE, mes, subgame	Analyze Hours 07 06		
Modu I II	Ile Intro Intro Domi strate relati Mixe MSN Corre perfe Exter	duction to Gan luction, the gam nance, Nash ec gies, preservati on between max d strategies d strategies, mi E characterization lated equilibriu ction, limitation	Module (Module (me Theory le of chess, proof o juilibrium, Maxmi on of pure Nash min and PSNE in r xed strategy Nash on theorem, algorit m (CE), computin s of subgame perfe mes	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n matrix games equilibrium (MSNE), fin hm to find MSNE g CE, extensive form gan ct Nash equilibrium	IV orm games of dominated natrix games, nding MSNE, mes, subgame	Analyze Hours 07 06		
Modu I II	Ile Intro Intro Domi strate relati- Mixe Mixe MSN Corre perfe Exter Imper	duction to Gam luction, the gam nance, Nash ec gies, preservati on between max d strategies d strategies, mi E characterization lated equilibriu ction, limitation nsive Form Gam	Module Module Module me Theory he of chess, proof o juilibrium, Maxmi on of pure Nash min and PSNE in the xed strategy Nash on theorem, algorith m (CE), computing s of subgame perfences nes n extensive form	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n matrix games equilibrium (MSNE), fin hm to find MSNE g CE, extensive form gan ct Nash equilibrium games (IIEFG), strategie	IV orm games of dominated natrix games, nding MSNE, nes, subgame es in IIEFGs,	Analyze Hours 07 06		
Modu I II III	Ile Intro Intro Domi strate relati Mixe MSN Corre perfe Exter Imper equiv	duction to Gan luction, the gam nance, Nash ec gies, preservati on between max d strategies d strategies, mi E characterization lated equilibriu ction, limitation nsive Form Gan fect informatio alence of strateg	Module (Module (me Theory me of chess, proof o quilibrium, Maxmi on of pure Nash min and PSNE in mark xed strategy Nash on theorem, algorit m (CE), computin s of subgame perfe mes n extensive form gies in IIEFGs, perf	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n matrix games equilibrium (MSNE), fin hm to find MSNE g CE, extensive form gan ct Nash equilibrium games (IIEFG), strategie fect recall	IV Dorm games of dominated natrix games, anding MSNE, mes, subgame es in IIEFGs,	Analyze Hours 07 06 06		
Modu I II III	Ile Intro Intro Domi strate relati- Mixe Mixe MSN Corre perfe Exter Imper equiv Equil	duction to Gan luction, the gam nance, Nash ec gies, preservati on between max d strategies d strategies, mi E characterization lated equilibriu ction, limitation nsive Form Gan fect information alence of strategies	Module Module Module me Theory le of chess, proof o juilibrium, Maxmi on of pure Nash min and PSNE in the xed strategy Nash on theorem, algorit m (CE), computin s of subgame perfe nes n extensive form gies in IIEFGs, perf G, game theory in	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n matrix games equilibrium (MSNE), fin hm to find MSNE g CE, extensive form gan ct Nash equilibrium games (IIEFG), strategie fect recall n practice: P2P file shar	IV orm games of dominated natrix games, nding MSNE, nes, subgame es in IIEFGs, ng, Bayesian	Analyze Hours 07 06 06		
Modu I II	Ile Intro Intro Domi strate relati Mixe Mixe MSN Corre perfe Exter Imper equiv Equil game	duction to Gam luction, the gam nance, Nash ec gies, preservati on between max d strategies d strategies, mi E characterization lated equilibriu ction, limitation nsive Form Gam fect informatio alence of strategi ibrium in IIEFO	Module (Module (ne Theory le of chess, proof o juilibrium, Maxmi on of pure Nash min and PSNE in the xed strategy Nash on theorem, algorither m (CE), computinne s of subgame perference nes n extensive form gies in IIEFGs, perform gies in IIEFGs, perform tility in Bayesian generation	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n matrix games equilibrium (MSNE), fin hm to find MSNE g CE, extensive form gan ct Nash equilibrium games (IIEFG), strategies fect recall n practice: P2P file shar- games, equilibrium in Bay	IV orm games of dominated natrix games, nding MSNE, nes, subgame es in IIEFGs, ng, Bayesian esian games	Analyze Hours 07 06 06		
Modu I II III	Ile Intro Intro Intro Domi strate relati Mixe Mixe MSN Corre perfe Exter Imper equiv Equil game Basic	duction to Gan luction, the gam nance, Nash ec gies, preservati on between max d strategies d strategies, mi E characterization lated equilibriu ction, limitation nsive Form Gan fect informatio alence of strategi ibrium in IIEF s, strategy and u mechanism de	Module (Module (ne Theory le of chess, proof o juilibrium, Maxmi on of pure Nash min and PSNE in r xed strategy Nash on theorem, algorit m (CE), computin s of subgame perfe nes n extensive form gies in IIEFGs, perf G, game theory in ttility in Bayesian g sign anism design rays	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n matrix games equilibrium (MSNE), fin hm to find MSNE g CE, extensive form gan ct Nash equilibrium games (IIEFG), strategie fect recall n practice: P2P file shar games, equilibrium in Bay lation principle introduct	IV Drm games of dominated natrix games, nding MSNE, nes, subgame es in IIEFGs, ng, Bayesian esian games ion and proof	Analyze Hours 07 06 06		
Modu I II III	Ile Intro Intro Domi strate relativ Mixe Mixe MSN Corre perfe Exter Imper equiv Equil game Basic Intro of Ar	duction to Gam luction, the gam nance, Nash ec gies, preservati on between max d strategies d strategies, mi E characterization lated equilibriu ction, limitation nsive Form Gam fect informatio alence of strategi ibrium in IIEFo s, strategy and u mechanism de luction to mech row's impossibi	Module (Module (me Theory te of chess, proof o juilibrium, Maxmi on of pure Nash min and PSNE in mark xed strategy Nash on theorem, algorit m (CE), computin s of subgame perfe mes n extensive form gies in IIEFGs, perf G, game theory in tility in Bayesian g sign anism design, reve lity result, introduc	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n matrix games equilibrium (MSNE), find hm to find MSNE g CE, extensive form gar ct Nash equilibrium games (IIEFG), strategies fect recall n practice: P2P file shart games, equilibrium in Bay lation principle, introduct strategies to social choice seture	IV orm games of dominated natrix games, nding MSNE, nes, subgame es in IIEFGs, ng, Bayesian esian games ion and proof	Analyze Hours 07 06 06		
Modu I II III	Ile Intro Intro Domi strate relati Mixe Mixe MSN Corre perfe Exter Imper equiv Equil game Basic Intro of Ar	duction to Gan luction, the gam nance, Nash ec gies, preservati on between max d strategies d strategies, mi E characterization lated equilibriu ction, limitation nsive Form Gan fect informatio alence of strategi ibrium in IIEF s, strategy and u mechanism de luction to mech row's impossibi luction and pro	Module (Module (ne Theory te of chess, proof o puilibrium, Maxmi on of pure Nash min and PSNE in re- xed strategy Nash on theorem, algorit m (CE), computin s of subgame perference nes n extensive form gies in IIEFGs, perfect G, game theory in tility in Bayesian generation sign anism design, rever lity result, introductor of of Gibbard-Satt	tions to solve real-world Contents f chess theorem, normal for n strategies, elimination equilibrium (PSNE), n matrix games equilibrium (MSNE), fin hm to find MSNE g CE, extensive form gan ct Nash equilibrium games (IIEFG), strategie fect recall n practice: P2P file shar games, equilibrium in Bay lation principle, introduct ettion to social choice setup terthwaite theorem, doma	IV Drm games of dominated hatrix games, hding MSNE, mes, subgame es in IIEFGs, ng, Bayesian esian games ion and proof in restriction.	Analyze Hours 07 06 06 06		

v	More mechanism design and auction theory Task sharing domain, uniform rule, mechanism design with transfers, examples of quasi-linear preferences, Pareto optimality and Groves payments Introduction to VCG mechanism, VCG in Combinatorial allocations, applications to Internet advertising, slot allocation and payments in position auctions, pros and cons of VCG mechanism	07								
VI	Optimal mechanism design Affine maximizers, single object allocation, Myerson's lemma, optimal mechanism design Single and multi-agent optimal mechanism design, examples of optimal mechanisms	07								
	Textbooks									
1	Game Theory" — Michael Maschler, Eilon Solan, Shmuel Zamir									
2	"Multiagent Systems" — Y. Shoham and K. Leyton Brown, Cambridge Un online copy available	iversity Press,								
	References									
1	"Game Theory and Mechanism Design" — Y. Narahari, World Scientific an Indian edition available	d IISc Press –								
2	Martin J. Osborne, An Introduction to Game Theory, Oxford University Press, 20	003.								
	Useful Links									
1	https://onlinecourses.nptel.ac.in/noc22_cs77/preview									

	CO-PO Mapping													
	Programme Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1		3										2	
CO2	1	2	2										2	
CO3	2	3	2										2	
CO4	1		3										2	
The stren	The strength of mapping is to be written as 1: Low, 2: Medium, 3: High													
Each CO	of the c	course	must m	ap to at	t least o	one PO.								

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
	AY 2022-23									
Course Information										
Progra	amme		B.Tech. (Comput	er Science and Eng	ineering)					
Class, Semester Third Year B. Tech., Sem V										
Cours	e Code		5CS353							
Cours	e Name		Elective 2 Lab: Ir	nage Processing La	ıb					
Desire	d Requisi	tes:								
r	Teaching	Scheme		Examination	Scheme (Marks)				
Practi	cal	2 Hrs/ Week	LA1	LA2	Lab I	ESE	Total			
Intera	ction	-	30	30	40)	100			
				Cre	dits: 1	I				
			Cours	e Objectives						
1	To share	in-depth knowl	edge of the course							
2	To delive	er hand-on expe	rience in the field							
3	To inculo	cate interest in d	ifferent domain are	eas						
		Course	e Outcomes (CO)	with Bloom's Tax	onomy Lo	evel				
At the	end of the	course, the stud	lents will be able to),	1					
		-				Bloom's	Bloom's			
CO		Cour	rse Outcome State	ement/s		Taxonomy	Taxonomy			
COL	P	•	1	•		Level	Description			
CO1	Demonst theoretic	rate various to al knowledge ga	echniques of ima ained.	ige processing re	lated to	III	Applying			
CO2	To analy	se and compare	the results of vario	ous algorithms		IV	Analysing			

List of Experiments / Lab Activities/Topics

List of Topics(Applicable for Interaction mode):

List of Lab Activities:

Lab sessions are to be utilized for problem solving/designing/implementation, to ensure that students have properly learnt the topics covered in the theory course. From below at least 10-12 assignments should be taken

- 1. Implement and apply different types of image transforms : scaling, rotation, transformation
- 2. Applying and analysing result of different image processing techniques: thresholding, contrast stretching.
- 3. Application of histogram equivalization technique
- 4. Implement image enhancement technique: Unsharp masking
- 5. Implement image enhancement technique: High boost filtering
- 6. Apply Different edge detection techniques: (canny, image subtraction etc)
- 7. Implement and / or apply different image segmentation techniques and analyse them
- 8. Implement different morphological image operations
- 9. Apply different image compression techniques

Textbooks									
1	R. C. Gonzalez, R. E. Woods, Digital Image Processing, 4th Edition. 2018, PHI								
2	A. K. Jain, Fundamentals of Digital Image Processing, PHI								
	References								
1	Milan Sonka, Vaclav Hlavac, Boyle, Digital Image Processing and Computer Vision, Cengage								
1	Learning								
2	S. Jayaraman, S. Esakkirajan, T. Veerkumar, Digital Image Processing, Tata McGrawHill								

3	Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, Digital Image Processing Usin MATLAB, 2nd ed.	g
	Useful Links	
1	NPTEL course: Link	
2	NPTEL course: Link	

CO-PO Mapping														
	Programme Outcomes (PO)										PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1			2									1	
CO2					3									
The stre	The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High													
Each CO	O of the	e course	e must i	map to	at least	one PC), and p	referab	ly to or	nly one	PO.			

	Assessment									
There are three components of lab assessment, LA1, LA2 and Lab ESE.										
IMP: Lab ESE	IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%									
Assessment Based on Conducted by Typical Schedule Ma										
	Lab activities,		During Week 1 to Week 8							
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30						
	journal		Week 8							
	Lab activities,		During Week 9 to Week 16							
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30						
	journal		Week 16							
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19							
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40						
	performance	applicable	Week 19							
Week 1 indicate	es starting week o	f a semester Lab activities/	Lab performance shall include performance shall include performance shall include performance shall be a shall	rmino						

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
AY 2022-23									
Course Information									
Progra	amme		B.Tech. (Compute	er Science Enginee	ring)				
Class.	Semester		Third Year B. Tec	ch., Sem V	6/				
Cours	e Code		5CS354	,					
Cours	e Name		Elective 2 Lab: A	rtificial Intelligenc	e and Mac	chine Learnin	g Lab		
Desire	d Requisi	tes:	Knowledge of Sta	tistics and Probabi	lity		6 240		
r	Teaching	Scheme		Examination	Scheme (Marks)			
Practi	cal	2 Hrs/ Week	LA1	LA2	Lab I	ESE	Total		
Intera	ction		30	30	40)	100		
				Cre	dits: 1		100		
					uits. 1				
			Cours	e Objectives					
	To make	students do pra	ctical implementati	on of the different	AI and M	L concepts a	nd		
1	technique	es.	etteur implementuu	on of the unforent	7 II und IVI	ill concepts a			
2	To make	students familia	ar with steps involv	ed in applying mad	chine learn	ning algorithr	ns to real-life		
	problems	5	•			0 0			
3	To get in	sights of how p	ure AI algorithms c	an be used					
4	To devel	op research inte	rest towards this fie	eld	-				
A / /1	1 6 4	Cours	e Outcomes (CO)	with Bloom's Tax	onomy L	evel			
At the	end of the	course, the stuc	ients will be able to),		Plaam's	Dloom's		
СО		Cou	rse Outcome State	ement/s		Taxonomy Level	Taxonomy Description		
CO1	Apply A analyze	AI and ML alg	gorithms to solve	real world proble	ems and	III, IV	Apply, Analyze		
CO2	Design measuri compari	and provide b ng the perfor ng them.	best solution to A mance of differe	AI and ML problems algorithms/too	ems by ls, and	V, VI	Evaluate, Create		
]	List of Experiment	ts / Lab Activities/	Topics				
List of	Topics(A	pplicable for I	nteraction mode):						
List of	Lab Acti	vities:							
1	Represe	ent knowledge i	n different forms						
	a) Logi	ical Representat	ion.						
	b) Sem	antic Networks							
	c) Proc	luction Rules							
	d) Fran	ne Representation	on.						
2.	. Apply H	Branch-and-bou	nd technique to Tra	velling Salesman l	Problem				
3.	. Apply I	Backtracking to	Sudoku/ N-Queen/	Subset sum proble	em.				
4.	. Use Mi	nimax approach	to find optimal mo	ove in a Tic-Tac-To	be Game.				
5.	. Design	and implementa	ation of Naive Baye	es Algorithm to fin	d the prob	ability of play	ying a Golf or		
6	Adopt r	rocedures to ha	andle imbalanced da	conunions.	e perform	ance			
7.	. Perform variable	n regression on g	given House Prices	dataset considerin	g one vari	able (Area) a	nd multiple		
8	. Implem clusters	ent K-means an and compare th	d KNN Clustering ne results.	algorithm to given	dataset by	y varying the	number of		
Mini-	project: G state assig	roup (2/3) stude ment. Design ar med group-wise	ents may select topi nd build the AI syst e.	c from research jou em for that probler	urnal/ liter n. OR The	ature as a pro e problem sta	blem tement may be		

	Textbooks								
1	Bell J., "Machine Learning Hands-On for Developers and Technical Professionals", Wiley 2015								
2	Mitchell T. M., "Machine Learning", MGH								
3	3 Marsland S., "Machine Learning: An Algorithmic Perspective", Chapman & Hall/CRC, 2 edition 2014.								
4	Khemani D., "A First Course in Artificial Intelligence", McGraw Hill Education (India), 2013.								
	References								
1	Khemani D., "Artificial Intelligence: Knowledge Representation and Reasoning", IIT Madras,								
1	Lecture Notes.								
	Useful Links								
1	Artificial Intelligence: Knowledge Representation and Reasoning Course on NPTEL: Link								
2	Introduction to Machine Learning Course on NPTEL: Link								
3	Machine Learning Course on CourseEra: Link								
4	Artificial Intelligence Search Methods for Problem Solving Course on NPTEL: Link								

CO-PO Mapping													
	Programme Outcomes (PO)										PS	PSO	
	1	1 2 3 4 5 6 7 8 9 10 11 12 1 2											
CO1	3											1	
CO2		2	2		2								3
The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High													
Each CO	Each CO of the course must map to at least one PO, and preferably to only one PO.												

Assessment										
There are three components of lab assessment, LA1, LA2 and Lab ESE.										
IMP: Lab ESE	is a separate head	of passing.(min 40 %), LA	1+LA2 should be min 40%							
Assessment	Assessment Based on Conducted by Typical Schedule Marks									
	Lab activities,		During Week 1 to Week 8							
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30						
	journal		Week 8							
	Lab activities,		During Week 9 to Week 16							
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30						
	journal		Week 16							
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19							
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40						
	performance	applicable	Week 19							
Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and										

related activities if any.

AY 2022-23 Course Information Programme B. Tech. (Computer Science and Engineering) Class. Semester Third Year B. Tech., Sem V Course Code SCIENCE Colspan="2">SCIENCE Colspan="2">SCIENCE Colspan="2">SCIENCE Colspan="2">SCIENCE Course Colspan="2">SCIENCE Course Colspan="2">SCIENCE Course Colspan="2">SCIENCE Course Colspan="2">SCIENCE Course Colspan="2">Course Colspan="2">SCIENCE Course Colspan="2">SCIENCE Course Colspan="2">SCIENCE Course Colspan="2">SCIENCE Course Colspan="2">SCIENCE Course Colspan="2">SCIENCE Course Course Course Colspan="2">SCIENCE Course Course Course Colspan="2">SCIENCE Course Course Course Colspan="2">SCIENCE Course	Walchand College of Engineering, Sangli										
Course Information Programme B. Tech. (Computer Science and Engineering) Course Code Class, Semester Thard Year B. Tech., Sem V Course Code SC3355 Course Code SC3355 Course Code SC3355 Course Name Elective 2 Lab: Internet (Web) of Things Lab Performation Practical 2 His/ Week LA1 LA2 Lab ESE Total Interaction - 30 30 40 100 Course Objectives - - 100 Credits: 1 Course Objectives 1 To share in-depth knowledge of the IOT. -	(Government Aided Autonomous Institute)										
Programme B. Tech. (Computer Science and Engineering) Class, Semester Third Year B. Tech., Sem V Course Orde SCS355 Course Name Elective 2 Lab: Internet (Web) of Things Lab Desired Requisites: Nil Teaching Scheme Practical 2 Hrs Weck LA1 LA2 Lab ESE Total Interaction - 30 30 40 100 Course Objectives 1 To share in-depth knowledge of the IOT. - - - 2 To deliver hand-on experience in the field. - - - 3 To inclucate interest in different domain areas - - - CO Course Outcome Statement/s Bioon's Tasonomy Description COI To apply the knowledge gained for solving different problems. III Apply CO2 To bemostrate basics of IOT - - Readown's Tasonomy Description CO3 To analyse and evaluate the solutions and compare them. V Evaluate - Evaluate CO4 To bemostrate basics of IOT <td< td=""><td colspan="11">Course Information</td></td<>	Course Information										
Class, Semester Third Year B. Tech., Sem V Course Code SC3355 Course Name Elective 2 Lab: Internet (Web) of Things Lab Desired Requisites: Nil Tractical 2 Hrs/ Week LA1 LA2 Lab ESE Total Interaction - 30 30 40 100 Course Objectives 1 To share in-depth knowledge of the IOT. - - - - 3 To inculcate interest in different domain areas - - - - Course Outcome Statement/s Taxonomy Taxonomy Taxonomy Description CO1 Course Outcome Statement/s III Apply - - CO2 Course Outcome Statement/s III Apply - - - CO2 To analyse and evaluate the solutions and compare them. VI Create - - CO4 Course out on spite solution to python programming. - - - - - - - - - - - - -	Progra	amme		B.Tech. (Comput	er Science and Eng	(ineering)					
Course Code SC\$355 Course Name Flective 2 Lab: Internet (Web) of Things Lab Desired Requisites: Nil Teaching Scheme Examination Scheme (Marks) Practical 2 Hrs/ Week LA Lab ESE Total Interaction 2 Hrs/ Week LA Lab ESE Total Interaction 2 Hrs/ Week LA Lab ESE Total Interaction - 30 30 40 100 Course Objectives Course Objectives Course Outcomes (CO) with Bloom's Taxonomy Level At the end of the course, the students will be able to. Course Outcome Statement/s Bloom's Taxonomy Level At the end of the course, the students will be able to. Course Outcome Statement/s Bloom's Taxonomy Level At the end of the course, the students will be able to. Course Outcome Statement/s Bloom's Taxonomy Level At the end of the course, the students will be able to. Course Outcome Statement/s Bloom's Taxonomy Level	Class,	Semester		Third Year B. Teo	ch., Sem V	<u> </u>					
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Textbooks 1 Mandler B., Barja J., Campista Mitre, M.E., Cagá_ová, D. Chaouchi, H. Zeadally, S. Badra, M. Giordano, S. Fazio, M. Somov, A. Vieriu, RL., "Internet of Things. IoT Infrastructures", Springer International Publishing, Second International Summit, IoT 360° 2015, Rome, Italy, October 27-29, 2015. Revised Selected Papers, Part I 2 Kyung, CM., Yasuura, H. Liu, Y. Lin, YL., "Smart Sensors and Systems", Springer International Publishing,2017.											
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1 Glordano, S. Fazio, M. Somov, A. Vieriu, RL., "Internet of Things. for Infrastructures", Springer International Publishing, Second International Summit, IoT 360° 2015, Rome, Italy, October 27-29, 2015. Revised Selected Papers, Part I 2 Kyung, CM., Yasuura, H. Liu, Y. Lin, YL., "Smart Sensors and Systems", Springer International Publishing,2017.		Mand	ller B., Barja J.	, Campista Mitre, I	M.E., Cagá_ová, E	D. Chaouch	hi, H. Zead	ally, S. I	Badra, M.		
2 Springer International Fublishing, Second International Summit, 101 300 2013, Kone, Italy, October 27-29, 2015. Revised Selected Papers, Part I 2 Kyung, CM., Yasuura, H. Liu, Y. Lin, YL., "Smart Sensors and Systems", Springer International Publishing,2017.	1	Gioro	lano, S. Fazio,	M. Somov, A. V	ieriu, RL., "Inte	rnet of I	hings. Io I $\sim 360^{\circ}$ 20	Infrastru	uctures",		
2 Kyung, CM., Yasuura, H. Liu, Y. Lin, YL., "Smart Sensors and Systems", Springer International Publishing,2017.		Octoł	per 27-29, 2015	. Revised Selected	Papers, Part I	Junnint, 1	01 300 20	715, KU	me, mary,		
² International Publishing,2017.	2	Kyun	g, CM., Yas	uura, H. Liu, Y.	Lin, YL., "Sm	nart Senso	ors and Sy	stems",	Springer		
		Interr	national Publish	ing,2017.			-		-		
					e						

1	Hersent Olivier, Boswarthick David, Elloumi Omar, "The Internet of Things: Key Applications and Protocols", Wiley-Blackwell, Second Edition, 2012
2	S. Misra, A. Mukherjee, and A. Roy, 2020. Introduction to IoT. Cambridge University Press.
3	S. Misra, C. Roy, and A. Mukherjee, 2020. Introduction to Industrial Internet of Things and Industry 4.0. CRC Press.
	Useful Links
1	https://onlinecourses.nptel.ac.in/noc21_cs17/preview
2	https://www.tinkercad.com/things/55ubLwvGK0g-1st-iot-project

CO-PO Mapping														
		Programme Outcomes (PO)										PS	50	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1					1	1					2		3	
CO2					1	1					2		3	
CO3					1	1					2		3	
CO4					1	1					2		3	
The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High														
Each Co	Each CO of the course must map to at least one PO, and preferably to only one PO.													

Assessment									
There are three components of lab assessment, LA1, LA2 and Lab ESE.									
IMP: Lab ESE	is a separate head	of passing.(min 40 %), LA	1+LA2 should be min 40%						
Assessment	Based on	Conducted by	Typical Schedule	Marks					
	Lab activities,		During Week 1 to Week 8						
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30					
	journal		Week 8						
	Lab activities,		During Week 9 to Week 16						
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30					
	journal		Week 16						
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19						
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40					
	performance	applicable	Week 19						
Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing									
experiments, m	experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the								

nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.
	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
AY 2022-23										
Course Information										
Programme B.Tech. (Computer Science Engineering)										
Class, Semester Third Year B. Tech., SemV										
Cours	e Code		5CS356							
Cours	e Name		Elective 2 Lab: Computer Graphics Lab							
Desire	d Requisi	tes:	C/C++ Programm	ing, Data Structures	& Files.	Java Progra	mming			
	11			6,		8	6			
	Teaching	Scheme		Examination S	cheme (I	Marks)				
Practi	cal	2 Hrs/ Week	LA1	LA2	Lab F	ESE	Total			
Intera	ction	_	30	30	40)	100			
				Cred	lits: 1					
		1								
			Cours	e Objectives						
-	To introduce the use of the components of a graphics system and become familiar with building									
1	1 approach of graphics system components and algorithms related with them.									
2	2 To learn the basic principles of 3- dimensional computer graphics.									
3	Provide an understanding of how to scan convert the basic geometrical primitives, how to transform									
	the shape	es to fit them as	per the picture defi	nition.	1 .	1. (1' ' 1			
4	projectio	an understanding	g of mapping from	world coordinates to	o device (coordinates,	clipping, and			
5	To be ab	le to discuss the	application of con	puter graphics conc	epts in th	e developm	ent of computer			
	games, ir	nformation visua	alization, and busin	ess applications.						
6	To comp	rehend and anal	yze the fundament	als of animation, vir	tual reali	ty, underlyin	g technologies,			
	principle	s, and application	ons. • Outcomes (CO)	with Bloom's Taxa	nomy I d	wal				
At the	end of the	course the stud	lents will be able to		nomy Lo					
		course, are see		,		Bloom's	Bloom's			
CO		Cou	rse Outcome State	ement/s		Taxonomy	Taxonomy			
						Level	Description			
CO1	Outline t	he fundamental	concepts of Comp	uter Graphics.		II	Understand			
CO2		the fundamen	tal concepts of co	omputer graphics v	vith its	III	Applying			
	Solve dif	transformations	s using algorithms.			111	Applying			
$\begin{array}{c} C03 \\ C04 \end{array}$	Investiga	ite acquired tran		IV	Analyzing					
C05	Scrutiniz	te technique of	computer animati	on and figure out 1	elation	1 7	Analyzing			
	with ima	ge and storage.	parter unifiliti	and inguite out i		IV				
]	List of Experimen	ts / Lab Activities/7	Fopics					

List of To	opics(Applicable for Interaction mode):
ListofI	ab Activities:
	id Activities.
	Minimum 8 experiments will be performed to understand functioning of Computer graphics &
	its visualization.
	The list contains;
	1. Practical based on C/C++ graphics library.
	2. Introductory OpenGL programming.
	3. Visualization of Data Sets. 4. 2D Transformations.
	5. 3D Transformations and animation.
	6. Line/Circle generation algorithm.
	7. Polygon filling algorithms.
	8. Hidden line/surface elimination algorithms (Z Buffer)
	9. Curve Generation (Cubic spline, Bezier).
	10. Study of Multimedia-file formats. (BMP-JPG/WAV-MP3/DAT-MPG etc).
	11. Visualization applications / Case tools/ animation using Multimedia concepts
	Textbooks
1	"Mathematical Elements for Computer Graphics", David F. Rogers, J Alan, Adams, TMGH, 2nd Edition
2	"Procedural Elements for Computer Graphics", David F. Rogers, TMGH, 2nd Edition
3	"Interactive Comp. Graphics, A Top-Down Approach using OpenGL", Edward Angel, Pearson, 5th Edition
	References
1	Procedural Elements for Computer Graphics by David F.Rogers, TMH publication.
2	Mathematical Elements for Computer Graphics by David F. Rogers and J. A. Adams, TMH publication.
3	Computer Graphics, principles & practices by J.D. Foley, A. van Dam, S.K. Feiner and J.F. Huges, Addison Wesley.
4	Computer Graphics, C version, by D. Hearn and M.P. Baker, Pearson Education.
5	Computer Graphics, a programming approach, by S. Harrington, TMH publication.
6	Computer Graphics by A.N. Sinha and A.D. Udai, TMH publication
	Useful Links
1	https://www.youtube.com/playlist?list=PLcZUy0j06PrGTnQUDUfucj6pG5alC4Klo

	CO-PO Mapping													
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	2	1	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	1	2	-	-	-	-	-	-	-	-	-	-
CO3	-	2	1	-	2	-	-	-	-	-	-	-	3	-
CO4	1	2	1	2	3	-	-	-	-	-	-	2	-	-
CO5	1	2	1	-	3	-	-	-	-	-	-	-	-	-
The stre	ength of	mappi	ng is to	be wri	tten as	1,2,3; v	vhere, 1	l: Low,	2: Med	lium, 3	High			
F 1 G	0 0 1					D 0		0 1			DO			

Each CO of the course must map to at least one PO, and preferably to only one PO.

Assessment
There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%

Assessment	Based on	Conducted by	Typical Schedule	Marks				
	Lab activities,		During Week 1 to Week 8					
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 8					
	Lab activities,		During Week 9 to Week 16					
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 16					
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19					
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40				
	performance	applicable	Week 19					
Week 1 indicate	es starting week o	f a semester. Lab activities/	Lab performance shall include performance	rming				
experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the								
nature and requ	irement of the lab	course. The experimental	lab shall have typically 8-10 experim	ents and				
related activitie	es if any.							

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
AY 2022-23										
Course Information										
Progra	Programme B.Tech. (Computer Science Engineering)									
Class,	Semester		Third Year B. Tech., SemV							
Cours	e Code		5CS358							
Cours	e Name		Elective 2 Lab: In	troduction to Gam	e Theory a	nd Mechanisi	n Design Lab			
Desire	d Requisi	tes:								
'	Teaching	Scheme		Examination	Scheme (N	Marks)				
Practi	cal	2 Hrs/ Week	LA1	LA2	Lab E	ESE	Total			
Intera	ction	-	30	30	40		100			
				Cre	edits: 1					
			Cours	e Objectives						
1	1 To share in-depth knowledge of the course									
	To delive	er hand-on expe	rience in the field							
3	1 o inculo	Course	e Outcomes (CO)	eas with Bloom's Tay	onomy I e	vol				
At the	end of the	course, the stud	lents will be able to).						
		,				Bloom's	Bloom's			
CO		Cou	rse Outcome State	ement/s		Taxonomy	Taxonomy			
~~~	I					Level	Description			
CO1	To apply	game theory co	oncepts.	4 1 -			Applying			
C02	To demo	se game theoret	ic solutions	tools.			Applying			
0.05		se game meorer	ic solutions.			T Å	Anaryzing			
		]	List of Experimen	ts / Lab Activities	/Topics					
List of	f Topics(A	pplicable for I	nteraction mode )	•	<b>1</b>					
		II marked and a second s	,							
<b>T</b>	РТ - L А - 4									
List of	i Lab Acti	vities:								
Minim	um 8 expe	eriments will be	performed to imple	ement the concepts	from Gam	ne Theorv and	Mechanism			
design	based on t	theory MOOC c	course.							
			Т	extbooks						

Textbooks									
1	Game Theory" — Michael Maschler, Eilon Solan, Shmuel Zamir								
2	"Multiagent Systems" — Y. Shoham and K. Leyton Brown, Cambridge University Press, online								
2	copy available								
References									
1	"Game Theory and Mechanism Design" - Y. Narahari, World Scientific and IISc Press - Indian								
1	edition available								
Useful Links									
1	https://onlinecourses.nptel.ac.in/noc22_cs77/								
1									

CO-PO Mapping														
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	2	1	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	1	2	-	-	-	-	-	-	-	-	-	-
CO3	-	2	1	-	2	-	-	-	-	-	-	-	3	-
The stre	The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High													

Each CO of the course must map to at least one PO, and preferably to only one PO.

Assessment											
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing (min 40 %). LA1+LA2 should be min 40%											
Assessment Based on Conducted by Typical Schedule M											
	Lab activities,	· · · ·	During Week 1 to Week 8								
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30							
	journal		Week 8								
	Lab activities,		During Week 9 to Week 16								
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30							
	journal		Week 16								
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19								
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40							
	performance	applicable	Week 19								

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

		Walc	hand College	of Engineering, Sar	ngli						
			(Government Alded	a Autonomous Institute)							
	Course Information										
Ducan			D Tash (Comput	Information	(ma)						
Progra	ig)										
Class,	Semester		Third Year B. Te	ech., Sem V							
Cours	e Code		50E372	<u> </u>							
Cours	e Name		Open Elective-1:	Data Science using Pytho	n						
Desire	d Requisi	tes:	Nil								
			1								
	Teaching	Scheme		Examination Scheme (Marks)							
Lectur	re	2 Hrs/week	MSE	ISE	ESE	Total					
Tutori	ial	-	30	20	50	100					
				Credits: 2							
			Course	Objectives							
1	Introduce	e python as a pro	ogramming languag	ge							
2	Introduce	e the mathematic	cal foundations req	uired for data science							
3	Introduce	e the first level c	lata science algorit	hms							
4	Introduce	e a practical cap	stone case study								
A ( 1	1.6.1	Course	Outcomes (CO) w	with Bloom's Taxonomy I	Level						
At the	end of the	course, the stud	lents will be able to	),	Diagray	Dlaam?a					
CO		Cours	sa Autaama Statar	montle	Bloom's	Bloom's Tayonomy					
		Cours	se Outcome State	ment/s	Level	Description					
CO1	Explain	a flow process fo	or data science prol	blems	II	Understand					
CO2	Impleme	nt Python codes	for data science so	olutions	III	Apply					
CO3	Correlate	e results to the so	olution approach fo	ollowed	III	Apply					
<b>CO4</b>	Construc	t use cases to va	alidate approach ai	nd identify modifications	IV/	Analyze					
	required			-	10						
Modu	le		Module	Contents		Hours					
	Intro	duction and Pr	ogramming in py	thon							
I	Intro Build	duction to Dat ling Tables	a Science, Introd	luction to basics of Py	thon, Tables,	4					
	Data	Visualization									
II	Cens	us, Charts, Histo	ograms, Functions,	Groups		5					
	Intro	duction to Stat	istics	<b>1</b>							
	Iterat	ion. Chance. Sa	mpling, Models, C	omparing Distributions		4					
	Нурс	othesis Testing	1 0,	1 0							
IV	A/B	Testing. Causali	ty. Confidence Int	ervals. Interpreting Confi	dence. Center	5					
	and S	pread, The Nor	mal Distribution	, , , , , , , , , , , , , , , , , , ,							
	Class	sification and R	egression			4					
	Class	ification, Classi	fiers, Correlation, I	Linear Regression, Logisti	c Regression	4					
	Class	sification and R	egression Case St	udies							
VI	Resid	luals, Regression	n Inference, Case S	Study		4					
	1	<i>. . . . . . . . . .</i>	,	~							
			Tex	ktbooks							
1	Com	outational and Ir	nferential Thinking	, The Foundations of Data	Science By A	ni Adhikari					
	and J	ohn DeNero UC	Berkeley. (Availa	ble Online)	÷						
_	The I	Elements of Stat	istical Learning, Da	ata Mining, Inference, and	Prediction (2n	d Edn.),					
2	² The Elements of Statistical Learning, Data Mining, Inference, and Prediction (2nd Edn.), Trevor Hastie Robert Tibshirani, Jerome Friedman, Springer, 2014										

References								
1	Probability & Statistics for Engineers & Scientists (9th Edn.), Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye, Prentice Hall Inc.							
Useful Links								
1	http://data8.org/							

	CO-PO Mapping													
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2													2
CO2					3									
CO3			2									1		
CO4			3	3									3	
The streng	The strength of mapping is to be written as 1: Low, 2: Medium, 3: High													
F 1 CO														

Each CO of the course must map to at least one PO.

### Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)											
			A	Y 2022-23							
			Cours	e Information							
Progra	amme		B.Tech. (Comput	ter Science and Eng	ineering)						
Class.	Semester		Third Year B. Te	ch., Sem V							
Cours	e Code		50E371								
Cours	e Name		Open Elective-2	Software Engineerii	ng and Datab	ase Essent	ials				
Desire	d Requisi	tes:	Nil	8	0						
	1										
,	Teaching	Scheme		Examination	Scheme (Ma	rks)					
Practi	cal	3 Hrs/ Week	MSE	ISE	ESE		Total				
Intera	ction	-	30	20	50		100				
				Cre	dits: 3						
Course Objectives											
	Understa	nd importance	of engineering app	roach to software de	evelopment a	nd compre	ehend the				
	knowled	ge of software p	processes & model	s practiced at IT ind	ustries.						
2	Be acqua	unted with the S	SDLC phases in de	tail and appreciate t	he importanc	e of softw	are quality				
	by virtue	of software tes	ting methods.								
3	To use co	onceptual desig	ns to prepare datab	base schemas.	accointed wit	h malation	1 databasa				
4	Design	stand the relation	onal model and the	theoretical issues a	ssociated wit	n relationa	al database				
5	To learn	SOL and Datab	ase Architectures.								
	101000	Cours	e Outcomes (CO)	with Bloom's Tax	onomy Leve	1					
At the	end of the	course, the stud	lents will be able t	0,	<b>v</b>						
со		Cou	rse Outcome State	ement/s	B Ta	Bloom's Ixonomy Level	Bloom's Taxonomy Description				
C01	explain p engineer	proficiency to u ing practices.	ndertake software	projects based on s	oftware	II	understanding				
CO2	summari planning	zing the spirit benefits.	of team-working i	n SDLC phases &	project	Π	understanding				
CO3	describe analyse t relationa	the conceptua the problem and l database scher	l designs of Data d Design ER diag na.	base, identifies the ram as well as prep	e need, pare the	I, IV	Remembering, Analysing				
<b>CO4</b>	apply S	QL to extract	required inform	ation from the da	atabase.		Analysing				
	Compare	, analyses vari	ous ways of writi	ng the queries for	a given	IV					
	problem	and Differentia	ung database Arch	itecture.							
Modu	ıle		Module Co	ntents			Hours				
linouu							110015				
I	Introduction Software Engineering Basics Software Crisis, Need of software engineering approach.ISoftware Processes: project management process, software development process models, Configuration management process, process management process										
П	Image: Software Quality & Project Planning         Notion of Software Quality:         Quality objectives, Need for improvement, Software quality factors,         Image: Quality standards,         Project Planning Basics:         Project management plan, Cost estimation, Project scheduling, Staffing         and personnel Planning, Risk management.										
III	Sof	tware Requirem	ient Process, Desig	gn principles, Struct ards, levels of Testin	ured design		6				

IV	<ul> <li>Introduction and Database Modelling using ER Model</li> <li>Introduction: General introduction to database systems, its advantages and applications, Database System Architecture, Database users and Administrator, Data models, Database management system, Database languages, View of Database, Data Models.</li> <li>ER Model: Entity set, Entity types, attributes, Notations, Relationship sets, Relationship types, Keys- super key, candidate key, primary key, Extended Features of ER Model-Generalization, Specialization and aggregation</li> </ul>	б
V	<ul> <li>Relational Model and SQL</li> <li>Relational Model: Structure of Relational Database, Reduction of ER model into Relational schemas, Schema-instance distinction, Key, Relational algebra, Tuple relation calculus, Domain relational calculus, Example queries,</li> <li>SQL: Introduction to SQL, Data definition statements with constraints, Insert, Update and Delete, Set Operations, Aggregate functions group by and having clauses, Nested Queries, Views, Joins.</li> </ul>	8
VI	Database Architectures Centralized &Client-Server architectures, server system architecture, Architectures for parallel databases, Distributed database concepts, Homogeneous & Heterogeneous databases, distributed data storage, data fragmentation, and replication and allocation techniques for distributed database.	6
	Textbooks	
1	Pankaj Jalote, "An integrated approach to S/W engineering", Narosa Pub	lishers, 2nd Edition.
2	Abraham Silberschatz, Henry F. Korth and S. Sudarshan, Database Sys Hill, 4th Edition 2002 / 6th Edition 2011	tem Concepts, Mc-Graw
3	Pankaj Jalote, "Software Project Management in practice", Pearson educ	ation
	References	
1	Roger S. Pressman, "Software Engineering: Practitioner"s Approach". M	lcGraw Hill
2	Raghu Ramakrishnan and Johannes Gehrke, Database Management System	ems, 3rd Edition. 2002
	Useful Links	
	https://www.javatpoint.com/software-engineering-tutorial	
2	https://www.w3schools.com/sql/trysql.asp?filename=trysql_asc	

	CO-PO Mapping														
	Programme Outcomes (PO)													PSO	
	1	1         2         3         4         5         6         7         8         9         10         11         12         1         2													
CO1	3					2	1								
CO2		3 3 1													
CO3			3	1											
CO4	2 2 1 1														
The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High															
Each CO	Each CO of the course must map to at least one PO, and preferably to only one PO.														

The assessment is based on MSE, ISE and ESE.

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ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)												
			AY	2022-23								
			Course 1	Information								
Progra	amme		B.Tech. (Comput	er Science and Engineer	ing)							
Class.	Semester		Third Year B. Te	ch Sem VI								
Cours	e Code		5CS321									
Cours	e Name		Cloud Computing	T								
Desire	d Requisi	tes•	Operating System	n Computer Networks								
Desire			operating system	n, computer retworks								
	Teaching	Scheme		Examination Schem	e (Marks)							
Lectur	re	3 Hrs/week	MSE	ISE	ESE	Total						
Tutori	ial	-	30	20	50	100						
			Course	Objectives								
1	An under	standing of fund	damental ideas beh	ind Cloud Computing, th	ne evolution of	the						
I	paradigm	, its applicabilit	y; benefits, as well	as current and future ch	allenges.							
2	Providing	g basic ideas and	d principles in clou	d management technique	es, virtualizatio	on						
2	Explorin	es and cloud sof	ng driven open sou	considerations.	ame and appli	ations						
			Outcomes (CO) w	ith Bloom's Taxonomy	Level	cations.						
At the	end of the	course, the stud	lents will be able to	,	Level							
СО		Course	e Outcome Statem	ent/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description						
CO1	Distingui	sh concepts	of distributed n	aradigm from other		Understanding						
	CO1 Distinguish concepts of distributed paradigm from other Understa											
	computin	ig paradigm a	and the mechani	sm of inter process	II							
<b>CO2</b>	computin communi Describe	ng paradigm a cation in distrib main concer	and the mechani puted systems.	sm of inter process	II	Understanding						
CO2	computin communi Describe limitation state-of-t	ng paradigm a leation in distrib main concept ns of cloud con he-art cloud cor	and the mechani puted systems. pts, key technolo nputing and the po nputing.	ogies, strengths, and ossible applications for	П	Understanding						
CO2	computir communi Describe limitation state-of-t Illustrate architectu	ng paradigm a ication in distrib main concept ns of cloud cont he-art cloud cort different cloudit ure and various	and the mechani puted systems. pts, key technolo nputing and the po nputing. infrastructure mod deployment models	bogies, strengths, and bossible applications for lels, cloud computing s.	II II III	Understanding						
CO2 CO3 CO4	computir communi Describe limitation state-of-t Illustrate architectu Classify on their c	ng paradigm a cation in distrib main concept ns of cloud cont he-art cloud cont different cloudi ure and various different hypery characteristics.	and the mechani puted systems. pts, key technolo nputing and the po nputing. infrastructure mod deployment models visors and virtualiz	by the second se	II II III IV	Understanding Applying Analyzing						
CO2 CO3 CO4 CO5	computir communi Describe limitation state-of-t Illustrate architectu Classify on their c Identify o and interv	ng paradigm a ication in distrib main concept ns of cloud cont he-art cloud cont different cloudid ure and various of different hypervector haracteristics. core issues of cloudid perability.	and the mechani puted systems. pts, key technolo nputing and the po- nputing. infrastructure mod deployment models visors and virtualiz	sm of inter process ogies, strengths, and ossible applications for lels, cloud computing s. ation techniques based ch as security, privacy,	II II III IV IV	Understanding Applying Analyzing Analyzing						
CO2 CO3 CO4 CO5 CO6	computir communi Describe limitation state-of-t Illustrate architectu Classify on their c Identify of and intero Examine	ng paradigm a ication in distrib main concept ns of cloud con he-art cloud con different cloudi ure and various different hypery characteristics. core issues of clopperability. the components	and the mechani puted systems. pts, key technolo nputing and the po nputing. infrastructure mod deployment models visors and virtualiz loud computing suc	sm of inter process ogies, strengths, and ossible applications for lels, cloud computing s. ation techniques based ch as security, privacy, nercial cloud platform.	II II III IV IV IV	Understanding Applying Analyzing Analyzing Analyzing						
CO2 CO3 CO4 CO5 CO6	computir communi Describe limitation state-of-t Illustrate architectu Classify on their c Identify of and intero Examine	ng paradigm a ication in distrib main concept ns of cloud con he-art cloud cor different cloudi ure and various different hypery haracteristics. core issues of cloperability. the components	and the mechani puted systems. pts, key technolo nputing and the po- nputing. infrastructure mod deployment models visors and virtualiz loud computing suc- s of Open and comr	sm of inter process ogies, strengths, and ossible applications for lels, cloud computing s. ation techniques based ch as security, privacy, nercial cloud platform.	II II III IV IV IV	Understanding Applying Analyzing Analyzing Analyzing						
CO2 CO3 CO4 CO5 CO6 Modu	computir communi Describe limitation state-of-t Illustrate architectu Classify on their c Identify of and intero Examine	ng paradigm a ication in distrib main concept ns of cloud con he-art cloud cor different cloudi ure and various a different hypery characteristics. core issues of clopperability. the components	and the mechani puted systems. pts, key technolo nputing and the po- nputing. infrastructure models visors and virtualiz loud computing suc- s of Open and comr Module C	sm of inter process ogies, strengths, and ossible applications for lels, cloud computing s. ation techniques based ch as security, privacy, mercial cloud platform.	II II III IV IV IV	Understanding Applying Analyzing Analyzing Analyzing Hours						
CO2 CO3 CO4 CO5 CO6 Modu	computir communi Describe limitation state-of-t Illustrate architectu Classify on their c Identify of and intero Examine	ig paradigm a ication in distrib main concept ns of cloud con he-art cloud con different cloudi ure and various different hyperv haracteristics. core issues of cloperability. the components	and the mechani puted systems. pts, key technolo nputing and the po- nputing. infrastructure mod deployment models visors and virtualiz loud computing suc s of Open and comr Module C uted computing	analysis from other sm of inter process ogies, strengths, and ossible applications for lels, cloud computing s. ation techniques based ch as security, privacy, mercial cloud platform.	II II III IV IV IV	Understanding Applying Analyzing Analyzing Analyzing Hours						
CO2 CO3 CO4 CO5 CO6 Modu	computir communi Describe limitation state-of-t Illustrate architecth Classify on their c Identify of and intero Examine	ing paradigm a facation in distribution main concept as of cloud con- he-art cloud con- different cloudid are and various a different hypery characteristics. core issues of cloudid perability. the components iples of distribu- of computing, in	and the mechani puted systems. pots, key technolo nputing and the po- nputing. infrastructure mod deployment models visors and virtualiz loud computing suc s of Open and comr Module C uted computing Elements of distrib	sm of inter process ogies, strengths, and ossible applications for lels, cloud computing s. ation techniques based ch as security, privacy, mercial cloud platform.	II II III IV IV IV eral concepts	Understanding Applying Analyzing Analyzing Analyzing Hours						
CO2 CO3 CO4 CO5 CO6 Modu	computir community Describe limitation state-of-t Illustrate architectu Classify on their c Identify of and intero Examine	ig paradigm a ication in distrib main concept as of cloud con- he-art cloud con- different cloudi ure and various of different hypery- haracteristics. core issues of cl- operability. the components <b>iples of distribu-</b> of computing, 1 lefinitions, computed	and the mechani puted systems. pts, key technolo aputing and the po- aputing and the po- aputing. infrastructure models visors and virtualiz loud computing success of Open and comr Module C uted computing Elements of distrifi- ponents of a distri-	sm of inter process ogies, strengths, and ossible applications for lels, cloud computing s. ation techniques based ch as security, privacy, nercial cloud platform. <b>Contents</b>	II II III IV IV IV eral concepts tral styles for	Understanding Applying Analyzing Analyzing Hours 7						
CO2 CO3 CO4 CO5 CO6 Modu	computir communi Describe limitation state-of-t Illustrate architecth Classify on their of Identify of and interv Examine	ig paradigm a ication in distrib main concepts of cloud con- he-art cloud con- different cloudid ure and various a different hypery characteristics. core issues of cl- operability. the components <b>iples of distribu</b> of computing, i lefinitions, components pouted comput-	and the mechani puted systems. pots, key technolo nputing and the po- nputing. infrastructure mod deployment models visors and virtualiz loud computing suc s of Open and comr Module C uted computing Elements of distributed computing tributed computing	sm of inter process ogies, strengths, and ossible applications for lels, cloud computing ation techniques based ch as security, privacy, mercial cloud platform. <b>ontents</b> puted computing – Gen buted system, architectu or inter-process com – Remote procedure ca	II II III IV IV IV eral concepts iral styles for mmunication, II, distributed	Understanding         Applying         Analyzing         Analyzing         Hours         7						
CO2 CO3 CO4 CO5 CO6 Modu	computir community Describe limitation state-of-t Illustrate architectu Classify on their c Identify of and intero Examine	ig paradigm a ication in distrib main concept as of cloud con- he-art cloud con- different cloudi ure and various of different hypery characteristics. core issues of cl- operability. the components <b>iples of distrib</b> of computing, 1 lefinitions, components pouted comput- nologies for dist t frameworks. G	and the mechani puted systems. pts, key technolo aputing and the po- aputing and the po- aputing. infrastructure models deployment models visors and virtualiz loud computing suc- s of Open and comr Module C uted computing Elements of distrift ponents of a distrift ing, models f tributed computing GraphQL, REST AF	sm of inter process ogies, strengths, and ossible applications for lels, cloud computing s. ation techniques based ch as security, privacy, mercial cloud platform. <b>Contents</b> outed computing – Gen buted system, architectu or inter-process com- net procedure ca PI.	II II III IV IV IV eral concepts rral styles for mmunication, II, distributed	Understanding Applying Analyzing Analyzing Hours 7						
CO2 CO3 CO4 CO5 CO6 Modu	computir communi Describe limitation state-of-t Illustrate architectu Classify on their of Identify of and interv Examine Ile Prince Eras and d distril Techn objec	ig paradigm a ication in distrib main concepts of cloud con- he-art cloud con- different cloudid ure and various different hypery characteristics. core issues of cl- operability. the components <b>iples of distribu</b> of computing, 1 efinitions, compo- tuted comput- nologies for dist <b>duction to Clou</b>	and the mechani puted systems. pts, key technolo nputing and the po- nputing. infrastructure mod deployment models visors and virtualiz loud computing suc s of Open and comr Module C uted computing Elements of distributed computing ing, models f tributed computing GraphQL, REST AF ad Computing	sm of inter process ogies, strengths, and ossible applications for lels, cloud computing s. ation techniques based ch as security, privacy, mercial cloud platform. ontents outed computing – Gen buted system, architectu or inter-process com – Remote procedure ca Y.	II II III IV IV IV eral concepts tral styles for mmunication, II, distributed	Understanding Applying Analyzing Analyzing Hours 7						
CO2 CO3 CO4 CO5 CO6 Modu	computir communi Describe limitation state-of-t Illustrate architectu Classify on their c Identify of and intero Examine Ile Prince Eras and d distril Techn objec	ig paradigm a ication in distrib main concepts of cloud con- he-art cloud con- different cloudid are and various a different hypery- haracteristics. core issues of cl- operability. the components iples of distribu- of computing, l efinitions, com- buted comput- nologies for dist t frameworks. G duction to Cloudid Computing (N	and the mechani puted systems. pts, key technolo aputing and the po- aputing and the po- aputing. infrastructure models deployment models visors and virtualiz loud computing suc- s of Open and comr Module C uted computing Elements of distrif- ponents of a distrif- ting, models f tributed computing GraphQL, REST AF ad Computing IST Model)Introdu	sm of inter process ogies, strengths, and ossible applications for lels, cloud computing s. ation techniques based ch as security, privacy, mercial cloud platform. <b>ontents</b> outed computing – Gen buted system, architectu or inter-process com – Remote procedure ca PI.	II II III IV IV IV eral concepts iral styles for mmunication, II, distributed	Understanding Applying Analyzing Analyzing Hours 7						
CO2 CO3 CO4 CO5 CO6 Modu	computir communi Describe limitation state-of-t Illustrate architectu Classify on their c Identify of and intero Examine Identify of and intero Eras and of distril Techn objec	ig paradigm a ication in distrib main concept ns of cloud con- he-art cloud con- different cloudi ure and various of different hypery characteristics. core issues of cl- operability. the components iples of distribu- of computing, I definitions, compo- tologies for dist t frameworks. G duction to Cloud Computing (N 1 Computing, G	and the mechani puted systems. pts, key technolo nputing and the po- nputing. infrastructure mod deployment models visors and virtualiz loud computing suc s of Open and comr <u>Module C</u> uted computing Elements of distriti ponents of a distri- ting, models f tributed computing GraphQL, REST AF Id Computing IST Model)Introdu Cloud service pro and Comp. of Cloud	sm of inter process ogies, strengths, and ossible applications for lels, cloud computing <u>s</u> . ation techniques based ch as security, privacy, nercial cloud platform. <b>ontents</b> outed computing – Gen buted system, architectu or inter-process com – Remote procedure ca PI.	II II III IV IV IV eral concepts tral styles for mmunication, II, distributed	Understanding Applying Analyzing Analyzing Hours 7 5						
CO2 CO3 CO4 CO5 CO6 Modu	computir communi Describe limitation state-of-t Illustrate architectu Classify on their of Identify of and intero Examine Ide Eras and d distril Techn objec <b>Intro</b> Cloud Cloud Disad	ig paradigm a ication in distrib main concepts of cloud con- he-art cloud con- different cloudid are and various a different hypery characteristics. core issues of cl- operability. the components <b>iples of distribu-</b> of computing, I buted comput- nologies for dist t frameworks. G <b>duction to Clou</b> al Computing (N al Computing, Cloud co- puting	and the mechani puted systems. ots, key technolo nputing and the po- nputing. infrastructure mod deployment models visors and virtualiz loud computing suc s of Open and comr Module C uted computing Elements of distributed computing tributed computing ing, models f tributed computing inghQL, REST AF ind Computing IST Model)Introdu Cloud service pro and Cons of Clo	sm of inter process ogies, strengths, and ossible applications for lels, cloud computing s. ation techniques based ch as security, privacy, mercial cloud platform. ontents outed computing – Gen buted system, architectu or inter-process com- ender procedure ca Pl. ction to Cloud Computin viders Properties, Char oud Computing, Beneficiated and computing of the com- ster computing of the com-	II II III IV IV IV IV eral concepts ral styles for mmunication, 11, distributed ng, History of acteristics & its of Cloud	Understanding Applying Analyzing Analyzing Hours 7 5						

Ш	<b>Cloud Computing Architecture</b> Cloud computing stack, Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services, Service Models (XaaS), Infrastructure as a Service(IaaS), Platform as a Service(PaaS), Software as a Service(SaaS), Deployment Models: Public cloud, Private cloud, Hybrid cloud, Community cloud.	7
IV	<b>Virtualization</b> Introduction, characteristics of virtualized environments, Taxonomy of virtualization Techniques, Virtualization and cloud computing, Pros and Cons of virtualization, technology Examples, Micro-services, Serverless architecture, Hypervisors, Containerization.	6
V	<b>Cloud Security</b> Type of attack, Security stack of IaaS, PaaS, SaaS, Gartner's seven cloud computing security Risks, Other cloud security issues: Virtualization, Access Control and identity Management, Application security, Data life cycle management, AWS IAM.	6
VI	<b>Case Study on Open Source &amp; Commercial Clouds</b> Eucalyptus, Microsoft Azure, Amazon EC2, Open Stack, Open Nebula, AWS, Free Amazon tiers and Google compute, Problems related to Big data analytics, Metering and Monitoring of cloud infrastructure.	8
	Textbooks	<b>D</b> · · 1 1
1	RajkumarBuyya, James Broberg, Andrzej M. Goscinski ,"Cloud Computing Paradigms", Wiley, 1 Edition 2013.	: Principles and
2	GautamShroff,"Enterprise Cloud Computing - Technology, Architecture, Cambridge University Press, 2010.	Applications",
3	Ronald L. Krutz, Russell Dean Vines ,"Cloud Security: A Comprehensive Cloud Computing", Wiley- India, 2010.	Guide to Secure
	References	
1	Barrie Sosinsky,"Cloud Computing Bible", Wiley-India, 2010.	
	Useful Links	
1		

	CO-PO Mapping														
	Programme Outcomes (PO)													PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	1														
CO2		2											2		
CO3		2											1		
CO4		2											1		
CO5		2											1		
CO6		2	2												
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High															
Each CO of the course must map to at least one PO.															

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

		Walc	hand College (Government Aidea	of Engineering, Statutonomous Institute)	angli							
			AY	2022-23								
			Course l	Information								
Progra	amme		B.Tech. (Comput	er Science and Engine	ering)							
Class,	Semester	•	Third Year B. Te	ch., Sem VI								
Cours	e Code		5CS322									
Cours	e Name		Advanced Databa	ise Systems								
Desire	d Requis	ites:	Database Enginee	ering								
	Teaching	Scheme		Examination Sche	me (Marks)							
Lectur	re	3 Hrs/week	MSE	ISE	ESE	Total						
Tutor	ial	-	30	20	50	100						
Course Objectives												
1	1 An understanding of the fundamentals in object-based databases and explore the database centric design issues involved in application development, the advances in database system											
2	Providin	g the methodolo	gy to implement th	e complex and real-wo	orld database ap	plications.						
3	Evaluati	on and analysis of	of the different type	es of advanced databas	es.							
		Course	Outcomes (CO) w	ith Bloom's Taxonor	ny Level							
At the	end of the	e course, the stud	ents will be able to	,								
со		Cours	e Outcome Staten	nent/s	Bloom's Taxonom Level	y Taxonomy Description						
CO1	Exploit	the fundamental	concepts involved	d in advanced databa	ses III	Apply						
	Analyse	the architecture	ata nandiing.	e of different databa	200	Analyse						
	using m	odern tools for a	lomain specific app	plications.	IV	7 maryse						
CO3	Recommendation	nend the optime oblem.	al database-based	solution to solve r	v v	Evaluate						
<b>CO4</b>	Apply t	ne acquired know	vledge in databases	to <b>design</b> and <b>build</b>	he VI	Create						
	different	business applica	ations.		V1							
	•			2 4 4		TT						
Niodu		at Deged Detak	Module	ontents		Hours						
I	Over Tabl Refe Map	view, Complex e Inheritance, A rence Types in ping	Data Types, Stru rrays and Multise SQL, Implement	cture Types and Inho t Types in SQL, Ob ting O-R Features, 0	eritance in SQI ject-Identity ar Object-Relation	L, ad 5 al						
II	App App Stan App	lication develop ication Program dardization, Rap ication Security	ment & Administ ns and User Ir id Application De . Performance Tur Development	ration nterfaces, Application evelopment, Application ning, Performance Be	n Architecture on Performanc nchmarks, Oth	s, e, 6 er						
III	Data Intro Data Mult Tran	Warehousing duction, Data W warehouse desig i-dimensional da sformation and I	arehouse Building gn process, dimens tta – cube, building Loading (ETL Proc	Blocks, Data Wareho ional modelling, conce the data warehouse – ess)	use Architectur eptual modellin Data Extractio	e, g, 8 n,						

	Distributed and Cloud Databases	
	Distributed databases: Homogeneous & heterogeneous databases, distributed	4
	data storage, distributed transactions, concurrency control in distributed	
W	databases, distributed query processing, Heterogeneous distributed databases.	
1 V	Cloud Databases – I	
	Introduction, Architecture of a cloud data storage system, Data Models,	2
	Transactions and replication, Deployment models, Comparison of Relational	3
	databases and Cloud databases, Challenges to develop Cloud Databases.	
	Cloud Databases – II	_
	Case study of any four NoSQL databases: Voldemort, MongoDB, Cassandra,	7
	Neo4J, Cloud Native, Data Lake	
VI	Spatial, Temporal Data and Mobility	6
VI	Databases Mobility and Personal Databases	0
	Databases, Woonity and reisonal Databases.	
	Textbooks	
1	Silberschatz, Korth, Sudarshan "Database system concepts" MGH 6th Edition.	
2	Raghu Ramkrishnan "Database Management System" MGH	
3	Paulraj Ponniah "Data Warehousing - Fundamentals for IT Professional Wiley	" 2nd Edition.
	Whey	
	References	
1	Thomas Connolly & Carolyn Begg "Database Systems : A practical approx	ach to design,
1	implementation & Management" Pearson 3rd Edition	
2	RamezElmasri and ShamkantNavathe, "Fundamentals of Database Syster	ns" Benjamin
	Cummings, 2nd Ed, 1994.	
3	Open source databases official websites	τ1
4	W. H. Inmon, "Building the Data Warehouse" Wiley Dreamtech India PVI	Ltd
5	RALPH KIMBALL, "The Data warehouse Life cycle Tool Kit" WILE	Y STUDENT
	EDITION	
	Usoful Links	
1	https://nptel.ac.in/courses/106/106/106106093/	
2	https://freevideolectures.com/course/2280/database-design/37	
3	https://onlinecourses.nptel.ac.in/noc21_cs04/preview	
4	https://onlinecourses.nptel.ac.in/noc21_cs58/preview	
5	https://docs.oracle.com/en/database/oracle/oracle-database/21/dwhsg/	

	CO-PO Mapping													
		Programme Outcomes (PO)												
	1	1         2         3         4         5         6         7         8         9         10         11         12										1	2	
CO1	3												2	
CO2					2								2	2
CO3			2										2	
CO4			3										1	3
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High														
Each CO of the course must map to at least one PO.														

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

		Wal	chand College	e of Engineerin	ng, Sang	gli						
AY 2022-23												
			Course	e Information								
Progr	amme		B.Tech. (Comput	er Science Enginee	ring)							
Class,	Semester		Third Year B. Teo	ch., Sem VI								
Cours	e Code		5CS371									
Cours	e Name		Advanced Databa	se System Laborat	ory							
Desire	ed Requisi	tes:	Database Enginee	ering								
	Teaching	Scheme		Examination	Scheme (I	Marks)						
Practi	cal	2 Hrs/ Week	LA1	LA2	Lab E	ESE		Total				
Intera	ction	-	30	30	40			100				
Credits: 1												
1	Desist	a 41a	Cours	e Objectives								
2	Practicin	g the concepts/t	different database	in theory course.	/ tools							
$\frac{2}{3}$	Designin	ig and implement	tation of the database	ase based application	ons.							
		Cours	e Outcomes (CO)	with Bloom's Tax	onomy Le	evel						
At the	end of the	course, the stud	lents will be able to	),								
CO		Com	na Autoomo State	montla		Bloon	n's	Bloom's				
		Cou	ise Outcome State	emenu s		Leve	el	Description				
C01	Scrutiniz	e different da	tabase servers, a	pplication archite	ctures /							
	models,					IV		Analyze				
	framewo	orks and ident	tify optimal one	, suitable for p	articular	1,		1 11111 / 20				
CO2	Select th	on. e. advanced/mod	lern databases and	recommend for p	ediction							
	and				curction	V		Evaluate				
	modellin	g of complex re	al world data.									
CO3	Design a	and build the di	fferent enterprise	applications using	modern	VI		Create				
	tools.											
			List of Experimen	ts / Lah Activities	/Tonics							
List of	f Topics(A	oplicable for I	nteraction mode )	:	ropics							
	• <b>F</b> -•»(											
List of	f Lab Acti	vities:										
	1. Min	imum 12 assigni	ments or 6 mini-pro	piects should be pr	actice/perf	form base	ed on	the				
	unde	erstanding of co	ncepts covered in the	heory course.	ne ne e, p e i i	01111 0 400						
	2. The	detail list of ass	ignments/mini-proj	jects will be display	y by subjec	ct teache	r.					
	3. Expl	lore to all the sta	te of the art techno	ology related to eac	h module i	in theory	cours	se.				
	4. Use	industry standar	d development too	Is for above labora	tory work.	a standa	rda					
	J. All	assignments/1a0	oratory work should		engineerin	ig stanua	105.					
			Te	extbooks								
1	Silbe	rschatz, Korth, S	Sudarshan "Databa	se system concepts	" MGH 4t	h Edition	n					
2	Ragh	u Ramkrishnan	"Database Manage	ement System" MG	Н							
				e e e e e e e e e e e e e e e e e e e								
	Thom	nas Connellur e	Carolyn Bagg "Da	tabase Systems : A	practical	annroad	to de	sign				
1	imnle	ementation & M	anagement" Pearso	on 3rd Edition	practical	approact	110 46	Joigii,				

2	RamezElmasri and ShamkantNavathe, "Fundamentals of Database Systems" Benjamin Cummings 2nd Ed, 1994
3	Official websites of open source databases
	Useful Links
1	Parallel processing :- https://docs.oracle.com/cd/A58617_01/server_804/a58238/ch2_succ.htm
2	Distributed database:- https://docs.oracle.com/database/121/ADMIN/ds_concepts.htm#ADMIN12134
3	www.mongodb.com, https://cassandra.apache.org
4	https://neo4j.com/developer/cypher/

	CO-PO Mapping														
	Programme Outcomes (PO)													PSO	
	1         2         3         4         5         6         7         8         9         10         11         12											1	2		
CO1													2		
CO2					2								2		
CO3					3						1		2	3	
CO4	CO4 2														
The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High															

Each CO of the course must map to at least one PO, and preferably to only one PO.

		Assessment			
There are three	components of la	b assessment, LA1, LA2 ar	nd Lab ESE.		
IMP: Lab ESE	is a separate head	of passing.(min 40 %), LA	1+LA2 should be min 40%		
Assessment	Based on	Conducted by	Typical Schedule	Marks	
	Lab activities,		During Week 1 to Week 8		
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30	
	journal		Week 8		
	Lab activities,		During Week 9 to Week 16	1	
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30	
	journal		Week 16		
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19		
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40	
	performance	applicable	Week 19		
Week 1 indicat	es starting week o	f a semester. Lab activities/	Lab performance shall include perfo	rming	

experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

		Wal	chand College	of Engineerin	ng, Sang	gli	
			(Government Alde	2022-23	uie)		
			Course	Information			
Progra	amme		B.Tech. (Compute	er Science Enginee	ring)		
Class,	Semester		Third Year B. Tec	ch., Sem VI			
Cours	e Code		5CS347				
Cours	e Name		Mini Project – 3				
Desire	d Requisi	tes:	Nil				
'	Teaching	Scheme		Examination	Scheme (I	Marks)	
Practi	cal	2 Hrs/ Week	LA1	LA2	Lab I	ESE	Total
Intera	ction	-	30	30	40	)	100
				Cre	edits: 1		
	<b>—</b> 1		Cours	e Objectives			
1	To use la	test design and	development tools	and project design	nringinla	NC	
3	To under	go project mana	t with appropriate r	and project design	i principle	testing tools	
4	To devel	op analytical vis	sion and skills to an	alyse, compare the	e outcome	with other te	echniques.
	1	Course	e Outcomes (CO)	with Bloom's Tax	onomy Le	evel	<b>1</b>
At the	end of the	course, the stud	lents will be able to	,			
00		C				Bloom's	Bloom's
		Cou	rse Outcome State	ment/s		I axonomy Level	1 axonomy Description
CO1	Demonst presentat	rate present t ion.	echnological trend	ds through semi	nar and	I	Remember
CO2	Demonst impleme	rate the appropriation.	priate selection of	software tool for	project	II	Understand
CO3	Work ir developn	n teams and nent.	participate in gro	oup activity of	software	III	Apply
CO4	Develop	a software prod	uct and demonstrat	e its significance .		V	Evaluate
		1	ist of Free opins on t	a / I ah A ativitian	Toriog		
I ist of	Tonias (A	nnliaghla fan I	List of Experiment	s / Lad Activities	opics		
LIST OF	T opics(A	pplicable for 1	nteraction mode ):				
List of	f Lab Acti	vities:					
	<ol> <li>The focus the c</li> <li>Stude</li> </ol>	theme of Mini F s should be mor ourse which are ents should mai	Project 3 should be e on the courses wh not covered in pre- ntain a project log b	based on current of hich doesn't have l vious Mini Project book containing w	r previous ab course 1/2 task). eekly prog	semester co (Preference) gress of the p	urses completed, should give to roject
	3. At the prob	ne end of the ser lem statement.	nester the project g	roup should achiev	e all the p	proposed obje	ectives of the
	4. The	work should be	completed in all as	pects of design, im	plementat	tion and testi	ng.
	5. Proje	ect report should	l be prepared and si	ubmitted in soft an	d hard for	m along with	all the code and
	6. Grou	ip should demoi	nstrate the work wit	h various test case	s and resu	lts obtained	and explain
	7. The work	group should pa and findings in	rticipate in technica technical commun	al symposiums, pa ity.	per presen	tations to de	monstrate their
		6.					
1	Nil		Te	EXTDOOKS			
			Re	ferences			

1	Nil
	Useful Links
1	Nil

	CO-PO Mapping													
				]	Progra	mme C	Outcom	es (PO	)				PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2												3	3
CO2	2	3											3	3
CO3		2		3	2								2	
CO4	2										3			3
The stre	The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High													
Each CO	O of the	e course	e must i	nap to	at least	one PC	), and p	referab	ly to or	nly one	PO.			

		Assessment			
There are three	components of la	b assessment, LA1, LA2 an	d Lab ESE.		
IMP: Lab ESE	is a separate head	of passing.(min 40 %), LA	1+LA2 should be min 40%		
Assessment	Based on	Conducted by	Typical Schedule	Marks	
	Lab activities,		During Week 1 to Week 8		
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30	
	journal		Week 8		
	Lab activities,		During Week 9 to Week 16		
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30	
	journal		Week 16		
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19		
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40	
	performance	applicable	Week 19		

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Walchand College of Engineering, Sangli							
			(Government Alda	2022-23	uie)		
			Course	Information			
Progra	amme		B.Tech. (Compute	er Science Enginee	ring)		
Class,	Semester		Third Year B. Teo	ch., Sem VI	6,		
Cours	e Code		5CS348				
Cours	e Name		Mini Project – 4				
Desire	d Requisi	tes:	Nil				
	-						
	Teaching	Scheme		Examination	Scheme (I	Marks)	
Practi	cal	2 Hrs/ Week	LA1	LA2	Lab F	ESE	Total
Intera	ction		30	30	40	)	100
				Cre	dits: 1		
			Cours	e Objectives			
1	To use la	test design and	development tools				
$\frac{2}{2}$	To under	go project mana	agement techniques	and project design	n principle	S.	
	To imple	ment the project	t with appropriate j	programming langu	ages and	with other t	echniques
	10 00 001	Cours	e Outcomes (CO)	with Bloom's Tax	onomv Le	evel	cerniques.
At the	end of the	course, the stud	lents will be able to	),	<b>/</b>		
~ ~						Bloom's	Bloom's
CO		Cou	rse Outcome State	ement/s		Taxonom	y Taxonomy
CO1	Demonst	rate present t	echnological tren	ds through semi	nar and	Level	Remember
	presentat	ion.	connoiogical acia	us unough somm	ilui una	Ι	Remember
CO2	Demonst	rate the approp	priate selection of	software tool for	project	П	Understand
	impleme	ntation.	· · · ·				
CO3	Work ir developn	i teams and nent.	participate in gro	oup activity of	software	III	Apply
<b>CO4</b>	Develop	a software prod	uct and demonstrat	e its significance.		V	Evaluate
		]	List of Experiment	ts / Lab Activities	/Topics		
List of	f Topics(A	pplicable for I	nteraction mode ):	:			
List of	f Lab Acti	vities:					
	1. Mini	Project 4 shoul	d be on customer s	pecific requiremen	ts useful to	o real life or	industry
	Thin	os (Preference s	s should give to the c	ourse which are no	ige Proces	in previous	Mini Project
	1/2/3	task).		ourse which are no	i covered	in previous	Willin T Tojeet
	2. Stude	ents should mai	ntain a project log	book containing we	eekly prog	gress of the p	project
	3. At th	e end of the ser	nester the project g	roup should achiev	e all the p	roposed obj	ectives of the
	prob.	lem statement.	completed in all as	nects of design im	nlamantat	ion and test	ing
	5. Proje	ect report should	l be prepared and s	ubmitted in soft an	d hard for	m along wit	h all the code and
	datas	ets.	r r and b				
	6. Grou	p should demon	nstrate the work wi	th various test case	s and resu	lts obtained	and explain
	7. The	e scope. group should na	rticipate in technic	al symposiums, pa	per presen	tations to de	emonstrate their
	work	and findings in	technical commun	nity.	r-30011		
			T	vthooks			
1	Nil		10				
			Re	eferences			

1	Nil
	Useful Links
1	Nil

	CO-PO Mapping													
				]	Progra	mme C	outcom	es (PO	)				PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2												3	3
CO2	2	3											3	3
CO3		2		3	2								2	
CO4	2										3			3
The stre	The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High													
Each CO	O of the	e course	e must i	nap to	at least	one PC	), and p	referab	ly to or	nly one	PO.			

		Assessment		
There are three	components of la	b assessment, LA1, LA2 an	d Lab ESE.	
IMP: Lab ESE	is a separate head	of passing.(min 40 %), LA	1+LA2 should be min 40%	
Assessment	Based on	Conducted by	Typical Schedule	Marks
	Lab activities,		During Week 1 to Week 8	
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30
	journal		Week 8	
	Lab activities,		During Week 9 to Week 16	
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30
	journal		Week 16	
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19	
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40
	performance	applicable	Week 19	

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)						
			AY	7 2022-23			
			Course	e Information			
Progra	amme		B.Tech. (Comput	er Science and Eng	gineering)		
Class,	Semester		Third Year B. Te	ch., Sem VI			
Cours	e Code		5HS301				
Cours	e Name		Humanities 2- Ge	erman Language			
Desire	ed Requisi	tes:	10+2 level Englis	sh			
,	Teaching	Scheme		Examination	Scheme (	(Marks)	
Practi	cal		LA1	LA2	Lab l	ESE	Total
Intera	ction	3 Hrs/ Week	30	30	40	)	100
				Cre	edits: 3		
			Cours	se Objectives			
1	To learn	colloquial Gern	nan language				
2	Enable st	tudents to comm	nunicate in day to c	lay situations			
	1 6 1	Cours	e Outcomes (CO)	with Bloom's Tax	konomy L	level	
At the	end of the	course, the stud	lents will be able to	0,		D1 9.	D1
CO		Com	rsa Autooma State	mont/s		Bloom's Tayonomy	Bloom's Taxonomy
		Cou	ise Outcome State	cilicity's		Level	Description
<b>CO1</b>	Commun	nicate clearly in	different scenarios			III	Applying
CO2	Handle o	oral and written	communications in	dependently		II	Understanding
		]	List of Experimen	ts / Lab Activities	/Topics		

# List of Topics(Applicable for Interaction mode ):

Module 1: Sentence structure and vocabulary building

- 1. Alphabet
- 2. Personal pronouns
- 3. German articles
- 4. Genders
- 5. Plural forms
- 6. Nouns

# Module 2:

- 1. Date and days of week
- 2. Names of month
- 3. Numbers 1 to 1000
- 4. Names of Continents, Countries and their Capitals
- 5. Languages and Nationalities, main cultural festivals
- 6. Health and parts of body.

## Module 3:

- 1. To introduce oneself and others
- 2. Greeting people/colleagues at office/work-place etc.
- 3. Exchanging information about country of origin
- 4. Place of residence, professions

## Module 4: Grammar

- 1. Forming questions
- 2. Prepositions
- 3. Conjunctions
- 4. Verbs
- 5. Dative and Accusative forms with examples
- 6. Opposite

# Module 5: Oral Communication

- 1. Asking for and telling telephone numbers with dial code numbers.
- 2. Making request
- 3. Word order in sentences/statements and full question.
- 4. Adding question tags.
- 5. Speak on given topic.
- 6. Asking questions

# Module 6: Written communication: Basic writing skills

- 1. Paragraph writing
- 2. Comprehension
- 3. Short easy writing
- 4. Filling in personal information
- 5. Writing emails and short messages

	Textbooks					
	Hartmut Auf der Strasse, Heiko Bock, Mechthild Gerdes, Jutta Mueller, Helmut Mueller, "Themen					
1	Aktuell 1- Deutsch als Fremdsprache-Kursbuch", Max Hueber Verlag, Munich, Germany and					
	Langers International Pvt.Ltd., New Delhi ,ISBN: 3-19-00016909, Reprint 2014					
	Hartmut Auf der Strasse, Heiko Bock, Mechthild Gerdes, Jutta Mueller, Helmut Mueller, "Themen					
2	Aktuell1- Deutsch als Fremdsprache-Arbeitsbuch", Max Hueber Verlag, Munich, Germany and					
	Langers International Pvt.Ltd., New Delhi ,ISBN: 3-19-0116903, Reprint 201					
	Alan B, Jones A."Themen Aktuell 1- Deutsch als Fremdsprache - Glossar", Max Hueber Verlag,					
3	Munich, Germany and Langers International Pvt.Ltd., New Delhi ,ISBN: 3-19-0001690-9, Reprint					
	2014					
4						
	References					
1	Archana Gogate, "German Workbook", Shubhasha Publications, Pune, Reprint July 2016					

2	Stefanie Dengler, Paul Rusch, Helen Schmitz, Tanja Sieber, "Netzwerk A1- Deutsch als FremdspracheKursbuch " Klett Langenscheidt, Munich, Germany and GOYAL Publishers Pyt.
	Ltd., New Delhi, First Indian edition-2015
	Stefanie Dengler, Paul Rusch, Helen Schmitz, Tanja Sieber, "Netzwerk A1- Deutsch als
3	Fremdsprache Arbeitsbuch ",Klett Langenscheidt, Munich, Germany and GOYAL Publishers
	Pvt.Ltd., New Delhi, First Indian edition-2015
4	Stefanie Dengler, Paul Rusch, Helen Schmitz, Tanja Sieber, Gavin Schalliol"Netzwerk A1-
	Deutsch aistremdsprache. Glossar ", Klett Langenscheidt, Munich, Germany and GOYAL
	Publishers Pvt.Ltd., New Delhi, First Indian edition-2015
	Useful Links
1	www.klett-sprachen.de/netzwerk
2	http://uztranslation.net.ru

	CO-PO Mapping													
		Programme Outcomes (PO)											PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1										1				
CO2										1				
The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High														

Each CO of the course must map to at least one PO, and preferably to only one PO.

	Assessment										
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%											
Assessment Based on Conducted by Typical Schedule Marks											
Lab activities,   During Week 1 to Week 8											
LA1	LA1 attendance, Lab Course Faculty Marks Submission at the end of 30										
	journal		Week 8								
	Lab activities,		During Week 9 to Week 16								
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30							
	journal		Week 16								
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19								
Lab ESE	Lab ESEjournal/External Examiner asMarks Submission at the end of40										
performance applicable Week 19											
Week 1 indicate	es starting week o	f a semester. Lab activities/	Lab performance shall include perfo	orming							

experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
AY 2022-23										
			Course	Information						
Progr	amme		B Tech (Comput	ter Science and Engineerin	(g)					
	Somostor		Third Vear B. Te	her Sem VI	(g)					
Class,	o Codo									
Cours			Flasting 2: Dama	ta Canaina & Casananhia	Information Co					
Cours	$\frac{\text{e Name}}{1 \text{ D}}$		Elective 5: Remo	the Sensing & Geographic	Information Sy	/stem				
Desire	d Requisi	tes:	Fundamentals of	Image processing						
	Teaching	Scheme		Examination Scheme	(Marks)					
Lectu	re	2 Hrs/week	MSE	ISE	ESE	Total				
Tutori	ial	-	30	20	50	100				
Tuton			50	Credite: 2	50	100				
				Cicuits. 2						
			Course	Objectives						
	To introd	luce the fundam	entals of Remote S	Sensing (RS) and geograph	ical informatic	on systems				
1	(GIS)									
2	To explore various Remote Sensing satellites, their characteristics and data products									
3	To inculcate advantages, limitations and interdisciplinary applications of RS and GIS									
		Course	Outcomes (CO) w	vith Bloom's Taxonomy I	Level					
At the	end of the	course, the stud	ents will be able to	о,	1	1				
	Bloom's									
CO	Course Outcome Statement/s Taxonomy									
<u>C01</u>	Evoluin	fundamental con	conte of PS and C	IC		Understand				
$\frac{CO1}{CO2}$	Interpret	and Apply varie	ous satellite sensor	data and data products		Apply				
C02	Demonst	rate GIS data ar	d GIS database ma	anagement system		Apply				
CO4	Compare	and Analyze	RS and GIS data	using modern tools and		Analyze				
	technique	es			IV					
CO5	Select an	nd Verify suitab	ole RS and GIS da	ata and data products to		Evaluate				
	design so	olution for vario	us interdisciplinary	y problems using RS and	V					
	GIS tools	s and techniques								
	-			a						
Modu	le		Module	Contents		Hours				
	Conc	epts and Found	lation of Remote	Sensing	ia Enorm					
	Flect	romagnetic Spe	ctrum and its Ch	aracteristics Energy Inter	action in the					
I	Atmo	sphere and with	th the Earth's Su	rface, Resolution in Ren	note Sensing,	5				
	Appl	ications of Remo	ote Sensing.	,	e,					
	Sense	ors, Platforms a	and Satellite Data	Products						
II	Broa	d Classifications	of Sensors and Pl	latform, Earth Observation	Satellite and	4				
	Sense	ors, Data Recept	tion, Transmission	and Processing, Remote	Sensing Data					
	Satel	lite Image Inter	rnretation and Pr	ocossing						
	Inter	retation Proce	dure and Element	ts Interpretation strategie	es and keys					
III	Digit	al Image proces	sing and Image A	Analysis steps. Image Rec	tification and	4				
	Restoration, Image Enhancement, Image Transformation									
	GIS -	- An Overview	,							
	Intro	duction, Geogra	phical concepts a	and Terminology, Differe	ence between					
IV	Imag	e Processing sy	stem and GIS, V	arious GIS packages and	their salient	5				
	featu	res, Essentials c	components of GIS	S, Utility of GIS, Applica	tions of GIS,					
	GPS,	Introduction to	ArcGIS							

V	GIS Data Introduction, GIS Data types and Data Representation, Data Acquisition, Georeferencing of GIS Data, Raster and Vector data, Remote Sensing Data in GIS, GIS Database and Database Management System	4
VI	Spatial Data AnalysisMeasurements in GIS-Lengths, Perimeters, and Areas, Queries, Reclassification, Buffering and Neighborhood Functions, Map Overlay, Spatial Interpolation	4
	Textbooks	
1	Chandra, A.M. and Ghosh, S.K., "Remote Sensing and GIS", Narosa Publishing	House. 2008
2	Lo, C.P. and Young, A.K.W., "Concepts and Techniques of Geographical Inform	nation
	System, Frentice Half India. 20012	
	Deferences	
1	Lillesand, T.M. and Kieffer, "Remote Sensing and Image Interpretation", - 6th Wiley and Sons. 2012	1 Edition, John
2	Chang, K, "Introduction to Geographical Systems", 4th Edition, Tata McGraw-H	Hill. 2010
	Useful Links	
1	https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-ce08	
2	https://nptel.ac.in/noc/courses/noc18/SEM1/noc18-ce10	
3	https://www.usgs.gov	
4	https://bhuvan.nrsc.gov.in/bhuvan_links.php#	

	CO-PO Mapping														
		Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	2														
CO2	3												2		
CO3	3												2		
CO4		2			3								3	3	
CO5															
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High															
Each CO of the course must map to at least one PO.															

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

		Walc	hand College (Government Aided	of Engineering, San d Autonomous Institute)	gli				
			AY	2022-23					
			Course ]	Information					
Progra	amme		B.Tech. (Comput	ter Science and Engineerin	g)				
Class,	Semester		Third Year B. Te	ch., Sem VI					
Cours	e Code		5CS332						
Cours	e Name		Elective 3: Advar	nced Computer Network					
Desire	d Requisi	tes:	Computer Netwo	prks					
			<b>I</b>	-					
	Teaching	Scheme		Examination Scheme	(Marks)				
Lectur	re	2 Hrs/week	MSE	ISE	ESE	Total			
Tutori	ial	_	30	20	50	100			
				Credits: 2	I				
		1	1						
	Course Objectives								
	Build an	understanding o	f the fundamental	concepts of wireless, mobi	le, ad hoc and	Wireless			
1	Sensor Networks.								
2	2 Develop an understanding of different components of computer networks, various protocols, routing algorithms, modern technologies and their applications.								
3	<ul> <li>3 Introduce the students to advanced networking concepts such as DWDM, WSNs, ATM and MPLS.</li> </ul>								
4 Allow the student to gain expertise in some specific areas of networking such as Network designing and Management.									
Course Outcomes (CO) with Bloom's Taxonomy Level									
At the	end of the	course, the stud	ents will be able to	),					
СО		Cours	se Outcome Stater	nent/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description			
CO1	Understa	nd fundamental	concepts of Wir	eless, Mobile, Ad Hoc,		Understand			
	Sensor,		_		II				
	Optical a	nd ATM networ	ks operation						
CO2	Choose a	ppropriate proto	col for desired cor	nmunication service	III	Apply			
CO3	Compare	various types o	f routing protocols	1 / 1 / 1		Analyse			
<u>CO4</u>	Evaluate	advanced netwo	ork technologies an	id network protocols	V	Evaluate			
N <i>T</i> ]	1.		M J J.	0		TT			
Modu			Niodule (	Contents		Hours			
Ι	Wireless and Mobile NetworksWireless and Mobile NetworksWired communication system, wireless communication system- paging system, cordless telephone system, cellular mobile system, Bluetooth. Wireless Local Area Network (WLAN), Wireless Generations-1G, 2G, 2.5G, 3G, 4G, 5G. Introduction to Cellular mobile Systems-GSM, CDMA. Cellular system design fundamental.								
П	Ad H Ad H wirel Ad h Wirel Routi Dema (AOI Netw applie	loc and Wireles loc Networks-E ess networks, E oc wireless Inte less Networks, ng Protocols - and Routing pro DV). Wireless orks, Enabling cation examples	s Sensor Network lements of Ad hoc xample commercia rnet, Issues in Des Classifications of Destination Seque btocols –Ad hoc Sensor Network Technologies fo , Network Architec	ss Wireless Networks, Issue al applications of Ad hoc signing a Routing Protocolo of Routing Protocols, T enced Distance Vector (I On–Demand Distance Ve s- Challenges for Wire or Wireless Sensor Netwo cture	es in Ad hoc e networking, l for Ad Hoc Yable Driven DSDV), On- ctor Routing eless Sensor works, WSN	5			

Ш	<b>Optical Networking</b> SONET/SDH standards, Dense Wavelength division multiplexing (DWDM).	4
	Performance and design Considerations	
IV	ATM: The WAN Protocol Faces of ATM, ATM Protocol operations (ATM cell and Transmission) ATM Networking basics, Theory of Operations, B-ISDN reference model, PHY layer, ATM Layer (Protocol model), ATM layer and cell, Traffic Descriptor and parameters, Traffic Congestion control defined, AAL Protocol model, Traffic contract and QoS, User Plane overview, Control Plane AAL, Management Plane, Sub-DS3 ATM, ATM public services	5
v	Routing in the InternetRouting in the Internet: Intra and inter domain routing; Unicast RoutingProtocols: RIP, OSPF, BGP; Multicast Routing Protocols: MOSPF, DVMRP,Drawbacks of traditional routing methods, Idea of TE, TE and DifferentTraffic classes. IP over ATM, Multi-protocol Label switching (MPLS), StorageArea Networks (SAN).	5
VI	Network ManagementSNMP: Concept, Management Components, SMI, MIB, SNMP format,Messages, Backbone Network Design: Backbone Requirements, NetworkCapacities Topologies, Topologies Strategies, Tuning Network.	4
	Textbooks	
1	Darren L Spohn, "Data Network Design", TMH	
2	HSPA, and WiMAX", McGraw-Hill Education	r LTE, EVDO,
	References	
1	"Computer Networking: A Top-Down Approach featuring the Internet", F.Kurose.	3e by James
2	Peterson and Davie, Computer Networks: A Systems Approach, Morgan Kaufma 3rd edition (ISBN: 155860832X).	an, 2003,
3	"Ad Hoc Wireless Networks Architectures and Protocols", by C. Siva Ram Manoj	Murthy, B.S.
	· •	
	Useful Links	
1	https://www.youtube.com/watch?app=desktop&v=sFhQzxAZzrw	
2	https://www.youtube.com/watch?v=Sz1PThotOUQ	
3	https://www.youtube.com/watch?v=BuIWNecUAE8	

	CO-PO Mapping														
		Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	3	2	-	-	-	-	-	-	-	-	-	-	3	2	
CO2	3	3	-	-	-	-	-	-	-	-	-	-	3	2	
CO3	3	2	3	-	-	-	-	-	-	-	-	-	3	2	
CO4	3 2 3 3 2														
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High															
Each CO	of the c	course 1	nust m	ap to at	t least c	one PO.									

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	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
				2022-23							
			Course I	Information							
Progr	amme		B Tech (Comput	er Science and Engine	ering)						
Close	Somostor		Third Vear B. Te	ch Sem VI	cring)						
Class,	Semester										
Cours	e Code		JUSSSS Elective 2: Deen	Loomina							
			Elective 5: Deep		<u> </u>	N 1 1 11.					
Desire	ed Requisi	tes:	Theory	ige of Linear Algebra,	Statistics and I	robability					
	Teaching	Scheme		Examination Sche	me (Marks)						
Lectu	re	2 Hrs/week	MSE	ISE	ESE	Total					
Tutor	ial	50	100								
		2									
			Course	Objectives							
	To explai	n the fundamen	tals of neural netwo	orks, recurrent neural i	networks (RNN	), long short term					
1	memory	cells and convol	lutional neural netw	vorks (CNN).		), iong short term					
2	To demo	nstrate various l	earning models for	practical application.							
3	To discus	s CNN, RNN a	nd Generative mod	el according to accura	cy and speed ev	aluation					
	paramete	r's									
A + +1	1 6 4	Course	Outcomes (CO) w	ith Bloom's Taxonon	ny Level						
At the	At the end of the course, the students will be able to,										
CO		Course	Outcome Stateme	ent/s	DIOUIII'S Taxonomy	DIOUIII'S Taxonomy					
		Course	Outcome Statem		Level	Description					
CO1	Illustrate mathema	fundamentals tics terminology	of deep learning	using foundation of	II	Understanding					
CO2	Compare	various deep l	earning models by	hyper tuning various	IV	Analyzing					
CO3	Demonst	rate various cas	e studies of deep le	arning.	III	Applying					
CO4	Design a	nd deploy deep	learning models or	n various frameworks	VI	Creating					
	and platf	orm.	-		VI						
Modu	ıle		Module Co	ontents		Hours					
	Intro	duction to Dee	p Learning								
I	Neura	l network fun	damentals: Genera	al Introduction to De	ep Learning,	5					
	Image	ptron algorithm fundamentals:	, Back propagation Pixels Image coor	and Multi-layer Netw	OFKS.						
	Para	neterized Lear	ning and Ontimiz	ation Methods							
	paran	neterized Lear	ning: Introduction	n to linear classifi	cation, Four						
II	comp	onents of param	neterized learning, r	ole of loss function.		4					
	Optin	iization wiethou	is: Optimization M	ethods: Gradient desce	,						
	Optin gradie	ent descent (SG	D) and extensions t	o SGD, regularization	·						
	Optin gradie Conv	ent descent (SG	Is: Optimization M D) and extensions t al Networks (CNN	o SGD, regularization							
	Optin gradie Conv Unde "Big	ent descent (SG olutional Neur rstanding Conv Matrix" and "T	Is: Optimization M D) and extensions t al Networks (CNN olutions: Convolu Siny Matrix" Analo	o SGD, regularization ) tions versus Cross-co	rrelation, The						
	Optin gradid Conv Unde "Big Exam	ent descent (SG olutional Neur rstanding Conv Matrix" and "T ple of Convolut	Is: Optimization M D) and extensions t al Networks (CNN olutions: Convolu iny Matrix" Analo- ion The Role of Co	o SGD, regularization tions versus Cross-co ogy, Kernels, A Hand	rrelation, The Computation	5					
III	Optin gradid Conv Unde "Big Exam CNN	ent descent (SG olutional Neur rstanding Conv Matrix" and "T ple of Convolut Building bloc	Is: Optimization M D) and extensions t al Networks (CNN olutions: Convolu iny Matrix" Analo- tion The Role of Co ks: Laver Types.	o SGD, regularization tions versus Cross-co ogy, Kernels, A Hand provolutions in Deep Le Convolutional Laver	rrelation, The Computation earning. rs, Activation	5					
III	Optin gradie Conv Unde "Big Exam CNN Layer	ent descent (SG olutional Neur rstanding Conv Matrix" and "T ple of Convolut Building block s, Pooling La	Is: Optimization M D) and extensions t al Networks (CNN olutions: Convolu iny Matrix" Analo- tion The Role of Co- ks: Layer Types, yers, Fully-connec	o SGD, regularization tions versus Cross-co ogy, Kernels, A Hand onvolutions in Deep La Convolutional Layer ted Layers, Batch N	rrelation, The Computation earning. rs, Activation Jormalization,	5					
III	Optin gradid Conv Unde "Big Exam CNN Layer Drop	ent descent (SG olutional Neur rstanding Conv Matrix" and "T ple of Convolut Building block s, Pooling La put, ShallowNE	Is: Optimization M D) and extensions t al Networks (CNN olutions: Convolu Tiny Matrix" Analo- tion The Role of Co ks: Layer Types, yers, Fully-connec t, LeNet, MiniVGC	o SGD, regularization tions versus Cross-co ogy, Kernels, A Hand onvolutions in Deep La Convolutional Layer ted Layers, Batch N GNET	rrelation, The Computation earning. rs, Activation Iormalization,	5					
III	Optim gradie Conv Unde "Big Exam CNN Layer Drope Deep	ent descent (SG olutional Neur rstanding Conv Matrix" and "T ple of Convolut Building block s, Pooling La but, ShallowNE learning-based	Is: Optimization M D) and extensions t al Networks (CNN olutions: Convolu iny Matrix" Analo ion The Role of Co ks: Layer Types, yers, Fully-connec t, LeNet, MiniVGC I object detection	ethods: Gradient desce o SGD, regularization tions versus Cross-co ogy, Kernels, A Hand onvolutions in Deep Le Convolutional Layer ted Layers, Batch N NET	rrelation, The Computation earning. rs, Activation lormalization,	5					
III IV	Optin gradid Conv Unde "Big Exam CNN Layer Dropo <b>Deep</b> Funda	ent descent (SG olutional Neur rstanding Conv Matrix" and "T ple of Convolut Building block s, Pooling La put, ShallowNE learning-based amentals of Obj	Is: Optimization M D) and extensions t al Networks (CNN olutions: Convolu Tiny Matrix" Analo- tion The Role of Co ks: Layer Types, yers, Fully-connec t, LeNet, MiniVGC I object detection ect detection, Family	ethods: Gradient desce o SGD, regularization (1) tions versus Cross-co ogy, Kernels, A Hand onvolutions in Deep Le Convolutional Layer ted Layers, Batch N GNET	rrelation, The Computation earning. rs, Activation lormalization,	5					

	Sequence Models	
V	Recurrent Neural Networks, Vanishing gradients, Gated Recurrent Units	
v	(GRU), Long-short-term-memories (LSTMs), Transformer, Bidirectional	4
	Encoder Representations from Transformers (BERT)	
VI	Generative Models	
V1	Autoencoders, Variational Autoencoders, Generative Adversarial Networks	4
	Textbooks	
1	Ian Goodfellow, Yoshua Bengio and Aaron Courville Deep Learning, MIT I	Press, 2016
2	Aurelien Geron, "Hands-On Machine Learning with Scikit-Learn	& TensorFlow",
	O'REILLY, Dec 2017	
	References	
1	Neural Networks: A Systematic Introduction, Raúl Rojas, 1996	
2	Pattern Recognition and Machine Learning, Christopher Bishop, 2007	
3	Prof. Mitesh M. Khapra, "Deep Learning", course on NPTEL, July 2018	
4	Andrew Ng, "Deep Learning Specialization", Coursera online course	
	Useful Links	
1	https://nptel.ac.in/courses/106/106/106106184/	
2	https://www.coursera.org/specializations/deep-learning	
3	Google Colab: https://colab.research.google.com/	
4	Transformer: https://huggingface.co/course/chapter1/1?fw=pt	

	CO-PO Mapping													
		Programme Outcomes (PO)												50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2													
CO2		2		1										
CO3			2											1
CO4			3		1									2
The stars	ath af u		- in to 1			. T	2. 14.1	: 2.	TT: al.					

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.

## Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

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ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)									
			AY	2022-23						
			Course	Information						
Progra	amme		B.Tech. (Comput	ter Science and Engineerin	(g)					
Class.	Semester		Third Year B. Te	ech., Sem VI	6/					
Cours	e Code		5CS334							
Cours	e Name		Elective 3: Soft C	Computing						
Desire	d Requisi	tes:		1 0						
	-		1							
	Teaching	Scheme		<b>Examination Scheme</b>	(Marks)					
Lectur	re	2 Hrs/week	MSE	ISE	ESE	Total				
Tutori	ial	-	30	20	50	100				
				Credits: 2	1					
	Course Objectives									
1	1 Understand comparative performance of soft and hard computing approaches.									
2	Provide t	o students a sou	nd foundation of m	nathematical, scientific and	l engineering p	rinciples				
2	Imbibe c	ate, solve and a	nalyse learning pro	oblems using soft computing	ıg.					
4	Understa	nd hybrid applic	cations of ANN Fr	izzy and GA						
•	4 Understand nybrid applications of ANN, Fuzzy and GA Course Outcomes (CO) with Bloom's Taxonomy Level									
At the end of the course, the students will be able to,										
Bloom's Bloom										
CO		Cours	se Outcome Stater	ment/s	Taxonomy	Taxonomy				
<u>CO1</u>	Interpret	soft computing	schemes using kno	wledge of discrete	Level	Understand				
	mathema	tics, data strue	ctures, theory of	computer science and		Onderstand				
	computer	ſ	j -	I	11					
	architect	ures.								
CO2	Demonst	rate machine lea	arning processes.			Apply				
$\frac{\text{CO3}}{\text{CO4}}$	Compare Design of	and analyse sol	t computing schen	nes.		Analyze				
C04	Evaluate	various scheme	s of soft computing	σ	VI	Fyaluate				
	Lvaluate	various seneme	s of soft computing	5	<b></b>	Lvaluate				
Modu	le		Module	Contents		Hours				
	Mod	ule 1 Fundame	ntals of Neural Ne	etworks						
T	Basic	s: Human Br	ain, Model of	Artificial Neuron, Neur	ral Network	4				
1	Archi	tectures, Charac	cteristics of Neural	Networks, Learning Meth	ods;	·				
	Back	nropagation N	etworks ( <b>BPN</b> )							
	BPN	Architecture, E	Back propagation 1	learning, applications: Par	rity Problem,	-				
	Enco	der Decoder, N	ETtalk and DEC-t	alk, Character Recognition	n, Cognitron;	5				
	CNN, RCNN.									
III	IIIUnsupervised Learning Introductions, ARTI Architecture, ART1 Algorithm, Applications of ART14									
<b>T</b> T 7	Fuzz	y Systems				4				
IV	Fuzzy	/ logic: Fuzzy (	Quantifiers, Fuzzy	Inference; Fuzzy Rule B	ased System;	4				
	Gene	tic Algorithm	ous, Applications.							
v	Funda Princ Struc	amentals: Biolo iple, Encoding ture: Mutation, (	ogical background , Reproduction Crossover, Selectio	d, Creation of Offspring ; Mathematical Found on; Applications	gs, Working ations; Data	6				

VI	<b>Hybrid Systems</b> Integration of neural networks, fuzzy logic and genetic algorithms: Hybrid Systems; Neuro-Fuzzy hybrids, Neuro-Evolutionary Hybrids, Fuzzy- Evolutionary Hybrids, GA-based BPN, Simplified Fuzzy ARTMAP.	3										
	· · · · · · · · · · · · · · · · · · ·											
	Textbooks											
1	"Neural Networks, Fuzzy Logic and Genetic Algorithms", S.	Rajasekaran,										
	G.A.VijayalakshmiPai, PHI (ECE).	-										
References												
1	MIT-OCW											
2	Hertz, Krogh, Palmer"Introduction to the Theory of Neural Computation"											
3	B. Yegnanarayana, PHI, "Artificial Neural Networks"											
4	David E. Goldberg, Addison Wesley, "Genetic Algorithms"											
Useful Links												
1	https://cse.iitkgp.ac.in/~dsamanta/courses/sca/index.html											

CO-PO Mapping														
	Programme Outcomes (PO)									PSO				
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2													
CO2			3										3	
CO3		3		2										
CO4			3										3	
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High														

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## Assessment

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Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)											
AY 2022-23											
	Course Information										
Programme         B.Tech. (Computer Science Engineering)											
Class,	Semester		Third Year B. Tech., Sem VI								
Cours	e Code		5CS372								
Cours	e Name		Elective 4 Lab: Software Engineering Tools Laboratory								
Desired Requisites: Software Engineering SDLC, Project Management, Agile Methodolo											
	Teaching	Scheme		Examination	Scheme (	Marks)					
Practi	cal	4 Hrs/ Week	LA1	LA2	Lab l	ESE	Total				
Intera	ction	-	30	30	40	)	100				
				Cre	dits: 2						
			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~								
			Cours	se Objectives		.1 775 1 1					
1	To Unde	rstand the Software and the here	vare Development of the operation of the	dearth and Tools pr	framouvor	the IT indu	istry.				
2	on SDLC		us on exploration o	i various software	mannewor	KS and CA.	SE tools used				
3	To cogni	ze with the Tes	ting tools to ensure	quality assurance.							
		Cours	e Outcomes (CO)	with Bloom's Tax	onomy L	evel					
At the	end of the	course, the stud	lents will be able to),							
CO		Cou	nga Autooma State	montla		Bloom's	Bloom's				
		Cou	ise Outcome State	ement/s		Level	Description				
CO1	Be famil used in th	iar with open he industry.	urrently	II	Understand						
CO2	Utilize of application	open source so ons, particularly	software	III	Apply						
CO3	Get acqu	ainted with the	use of software to	ools to achieve qua	lity and	VI	Create				
	Industry	readiness.									
		l	List of Experimen	ts / Lab Activities/	Topics						
List of	f Topics(A	pplicable for I	nteraction mode)	:	<u>- opres</u>						
List of	f Lab Acti	vities:	,								
	1. Over	view of FOSS.	C 1 1	1							
	2. Stud	y of different so	oftware development	t frameworks.							
	4. Unde	erstanding versi	on control using V	SS.							
	5. Man	aging code usin	g SVN.								
	6. Perfe	orming Function	nal testing								
	7. Perfe	orming regression	on testing								
	8. Perio	orming perform	ance testing	nole							
	10. Stud	v of various sof	tware engineering	tools (e.g CircleCI.	Maven. C	Gradle).					
			6 6	,	,						
			T	extbooks							
1	Dr.K.	V.K.K.Prasad,	"Software Testing	$\frac{\text{Tools}^{"}}{1}$	" D	<u> </u>					
2	Desik	an, Kamesh, "S	oitware Testing: p	rinciples and Practi	ces", Peai	rson Educat	uon, ISBN				
			D	eferences							
-	Nina	Godbole, "Soft	ware Quality Assur	ance: Principles A	nd Practic	e", Alpha S	Science				
	1 International, Ltd (August 1, 2004)										

Useful Links							
1	https://www.javatpoint.com/software-engineering-case-tools-for-software-metrics						
2	https://www.javatpoint.com/github						
3	https://www.javatpoint.com/software-testing-tutorial						

CO-PO Mapping														
		Programme Outcomes (PO)										PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	2											1	
CO2					2									
CO3				2		2								2
The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High														
Each CO of the course must map to at least one PO, and preferably to only one PO.														

Assessment									
There are three components of lab assessment, LA1, LA2 and Lab ESE.									
IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%									
Assessment	Based on	Conducted by	Typical Schedule	Marks					
	Lab activities,		During Week 1 to Week 8						
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30					
	journal		Week 8						
	Lab activities,		During Week 9 to Week 16						
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30					
	journal		Week 16						
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19						
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40					
	performance	applicable	Week 19						

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.
Walchand College of Engineering, Sangli											
AY 2022-23											
Course Information											
Programme B.Tech. (Computer Science Engineering)											
Class,	Class, Semester Third Year B. Tech., Sem VI										
Cours	Course Code 5CS373										
Cours	se Name		Elective 4 Lab: Advanced Web and Mobile Application Development Lab								
Desire	ed Requisi	tes:	Programming Lab-3								
	Teaching	Scheme		Examination	Scheme	(Marks)					
Practi	ical	4 Hrs/ Week	LA1	LA2	Lab	ESE		Total			
Intera	action	-	30	30	40	0		100			
				Cre	dits: 2						
			~								
		. 1 . 1'	Cour	se Objectives	1 1 1	1		1 6			
1	1 to inculcate understanding of state-of-the-art front-end and back-end development frameworks of										
-	to introduce selection of appropriate concepts from different state-of-the-art frameworks/libraries and										
2	2 tools for developing a web and mobile app.										
3	to infuse skills of combining different components from state-of-the-art technologies to design a web										
	and mob	Cours	e Outcomes (CO)	ns. with Bloom's Tay	onomy I	evel					
At the	end of the	course, the stud	dents will be able t	0.	ununiy i						
со		Cou	rse Outcome State	ement/s		Bloom Taxonoi Level	's my	Bloom's Taxonomy Description			
CO1	summari end web	ze the concept and mobile app	s of various state- development tech	of-the-art front-end nologies & framewo	l, back- orks.	II		Understanding			
CO2	illustrate web and different	the concepts o mobile app de web developme	f various state-of- velopment technol ent tools.	the-art front-end, ba ogies & framework	ack-end as using	III		Applying			
CO3	test the end, bac framewo	concepts and c ck-end web and orks using web c	components of var d mobile app dev levelopment tools.	ious state-of-the-ar velopment technolo	t front- ogies &	IV		Analysing			
CO4	select a developr to solve	ppropriate fro nent technologi real-world prob	nt-end, back-end es, frameworks, to lems.	web and mobi	le app ponents	V		Evaluating			
CO5	O5build a web app and/or mobile app, individually or in a team by combining various state-of-the-art front-end, back-end and/or mobile app development technologies & frameworks for real-worldVICreatingCreating										
]	List of Experimer	nts / Lab Activities/	Topics						

List of Topics(Applicable for Interaction mode): List of Lab Activities:

Module 1: Web Application Framework/Library – Part 1

State-of-the-art Front-End Framework library: One of the following technologies will be considered: Angular, React.js or other state-of-the-art front-end development framework/library.

Experiments:

1. Installing framework and configuring Integrated Development Environment (IDE), and its dependencies.

- 2. Creating workspace, project and setting up the necessary environment.
- 3. Implementing the fundamental syntaxes and components of the framework.
- 4. Building and testing the application.
- 5. Deploying the application.

Module 2: Web Application Framework/Library – Part 2

State-of-the-art Front-End Framework library: One of the following technologies will be

considered:Meteor.js, Vue.js or other state-of-the-art front-end development framework/library.

Experiments:

- 1. Installing framework and configuring Integrated Development Environment (IDE), and its dependencies.
- 2. Creating workspace, project and setting up the necessary environment.
- 3. Implementing the fundamental syntaxes and components of the framework.
- 4. Building and testing the application.
- 5. Deploying the application.

Module 3: Server-side Development Framework/Library – Part 1

State-of-the-art server-side Technology: Ruby on Rails, Flask or other state-of-the-art back-end development framework/library.

Experiments:

1. Installing framework and configuring Integrated Development Environment (IDE), and its dependencies.

- 2. Creating workspace, project and setting up the necessary environment.
- 3. Implementing the fundamental syntaxes and components of the framework.
- 4. Implementing server-side validations and authentication for web application.
- 5. Implementing CRUD operations for web application.
- 6. Building and testing the application.
- 7. Deploying the application.

Module 4: Server-side Development Framework/Library – Part 2

State-of-the-art server-side Technology: Django or another state-of-the-art framework/library. **Experiments:**

1. Installing framework and configuring Integrated Development Environment (IDE), and its dependencies.

- 2. Creating workspace, project and setting up the necessary environment.
- 3. Implementing the fundamental syntaxes and components of the framework.
- 4. Implementing server-side validations and authentication for web application.
- 5. Implementing CRUD operations for web application.
- 6. Building and testing the application.
- 7. Deploying the application.

Module 5: Mobile App Development

Introduction to App Development, Introduction to Android App Development, Installation and configuration of IDE, Activities, Intents and Intent Filters, UI and Navigation, Camera, Connectivity to database, Webbased content, debugging and testing the app, and publishing the app.

Experiments:

- 1. Installing and configuring Integrated Development Environment (IDE).
- 2. Managing the project.
- 3. Writing the app.
- 4. Connecting the app to the database.
- 5. Building and running the app on an emulator and on a hardware device.
- 6. Configuring, debugging, testing, and profiling the app.
- 7. Publishing the app on the marketplace.

Module 6: Hosting Web Applications

Building web application and Hosting web application.

Experiments:

- 1. Choosing a hosting server and selecting a plan for web hosting.
- 2. Choosing and configuring DNS address.
- 3. Uploading, configuring and running the website over the internet.

Course Contents for BTech Programme, Department of Computer Science and Engineering, AY2022-23

	Textbooks
1	Vasan Subramanian, "Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node", Apress, 2nd Edition, 2019, ISBN-13: 978-1484243909
2	Azat Mardan, "Full Stack JavaScript: Learn Backbone.js, Node.js, and MongoDB", Apress,2nd Edition, 2018, ISBN-13: 978-1484237175
3	Neil Smyth, "Android Studio 3.6 Development Essentials - Java Edition: Developing Android 10 (Q) Apps Using Android Studio 3.6, Java and Android Jetpack", Payload Media, 2020,ISBN-13: 978-1951442156
	References
1	Dawn Griffiths, David Griffiths, "Head First Android Development", O'Reilly Media, 2nd Edition, 2017, ISBN: 9781491974056
2	Rick Boyer, "Android 9 Development Cookbook: Over 100 recipes and solutions to solve the most common problems faced by Android developers", Packt Publishing Limited, 3rd Edition, 2018, ISBN-13: 978-1788991216
3	Felipe Coury, Ari Lerner, Carlos Taborda, "ng-book: The Complete Guide to Angular", Create Space Independent Publishing Platform, 5th Edition, 2018, ISBN-13: 978- 1985170285
	Useful Links
1	www.w3schools.com
2	https://developer.android.com/docs
3	Official framework websites for Documentation/Help

	CO-PO Mapping													
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	1												1
CO2	3	2	2	3										2
CO3		3		2										1
CO4		2		2										1
CO5			3	2					3					2
The stre	ngth of	f mappi	ng is to	be wri	tten as	1,2,3; v	where, 1	: Low,	2: Mea	lium, 3	High	-	-	

Each CO of the course must map to at least one PO, and preferably to only one PO.

	Assessment											
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%												
Assessment	Based on	Conducted by	Typical Schedule	Marks								
LA1	Lab activities,		During Week 1 to Week 8									
	attendance,	Lab Course Faculty	Marks Submission at the end of	30								
	journal		Week 8									
	Lab activities,		During Week 9 to Week 16									
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30								
	journal		Week 16									
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19									
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40								
	performance	applicable	Week 19									

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Walchand College of Engineering, Sangli											
	AV 2022-23										
	Course Information										
Ducan			D Tash (Comput	tan Spience and Engin	again a)						
Progra	amme	eering)									
Class,	Semester		Third Year B. Te	cn., Sem VI							
Cours	e Code		50E378		-						
Course Name Open Elective-3: Fundamentals of IOT											
Desired Kequisites: Basic programming knowledge											
	Teaching	Scheme									
Lectur	re	2 Hrs/week	MSE	ISE	ESE	Total					
Tutori	ial	-	30	20	50	100					
				Credits	s: 2						
			Course	Objectives							
1	To illustr	ate the basic con	ncepts of Internet of	of Things.							
$\frac{2}{2}$	To illustr	ate basic concep	ots of IIOT.								
	To demo	nstrate Working	of IOT devices.	14h Dloom 27 Town	T arral						
At the	end of the	course the stud	ents will be able to	VILIN BIOOM'S TAXONO	my Level						
CO	At the end of the course, the students will be able to, CO Bloom's Taxonomy										
	Level	Description									
$\frac{COI}{CO2}$		Apply									
CO3 To access different operations using IOT applications						Appiy Evaluate					
CO4 To produce a program to solve a real-world problem VI											
	10 produ	ee a program to	sorve a rear worra			Create					
Modu	le		Module	Contents		Hours					
I	Introc Introc Techi	luction to Intern luction, Physica nology, Sensing	et of Things al design of IOT, Actuation	Logical Design of I	OT,IOT Enabling	4					
П	Basic	s of IOT Netwo	rking orking IOT Netwo	rk Protocols Connect	tivity Technology	5					
	INT a	and Communica	tion Protocols	ik i fotocols, connect	tivity reenhology						
III	Comr Comr	nunication P nunications .	rotocols, Sensor	r Networks, Ma	chine-to-Machine	5					
IV	Intero Introc Introc	luction to Raspt	ino Programming, perry Pi, Implemen	Introduction to Pyth tation of IoT with Ras	on programming, spberry Pi.	4					
V	Indus Introc Platfo	trial IoT luction to IIOT orm	,AWS-IOT, Introc	luction to Lora-wan,	Node MCU IOT	4					
VI	Case Agric Envir	Study ulture, Health onment	care, Smart	city, Activity Mor	itoring, Energy,	4					
				uth a alwa							
1	S Mi	sra A Mukheri	ee and A Roy 20	20 Introduction to Io	T. Cambridge Univ	versity Press					
	S. Mi	sra, C. Roy, an	d A. Mukherjee, 2	2020. Introduction to 10	Industrial Internet	of Things and					
2	Indus	try 4.0. CRC Pr	ess.								
3	Resea	arch Papers									

	References										
1	Arashdeep Bahga, Vijay Madisetti Internet of Things an Hands on Approach, University Press.										
	Useful Links										
1	https://onlinecourses.nptel.ac.in/noc21_cs17										

CO-PO Mapping														
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1		2	3											2
CO2	1		2											2
CO3	1	2	2											2
CO4		2	1											1
The strong	oth of r	nonnin	a is to l	a writt	en as 1	· Low	2. Med	ium 2.	High					

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
	AY 2022-23										
	Course Information										
Progr	amme		B Tech (Comput	er Science and Engi	ineerin	a)					
Class	Somostor		Third Year B. Te	ch Sem VI		5)					
Course Code 50E270											
Cours	e Coue		Open Elective 4:	Artificial Intelligon	aa and	Machinala	mina				
Desired Description											
Desire	nitroductory riogramming knowledge, riobability and stat										
	Teaching	Scheme		Examination Sc	heme	(Marks)					
Lectur	re	3 Hrs/week	MSE	ISE		ESE	Total				
Tutori	ial	-	30	20		50	100				
				Credi	ts: 3						
		1	1								
			Course	Objectives							
1	Introduce	e and apply Prin	ciples of Artificial	Intelligence.							
2	Introduce	and apply Prin	ciples of Machine l	Learning.							
		Course	Outcomes (CO) w	ith Bloom's Taxon	omy I	Level					
At the	end of the	course, the stud	ents will be able to	,							
		C				Bloom's	Bloom's				
CO			se Outcome Staten	nent/s	Laxonomy	1 axonomy Decemination					
C01	Illustrate	AI and MI. Pro	blems and its simn	le solutions		III	Apply				
CO2 Compare simple solutions for AI and ML problems							Analyze				
CO3 Classify various AI and ML problem solving schemes. V						Evaluate					
	<u> </u>			6							
Modu	le		Module (Contents			Hours				
	Intro	duction to AI a	nd Problem Solvi	ng							
I	Introc Const	luction, History traint satisfaction	, Application, App n problems.	roaches, Problem so	olving	by searching.	7				
	Knov	vledge Represe	ntation, Logic and	l Reasoning							
II	Propo	sitional Logic,	Inference rules, Fir	7							
	syster	ms, Reasoning v	vith uncertainty, Fu	izzy reasoning, Baye	es netv	vorks.					
	Expe	rt Systems	nabita atuma Dula 1	and EC Dula Inde		Tutus du sti su	6				
111	ES C	tural Language	Processing	based ES, Rule Indu	uction,	Introduction	0				
	Intro	duction to Mac	hine Learning								
IV	Intro	luction to Mac	hine Learning. C	Concepts of Super	vised	and	6				
	Unsu	pervised Learn	ning,Linear and M	ng,Linear and Multivariate Regression.							
	Class	ification and U	Insupervised learn	ing							
V	Decis	ion Trees, Log	gistic regression,	Unsupervised learn	ning-C	lustering, K-	7				
	mean	s clustering, Dir	nensionality Reduc	ction-PCA.							
VI	Evalu Evalu Study	lation Measure	, ROC curve, Intro	duction to reinforce	ment le	earning, Case	6				
			Tex	tbooks							
1	Elain	e Rich and Kelv	in Knight, Nair, "A	Artificial Intelligence	e," Mc	Graw Hill Pu	blication.				
2	Janak India	firaman et al., "I	Foundations of Arti	ficial Intelligence an	nd Exp	ert Systems"	, MacMillan				
3	India. 2 Tom M. Mitchell, Machine Learning, McCrew, Uill										
	Tom	M. Mitchell, Ma	achine Learning, M	cGraw-Hill.							

	References									
1	NPTEL course on Introduction to AI.									
2	NPTEL course on Introduction to Machine Learning.									
	Useful Links									
1	Artificial Intelligence Search Methods for Problem Solving (SWAYAM):									
1	https://onlinecourses.nptel.ac.in/noc21_cs79/preview									
2	Introduction to Artificial Intelligence (AI) (Coursera):									
	https://www.coursera.org/learn/introduction-to-ai									
3	https://ai.google/education/									
4	Machine Learning by Stanford (Andrew Ng) on Coursera:									
4	https://www.coursera.org/learn/machine-learning									
5	Introduction to Machine Learning – IITM (SWAYAM)									
5	https://onlinecourses.nptel.ac.in/noc21_cs70/preview									

CO-PO Mapping														
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3												1	
CO2		3											1	
CO3		3											1	
The stren	The strength of mapping is to be written as 1: Low, 2: Medium, 3: High													
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Assessment

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