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		Basic	c of sem	ICOI	nductors: De	ensity of	energy st	tates, Ener	gy-band	8				

	levels. Mobility and carrier concentrations (intrinsic). Radiative and non - radiative recombination mechanisms in semiconductors . Semiconductor Devices : Properties of PN junction and I-V diode equation, Photovoltaic cell, LED Materials for fabrication, LED Structures and Characteristics; Injection Laser Diode (ILD) - Laser action in semiconductors, structures and efficiency.		
IV	8		
V	Dielectrics Materials : Polar and Non-Polar Dielectrics, Dipole moment and Polarization, Dielectric constant& Polarization, Gauss law in Dielectric, the relation between electric field vector E, Pand D. Piezoelectric materials - Ferroelectric materials, Piezoelectric effect, direct and converse parameter definitions, Piezoceramics, Piezopolymers, Piezoelectric materials as sensor and transducers.	8	
	itures (ir any)	40	
Suggestive	e list of experiments:	40	
1 Te	a determine the width of a single slit from the study of Fraunhoffer diffract	ion nat	tern using
a	He-Ne Laser.	ion pai	tom using
2. To	o determine the frequency of A.C. mains using an electrical - vibrator.		
3. D	etermination of Planck's constant.		
4. To	o determine the frequency of A.C. mains using a sonometer		
5. To	o study the nature of polarization of light using the half-wave plate.		
6. To	o find the numerical aperture of the given fibre.		
7. To	b determine the refractive indices μ_0 and μ_e of Quartz prism for ordinary and	nd extr	aordinary
ra	ys using the spectrometer.		
8. To	b determine the wavelength of monochromatic source of light by Fresnel's b	iprism.	
9. To	b study the V-I characteristics of semiconductor diode		
10.10	o study V-I Characteristics of LED		
11.1(o study the v-l characteristics of tunnel diode	Noute	n'a minaa
12. IC	ethod	Newic	on s rings
13. To	o determine the absorption coefficient of a glass plate by "LUMMER"	BRC	DHUM"
pł	notometer.		
14. To	o determine the resolving power of a telescope.		
15. To	o determine the wavelength of light emitted by mercury vapour lamp usin	ga d	iffraction
gr	ating.		
Text Boo	k-		
• Co	oncepts of Modern Physics, Arthur Beiser, Tata McGraw-Hill,6th edition,20	09.	
• O	ptics, A.Ghatak, McGraw Hill, 2012.		
• E1	ngineering Physics , Hitendra K Malik& A.K. Singh, Mc Graw Hill Educatio	on Priv	vate
	imited		
	icutations of Woodern Filysics, S. F. Falli		
	Textbook of Engineering Physics, S. Chanu. Dhannat Dai Dublisher	e Nou	,
	elhi 8 th edition 2011	5, INCW	
E	lectrical Engineering Materials by A.J. Dekker. PHI publication		
Reference	e Books		
• La	asers and non-linear optics, B.B.Laud, New Age international,3 rd edition,20)11	

- Solid State Physics, S.O.Pillai, New Age International Ltd, publishers •
- Electromagnetic Theory for Telecommunications, C.S.Liu and V.K.Tripathi, Foundation • Books, New Delhi,2007
- Quantum Mechanics by L.I. Schiff, Mc Graw Hill Co.
- A Textbook of Quantum Mechanics by Piravonu Mathews, K. Venkatesan (Tata • McGraw Hill)
- Cady, W. G., Piezoelectricity, Dover Publication •
- Piezoelectric Materials & Devices: Application in Engineering And Medical Sciences By M.S. Vijiya .CRC Press.
- Electrical Engineering Materials Physics Properties by SP A Seth, Dhanpat Rai Publications. .
- Modes of Evaluation and Rubric
- Assignments, Quiz, Tests & exams

Criteria	Excellent (3 points)	Good (2 points)	Fair(1 point)
Quiz	> 80%	60-80%	40-60%
Test & exam	>75%	60 - 75%	< 60%
Assignment	Assignment is coherently organized and the logic / solution to all the problems provided. Writing is clear and concise and persuasive.	Assignment is generally well organized and logic / solution to maximum of the problems provided barring few inaccuracies.	Assignment is poorly organized and difficult to follow. Does not flow logically from one part to another with lots of mistakes

List/Links of e-learning resource

- https://nptel.ac.in/courses/122107035/#
- https://nptel.ac.in/course.html •
- http://www.tndte.gov.in/site/wp-content/uploads/2016/08/Engineering-physics.pdf •
- https://physicstoday.scitation.org
- Barbastathis, G. and Sheppard C., Optics, •

Han

https://ocw.mit.edu/courses/mechanical-engineering/2-71-optics-spring-2009/

Recommendation by Board of studies on	14.06.2022
Approval by Academic council on	
Compiled and designed by	Jetendra Parashar
Subject handled by department	Applied Science (Physics)
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Reputy:

(Engineering Conege), ViDISHA M.P (An Autonomous Institute Affiliated to RGPV Bhopal) Computer Science and Engineering Semester/Year Program B.Tech. Subject ESC Subject CSA101 Subject Category ESC Subject CSA101 Name: Engineering Maximum Marks Allotted Contact Hours Contact Hours	e and Total Credits
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Course Objective:	ad Davia
concepts of computers. To understand the component of computer and generation of com familiarize students with the programming and problem-solving concepts using C Prog- language. The course will help student to solve the problem using computer programming.	nd Basic puter. To iramming
Course Outcomes:	
CO1: Familiarize the importance of computer science and engineering Unders	stand the
concept of generation of computer and learn about component of computer system.	h ant and
 CO2: Understand the concept of Problem-solving using C and Implement the flow- program for solving Mathematical and Engineering problems. 	chart and
CO3: Articulate the Modular Programming Concept and Solve the Engineering Problem	em using
Modular Programming. CO4: Articulate the Advance C Programming Concept to Solve the Engineering	Problem
using Structure, Union and File Management.	
CO5: Describe the various Computer Science disciplines and their applications.	CO's
Introduction to Computer Science and Engineering: Computer: Definition, Classification, Generation, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, and	CO1
System & Application Software. Problem Solving using C: Programming solving using computer concept, flowchart.Rules/ conventions of coding, documentation, naming variables, History of C, Structure of a C Program; Data types, Constant & Variable, naming variables, Operators (arithmetic, logical, bitwise, relational, ternary, Pointers - & and * operators) & expressions, Control Constructs – if-else, for, while, do-while, Case switch statement,Special constructs – Break, continue, exit(), goto& labels,Type conversion & type casting, Priority & associatively of operators; Type modifiers. 10	CO2
Modular Programming: Arrays; storage classes, Functions; Arguments; Return value; Parameter passing – call by value, call by reference; Return statement; Scope, visibility and life-time rules for various types of variables; Calling a function; Recursion – basics, comparison with iteration, types of recursion- direct, indirect, tree and tail recursion, when to avoid recursion.	CO3
N Advance C Programming: Structure – basic, declaration, membership operator, pointer to structure, referential operator, self-referential structures, structure within structure, array in structure, array of structures. Union – basic, declaration; Pre-processor Directives: C pre-processor – basics, #Include, #define, Enumerated data type; Typedef; File Handling in C- concepts, functions.	CO4
V Introduction to Computer Science disciplines and their applications: Networking, Security, Operating System, Data Science, Machine Learning, Cloud Computing, Block chain, web development. 7	CO5
Guest Lectures (if any) May be arranged as required	
Total Hours 40	
1. Make a Poster on Component of Computer Systems/Generation of Computer System with their	working
(CO1)	tenting
12 verite a program to determine given number is Armstrong number or not.(CO2)	nak Saxena person

- 3. Write a program to determine the roots of quadratic equation $ax^{2}+bx+c=0(CO2)$
- 4. Write a program to calculate the factorial of an integer quantity. (CO2)
- 5. Write a program to print diamond shape using star. (CO2)
- 6. Write a Program to find and print the sum of first N Prime Numbers.(CO2)
- 7. Write a program to convert binary to decimal and decimal to binary.(CO3)
- Write a Program in C to read two arrays, add them and to print the resultant array. Use read_mat(),add_mat() and print_mat() functions. Array should not be declared as global variables. (CO3)
- 9. Write a program to read two matrix and apply addition, subtraction, multiplication, transpose operation and display result. (CO3)
- 10. Write a C Program to calculate area of triangle, rectangle, circle using function. (CO3)
- 11. Write a program using recursive function to output in reverse the sequence of characters input from the keyboard. The input is terminated by new line. Your output should be on a new line. Write an iterative solution for the same.
- 12. Write a Program to store data about 10 books. Which contain book title, price and number of copies of the book. After reading the data about books your program should display the data of all the book which cost more than Rs 200. (CO4)
- 13. Write a program using structure to accept the current time in (Hr:min:sec) , update it by one second and to print it. (CO4)
- 14. Write a program to count characters, spaces and new lines in a file. The name of the file should be entered through command line. (CO4)
- 15. Create a Poster on any one latest computer science and engineering disciplines. (CO5)

Text Book-

Let us C By YashwantKanetkar, BPBPublication

• Programming in C, SchaumOutline, McGraw-Hill

Reference Books-

- Programming in ANSI-C By E. Balagurusami, TMHPublication
- C Programming language By Kernighan, Brian, W, Retchie, Dennis, PHI Publication
- Information Technology: Theory and Practice y PRADEEP K. SINHA (Author), PRITI SINHA (Author)
 Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

List/Links of e-learning resource

List and Links of e-learning resources:						
1. https://nptel.ac.in/courses/108/105/1	1. https://nptel.ac.in/courses/108/105/108105132/					
https://de-iitr.vlabs.ac.in/						
Recommendation by Board of studies on	June-2022					
Approval by Academic council on	June-2022					
Compiled and designed by CS & IT						
Subject handled by department	CS & IT					





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Dr. Divyarishi Sahu

Prof. Shaffa Chugh

Prof. C. S. Sharma

Dr. Ashutosh Datar

Dr. Jotsna V Ogale

UNIT V: Introduction to Network: second order differential equations for Series and parallel R-L, R-C, R-L-C circuits, initial and final conditions in network elements, forced and free response, time constants, steady state and transient state response. Representation of sine function as rotating phasor, phasor diagrams, impedances and admittances, AC circuit analysis, effective or RMS values, average power and complex power. Three-phase circuits. Introduction to two port network. 8 CO4 Guest Lectures (if any) 40 40 Suggestive list of experiments: 40 I. To verify Kirchhoff's voltage law and Kirchhoff's current law. 40 Suggestive list of experiments: 40 I. To verify Thevenin's, Norton's, Superposition and Maximum power transfer theorems in At circuits. 5 3. To verify Tellegin's theorem in AC circuits. 40 4. To perform polarity test on single phase transformer. 5. To determine the transformation ratio of single phase transformer. 5. To conduct short circuit test on single phase transformer and calculate iron losses. 7. To conduct short circuit test on single phase transformer and determine voltage regulation an efficiency. To determine active power, reactive power, of single phase R-L series circuit. 9. To determine line of 3 phase balanced and unbalanced Star. 10. To determine line of 3 phase balanced and unbalanced Star. 17 conduct Del Toro, Electrical Engineering ", MCGraw Hill, 2000. 10. Kulshreshtha, "Basic Electric		components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.		
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https://nptel.ac.in/courses/108105053

Dr. Dhananjay V Gadre

Dr. N. P. Patidar

Mr. Satish Asani Prof. C. S. Sharma

Jaw

Mr. Sudesh Morey Dr. Ashutosh Datar

Prof. Vipin Patait Dr. Jyosha V Ogale

Dr. Divyarishi Sahu

Prof. Shalla Chugh

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) Computer Science and Engineering											
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Text Books	<u>}-</u>						
• M.	Mano, "Digital Logic and Compute	er Design", Pearson Education.					
• T.	L. Floyd, "Digital Fundamentals", F	Pearson Education.					
• A.	Anand Kumar, "Fundamentals of I	Digital Circuits", PHI.					
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	Integral Ca	alculus : D	efinite I	ntegral a	as a	a Limit of	f th	ie Sum, Appl	ication			
III	in Summat	ion of Se	eries, N	Aultiple	Int	egrals, (Ch	ange of or	der of		8	3
	Integration,	Applicatior	n of Dou	uble and	Tri	ple Integ	ral	s (Area & Vol	ume).			
	Matrix [Definition,	Types	& Prop	erti	es of M	lat	rices, Eleme	ntay _r	+		
	Transforma	tion, Ran	k of N	Iatrix. C	on	sistencv	of	f Linear Svs	stem o	f		
N	Equations	and their s	solution	s. Figen	Va	lues and	Fi	igen Vectors	Cavley	,	8	4
				nlication	to	find the P			Caylo	′		
		neorem an	iu its Ap	piication	ιU		iive	58.				

	Boolean Algebra & Graph Theory: Algebra of logic, Principal of		
	Duality and basic theorem, Boolean expression and Boolean functions,	_	_
V	Definition of Graph, Types of Graphs, Sub Graphs, Walk, Path and	8	5
	Circuits,.		
TOTAL HO	DURS	40	

Reference Books:

- 1. Engg. Mathematics: By B.S. Grewal
- 2. Boolean Algebra: R.S. Agrawal
- 3. Engg. Mathematics: by H.K. Dass
- 4. Engg. Mathematics : By B. V. Rammanna

Recommendation by Board of studies on	14-06-2022
Approval by Academic council on	16-06-2022
Compiled and designed by	Applied Maths Board of Studies, Chairman Dr. Shailesh Jaloree

Juilever

Market Market	SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) Department of Humanities and Management											
Semester/Y	ear	ΙY	ear	Dopu	Program	n		B.	Tech Al	l Brar	nches	5
Subject	MAG	Sub	ject	MAC	101	Subj	ect	Univ	ersal H	uman	Valu	ies
Category	MAC	Co	de:	MAC	101	Nam	ie:					
			Max	imum Mark	s Allotted			1	Conta	act Ho	ours	
	Ihe	eory		Assign	L Dd	ractical		Total				I otal Cradita
End Sem	Mid-Se	em	Quiz	ment	Sem	Work Quiz		Marks	L	Т	Ρ	Credits
00	00		00	00	00 60 20 20 100						2	Grade
Prerequisit	es:											
During the	Inducti	on Pr	rograr	n, studen	ts would	get an	initial	exposure to	o hum	an va	alues	s through
Universal	Juman V	/alue	s – I.	This exp	osure is	to be au	Jamen	ted by this	compu	sorv	full	semester
foundation	course.	r aldo	0	inio onp			Janon		oompu	eer y	. an	
Course Ob	jective:											
At the end	of the co	ourse,	the s	tudents w	ill be able	to:						
1.	Develop	a holi	istic p	erspective	based or	n explora	ation a	bout others	and the	emse	lves.	
2.	Develor	o clai	ritv. i	mportance	of harr	nonv ai	nd hu	manity towa	ards fa	milv.	so	ciety and
nat	ure/exis	tence	,, ,		or num	nong a		inding tone		, ,	000	sioty and
3	Strength		olf_rofl	ection								
0. 4 F	Suelen .		-itmon	t and any	rage to ac	.+						
4. L	evelop (comm	liumer		rage to at	jl.						
Course Ou	tcomes:						£ 415 - 115		41			
(family so	na or the viety inat	e cour Ture)	se, st	udents wil	i become	aware c	or them	iselves, and	theirsi	Irrou	nainę	js
2 They wo	uld have	botte	ar criti									
2. They we				car ability.	n in life , an	م ارم م م		non volation	abiaa a	بما امم		
in mind will	he able	to ha	indle r	oroblems v	with susta	inable s	ng nur Slution	nan relation:	snips a	na ni	umar	n nature
4. They wo	uld also	beco	me se	ensitive to	their com	mitment	toward	ds nature an	d exist	ence.		
5 They we	ould be a	able to	n appl	v what the	ev have le	arnt to th	neir ow	n selves in (differen	it dav	-to-d	av real-
life scenari	os, at lea	ast a b	beginr	ning would	l be made	e in this o	directio	on.		ady	.00	
UNITs				_	Descrip	tions				Н	rs.	CO's
	Introdu	ction	- Nee	ed, Basic	Guideline	s, Conte	ent and	d Process fo	or Valu	e		
	Educat	ion		,		-,						
	1. Selt	f-Expl	loratio	n-what is	s it? – It	s conte	nt and	d process;	'Natura	al		
	Acceptance' and Experiential Validation- as the process for self-											
	explora	ation					A 1	L				
I	2. Cor	ntinuo	us H	appiness	and Pro	sperity-	A 100	K at basic	Huma	n	8	1
	3 Rial	nons nt unr	dersta	ndina Re	lationshir	and P	hvsica	Eacility_ th	ne haei			
	require	ment	s for	fulfilment	of aspira	tions of	everv	/ human be	ina wit	h		
	their co	prrect	priorit	ty					5			
	4. Un	dersta	anding	g Happin	ess and	Prospe	erity c	orrectly- A	critica	al		
	apprais	sal of	the cu	urrent scer	nario							

	5. Method to fulfil the above human aspirations: understanding and		
	living in harmony at various levels. Include practice sessions to discuss		
	natural acceptance in human being as the innate acceptance for living		
	with responsibility.		
	Understanding Harmony in the Human Being - Harmony in Myself!		
	1. Understanding human being as a co-existence of the sentient 'I' and		
	the material 'Body'		
	2. Understanding the needs of Self ('I') and 'Body' - happiness and		
	physical facility		
	3. Understanding the characteristics and activities of 'I' and harmony in	e	2
11	Ч ^г	0	2
	4. Understanding the harmony of I with the Body: Sanyam and Health;		
	correct appraisal of Physical needs, meaning of Prosperity in detail		
	5. To ensure Sanyam and Health. Include practice sessions to discuss		
	the role others have played in making material goods. Identifying from		
	one's own life. Differentiate between prosperity and accumulation.		
	Understanding Harmony in the Family and Society- Harmony in		
	Human- Human Relationship		
	1. Understanding values in human-human relationship; meaning of		
	Justice (nine universal values in relationships) and program for its		
	fulfillment to ensure mutual happiness.		
	2. Understanding the meaning of Trust; Difference between intention		
	and competence.		
111	3.Understanding the meaning of Respect, Difference between Respect	4	3
	and differentiation; the other salient values in relationship.		
	4.Understanding the harmony in the society (society being an extension		
	of family): Resolution, Prosperity, fearlessness (trust) and co-existence		
	as comprehensive Human Goals.		
	5. Visualizing a universal harmonious order in society- Undivided		
	Society, Universal Order- from family to world family. Gratitude as a		
	universal value in relationships. Elicit examples from students' lives.		
	Understanding Harmony in the Nature and Existence - Whole existence		
	as Coexistence		
	1. Understanding the harmony in the Nature		
	2. Interconnectedness and mutual fulfilment among the four orders of		
	nature recyclability and self-regulation in nature.	_	
IV	3. Understanding Existence as Co-existence of mutually interacting	8	4
	units in all-pervasive space.		
	4. Holistic perception of harmony at all levels of existence.		
	5. Include practice sessions to discuss human being as cause of		
	imbalance in nature (film "Home" can be used), pollution, depletion of		
	resources and role of technology etc.		
	Implications of the above Holistic Understanding of Harmony on		
	N Laccentance of human values		
	2 Definitiveness of Ethical Human Conduct		
	3. Basis for Humanistic Education, Humanistic Constitution and		
V	Humanistic Universal Order	9	5
	4 Competence in professiona, ethics: _ Ability to utilize the		
	professional competence for augmenting universal human order		
	Ability to identify the scope and characteristics of people friendly and		
	eco-friendly production systems, c. Ability to identify and develop		
		I	

	appropriate technologies and management patterns for above								
	production systems.								
	5. Strategy for transition from the present state to Universal Human								
	Order: a. as socially and ecologically responsible engineers,								
	technologists b. At the level of society: as mutually enriching institutions								
	and organizations.								
		5							
	Total Hours	40							
	Suggestive list of experiments:								
	Guest Lectures (if any) I Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books,								
	New Delhi, 2010								
	Reference Books-								
	. JeevanVidva: EkParichava, A Nagarai, JeevanVidvaPrakashan, Amarkant	ak 1999	9.						
1	Text Book2Hilumaan Maluesa Ad Martingating New Age Intl. Publishers, New Delhi, 2004								
	Modes of Evaluation and Rubric								
	Questignnaire,Quiz,Presentation and standard procedure will be followed								
	List/Links of e-learning resource	-							
	https://fdp-aicte-india.org								
	https://vyce.ac.in								
	Recommendation by Board of studies on 26/02/2022								
	Approval by Academic counci on								
	Compiled and designed by Dr. Manorama Saini and Dr. Veena	aDatar							
	Subject handled by department Humanities and Management								







	SAMRAT ASHOK TECHNOLOGICAL INSTITUTE											
ST BUOK TEO	(Engineering College), VIDISHA M.P.											
				(An Au	Itonomou	່ສ sl	nstitute Affil	liated to RGPV	Bhonal)			
Pres -	Leve				nartm	<u>_</u>	$nt of \Lambda n$	nlied Scio	nce			
VIDIS the second	HA M.P.	e	llahua			сі г	с ит во				ma	
Cubie -	Subject Subject Subject											
Categor	BSC		ode:	CHB	101		Name:	A	pplied Ch	emistry	,	
	<i>,</i>	_	Maxim	um Marks	Allotted				Conta	act	То	tal
	Th	neory	0=/A		P	rac		Total Marks	Hou	rs	Cre	dits
End Ser	11 Mid-S 20	em	Quiz/As	signment	End Sen	n	Lap-Work 20	150	3	1 P - 2		1
00	20			20	50		20	100	5	- 2		T
Prerequi	sites:									_		_
Students	who have o	comple	eted 12th	with Scie	nce strea	m	or Chemist	ry of 12th stand	dard or eq	quivale	nt	
Course C	Objective:			minter : in t	a males (~	idante foi "	line with the st				. Al
I he mail	n aim of En	ginee	and enc	mistry is t incering f	io make S ield With	Sti 1 t	laents tami	liar with basic	concepts	s ot Ch he ah	nemistr	y, the
Scientific	ally the vari	ous ch	nemistry	related pro	blems in	in	dustry/engi	neering field.	UNG WIII			-piaili
Course C	Outcomes:			•								
Student	after succe	ssful o	completio	on of cour	se shall	pc	ssess skills	s to think critic	cally and	analy	se che	mistry
problems	s in enginee	ering f	ield. Stu	dents are	expected	d 1	to solve the	e chemistry pr	oblems v	with an	engine	eering
data.	Laboratory	WOIK	is interiu			ea		ng experiment	s anu an	alyse	experiii	lentai
CO's					CO's	s C	Description	1				
	DIG											
CO1	Differentiate hard & soft water, solve the related numerical on water treatment and have knowledge regarding its Significance in industry and daily life.											
CO2	Apply their knowledge regarding various types of fuels including petroleum fuels, Fuels Cells, Electrical Vehicle Batteries											
CO3	Acquire basic knowledge of various types of Corrosion, its harmful effects and preventive methods.											
CO4	To know basic concept of polymers and its properties. To have knowledge about advanced											
	electroactive polymers and their applications. To know preliminary understanding of											
	Nanomate	erials a	and their	applicatio	ns.		optimet '			0.000 -		th
	the help of	ie nee f snec	troscopy	/ chromate	uenuty ar ogranhv	IŪ	esumate ab		wn/new c	οπροι	inas wi	u1
				. en en au	-g.apity.						<u> </u>	Re
UNIT				[Descriptio	ns	i			Hrs	S CO	mar
		FOUR		·-							5	ks
	Sources	ECHN Availal	hility im	: Surities in '	Water Tu	ne	es of hardne	ess Units of he	ardness			
	Concentra	ition	expressi	on: Norn	nality, N	10l	arity, Mola	ality. Water	analysis			
I	technique	s	Hardne	ess dete	rmination	1	by EDTA	method, A	Alkalinity	8	1	
	determina	tion. [Defects i	n boiler du	ue to Har	d	water. Exte	rnal Treatmen	t (Lime-			
	water. Nur	nerica	al Problei	ange resir ns.	i metrioa)	, 0			iei ieeu			
	ELECTRO	CHE	MISTRY	& ENERG	Y STOR	AG	SE SYSTEN	IS:				
	Electroche	emistr	y: Introdu	iction, EM	F of cell,	Sir	ngle electro	de potential-De	erivation			
	of Nernst	equati	on, Num	erical prot	plems bas	sec	d on Nernst	Equation (E, E	o&E _{cell}).			
П	Energy S secondary	iorage	; Syster reserved	ns. mtrod I batteries	uciion, C). Constri	Jia uci	ssilication tion, workin	or patteries (primary, ations of	8	2	
	Li-ion bat	teries.	Advant	ages of L	i-ion bat	ter	y as an el	lectrochemical	energy		-	
	system for	elect	ric vehic	les. Recyc	cling of Li	ithi	ium-ion bat	teries by direc	t cycling			
	Method. In	ntrodu	ction of	Na- ion ba	attery, gra	apł	nene batter	y. Recycling, a	disposal			
				ICS.		N						
	Introductio	on, Tv	pes of	Corrosion	, Disadva	an	tages of c	corrosion. The	ories of			
	corrosion,	Facto	ors influe	ncing the	rate of c	or	rosion. Met	hods of Preve	ntion of	R	2	
	Corrosion	, Cont	rol of Er	ivironmen	t, Alloying	<u>j</u> , \$	Surface coa	atings, Metal c	oatings,		5	
	Electropla	ung, C Protec	tion. Sac	auon and rificial And	ode Metho	no od	etc	ing, Anoaizing	,			

	ENGINEERING MATERIALS:								
IV	Polymers: Nomenclature & classification of polymers. Electrically active polymers, Conducting polymers, Liquid-crystal polymers (LCP), Photoactive polymers, Photovoltaic materials: solar cells and dye sensitized solar cells- principle and applications, Conducting Polymers: Methods of synthesis and properties of polyaniline (PANi), polypyrrol (PPy) and polythiophene (PTh); applications of these polymers in advanced technologies. Nanomaterials: Synthesis, characterization and applications of nano materials (Eg. fullerene, graphene, carbon nanotubes and quantum dots) in electronic and nano devices. Introduction to Optical Fibres.	8	4						
V	INSTRUMENTAL METHODS OF ANALYSIS: Importance of Instrumental techniques. Classification of Instrumental techniques. Introduction to Electroanalytical and Spectroscopic Methods. Principle, Instrumentation, Working and applications of following techniques: Colorimetry, IR Spectroscopy, Conductometry, pH metry, Chromatography and Gas Chromatography.								
Guest Le	ectures (if any)								
Total Ho	ours	40							
Suggesti	ive list of experiments:								
LABOR	ATORY EXPERIMENTS: (Any 10 experiments to be performed)								
1	To determine strength of unknown Ferrous Ammonium Sulphate FeSO4.(NH4)2SO4	.6H ₂ O	(Mohr's	s Salt)					
2.	solution by titrating it against intermediate Potassium Dichromate (K ₂ Cr ₂ O ₇) soluti Amine(DPA) as internal indicator.[Redox Titration] To determine Temporary, Permanent and Total Hardness in given sample of	on usi water	ng Di P by E.[henyl D.T.A.					
3. ⁻	method.[Complexometric Titration] 3. To determine strength of Sodium Carbonate and Sodium Bicarbonate in given alkaline solution by titrating with standard HCL using phenolphthalein and Methyl Orange indicators								
4. 4. 5. 6. 7. 6. 7. 7. 8. 9. 10. 11. 12. 13. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 14. 15. 16. 17. 17. 18. 17. 18. 17. 18. 18. 19. 19. 19. 10. 10. 10. 11. 12. 13. 14. 15. 16. 17. 16. 17. 17. 18. 17. 18. 18. 19. 19. 19. 10. 11. 12. 13. 14. 15. 16. 17. 16. 17. 17. 18. 17. 18. 17. 18. 17. 17. 17. 17. 18. 17. 18. 18. 17. 18. 17. 17. 17. 17. 17. 17. 17. 17	To determine alkalinity in given water sample using Phenolphthalein and Methyl O ndicators.[Acid Base Titration] To determine strength of unknown CuSO₄ solution by titrating it against intermed hiosulphate (Hypo) solution using starch as final indicator.[lodometric Titration] To determine the chloride content of the given sample of water using silver nitrate s botassium chromate solution as an indicator.[Precipitation Titration] To separate mixture of pigments by Thin Layer Chromatography [Instrumental Methods]. To verify Beer Lambert's law of colorimetry [Instrumental Methods]. To determine amount of Iron by colorimetry [Instrumental Methods]. To determine amount of Iron by UV spectrophotometer.[Instrumental Methods] To determine pH of given solution using pH meter. [Instrumental Methods] To determine brength of acid/base by conductometric titrations. [Instrumental Methods] To determine Moisture content in given sample of coal.[Proximate Analysis] To determine the Viscosity Index of give lubricating oil by Redwood Viscometer N Viscometer 2.[Lubricating Oil Analysis] To determine the Flash Point and Fire Point of lubricating oil by Abel's Appara Analysis] To determine the Flash Point and Fire Point of lubricating oil by Pensky Mart Apparatus.[Lubricating Oil Analysis] To determine the Flash Point and Fire Point of lubricating oil by Pensky Mart Apparatus.[Lubricating Oil Analysis] To determine the Flash Point and Fire Point of lubricating oil by Pensky Mart Apparatus.[Lubricating Oil Analysis]	vrange iate so solutior ods]. vods] No.1 a tus.[Lu tin's	nd Red	wood g Oil					
	Engineering Chemistry - Jain & Jain - Dhanpat Rai &Company Pvt. Ltd, New Delhi. A Text Book of Engineering Chemistry - S.S. Dara - S. Chand Publication, Delhi. Engineering Chemistry- Shashi Chawla, Dhanpat Rai &Company Pvt. Ltd, Delhi. Engineering Chemistry - Uppal - Khanna Publishers. A Text book of Engg. Chemistry- Agarwal, C.V, Murthy C.P, Naidu, BS Publicatior B. Sivasankar, Engineering Chemistry 1 st Edition, Mc Graw Hill Education (India) O.G. Palanna, McGraw Hill Education (India) Private Limited, 9 th Reprint, 2015	n, Hyde), 2008	erabad.						
REFERE	INCE BOOKS:								

 Chemistry in Engineering and Technology, Kur 	iacose J.C. and Rajaram J., Tata McGraw Hill.							
 Applied Chemistry- Theory and Practice, O.P. Publishers, New Delhi. 	Viramani, A.K. Narula, New Age International Pvt. Ltd.							
 Chemistry of Engineering Material-C.V. Agarv Publications. 	Chemistry of Engineering Material-C.V. Agarwal, Andranaidu C. Parameswara Moorthy -B.S. Publications.							
 William Kemp, Organic Spectroscopy, 3 rd edit 	ion, Palgrave, New York, 2005.							
Modes of Evaluation and Rubric								
Evaluation will be continuous as an integral part of the class as well through external assessment. Laboratory assessment will be based on assignments, presentations, and viva of each candidate.								
List/Links of e-learning resource								
 Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan <u>https://nptel.ac.in/course.html</u> https://iln.ieee.org/resources/e-learning <u>https://www.researchgate.net/publication/221928462_ELearning_Usage_During_Chemical_Engineering_Courses</u> <u>https://learncheme.com/</u> <u>https://www.anits.edu.in/elearn_c.php</u> 								
Recommendation by Board of studies on	14.6.2022 (Tuesday)							
Approval by Academic council on	16.6.2022 (Thursday)							
Subject handled by department	Applied Science (Chemistry)							



Dr Manju Singh Prof & Head, Chemistry UIT, RGPV, Bhopal

(Dr.NSSapre)

Dr Nitin Sapre Prof & Head, Chemistry SGSITS, Indore

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Dr J Parashar Dr Manoj Datar Dean, Academics Prof & Head, Chemistry SATI, Vidisha SATI, Vidisha

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE											
	The second second		(H	Enginee	ering (Colleg	e), VIDISH	A M.F	? .		
and the	ř.		(An	Autonor	nous Ins	titute A	Affiliated to RGI	PV Bhop	oal)		
VIDISHA M.P.	1		Con	npute	r Sci	ence	e and Eng	ineer	ing		
Semester/Ye	ar			Prog	gram			B.Te	ch.		
Subject Category	ESC	Subject Code:	CS	A103	Subj Nan	ect ne:	Problem Solv	ing using	g Data	Struct	ures
		Maxi	mum Ma	rks Allot	ted		-	Cont	act Ho	urs	
	Theor	y]	Practical	r			uis	Total	
End Sem	Mid- Sem	Assign ment	Quiz	End Sem	Lab- Work	Quiz	Total Marks	L	Т	Р	Credits
60	20	10	10	30	10	10	150	3	0	2	4
Prerequisites	5:										
Logical thin	king and C	omputer F	undame	ntals							
Course Obje	ctive:	. 1 . 6	• • •					<u> </u>			1.
Introduce th	e fundam	entals of	data str	ictures a	and how	these	concepts are u	iseful ii	1 prob	lemsc	olving.
Course Outc	omes:										
CO-1Unde	rstand- I	Problem so	olving u	sing of	data str	ructure	and various se	arching	and	sorting	gmethods.
CO-2 Appl	y - Apply d	lifferent co	oncepts o	of data str	ructures	to solve	e different comp	outing pr	oblem	ıs.	-
CO-3 Anal	yse- Anal	lyze the ac	cess pat	tern of v	various c	lata stru	ucture and unde	rstand t	heirap	plicat	oility.
CO-4 Eval	uate-Eval	uate and C	Compare	the perf	ormance	e of dif	ferent data stru	ctures of	n real	world	problems.
CO-5 Disci	uss- Grap	n and Tree	structui	e with th	ieir oper	ations a	and applicability	<i>r</i>			
UNITs				Des	criptions	s			H	Irs.	CO's
	Problem	solving	concept	s: top-d	lown, b	ottom-	up design, Co	oncept	of		
	datatype, variable, constant and pointers. Dynamic memory allocation.										
	Algorithm: Definition and complexity Analysis.										
	Introduction to data structure: Linear, Nonlinear, Primitive and										
Ι	Nonprimitive.									08	
	array- Representation and Address Calculation. Operations on arrays with										
	algorithms (traversing, searching, inserting,										
	deleting)	and analys	sis.	8,	8,						
	List-Sing	gly linked	lists: R	epresent	ation in	memo	ry, Operations	on sing	gly		
п	linked lis	st with algo	orithms	(traversii	ng, searc	ching, i	nsertion, deletio	on)Doub	oly	06	
11	Circular	linked	lists_O	neration	mis and s with	anarys	orithms and	analve	ic	06	
	Represen	ntation & n	nsts-0 anipula	tions of r	olvnom	with algorithms and analysis.					
	Stack-	Introductio	n to St	ack and	its oper	ations,	Implementation	ı of sta	ck		
	using arr	ay and lin	ked list	with co	mpariso	n. App	lication of stac	ks (Poli	sh		
	Notation	s, converti	ng infix	to postf	fix notat	tion, ev	aluating postfix	notatic	on,		
111	Parenthe	sis balanci	ng, Recu	irsion).	•,		T 1 4 4	c		09	
	Queue-	Introducti	on to Qi ked list	De-que	its oper	ations.	Implementation	i or que	ue		
	queue. A	pplication	s of quet	ie.	ac, enel	nai que	cue, priority				
	Tree-	Definition	and	terminol	logy, c	oncept	of binary	tree a	nd		
	represent	tation, Tra	versing	binary	tree (pi	re orde	er, post order,	in orde	er)		
	Operation	n with alg	orithm	insertior	n and de	eletion.	Binary Search	Trees a	nd		
IV	Concept	of balance	tree (A'	∨L).			marka D		- 6	09	
	Graph T	Definition	of graph	rminolog	gy, Type th First	es of g	raphs, Represe	ntation	OI		
	First Trav	versing.	or grapi	- Dieau	ui i'iist	riaver	sing and Depth	L			
I		0									



100m the day shade faith to total from the

Dr. Kanak Saxena Chairperson

Guest Lectures (if any) Total Hours 40 List of Experiments 40 1. Write program to implement pointers and structure in C to understand the concepts ofDynamic memory allocation. 40 2. Write a program to implement concept of linear array with following operations: i. Traverse an array. ii. Find minimum item, maximum item, and average of an array items. iii. Find minimum item, maximum item, and average of an array items. iii. Find minimum item, maximum item, and average of an array items. iii. Insert a new item at beginning, end and middle position within an array. iv. Delete an item from an array. 3. Write a program to implement singly linked list. iii. Delete an item from single linked list. iii. Delete an item from single linked list. iiii. Traverse a single linked list. iii. Delete an item from single linked list. iiiii. Traverse a single linked list. iii. Delete an item from stack with its operations (Push, Pop, Peek, IsEmpty) using: i. Using array iii. Using linked list iiiii. Using linked list 6. Write a program to implement queue with its operations (enqueue, dequeue) using: i. Using linked list 8. Modify the queue program to implement circular queue with its operations. 9. Write a program to implement depth first traverse an a graph. 10. Wri	V Searching- Search methods- L (collision, chaining and probing) v Sorting-Sorting Methods-Bubble sort, Merge sort, Radix sort, Shell analysis.		ear search, Binary search and Hashing th their algorithms and analysis. ort, Selection sort, Insertion sort, Quick ort with their algorithms and	08						
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v. Radix sort Reference Books- Data Structure- Schaum's Series- McGraw Hill Publication Data Structure- Horwitz and Sartaj Sahni Data Structure through C, Yashwant Kanekar, BPB Publication. Modes of Evaluation and Rubric The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, termwork, end-semester examinations, and end-semester practical examinations. List/Links of e-learning resource Recommendation by Board of studies on June-2022 Compiled and designed by Dr. Sandeep Raghuwanshi Subject handled by department	i	iv. Quick sort								
Reference Books- • Data Structure- Schaum's Series- McGraw Hill Publication • Data Structure- Horwitz and Sartaj Sahni • Data Structure Horwitz and Sartaj Sahni • Data Structure through C, Yashwant Kanekar, BPB Publication. Modes of Evaluation and Rubric The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, termwork, end-semester examinations, and end-semester practical examinations. List/Links of e-learning resource Recommendation by Board of studies on June-2022 Approval by Academic council on June-2022 Compiled and designed by Dr. Sandeep Raghuwanshi Subject handled by department Computer Science & Engineering		v. Radix sort								
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Data Structure- Horwitz and Sartaj Sahni Data Structure through C, Yashwant Kanekar, BPB Publication. Modes of Evaluation and Rubric The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, termwork, end- semester examinations, and end-semester practical examinations. List/Links of e-learning resource Recommendation by Board of studies on June-2022 Approval by Academic council on June-2022 Compiled and designed by Dr. Sandeep Raghuwanshi Subject handled by department	•	Data Structure- Schaum's Series- McGra	w Hill Publication							
Data Structure through C, Yashwant Kanekar, BPB Publication. Modes of Evaluation and Rubric The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, termwork, end- semester examinations, and end-semester practical examinations. List/Links of e-learning resource Recommendation by Board of studies on June-2022 Approval by Academic council on June-2022 Compiled and designed by Dr. Sandeep Raghuwanshi Subject handled by department Computer Science & Engineering	•	Data Structure- Horwitz and Sartaj Sahni								
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The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, termwork, end-semester examinations, and end-semester practical examinations. List/Links of e-learning resource Recommendation by Board of studies on June-2022 Approval by Academic council on June-2022 Compiled and designed by Dr. Sandeep Raghuwanshi Subject handled by department Computer Science & Engineering	Modes of	Evaluation and Rubric								
semester examinations, and end-semester practical examinations. List/Links of e-learning resource Recommendation by Board of studies on June-2022 Approval by Academic council on June-2022 Compiled and designed by Dr. Sandeep Raghuwanshi Subject handled by department Computer Science & Engineering	The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments. termwork. end-									
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Approval by Academic council onJune-2022Compiled and designed byDr. Sandeep RaghuwanshiSubject handled by departmentComputer Science & Engineering	Recomm	endation by Board of studies on	June-2022							
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Subject handled by department Computer Science & Engineering	Compileo	l and designed by	Dr. Sandeep Raghuwanshi							
	Subject h	andled by department	Computer Science & Engineering							



Dr. Kanak Saxena Chairperson



SAMRAT ASHOK TECHNOLOGICAL INSTITUTE

(Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal)

Computer Science and Engineering

Semester/Ye	ar			Prog	gram		B.Tech.				
Subject Category	ESC	Subject Code:	IT	C101	Subj Nan	ect ne:	Pyth	on Prog	ammi	ng	
		Maxin	num Ma	rks Allot	tted			Cont	oct Ho	1170	
	Theo	ry]	Practical			Conta		uis	Total
End Sem	Mid- Sem	Assign ment	Quiz	End Sem	Lab- Work	Quiz	Total Marks	L	Т	Р	Credits
60	20	10	10	30	10	10	150	3	0	2	4
Prerequisite	s:										
• Hig • Ele	gh School mentary l	Level Math Knowledge o	ematics of Comp	outer							
Course Obje	ective:										
This course	e introdu	ces core pr	ogramn	ning ba	sics—in	cluding	data types, co	ontrol s	structu	res,	algorithm
developmen	it, and pi	rogram desi	gn wit	h functi	ons via	the Py	thon programm	ning la	nguag	e. Th	ie course
discusses the	e fundam	ental princip	les of C	bject-O	riented F	rogrami	ming.	-			
Course Outo	comes:										
Upon compl	letion of t	his course, tl	ne stude	ent will b	e able to):					
CO	-1: Abilit	y to install p	ython a	nd its di	fferent p	ackages.					
CO	-2: Imple	ment solution	n logic	of probl	em and c	draw it in	n the form of alg	gorithm	.CO-		
3:	Design a	nd write a py	thon pr	ogram fo	or given	algorith	m.				
CC	0-4: Unde	erstand and a	pply the	e list log	ics to pro	oblem so	olution.				
CC	0-5: Unde	erstand Object	ct Orien	ted with	referenc	e to pytl	hon programmi	ng.			
UNITS				Des	criptions	5			H	lrs.	CO's
	Introduc	ction to co	mputer	scienc	e, algoi	rithms,	data represent	tation	in		
	computers, hardware, software and operating system. Installation of python										
т	interactive shell, IDLE, saving, editing, and running a script. The concept										CO1
1	of datatypes: variables, immutable variables, numerical types, operators										
	expressi	ions, Indenta	ation an	d comm	ents in t	the					
	program	1.									
	Condition	onal Stateme	ents- C	ondition	s, Boole	an Logi	c, Logical oper	ators a	ıd		GO2
Π	Ranges. Control Statements- Break, Continue and Pass. Flow Control-if, if-										CO2
	else, nested if-else, Loop statements- for loop, while										
	100p, ivested 100ps.										
	String:	subscript of	berator,	indexin	g, slicin	ig a stri	ng; strings and	1 numb	er		
	system:	converting s	strings i	o numbe	ers and v	/ice ver	sa. Strings and	text file	s,	0	CO3
111	raading	lating mes	and c	intectorie	from/to	and sys	s modules, te	xt me	S:	9	
	creating	and reading	and m	atted file	$\frac{1011}{10}$	a me, tab-sena	rated)				
	Lists t	unles and	dictions	rias Br	sic list	operato	rs replacing	incortin	a –		
	removir	upies, allu v	ut sear	ching an	d sorting	operato r lists d	lictionary literal	s addii	g, ng		
IV	and rem	oving keys	access	ing and	replacing	g values		s, addi	15	7	CO4
	traversing dictionaries										
	Classes	and OOP: (lasses.	objects.	attribute	es and m	nethods, definin	gclasse	s.		
	design with classes. Inheritance, Overloading, Overriding, and Data hiding										
V	Exception: Exception Handling, except clause. Trv									8	CO5
	finally c	lause, User I	Defined	Excepti	ons.	, ,					
Guest Lectu	Guest Lectures (if any)										
Total Hours							4	40			
List of Exp	List of Experiments										
1. Wi	rite a pro	gram in pyt	hon to	check a	numbe	r wheth	ner it is prime o	or not.			

- 2. Write a program to check a number whether it is palindrome or not.
- 3. Write a function to swap the values of two variables through a function.

1.14 12sm Lotom: Sharps Frank

- 4. Write a python program to Read a file line by line and print it.
- 5. Write a program to display the number of lines in the file and size of a file in bytes.
- 6. Write a program to calculate the factorial of an integer using recursion.
- 7. Write a program to print Fibonacci series using recursion.
- 8. Write a program for binary search.
- 9. Python Program for Sum of squares of first n natural numbers.
- 10. Python Program to find sum of array.
- 11. Python program to read character by character from a file.
- 12. Python Program to print with your own font.
- 13. Python program to print even length words in a string.
- 14. Python program to check if a string is palindrome or not.
- 15. Program to print ASCII Value of a character.
- 16. Python program to find smallest and largest number in a list.
- **17**. Python program to find the size of a Tuple.

Text Books-

- M. Mano, "Digital Logic and Computer Design", Pearson Education.
- T. L. Floyd, "Digital Fundamentals", Pearson Education.
- A. Anand Kumar, "Fundamentals of Digital Circuits", PHI.

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, termwork, end-semester examinations, and end-semester practical examinations.

List/Links of e-learning resource

List and Links of e-learning resources:

- 4. https://nptel.ac.in/courses/108/105/108105132/
- 5. https://de-iitr.vlabs.ac.in/

1	
Recommendation by Board of studies on	June-2022
Approval by Academic council on	June-2022
Compiled and designed by	CS & IT
Subject handled by department	CS & IT



Course

Dr. Kanak Saxena Chairperson

-		SAMRAT ASHOK TECHNOLOGICAL INSTITUTE										
:00)		(Engineering College), VIDISHA M.P.										
1			(/	An Auto	nomous Insti	tute Affiliated t	o RGF	W Bho	opal)			
Para all				Dep	artment (of Humani	ities					
Seme	ster	MI		Progra	n			B.T	sch.			
Subject	HUM	IUM Subject			Subject	Comn	nunica	ation a	nd Report V	Vriting		
Category		Code	1	01	Name							
	-	Ma	ximum Marks /	Noted	mation	Total Marke	C	Contact	Hours	Total Credits		
End		Outz	Assignment	En	d Lab-	TOTAL MAINS		_	_			
Sem	Md- Sem	California.	/ sagetter	Ser	n Work		L	т	P			
60	20	10	10	_	-	100	2	-	2	3		
Prerequia	ites:											
In this era	of globalb	zation and	Information te	chnolo	y, English h	as a special ar	nd pre	domin	ant role in t	he		
communic	ative sphe	ere, and th	us English coi al baundarias	mmand	s the most pr	estigious posit	ion in	the wo	orid in the e	xchange of		
communic	ative com	petence of	ar boundaries l'engineering :	student	madus nas di S.	een designed i	to dev	elop u	e inguisiic	anu		
Course C	bjective:											
 To Imp 	rove the I	anguage p	roficiency of t	he stud	ents in Englis	sh with empha	sis on	LSRM	i skills.			
2. To ena	ble the st	udents to	study and con	prehen	d the prescri	bed lessons ar	nd sub	jects r	nore effecti	vely, relating		
3 To dev	eloo the c	and practi communica	cal componen ation skills of t	is. he stud	ents in both f	ormal and info	rmai s	ituatio	ns			
Course C	utcomes:											
After completion of the course student will be able												
CO1	Tole	am the pi	oper meanin	ig of co	mmunicatio	n in the corpo	orate	world				
CO2	Tour	nderstand	real life situ	ations i	n business	by acquiring s	soft sl	kills ar	nd also lea	im how to		
	exce	l in an inte	erview.		<u> </u>							
003	l o dr	aft report	s and preser	t their	views effect	tively.						
CO4	I o in	terpret co wt.ac.wol	mmunication	i situati	on and com	municate effe	ective	iy witi	n peers in	official		
CO5	Towri	te critical	v and comm	: equita unicate	effectively	to nurture un	derst:	anding	and trust			
UNITS	1.0.1		7 ana samin	Des	riptions				Hrs.	CO's		
	Signi	ficance o	f Communi	ation	Process of	Communicati	ion. J	The				
	impo	rtance of	Effective Co	mmmi	cation in Br	isiness Verb	al and	Non-	.			
	Verb	al Comm	mication Or	al and l	Written Cor	numication	Rami	ers to		_		
	Com	mmicstio	n	ai aina	winten cor	шильсаноц,	190111	C15 10	10	1		
	Com	Clather Ca	u. val Catting, C	halitia	of a good l	laadar Tima						
I	Mana	orement '	Time Wester	s Droh	s of a good i lem Solving	leader, 1 me			8	2		
	Repo	at Writin	rg: Definition	n Inny	rtance. Two	es of Renorts						
	Struc	ture and I	ayout.				3		8	3		
	Busin	ness Writ	ing: Types o	fLette	rs, Structure	and Layout	of					
IV	Lette	rs, E-mail	writing, Me	mo, Ne	tices, Circu	ilars, Agenda,	Mim	utes o	f 8	4		
	meeti	ing.			-							
	Gran	nmar and	i Vocabular	y deve	opment: Pa	arts of speech	, Sub	ject-				
V	verb :	agreemen	t, Sentence s	structu	re, Synonym	is, Antonyms	,		6	5		
	Hom	onyms.										

Guest Lectures (if any)			
Total Hours		40	
1.NA			
Text Book- 1.A.J.Thomason and A.V.Martinet, A Practical English G English for Effective Communication, Oxford.	rammar, Oxford IBH Pub Sanjay Kum	ar Pushç) Lata,
Reference Books- Language and Life: A Skills Approach Board o Business Correspondence and Report Writing- Living English Structure -By W.S. Allen; Longr English Grammar- Ehrlich, Schaum Series; TM Spoken English for India -By R.K. Bansal and New International Business English- By Joan s Effective Technical Communication - Rizvi; TM Body Language - Vinay Mohan Sharma	f Editors, Orient Black Swan Publisher By R.C. Sharma; TMH. nans. IH. IB Harrison Orient Longman. iand Alexander; OUP. IH	s, India.	2018.
Two mid-semester tests. Ouizzes for continuous evaluat	ion. Sessional and an end-semester e	vaminal	tion
List/Links of e-learning resource			
 https://onlinecourses.nptel.ac.in https://www.classcentral.com(swayam) 			
Recommendation by Board of Studies on	13/06/2024		
Approval by Academic council on	De Latination Classification		
Compiled by	Dr. Amitosh Singh/ Aditi Dwived		
Subject handled by department	Department of Humanities		

SHOK TECHNOL	DEICH INC		SA	AMR.	AT ASHO	OK TECHI	NOLOGICAL IN	ISTITU	ΤЕ		
A CAT					(Enginee	ring Colles	ge), VIDISHA M	[.P.			
Yy Water	and the second sec		(A	n Au	tonomous	Institute A	Affiliated to RGF	V Bhor	al)		
VIDUGUS	ALC.		,		Depart	ment of	Applied Scien	ce	,		
Semester/Yez)r	Second/H	First		Progra	m		B Tec	h		
Subject	Departmental	Subje	ct		riogiu	Subject	Statistics : Pro	bability I	n. Distri	butions	s and
Category	Core	Code	:	MA	B 102	Name:	Diffe	erential E	quati	ons	
		Maximu	ım Ma	rks Al	lotted			Conta	at Uo	1120	
	Theory				Pra	ctical		Conta		urs	Total
End Sem	Mid-Ser	n	Qı	uiz	End Sem	Lab- Work	Total Marks	L	Т	Р	Credits
60	20		2	0	-	-	100	3	1	-	4
Prerequisit	es:										
Basics of D	ifferentiations,	, Integrat	tions	and S	Statistics						
Course Obj	ective:										
The objectiv	e of this course	is to fam	iliarize	e the	prospecti	ve enginee	ers with techniqu	es in Di	ffere	ntial e	quations
and Statistic	s. It aims to eq	uip the st	udent	s wit	h standar	d concept	s and tools at an	interm	ediat	e to a	dvanced
level that wi	Il serve them w	ell toward	ls tack	ding r	nore adva	anced leve	l of mathematics	and ap	olicat	tions t	hat they
would find u	seful in their di	sciplines.									,
Course Outo	omes:										
This course	primarily contrib	outes to a	pplied	d mat	hematics	program o	utcomes that de	velop st	uder	nts abi	lities to:
1. Acquire t	ne basic knowle	dge of Sta	tistics	s: Pro	bability D	istribution	s with their appl	ications	and	fitting	of
curves using	method of leas	t squares					o men enen opp.				•••
2. Learn the	principal conce	nts about	samn	ling a	ind its adv	antages a	nd also categoriz	ed the s	amp	ling m	ethods.
3. The Effect	ive Mathematic	al Tools f	or the	Solu	tions of D	ifferential	Equations that N	1odel Ph	vsica	al	
Processes	·			oora				louerri	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
4. Differenti	al Equation for S	Solving Fr	nginee	ring F	Problems						
5 Partial Dif	ferential Fouati	ons are v	erv mi	uch u	seful for S	olving Var	ious Boundary V	alue Pro	blem	IS	
			.,								
UNITs				D	escriptio	ns			ŀ	lrs.	CO's
	Binomial Pois	son and	Norm	ial di	stribution	s and the	ir Mean and V	ariance			
I	Methods of Le	ast Squar	es and	d curv	e fitting.			ununce)		8	1
11	Sampling dist	ributions:	t. F. 1	x^2 dist	ributions	and their	applications.			8	2
	Differential Fo	inations:	Differ	entia	l Equatio	ns of first	order and first	degree		-	
	first order a	nd high	or de	gree	Linear	Differenti:	al Equation N	on-linea	, r		
111	Differential Fo	na men nustion l	inoar	Diffo	rential of	F Higher o	rders with const	tant		8	3
	coefficient M	othod of V		ion of	Paramet	erc	iders with cons	lant			
	Differential Eq			r Type	s: Homo	annonic Li	inear Differentia	1			
IV/		uation of	noor [i iypi Eaust	ion Simu	dtanoous L	linear Differentia	ו הו		0	4
IV	Equations, Leg	genure Li		quat	ion, sint	intaneous i		ai		0	4
	Dartial Differen	ntial Face	ation		inition -	d formet	on of Douting Dif	forest:-			
		nual Equ	ations		Non line		incor Partial DI	forentia			
V	Equations, Lag	grange s	Linear	PDE	, Non-Iine	ear PDE, L	inear Partial Dif	Terentia	I	8	5
	Equation of Se		er wit		nstant Co	enficients.	Applications of F	'DE			
T-+ 111	(wave equation	m and He	at Equ	latior	15)					40	
Iotal Hours										40	
Reference	Books:		_								
1. Higher E	ngineering Math	nematics	by B. S	5. Gre	wal 2.	Engineerir	ng Mathematics	by B. V.	Rami	mana	

3. Advance Engineering Mathematics by E. Kreyszig
 4. Veerarajan T, Statistics, Probability and Random Process, 2nd Edition, Tata McGraw Hill Publishing company Ltd., New Delhi

ST LEWIN TECHNOLOGICAL	AND IL CONTRACTOR	SA	MRAT	Γ ASH	OK T	ECHN	OLOGICAI	L INST	ΓITU	TE	
VIDIGHA M.P.	A States		(An Con	Autonor	nous Ins	titute Ai	ffiliated to RGP	V Bhopa neeri	al) na		
Semester/Ye	ar			Prog	ram			B Tec	<u>ng</u>		
Subject Category	ESC	Subject Code:	CS	L110	Subj	ect	Com	puter W	orksho	р	
Cutogory	Theor	Maxi	mum Ma	rks Allot	ted			Conta	ct Hou	ırs	Total
EndSom	Mid-	Assign	Ouiz	End	Lab-	Ouiz	Total Marks	т	т	D	Credits
	Sem	ment	Quiz	Sem 60	Work 20	20	100			2	2
Prorequisite	ç.						•				
Course Obje	ective:	es of oper	ting sys	tem incl	uding F	ile hand	lling utilities S	ecurity	by fil	a nar	missions
 To famili redirection (To impar API's). To facilit To facilit To facilit 	aarize fund Control str rt fundame ate studen ate studen ate studen	damentals of ructures, ar entals of fi ts in unders ts in unders ts in unders	of the Bo ithmetic ile conce standing standing standing	in shell pts kern Inter pro semapho process.	ain shell interrupt lel suppo cess con ore and s	(bash), process ort for f nmunica hared m	shell programm sing, functions, file, File structu ation. emory.	ung, pip debuggi ire relat	es, inj ng she ed sys	put an ell scr stem	nd output ipts. calls (file
Course Outo	comes:										
CC adr CC CC CC CC Syn CC use	01. Ability nin level a 02. Ability 03. Ability 04. Ability ochronization 05. Ability of resource	to use vari and a prerect to write Sh to design to develo ion. to develo ces availab	ious Linu quisite to nell Prog and wri op IPC-4 p Netwo le on diff	ax comm pursue j ramming te applic API's that ork Prog ferent ma	ands that ob as a l gusing L cation to at can b ramming achines i	at are us Network inux co manipu e used g that al n a netw	ed to manipulat administrator. mmands. ilate internal ke to control vari llows applicatio york.	e syster ernel lev ious pro	nopera el Lin ocesse: nake e	ations aux F s for fficie	s at ileSystem. nt
UNITs				Des	criptions	8			H	rs.	CO's
Ι	INTROI of LINU editor. L process utilities	DUCTION JX, archite inux comm utilities, o and backup	TO LIN cture of nands, fi lisk util utilities	IUX AN LINUX le handli ities, ne	D LINU, feature ing utilit tworkin	IX UTII s of LI ies, secu g comr	LITIES: A brie: NUX, introduct urity by file per nands, Text P.	f history ion to v missions rocessin	vi s, 4 g	4	CO1
П	Introdu Pipes, Customi Filters: of files, Count C	ction to Comma zation. Filters and Operation haracters, V	Shells: and-Line d Pipes, s on Ch Words or	Linux S Ed Concate aracters, Lines, C	Session, iting, nating f Files w Comparin	Standar Optio iles, Dis vith Dup ng Files.	rd Streams, Reons, Shell/Env splay Beginning plicate Lines,	direction ironmer g and En	n, nt d	4	CO2
Ш	Grep: C Sed: Sc UNIX F (Index N File N Manager	Dperation, g cripts, Ope FILE STRU Iode), file c Manageme ment, Direc	grep Fam ration, A JCTURI lescripto ent: Fi ctory AP	ily, Sear Addresse E: Introc rs, system ile Stru I.	ching fo s, comm luction m calls a uctures,	r File Co aands, A to UNE nd devig Syst	ontent. Applications, gr X file system, ce drivers. em Calls f	epand se inode for Fil	ed.	4	CO3
IV	PROCE structure scheduli	ESS ANE e: process ng, zombie	SIGN table, e proces	IALS: viewing ses, orpl	Process, process nan proc	proce ses, sys cess, un	ess identifiers, item processes, reliable	proces proces	3S 3S 4	4	CO4
10thy	and fe	Agui	shada	Frail	, R	5	Holon &	adur		D	r. Kanak Saxe hairperson





	signals, interrupted system calls.			
	File locking: creating lock files, lo	cking regions, use of read and writewith		
	locking, competing locks, other lock	commands, deadlocks.		
	INTER PROCESS COMMUNICA	ATION : Pipe, process pipes, the pipecall.		
	parent and child processes, and nar	ned pipes, semaphores, message queues.		
V	shared memory INTRODUCTIO	DN TO SOCKETS Socket socket	4	CO5
	connections - socket attributes sock	et addresses		
Guest Le	ctures (if any)			
Total H	Durs		20	
List of E	xperiments		20	
1.	Write a program using echo, printf, sc	ript, passwd, uname, who, date, stty, pw	dcomm	ands.
2	Write a program using unlink du df	mount umount find unmask ulimit ps	w find	er arn ftn
2.	commands.	mount, uniount, mid, uninask, unint, ps,	w, iiiig	,er,arp, rep
3	Write a program using telnet rlogin Tex	t Processing utilities and backup utilities	tail has	d
5.	sort nl uniq gren egren fgren ci	it paste join tee ng comm cmp diff	tan, near tr aw	nt Ne
	commands	it, pase, join, ice, pg, comm, emp, um	, u, av	/K
1	Write a shell script that accepts a file n	ame starting and ending line numbers as	raumon	ts and
	displays all the lines between the given	line numbers.	iguillen	ts and
5.	Illustrate by writing script that will pri in different colours like red brown etc.	int, message "Hello World, in Bold and I using echo commands?	Blink ef	fect,and
6	Write a shell script that deletes all lines	containing a specified word in one or mor	e filess	upplied as
0.	arguments to it.	containing a specifical word in one of mor	0 111035	appried us
7.	Illustrate by writing script using for loop	to print the following patterns?		
8.	Write a shell script that displays a list	of all the files in the current directory to	which t	heuser
	has read, write and execute permissions			
9.	Write a program inter-process communi	cation.		
10.	Write a program to communicate using	sockets.		
Text Boo	ks-			
1. W	Richard, Stevens (2005), Advanced Pr	ogramming in the UNIX Environment. 3r	d editio	n.Pearson
Educ	ation, New Delhi, India.			,
2. Ur	ix and shell Programming Behrouz A. Fo	prouzan, Richard F. Gilberg. Thomson		
REFERE	NCES Books-:			
1. Lii	nux System Programming, Robert Love,	O'Reilly, SPD.		
2. A	dvanced Programming in the UNIX envi	ironment, 2nd Edition, W.R.Stevens, Pears	sonEdu	cation.
3. U	NIX Network Programming, W.R. Stev	vens, PHI. UNIX for Programmers and U	Users, 3	Brd
Editio	on, Graham Glass, King Ables, Pearson E	Education		
Modes of	f Evaluation and Rubric			
The eval	uation modes consist of performance in	Quiz/ Assignments, term work, and end-se	mesterr	oractical
examinat	ions.			
List/Link	s of e-learning resource			
Recomm	endation by Board of studies on	June-2022		
Approva	by Academic council on	June-2022		
Compile	and designed by	CS & IT		
Subject h	andled by department	CS & IT		



SUM TCHNOLOGICAL			SAMRAT (En (An Autono	ASHOI Igineeri Iomous I	K TECHN ng Colleg nstitute A	IOLC ge), \ \ffilia	DGICAL INS /IDISHA M. ted to RGP	STITUT P. V Bhop	E al)		
UIDISHA M.P.			Departi	nent of	Humani	ities	and Manag	gement			
Semester/	/ear	II Year	F	Program	1		B.	Tech Al	l Bran	che	S
Subject Category	MAC	Subject Code:	MAC102		Subject Name:	t	Professio Responsi	nal Eth bility	ics ar	nd S	Social
	Tł	Maxi	mum Marks A	llotted	Practical				ontact		Total
End Sem	Mid- Sem	Quiz	Assignment	End Sem	Lab-	Qu	Total iz Marks	L	T	Ρ	Credits
00	00	00	00	30	10	10) 50	0	0	2	Grade
_											
Prerequisit	es:										
To enable	the stude	ents to inst	ill moral, to cr	eate an	awarene	ess c	of professio	nal ethi	cs, hu	ma	n values,
loyalty and	social re	sponsibility	/.								
Course Obj	jective:										
At the end	of the cou	urse, the s	tudents will be	able to	:						
1. To	learn the	importanc	ce of values ar	nd ethic	s in perso	onal	life and prot	fession	al care	ers	i.
2. To	gain kno	wledge of	ethical behavi	or.							
3. To	acquire t	he basics	of social respo	onsibility	/.						
Course Out	tcomes:										
1. To	imbibe a	nd internal	lize the basic p	ourpose	of huma	n va	lues.				
2. To	apprecia	ate profes	sional rules a	ind cod	les of co	ondu	ct in perso	nal life	and	pro	fessional
car	eers.										
3. To	know the	e importano	ce of values ar	nd ethic	s in profe	essio	nal behavio	r.			
4. To	impart i	norms of	professional	ethics	in life	throu	ugh ration a	ality, c	onsis	ster	icy and
im	partiality	<i>.</i>									
5. To	inculcate	e the sense	e of social resp	onsibili	ty.						
UNITs			D	escriptio	ons				Hr	s.	CO's
	Principl	es of profe	essional ethics	: hones	ty, trustw	/orthi	iness, loyali	y, bein	g		
I	law-abio	ding, no	sinister mo	otives,	socially	res	ponsible,	respec	t, 8	3	1
	account	tability and	l fairness to all								
	Codes	of conduct:	: public, clients	, profes	ssional co	omm	unity, profe	ssion,	6		n
11	workpla	ice rights a	and responsibil	lities, ot	her stake	ehold	lers.)	Z
	Factors	necessitat	ting professior	nal ethic	s: adviso	ory re	sponsibilitie	es,			
Ш	contrac	tual duties	,						4	ŀ	3
	The imp	oortance of	f ethical behav	ior in b	usiness.						
	Persona	al ethics: ir	npartiality, rati	onality,	consiste	ncy a	and reversit	oility			,
IV	Norms	of professi	onal ethics in o	our life.					5	5	4
V	Corpora	ate social	responsibility:	enviro	nmental,	phi	lanthropic,	ethical	, 9)	5

and economic responsibility.			
Guest Lectures (if any)		2	
Total Hours		40	
Suggestive list of experiments:			
1. N.A			
1. Text Book- Professional ethics includes H	luman values, R. Subramanian,	Oxfor	d higher
education.			
Reference Books-			
2. Professional Ethics and Social Responsit	oility, Daniel E. Wueste, Rowman	n and	Littlefield
Publication, INC			
3. Professional ethics and human values, R. S	. Naagarazan, New age internation	nal (P)	limited
,New Delhi,2006.			
4. Human values and professional ethics, Jays	hree Suresh, B. S. Raghvan,S. Ch	and	
5. http://www.slideword.org/slidestag.aspx/hu	man-values-and-Professional-ethic	cs.	
Modes of Evaluation and Rubric			
Questionnaire,Quiz,Presentation and standard proc	edure will be followed .		
List/Links of e-learning resource			
<u>https://onlinecourses.nptel.ac.in</u>			
 <u>https://www.classcentral.com</u> (swayam) 			
Recommendation by Board of studies on	26/02/2022		
Approval by Academic council on			
Compiled and designed by	Dr. Manorama Saini and Dr. Vee	enaDat	ar
Subject handled by department	Humanities and Management		





ISHON TECHNOLOGICAL		SAMR	AT AS	HOK	TEC	HNOI	LOGICAL	INSTI	ΓU	ТЕ	
GTA			(Engi	neerii	ng Co	llege),	VIDISHA	M.P.			
Secret S	A Starter	(4	An Autor	nomous	s Institu	ite Affili	ated to RGPV	Bhopal)			
VIDISHA M.R.	1		DI	EPAF	RTM	ENT (OF CS & I	T			
Semester/Ye	ar	III/II		Pro	gram		B.Tecl	h – Interi	et of	fThing	gs
Subject	DC	Subject Code:	ΙΟ	302	Su	bject	Electron	nic Device	s an	d Circ	uits
Category		Maximum	Marks A	llotted	Na	ame		1			Total
	r	Theory		lotteu	Practic	al	Total	Conta	ct Ho	ours	Credits
ES	MS	Assignment	Quiz	ES	LW	Quiz	Marks	L	T	P	
60	20	10	10	<u>30</u>	10 []-: 20	$\frac{10}{24}$	150	3	0	2	4
Proroquisite	AG.		V	v.e.i. J	uly 20	JZ4					
Applied Phy	sics										
Course Obj	ective:										
• The pu	rpose of	f the course is to te	ach the	fundan	nental	principle	e of electronic	cs.			
• The m	aterial c	overs a variety of	topics	includ	ing vai	rious typ	pes of diodes	, transis	or,	amplif	fiers and
applica	ation.				-				-		
UNITs			Ι	Descrip	tions					H	lrs.
	Semico	onductor Diodes: 1	Basics of	f semi	conduc	tor theor	ry, Introduction	on to PN	[
Т	junctio	on diode, Special f	unction	diode,	Zener	diode, P	IN, Varactor	, Tunnel	,		8
-	Schott	ky, LED & Photo	diode a	and its	applic	ations.	Design circu	its using	5		
	diodes	<u>Half wave & Hal</u>	t Wave	rectifie	er, Clar	npers an	d clippers.				
п	Bipola CP ac	r Junction Transis	tors (BJ	IS): I	ransiste	or consti	ruction and o	peration	,		0
11	L imits	of operation BIT	Biasing	ipiiryii	ig acti	oli, CE		guration	,		0
	Field	Effect Transistor	(FET)	Iunctio	on Fiel	d-Effect	t Transistor	(IFET)			
	Constr	uction. Operation	on and	l Bia	asing.	Deplet	tion-type M	IOSFET			
III	Enhan	cement-type MOS	SFET: s	tructur	e and	physica	al operation,	current			8
	voltage	e characteristics,	D.C. op	peratio	n, Bia	sing, co	onfiguration:	commor	L		
	source	, gate and drain ty	bes.								
	Compo	ound Configuration	ns: Cas	cade a	and cas	scade co	onnection, Da	arlingtor	L		
IV	connec	ction, CMOS circ	uit, curr	ent so	urce ci	rcuit, cu	urrent mirror	circuits	,		8
	differe	$\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$	uits.	1	D'(·c (* 1	1	1			
	Operat	ional Amplifier a	ina App basies	proof	n: Dir	On amp	and commo	on mode	;		
V	Specifi	ication- DC offset	narame	pract	freque	op-amp	ameters On-	op-anış amn uni	-		8
v	specifi	cations Op-amp	Applica	ations.	Const	ant gai	n multiplier	voltage			0
	summi	ng, voltage buffer	, compai	ator.	Comb	unit gui	in munipitor,	vonug			
Total Hours	5	<i>C, C</i>								4	40
Course Out	comes:										
CO1: Ident	ify and u	understand the fun	damenta	l princ	iple an	d worki	ng of Diodes.				
CO2: Anal	yze the ł	behavior of BJT ar	d its bia	ising.							
CO3: Anal	yze the l	behavior of FET a	nd its bia	asing.							
CO4: Exan	nine the	various configurat	ions of I	BJT an	d FET.						
CO5: Anal	yze and	synthesize the Op-	amps.								
Text Book											
1. Electro	onic Dev	rices & circuits – E	Boyelsta	d & Ne	eshelsk	y – PHI					
2. Intuitiv	ve Analo	og Circuit Design-	Marc T.	Thom	pson						
Reference B	ooks										
1. A Text	t of elect	ronic" 2nd edition	S.Chan	d-R.S	Sedha						
2. Integra	ted Elec	ctronics. – Millman	n Halkia	S							
3. Electro	onic Dev	rices & Circuits – I	David A	. Bell -	- PHI						

- 4. Principles of Electronic Devices Malvino
- 5. Starting Electronics (Fourth Edition)-Keith Brindley
- 6. Microelectronics & circuit 5th edition Sandra & Smith.

List/Links of e-learning resource

• https://archive.nptel.ac.in/noc/courses/noc21/SEM2/noc21-ee80/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

P	
CO-PO	Mapping:

010	mappi	ug.													
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2	
CO-1	2	1	1										1	1	
CO-2	2	1	2	1	1								2	1	
CO-3	2	1	2	1	1								2	1	
CO-4	2	2	2	1									2	1	
CO-5	2	2	2	1									1	1	
Comment	1tat .	. f													

Suggestive list of experiments:

1. Design voltage regulator using Zener diode and verify its characteristics.

- 2. To draw the output waveform of Full wave rectifier. Calculate PIV, Ripple Factor, Form Factor and Efficiency.
- 3. Analysis of common base PNP bipolar junction transistor and verify input and output characteristics.
- 4. Analysis of common emitter NPN bipolar junction transistor and verify input and output characteristics.
- 5. To draw the static characteristics of JFET and find out its parameters.
- 6. To design the power supply of +5V and -5V using IC regulator.
- 7. To design a positive clipper circuit using a 1 kHz square wave with a 10 volt peak-to-peak magnitude as the input signal.
- 8. To design a negative clamper circuit using a 1 kHz square wave with a 10-volt peak-to-peak magnitude as the input signal.
- 9. To draw the frequency response of two stages RC coupled class A amplifier using transistor.
- 10. To draw the frequency response of two stages Direct coupled class A amplifier using transistor.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of CS & IT

LENON TECHNOLOGICAL		SAMR	AT AS	HOK	TEC	HNO	LOGI	CAL	INST	ITU	ТЕ	
GTA			(Engi	neeri	ng Co	llege),	VID	ISHA	M.P.			
A CONTRACTOR	A A A A A A A A A A A A A A A A A A A	(4	An Autor	nomou	s Institu	ite Affili	iated to	RGPV	Bhona	D		
UIDISHA M.P.	*	(-	DI	ΤΡΔΙ	2 TMI	FNT (OF C	S & I	Т	-)		
Semester/Ve	ar	III/II		Pro	aram				. ∎ h _ Inter	net of	Thing	IC .
Subject			10	202		oject	011	b.rtt	$\frac{1-110}{10}$	net of		,5
Category	DC	Subject Code:	10	303	Na	ame	Obje	ct Orien	ited Prog	gramr	ning w	ith Java
		Maximum	Marks A	llotted	Ducatio	<u></u>	T	- 4 - 1	Cont	act Ho	ours	Total Credita
ES	MS	Assignment	Ouiz	ES	LW	ai Ouiz		otai arks	L	т	Р	Creatts
60	20	10	10	30	10	10	1	50	3	0	2	4
			v	v.e.f	July 20)24						
Prerequisite	es:											
Fundamen	tals of F	Programming Ski	ills									
Course Obj	ective:											
• Enable	student	s to understand co	oncepts a	and pri	nciples	of obje	ect orie	nted pr	ogramr	ning 1	metho	dologies
using J	AVA as	s a vehicle.						74.1				
Also le	earn soft	ware development	and pro	blem s	solving	using th	his JAV	A tech	nology			
UNITS	T / 1		1.D	Jescrip	otions		· 0	1	<u></u>	1	H	rs.
	Introd	uction: Procedur	al Parac	ligms	of pro	gramm	ung, O	bject (Jriente	d		
	Paradi	igm for progr	amming	g, Pr	ocedur	al vs	. Ob	ject (Jriente	d		
	Progra	amming, Principl	les of O	OP, I	3enefit	s and a	applica	ations of	OO to			
Ι	DOP	Concepts: Data	Abstra	ction,	, Enca	psulati	on, In	heritai	nce an	d		8
	Polym	orphism. Introdu	iction o	f Java	, Featu	ires of	Java, I	Byte C	ode an	d		
	Java V	/irtual Machine,	Java De	evelop	ment I	Sit (JD	к). Ва "	1S1CS OI	t object	IS		
	and c.	lasses in Java,	tokens,	кеуч	vords,	identif	iers, v	variabl	es, dat	a		
	types,	and operators in	java, I	ype ca	asting,	strict K	eywor	a.	G 1			
	Contro	ol Statements –	– II, el	lse, n	ested 1	II, 1I-e	Ise la	aders,	Switci	1,		
	while,	do-while, for,	Ior-ea	ch, b	reak,	contint	ue. Co	ommar	nd Lin	e		
п	Argun	nent, Classes and		is, En	capsula	ation,	i ignu y	/ Enca	psulate	a 14		0
11	classes	s, Nesleu Class, I	String	ass, ai Duffo	r Arro	\mathbf{v} \mathbf{V}	tor W	roppor				0
	Data t	s. Object, Suing, members memb	er Euro	Duile	I, Alla Data I	idina.	Vicih	ility m	odifie	5. .c		
	in java		ci i une	uon,		nunig.	v 1510	IIIty II	loumer	3		
	Is-A r	elationshin Has	-A rela	tionet	nin In	heritan	ce in	Iava 1	vnes (of		
	inherit	tance Super an	d sub a	rlass	Metho	d Sig	nature	Over	loadina	, ''		
	Consti	ructor Overload	ling N	lethor	1 Ove	rloadin	ng th	is and	d stati	, ,		
III	keywo	ord finalize () r	nethod	Casti	ng ohi	iects I	nstanc	e of o	perato	r		8
	Overri	iding. covariant	return ty	vpe. S	Super.	final k	evwor	d. ove	rloadin	ς		
	VS. OV	erriding. Static c	ontrol f	low. i	nstance	e contro	ol flow	.,		0		
	Abstra	action: Abstract	class,	Interfa	ace in	Java,	differe	ences	betwee	n		
	classes	s and interfaces.	Definir	ng an	interfa	ce, im	olemer	nting ir	nterface	e,		
IV	applyi	ng interfaces,	variable	es in	interf	ace, e	xtendi	ng in	terface	s.		8
	Defini	ing, Creating	and A	ccessi	ng a	Packa	age,	Unders	standin	g		
	CLAS	SPATH, importi	ng pack	ages.	Coupl	ing, Co	ohesion	1.		_		
	Excep	tion Handling:	Concer	pts of	f Exce	eption	handl	ing, t	ypes o	of		
	except	tions, usage of the	ry, cate	h, thro	ow, thi	ows a	nd fina	ally ke	yword	s,		
N/	Built-i	in exceptions,	creati	ing	own	except	tion	sub	classe	s.		Q
v	Multit	hreading: Conc	epts of	Mul	tithrea	ding, ding,	differe	nces	betwee	n		0
	proces	ss and thread, th	read life	e cycl	e, crea	ting m	ultiple	thread	ds usin	g		
	Thread	d class, Runnabl	e interfa	ace. S	ynchro	onizatic	on, thre	eads pi	rioritie	s,		

inter uneau communication, daemon uneaus, deaulocks, uneau
groups. Introduction of Java Micro services.
Total Hours 40
Course Outcomes:
CO-1 Define classes, objects, members of a class and relationships among them needed for a specific
program. CO_2 Write the java application programs using OOPs principles
CO-3 Write the java application on constructors, overloading
CO-4 Demonstrate package creating and accessing members of a packages
CO-5 Understand and develop collection frame work and its application programs.
Text Book
1. Naughton & Schildt, "The Complete Reference Java 2", TataMcGraw Hill
2. E Balaguruswamy, "Programming in Java", TMH Publications
Reference Books
1. Deitel "Java-How to Program:" Pearson Education. Asia
2. Horstmann & Cornell. "Core Java 2." (Vol L & II). Sun Microsystems
3 Ivan Bavross "java 2.0" BPB publications
4 Java Programming for the absolute beginners By Russell PHI Learning
 Java Programming by Hari Mohan Pandey, Pearson
Jist/Links of e-learning resource
https://archive.nptel.ac.in/courses/106/105/106105153/
Modes of Evaluation and Rubric
The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semest
practical examination.
CO-PO Mapping:
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$
CO-1 1 3 3 2
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$
Suggestive list of experiments:
1. Write a java program to find the Fibonacci series using recursive and non-recursive functions.
2. Write a java program to multiply two given matrices.
3. Write a java program for Method overloading and Constructor overloading.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example. B. Write a java program to implement Interface using extends keyword.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example. B. Write a java program to implement Interface using extends keyword. A. Write a java program to create inner classes.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example. B. Write a java program to implement Interface using extends keyword. A. Write a java program to create inner classes. B. Write a java program to create user defined package.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example. B. Write a java program to implement Interface using extends keyword. A. Write a java program to create inner classes. B. Write a java program to create user defined package. A. Write a java program for creating multiple catch blocks.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example. B. Write a java program to implement Interface using extends keyword. A. Write a java program to create inner classes. B. Write a java program to create user defined package. A. Write a java program for creating multiple catch blocks. B. Write a java program for producer and consumer problem using Threads.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example. B. Write a java program to implement Interface using extends keyword. A. Write a java program to create inner classes. B. Write a java program to create user defined package. A. Write a java program for creating multiple catch blocks. B. Write a java program for producer and consumer problem using Threads. Write a Java program that implements a multi-thread application that has three threads.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example. B. Write a java program to implement Interface using extends keyword. A. Write a java program to create inner classes. B. Write a java program to create user defined package. A. Write a java program for creating multiple catch blocks. B. Write a java program for producer and consumer problem using Threads. Write a java program to display File class properties.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example. B. Write a java program to implement Interface using extends keyword. A. Write a java program to create inner classes. B. Write a java program to create user defined package. A. Write a java program for creating multiple catch blocks. B. Write a java program for producer and consumer problem using Threads. Write a java program to display File class properties. B. Write a java program to represent ArrayList class.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example. B. Write a java program to implement Interface using extends keyword. A. Write a java program to create inner classes. B. Write a java program to create user defined package. A. Write a java program for creating multiple catch blocks. B. Write a java program for producer and consumer problem using Threads. Write a java program to display File class properties. B. Write a java program to represent ArrayList class. Write a java program to represent ArrayList class.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example. B. Write a java program to implement Interface using extends keyword. A. Write a java program to create inner classes. B. Write a java program to create inner classes. B. Write a java program to create user defined package. A. Write a java program for creating multiple catch blocks. B. Write a java program for producer and consumer problem using Threads. Write a java program to display File class properties. B. Write a java program to represent ArrayList class. C. Write a java program to represent ArrayList class. Write a java program to adds phone no, name from a text file using hashtable. Write an applet program that displays a simple message.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example. B. Write a java program to implement Interface using extends keyword. A. Write a java program to create inner classes. B. Write a java program to create user defined package. A. Write a java program for creating multiple catch blocks. B. Write a java program for producer and consumer problem using Threads. Write a java program to display File class properties. B. Write a java program to represent ArrayList class. C. Write a Java program loads phone no, name from a text file using hashtable. Write a Java program that displays a simple message. A. Write a Java program computes factorial value using Applet.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example. B. Write a java program to implement Interface using extends keyword. A. Write a java program to create inner classes. B. Write a java program to create user defined package. A. Write a java program for creating multiple catch blocks. B. Write a java program for producer and consumer problem using Threads. Write a java program to display File class properties. B. Write a java program to represent ArrayList class. C. Write a Java program loads phone no, name from a text file using hashtable. Write a Java program computes factorial value using Applet. Write a program for passing parameters using Applet.
 Write a java program for Method overloading and Constructor overloading. Write a java program to display the employee details using Scanner class. Write a java program that checks whether a given string is palindrome or not. A. Write a java program to represent Abstract class with example. B. Write a java program to implement Interface using extends keyword. A. Write a java program to create inner classes. B. Write a java program to create user defined package. A. Write a java program for creating multiple catch blocks. B. Write a java program for creating multiple catch blocks. B. Write a java program for producer and consumer problem using Threads. Write a Java program to display File class properties. B. Write a java program to display File class properties. B. Write a java program to represent ArrayList class. C. Write a Java program loads phone no, name from a text file using hashtable. Write a Java program computes factorial value using Applet. B. Write a java program for passing parameters using Applet. A. Write a java program for passing parameters using Applet. B. Write a java program for handling Mouse events and Key events.

14. Write a java program that connects to a database using JDBC.15. A. Write a java program to connect to a database using JDBC and insert values into it.B. Write a java program to connect to a database using JDBC and delete values from it.

16. Write a java program that works as a simple calculator. Use a Grid Layout to arrange Buttons for digits								
and for the + - * % operations. Add a text field to display the result								
Recommendation by Board of studies on								
Approval by Academic council on								
Compiled and designed by								
Subject handled by department	Department of CS & IT							

LINON TECHNOLOGICAL AL	SAMRAT ASHOK TECHNOLOGICAL INSTITUTE											
(Engineering College), VIDISHA M.P.												
(An Autonomous Institute Affiliated to RGPV Bhopal)												
VIDISHA M.P.		× ×	DE	PAR	FMEN	NT OF C	S & IT	1 /				
Semester/Year	•	III/II		Program B.Tech – Internet of Things							nings	
Subject	DC	Subject Code	: 10) 304	Subi	ect Name	Analysis	and De	esign	gn of Algorithms		
Category		Maximu	m Marks	Allotted	~ J		J ~-~	C	ontac	t	Tatal	
	T	Theory Practical Total Hou									Credits	
ES	MS	Assignment	Quiz	ES	LW	Quiz	T	P				
60 20 10 10 30 10 10 150 3 0										2	4	
Prerequisites:	1			w.e.i. j	uly 20.	24						
Fundamentals	of Data	Structures										
Course Objec	tive:											
• Determ	ine diff	ferent time com	plexitie	s of a g	given al	lgorithm						
Demons	strate a	lgorithms using	g variou	s desig	n techn	iques.						
Develop	algorit	hms using variou	us design	technic	ques for	a given pro	blem.					
UNITS				Descri	ptions					I	łrs.	
		rithms: Defini	ition an	d chai	acteris	tics. Analy	ysis: Spac	ce an	d			
	Time	Complexity, A	sympto	tic Not	ations,	Time Com	iplexity A	nalysi	S			
	of a	ligorithms (Li	inear S	bearch,	Inser	tion Sort	etc.)Red	curs1v	e			
т	algori	ithms and re	currence	e rela	tions.	Solutions	of rect	irrenc	e		0	
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	Divid	le and conquer		jue, an	arysis,	design and	u compari		01			
	vario	us algorithms t	ort Up	1 this t	ecnniq	ue, exampl	ie binary :	iontio	1, n			
	with t	their complexit	v analve	ip son ic	, 51145	sen s mau	ix munipi	Icatio	11			
	Gree	dv Algorithm	s: Kna	nsack	proble	em Job s	equencing	y wit	h			
	deadl	ines optimal	merge	natter	ns H	uffman co	oding Dy	vnami	c			
П	Progr	amming: Mul	tistage	Graph	. all	pairs sho	test path	s. 0-	1	8		
	Knap	sack. Chaine	d matr	ix m	ultiplic	ation. Lo	ngest co	ommo	n		-	
	subse	quence, Travel	ling sale	esperso	n prob	lem.	0					
	Grap	h and Tree	Algorith	nms: T	ravers	al algorith	ms: Dept	h Firs	st			
	Searc	ch (DFS) and	Bread	th First	st Sea	rch (BFS)	; Shortes	t pat	h			
тт	algori	ithms- Dijkstr	ra's Al	lgorithi	ms an	d Compl	exity Ar	nalysis	5,		0	
111	Trans	sitive closure, l	Minimu	m Spai	nning 🛛	Free- Prim	's and Kr	uskal'	S		0	
	Algor	rithm and their	complex	xity an	alysis,	Union Fine	d Data Str	ucture	e,			
	Topo	logical sorting,	Networ	k Flow	Algor	ithm.						
	Bran	ch &Bound te	chnique	e: Defi	nition a	and applica	tion to so	lve 0/	1			
IV	Knap	sack Problem,	8-puzzl	e probl	lem, tra	avelling sa	lesman pr	oblen	1.		8	
	Back	tracking conc	ept and	its exa	amples	like 8 Qu	ieens's pr	oblem	ı,			
	Ham	Iltonian cycle, C	Jraph C	oloring	g proble	em.	. 1 . 1 .		C			
		table and	Intract	able	Probl	ems: Co	mputabili	ty c)t			
17	Algoi	rithms- P, NP	', NP-C	omplet	e and	NP-nard.		10n t	0		0	
v Approximation Algorithms, NP-complete problems and Reduc								luctio	n	0		
	nrohl	iques. Lower	bound t	neory	and n	s use m s	orving alg	georai	C			
Total Hours	probl	C111.									40	
Course Outco	mes:											
CO1: Analy	ze and j	justify the runnir	ng time c	omplex	ity of a	lgorithms						
CO2: Articu	CO2: Articulate the effectiveness of divide and conquer methods to solve searching, sorting and other											

problems.

CO3: Understand the combinatorial problems and justify the use of Greedy and Dynamic Programming techniques to solve them.

CO4: Model graph or tree for a given engineering problem, and write the corresponding algorithm to solve it.

CO-5: Able to analyses the NP-complete

Text Book

- 1. Thomas Cormen, Charles Leiserson, Ronald Rivest and Cliford Stein, "Introduction to Algorithms", PHI, 3rd edition.
- 2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", Universities Press.

Reference Books

1. Gilles Brassard and Paul Bratley, "Fundamentals of Algorithmics", PHI.

List/Links of e-learning resource

• https://archive.nptel.ac.in/courses/106/106/106106131/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO	Mappi	ng:	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO ₁₁	PO ₁₂	PSO-1	PSO2
CO-1	3	3	2	3	1							2	3	
CO-2		3	3	2	3									
CO-3	2	3	3	3	2									
CO-4		2	3	3										
CO-5		3	2	3										

Suggestive list of experiments:

- 1. Implement Algorithm to calculate factorial of given number using iteration method and recursive Method.
- 2. Implement logic to swap two integer numbers using three different approaches.
- 3. Implement Algorithm to determine if a given number is divisible by 5 or not without using % Operator.
- 4. Implement Algorithm to convert binary number to decimal number without using array and Power function.
- 5. Implement Algorithm to print reverse of string using recursion and without using character Array.
- 6. Implement Linear Search Algorithm.
- 7. Implement Binary Search Algorithm (By using Iterative Approach)
- 8. Implement Binary Search Algorithm (By using Recursive Approach)
- 9. Implement Insertion Sort Algorithm
- 10. Implement Quick Sort Algorithm (By using Recursive Approach)
- 11. Implement Quick Sort Algorithm (By using Non Recursive Approach).
- 12. Implement Merge Sort Algorithm.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of CS & IT

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE												
GIA	(Engineering College), VIDISHA M.P.											
(An Autonomous Institute Affiliated to RGPV Bhopal)												
VIDISHA M.P.	DEPARTMENT OF CS & IT											
Semester/Year III/II Program B.Tech – Internet of Things												
Subject	DC	Subject Code:	10	305	Subject		Comn	uter S	vstem	Organization		
Category	DC	Maximum M	Ionka A	llottod	Name		comp		ystem	orga		
	Т	heorv	larks A		Practical		Total	Con	tact H	Iours	Total Credits	
ES	MS	Assignment	Quiz	ES	LW Quiz	2	Marks	L	Т	Р		
60	20	10	10				100	3	0	0	3	
w.e.f. July 2024												
Prerequisit	tes:		-1 171-									
Fundame	ntal kno	wledge of Digit	al Elec	ctronic	cs							
Course Ob	Jecuve:	a anappization on	d anabi	tootum	of commut		vetoma on	dalaa	trani			
• Unde	rstand th	e organization and	d archi	tecture	e of comput	er s	ystems and		tronic	c comp	puters.	
• Study	the asse	embly language pr	ogram	execu	tion, instruc	2010	n format, a	ina in	struc	tion cy	/cle.	
• Desig	n a simp	ble computer using	g hardv	vired a	ind micropr	ogra	ammed co	ntrol I	netho	ods.		
• Study	the basi	ic components of	compu	ter sys	tems beside	es co	omputer ar	rithme	etic.	1.	1	
• Unde	rstand in	iput-output organi	zation,	memo	ory organiza	t101	n and man	ageme	ent, a	nd pip	elining	
UNITS	. .	·	<u> </u>	escrip	tions			<u> </u>			Hrs.	
	Introdu	iction: Function	and	structu	ure of a	con	nputer, F	unctic	onal			
	compo	nents of a c	ompute	er, li	nterconnecti	on	of con	npone	nts,			
	Perform	nance of a com	puter,	Regist	ter Transfe	r la	inguage :	Regi	ster			
т	Transfer, Bus and Memory Transfers, Three-Stare Bus Buffers,									7		
1	Memory Transfer, Arithmetic Microoperations Binary Adder, Binary								ary	/		
	Adder-	Subtractor, Bina	ry ind	cremei	nrer, Arith	met	IC CIrcui	t, Lo	ogic			
	Microo	E Logio Migroopo	viicroo	peration of the second	ons, Arithin ift Miana a		: Logic Si	niith m	mi,			
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	Logic Control	Sillit Ullit 1 unit: Control r	nomor	v odd	ross socio	noir	a miero	nrom	om			
	exampl	le Microinstructi	on Fo	emory, address sequencing, micro program								
II	Eetch F	Routine Symbolic	Micro	nnai,	symbolic T	ign	of the cor	ons, i	nit		7	
	Micror	rogram Sequence	r	prog		ngn		ittoi u	m,			
	CPU d	esign. Instruction	cvcle	data	representati	on	memory	refere	nce			
	instruct	tions. input-outp	ut an	d int	errunt add	lres	sing mod	les d	lata			
Ш	transfer	r and manipulation	on and	l nrog	am control	Co	omputer ar	ithme	tic [.]		7	
	Additio	on and subtraction	ı. float	ing po	int arithme	tic d	operations.	. deci	mal			
	arithme	etic unit.	-,	0 r -			- F	,				
	Memor	ry organization:	Memo	ry hie	rarchy, ma	in	memory.	auxili	ary			
TX 7	memor	v, associative me	mory, o	cache	memory, vi	rtua	l memory:	Inpu	tor		-	
IV	output organization: Input or output Interface, asynchronous data								lata		/	
	transfer	r, modes of transf	er, pric	ority in	terrupt, dire	ect i	nemory ac	ccess.				
	Pipelin	e: Parallel proces	sing, p	ipelini	ng-arithmet	ic p	oipeline, in	struct	ion			
V	pipelin	e; Multiprocess	sors:	Chara	acteristics	of	multipr	ocess	ors,		7	
v	interco	nnection structur	es, int	er-pro	cessor arbit	rati	on, inter-j	proces	sor		/	
	commu	inication, and syn	chroniz	zation.								
Total Hou	rs					_					35	
Course Ou	tcomes:			1 -	0.1							
CO1: Un	derstand	d the organizatio	n and	levels	s of design	ın c	computer	archi	tectu	ire and	d understand	
the conce	pts of R	legister transfer	langua	ges.								
CO2: De	scribe a	rithmetic micro-	operat	ions,	logic micro	0-01	perations,	shift	mic	ro-op	erations	

address sequencing, microprogram example, and design of control unit
CO3: Understand the Instruction cycle, data representation, memory reference instructions, inputoutput, and interrupt, addressing modes, data transfer, and manipulation, program control. Addition and subtraction, floating point arithmetic operations, decimal arithmetic unit.

CO4: Knowledge about Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory Input or output Interface, asynchronous data transfer, modes of transfer, Priority interrupt, and direct memory access.

CO5: Explore the Parallel processing, pipelining-arithmetic pipeline, instruction pipeline Characteristics of multiprocessors, interconnection structures, inter-processor arbitration, interprocessor Communication, and synchronization.

Text Book

1. M. Morris Mano, "Computer Systems Architecture", Pearson, 3rd edition.

Reference Books

- 1. John D. Carpinelli, "Computer Systems Organization and Architecture", Pearson, 1st Edition.
- 2. Patterson, Hennessy, "Computer Organization and Design: The Hardware/Software Interface", Morgan Kaufmann.

List/Links of e-learning resource

• https://archive.nptel.ac.in/noc/courses/noc22/SEM1/noc22-cs15/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid-semester Tests. Quiz/Assignments, term work. **CO-PO Mapping:**

		-8-													
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2	
CO-1	1	1	2										1	2	
CO-2	2	2	2										1	2	
CO-3	2	1	2										1	2	
CO-4	2	1	2											2	
CO-5	2	2	1										1	2	
Recomm	nendatio	on by Bo	oard of s	tudies o	on										
Approva	Approval by Academic council on														
Compiled and designed by															_
Subject l	handled	by depa	artment				De	partmen	t of CS	& IT					

STATISTICS TECHNOLOGICAL	SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P.													
Su Conte	(Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) DEPARTMENT OF CS & IT													
UIDISHA M.P.	4			(DEP	ARTI	MENT	' OF	'CS &	IT	P==)			
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Subject Category	DLC	Subje	ect Code	:	IO 306	5	Subject Name		Web A	Applica	tion De	evelopm	ent	
		1	Maximu	m Marl	s Allott	ted				Co	ontact I	Hours	Total	
ES		Theory Assi	onment	Ou	iz E	Pra S LV	ctical V Oui	7	Total Marks		Т	P	Credits	
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					w.e.	f. July	2024							
Prerequisit	es:	1 1 0	D	•										
Fundament	al Know	ledge of	Prograi	mming										
Understand	Static a	nd Dyna	mic We	h Page	s									
UNITs		ila D'fila		io i ugo	Desc	ription	s					H	rs.	
T	WEBS	ITE BA	SICS, V	Web Es	sential	s: Clier	nts, Serv	ers ar	nd Comm	nunicat	ion,		0	
1	The Int	ernet, B	asic Int	ernet p	rotocol	s, Worl	d wide v	veb.					8	
	HTTP	Request	t Messa	age, H	TTP R	lespons	e Mess	age, V	Web Cli	ents, V	Web			
II	Servers	s, HTML	.5, Tabl	les, Lis	ts, Ima	ge, HT	ML5 co	ntrol	elements	, Sema	intic		8	
	CSS3, Inline, embedded and external style sheets, Rule cascading,													
ш	CSS3, Inline, embedded and external style sheets, Rule cascading, Inheritance, Backgrounds, Border Images, Colors Shadows, Text, 8													
111	Inheritance, Backgrounds, Border Images, Colors Shadows, Text, 8 Transformations, Transitions, Animations.													
	Java Script: An introduction to JavaScript, JavaScript DOM Model-Date													
IV	and Objects, function, Regular Expressions.													
V	Except	ion Han	dling-V	alidati	on-Bui	lt-in oł	jects-Ev	ent I	Handling	- DHT	ML		0	
v	with Ja	vaScript	. XML	- Eleme	ents, att	tributes	, parser,	DOM	I, query.				0	
Total Hour	<u>s</u>											4	40	
	comes:	l and int	orprot t	ha hasi	2 conce	nts of t	ha Intar	nat tr						
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CO3 : To k	now and	analyse	client si	ide scri	pting la	anguag	e concep	ots.		11 1001	, inte i		200.	
CO4: Desi	gn and D	evelop I	nternet	applica	tions v	vith the	help of	Java	script.					
CO5: Und	erstand th	ne conce	pt of ex	ceptior	al hand	dling								
Text Book	& Refere	ice Book	S-	0	XX 1 7	F 1							1	
I. Achyu	t Godbol	e, Atul k	Cahate d	& quot	;Web	l'echno	logies: 'I	CP/II	P, Web/Ja	ava Pro	ogram	ning, ai	nd	
Cloud	Computi	ng", Thi	rd Editi	ion, Mc	Graw	H1ll Ed	ucation.							
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● httr	os://archiv	e.nptel.ad	c.in/noc/	courses	/noc16/	SEM2/r	loc16-cs1	.0/						
Modes of E	Modes of Evaluation and Rubric													
The evaluation	The evaluation modes consist of performance in two mid-semester Tests, Quiz/Assignments, term work, end semester													
practical exa	practical examination.													
COS P(pping:	PO ₂	PO ₄	PO	PO₄	PO ₇	PO₀	PO	PO ₁	PO11	PO ₁₂	PSO1	PSO2	
CO1 2	1	2	4	- 03	- 00	- 07			- 01	. ~11	12	1	1	
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CO3 2 CO4 2	$\frac{1}{2}$	2										1	2	

Suggestive list of experiments:

1. Design a web page to display your CV.

2. Design a web page using HTML tags to take the input in a form and display it in another page/frame.

3. Design a web page to isolate a part of the text that might be formatted in a different direction from other text outside it

4. Create a Zebra Striping a Table and make an image rounded with CSS3.

5. Create speech bubble shape and Image cross effect with CSS3 transition.

6. Using HTML, CSS create a styled checkbox with animation on state change.

7. Using HTML, CSS create display an image overlay effect on hover.

8. Using HTML, CSS create a list with floating headings for each section.

9. Using HTML, CSS, JavaScript create a typewriter effect animation.

10. Using HTML, CSS create an animated underline effect when the user hovers over the text.

11. Write a JavaScript program to set paragraph background colour.

12. Write a JavaScript function to add rows to a table.

13. Write a JavaScript function that accepts a row, column (to identify a particular cell) and a string to update the cell and the cell's content.

14. Write a JavaScript program to highlight the bold words of the following paragraph, on mouse over a certain link.

15. Write a JavaScript program to get the window width and height (any time the window is resized).

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of CS & IT

SHOR TECHNOLOGICE	SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P.												
	(Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) DEPARTMENT OF IT												
VIDISHA M.P.	(An Autonomous Institute Affinated to KGPV Bhopal) DEPARTMENT OF IT Semester/Year IV/II Program B.Tech – Internet of Things Subject Category DC Subject Code: IO 401 Subject Name Microprocessors and Microcontrollers Maximum Marks Allotted Contact Hours Total												
Semester/Ye	ear	IV/II		Pro	gram		B.Tech	ı – Inter	net o	f Thin	gs		
Subject	DC	Subject Code:	IC) 401	Su	bject	Microproces	ssors an	d Mie	crocon	trollers		
Category		Maximum	Marks A	Allotted		ame		Gent	4 TT		Total		
	T	heory			Practic	al	Total	Cont	act H	ours	Credits		
ES 60	MS 20	Assignment	Quiz	ES 30	LW 10	Quiz	Marks	L 3	<u>Т</u> 0	P 2	1		
00	20	10	10	w.e.f	Inly 20	024	150	5	U	4	-		
Prerequisite	s:		,		July 2								
Basic Compu	uting and I	Logical reasoning.											
Course Obje	ective:	0 111 1.1 1			0.0.11	2.0	11 0 1 6						
• To mak	ke student	s familiar with the	e basic b	olocks o	of 8 bit	Microco	ontroller & 16	bit mici	oproc	essor	device in		
To prov	vide comp	rehensive knowled	ge of the	archite	cture. fe	eatures a	nd interfacing v	vith peri	phera	l devic	es.		
• To use	To use assembly and high level languages to interface the microcontroller to various devices. UNITS Bescriptions Hrs												
UNITs	UNITS Descriptions Hrs.												
т	Introduction to 16 bit Microprocessor-Introduction to 8086 Microprocessor family												
1	I Architecture, Pin diagram, Instruction set, Assembler directive, Addressing modes, 8 Maximum and Minimum Mode operation, Elementary 8086 Programming, 8												
	Microco	ntrollers and Em	bedded	process	sors, ov	verview	of 8051 fami	ily. 805	1				
	microcon	ntroller hardware,	oscillato	r and c	lock, C	PU regis	ters, Register b	anks an	d				
II	stack, flags, PSW, SFR's, I/O ports, internal memory, 8051 pin description. 8051 programming model, Assembly, Language programming, Data types, directives.												
	programming model, Assembly, Language programming, Data types, directives. Addressing modes of 8051, memory access using various addressing modes, Bit												
	Addressing modes of 8051, memory access using various addressing modes, Bit addresses for I/O and RAM, I/O port programming.												
	Arithme	tic Operations with	n 8051: A	Arithme	tic instr	uctions,	signed number	concep	ts				
ш	and arith	hmetic operations.	Branch	Instruct	tions: Ju	manipul	p and Call Ins	truction	s,		8		
	and com	pare instructions r	otate and	l swap	instruct	ions, dat	a serialization,	single b	it		0		
	instruction	ons, operations wit	h carry, 1	reading	input pi	ins.		Ũ					
	Timers:	Programming, Cou	inter pro	grammi	ing, Ser	ial comn	nunication, RS2	232, 805	1				
IV	program	ming for serial	port, i	Serial	Port p rdware	interrunt	ning, 8051 I ts serial comm	nterrupt	s, m		8		
	interrupt	ts, interrupt priority	in 8051	, Interru	ipt prog	ramming	g.	unicatio					
	Interface	e 8051, LCD Inte	erfacing,	memo	ry add	ress dec	oding, interfac	ing wit	h				
v	external	ROM, data memo	ory space	e, acces	sing ex	ternal m	emory in C, In	nterfacin	g		8		
	8255, pi	ADC 8051 program	, modes mming fa	01 823 or 8255	00, 820	5 conne	ction to stepp	er moto	r,				
Total Hours		ribe, 0001 progra		0200	•					4	40		
Course Out	comes:								•				
CO 1: Acqui	ire and der	monstrate fundame	ntal knov	wledge	of micro	oprocess	ors or interfacir	ng and p	rograi	nming			
CO 2: Under	rstanding i 7 the arithr	the fundamentals o	r 8051 m	with the	itroller. De help (of instruc	rtions						
CO 4: Analy	ze the cor	ncept of Timer, Ser	ial Comr	nunicat	ion and	interrup	t.						
CO5: To und	derstand th	ne interfacing of 80	51 micro	ocontrol	ler with	periphe	ral devices.						
Text Book	0 17	M DL 1	A .1- ···	1 1/			Dania I 1 T	1. 1.5	7	11:11 - 2	L-1.1: 1. 1		
I. AKK Compa	1. A K Ray & K M Bhurchandi, Advanced Microprocessor and Peripheral, Tata McGraw-Hill Publishing Company Limited												
2. MAN	2. M A Mazidi, J G Mazidi and R D McKinley, The 8051 Microcontroller and Embedded Systems: Using												
Assemt	bly and C,	Pearson.											
1. Ramesh	n S Goar	nkar, Microprocess	sor Arch	nitecture	e, Prog	ramming	g & Applicatio	ons with	n the	8085	, Penram		
Internat	tional Pub	lishing (India) Pvt.	Ltd., Fo	urth Ed	ition, 20)02.	hardware Cr	a Dinis	or 14				
2. Dougla 1986	s v. Hall,	whereprocessors a	ua interfa	acing pi	ogram	ung and	naroware Greg	g D1V1S1	on, M	icGrav	v-Hill,		

Lis	List/Links of e-learning resource														
	•	https://	archive.	.nptel.ac	c.in/cou	ses/108	8/105/10	0810510)2/						
Mo	des o	of Evalu	lation a	nd Rul	oric										
The	e eval	uation 1	modes c	consist o	of perfor	mance	in two	mid sen	nester T	ests, Qı	uiz/Assi	gnments	, term we	ork, end	semester
pra	ctical	examir	nation.												
CO	-PO	Mappi	ng:											D CC 1	DGGA
C	Os	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO_1	PO ₁₁	PO ₁₂	PSO1	PSO2
C	0-1	2	2	1										1	2
C	0-2	2	2	2	-									1	2
C	0-3	2	2	2	1									1	2
C	0-4	3	2	2	1									1	2
Suc	U-5	<u>Z</u>	2 of ownor	l								l		1	
3ug	. WAP to add a data byte located at the offset address 0500H in the segment 2000H to another data byte located at														
1.	1. WAP to add a data byte located at the offset address 0500H in the segment 2000H to another data byte located at the offset address 0600H in the segment 3000H														
2	the offset address 0600H in the segment 3000H.														
2.	WA	P to mo		JH to re	gister B	A and	CX, add	1 05H to	each o	them a	ind stor	e the res		JUH. Seg	ment
2	addr	ess: 50	00H.		6 2 0 0 0 1		rr1		6.00			• • •			T
3.	WA	P to add	d the co	ntents o	f 2000F	1: 0500	H to the	conten	ts of 30	00H: 06	booh an	d store t	he result	1n 50001	1:
	0700)н.		-											
4.	WA	P to fin	d the sq	uare of	a given	numbe	r.								
5.	WA	P to fin	d the 2'	s compl	liment o	f a give	en numb	er.							
6.	WA	P to fin	d the sq	uare roo	ot of a g	iven nu	mber.								
7.	WA	P to arr	ange the	e given	set of b	ytes in a	ascendii	ng order							
8.	WA	P to arr	ange the	e given	set of by	ytes in t	the desc	ending	order.						
9.	WA	P to fin	d out th	e larges	t numbe	er in the	e given s	set of 8-	bit num	ber stor	red at m	emory le	ocation 0	500H in	the
	segn	nent 20	00H.												
10.	WA	P to fin	d out th	e even a	and odd	numbe	rs from	the give	en set of	f 10 data	a bytes	stored at	memory	location	4000H:
	0400Н.														
Rec	ecommendation by Board of studies on														
Ap	prova	1 by Ac	ademic	council	on										
Cor	npile	d and d	esigned	by					L						
Sub	ject l	nandled	by depa	artment					Depar	tment o	f IT				

ST BHOK TECHNOLOGICAL IL	SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P.													
SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) DEPARTMENT OF IT														
(Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) DEPARTMENT OF IT Semester/Year IV/II Program B.Tech – Internet of Things														
UIDISHA M.P.	DEPARTMENT OF IT emester/Year IV/II Program B.Tech – Internet of Things Subject Category DC Subject Code: IO 402 Subject Name Database Management System Maximum Marks Allotted													
Semester/Ye	ear	IV/II		Pro	gram		B.Tech	n – Inter	met of	f Thin	gs			
Subject	DC	Subject Codes	10	402	Sul	oject	Datahar	. Mana	~ ~ ~ ~ ~ ~	- 4 C				
Category	DC	Subject Code:	10	402	Na	ame	Databas	e Mana	geme	nt Sys	tem			
		Maximum	Marks A	llotted	l		1	Cont	act Ho	ours	Total			
		heory	<u> </u>		Practic	al	Total			-	Credits			
ES		Assignment	Quiz	ES 20		Quiz	Marks		<u>T</u>	Р 2	4			
00	20	10	10	30	10	10	150	3	U	2	4			
D			V	v.e.i.	July 20)24								
Prerequisite Basic Knowl	edge of M	athematics and Pr	orammi	<u>η</u> α										
Course Obj	ective.	famematics and Fit	Jgrannin	ig										
• To I	understand	the different issue	es involve	ed in the	e design	and imr	lementation of	a databa	ase sv	stem.				
• To 1	represent a	a database system i	ising ER	diagrar	ns and t	o learn n	ormalization te	chnique	s	stern.				
• To 1	learn the fu	undamentals of dat	a models	, relatio	onal alge	ebra, and	SQL.	1						
• To 1	understand	the basic issues o	f transact	ion pro	cessing	and con	currency contro	ol.						
• To 1	become fa	miliar with databas	se storage	e structu	ires and	access t	echniques							
UNITs			I	Descrip	otions					H	lrs.			
• To become familiar with database storage structures and access techniques UNITs Descriptions Hrs. Introduction: Purpose of Database System Views of data - data models, database Introduction: Purpose of Database System Views of data - data models, database														
Ι	UNITs Descriptions Hrs. Introduction: Purpose of Database System Views of data - data models, database management system, three-schema architecture of DBMS, components of DBMS. 8													
	I management system, three-schema architecture of DBMS, components of DBMS. E/R Model - Conceptual data modeling - motivation, entities, entity types, attributes relationships, relationship types, E/R diagram notation, examples.													
	Relation	al Model: Relation	ypes, E/F	K diagra	<u>Conce</u>	on, example of re	inples.	instand	20					
	relationships, relational Data Model - Concept of relations, schema-instance distinction keys referential integrity and foreign keys relational algebra operators													
П	SOL - Ir	ntroduction. data d	efinition	in SOI	<i>i</i> table.	kev and	foreign kev de	efinition	s, s.		8			
	update b	behaviors. Queryin	g in SQI	, notio	n of ag	gregatio	n, aggregation	functior	ns		-			
	group by	and having clause	es.	·	C	6 6								
	Database	e Design: Depende	ncies and	l Norm	al forms	s, depend	lency theory - f	function	al					
III	depender	ncies, Armstrong's	axioms	for Fl	D's, clo	sure of	a set of FD's,	minim	al		8			
	covers, o	definitions of INF	² , 2NF, 3 ma for 21	SNF an	d BCNE	F, decon	npositions and	desirab.	le					
	Transact	ions: Transaction	nrocessin	or and	Error re		acconcepts of tr	1 JINF.	n					
IV	processi	ng ACID properti	es concil	rrency	control	locking	based protocol	ls for CO			8			
	error rec	overy and logging.	undo, re	do, und	lo-redo	logging a	and recovery m	ethods.	_,		0			
	Impleme	entation Technique	s: Data S	torage a	and Inde	exes - fil	e organizations	, primar	y,					
V	secondar	ry index structures	, various	index s	tructure	s - hash	-based, dynami	c hashir	ıg		8			
	techniqu	es, multi-level inde	exes, B+	trees.										
Total Hours	5									4	40			
Course Out	comes:	h				of dotal								
CO-1: Under		basic concepts, pri	ncipies a	na appi	1cations	of datat	ase systems.							
CO-2: Discu	iss the con	nponents of DBMS	, data me	dels, R			S.		1.0					
CO-3 : Use k	nowledge	to find the functio	nal deper	idencie	s and di	fferentia	te between diffe	erent noi	rmal f	orms.				
CO-4: Exect	ite transac	tion concepts and	concurrer	ncy pro	tocols									
CO-5: Artici	late the ba	asic concept of sto	rage and	access	techniqu	ies.								
Text Book	Elmoori or	nd Shamlant D. N	wath a Fr	mdomo	mtala of	Databas	Sustana Da	anaon Ed	Inostic					
1. Kamez	Ennasri ai	nu Shamkant B. Na the "Data har- South	avaine, Fi	undame	7th of	Databas	be Systems, Pea	arson E0	iucatio	011				
2. Silberso	chatz, Kor	in, Data base syst	em Conc	epts,	/ th ed.,	wcGraw	⁻ IIIII.							
1 C I D	oto "Am In	traduction to Det-	hase See	toma" (Rth ad	Dagraar								
1. C. J. D.	aut, All II Domological	mon and Johannas	Gobrico I	Dotobo	oui eu.,	i caison.	Systems McC-	W LI:11						
2. Kagiiu	oh and Ca	rios Coronal Data	basa Swat	Databas	se mana	anlomor:	bystems MCOR	aw Fill.	Car		oorning			
J. reter R	ob and Ca	nos Coronei, Data	base Syst	em-De	sign, if	npiemen	tation and Man	agement	., Cen	igage I	Leanning.			
• http	s://nntel a	c.in/courses/106/10	04/10610	4135/										
• http	s://nptel.a	c.in/courses/106/10	06/10610	6220										

Modes	Modes of Evaluation and Rubric													
The eva	luation n	nodes c	onsist o	of perfor	rmance	in two	mid ser	nester 7	Fests, Q	uiz/Ass	ignment	s, term v	vork, end	semester
practica	l examin	ation.												
CO-PO	Mappir	ıg:												
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2
CO-1	1	1	2										1	2
CO-2	3	2	2										1	2
CO-3	2	1	2		2								1	2
CO-4	2	1	2											2
CO-5	2	2	2											1
Suggest	Suggestive list of experiments:													
1. I	1. Design a Database and create required tables. For e.g. Bank, College Database													
2. A	2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables													
3. V	Vrite a sc	l staten	nent for	implen	nenting	ALTE	R,UPDA	ATE and	d DELE	ETE				
4. V	Vrite the	queries	to imp	lement	the join	s								
5. V	Vrite the	query f	or impl	ementir	ig the a	ggregat	e functi	ons						
6. V	Vrite the	auerv t	o imple	ment th	e conce	ept of In	tegrity	constrai	ints					
7. V	Vrite the	auerv t	o create	the vie	ws	1	0,							
8 P	Perform t	he quer	ies with	groun	by and	having	clauses							
9 P	erform t	he follo	wing of	reration	for de	monstra	ting the	inserti	on und	lation a	nd deleti	on using	the refer	ential
<i>)</i> . 1	errority c	onstrai	nte	beration		nonstra	ting the	msertiv	on, upu	ation a	na acien	on using		ciitiai
10 1	Megnity C	onsuar	1115 											
10. V	10. Write the query for creating the users and their role													
Recomr	Recommendation by Board of studies on													
Approv	Approval by Academic council on													
Compile	ed and de	esigned	by							C IT				
Subject	handled	by depa	artment					Depar	rtment c	of IT				

States	SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal)												
VIDISHA M.R.	4	(4	An Autor	iomous D	s Institu)EPAR'	ite Affil IMENT	iated to RGPV	Bhopa	I)				
Semester/Ye	ear	IV/II		Pro	gram		B.Tech	n – Inte	rnet of	f Thin	gs		
Subject Category	DC	Subject Code:	ю	403	Sul Na	oject ame	Sig	nals an	d Syst	tems			
		Maximum	Marks A	llotted				Conf	act H	ours	Total		
		heory	<u> </u>	Ta	Practic	al	Total				Credits		
ES		Assignment	Quiz	ES			Marks		T	Р 2	4		
00	20	10	10	<u> </u>	10 [] 2(10	150	3	U	2	4		
Duonoquisito			• •	v.e.i.	July 20	124							
Engineering	s. Mathemat	ics											
Course Obje	ective:	103											
Understa	nd the fund	damentals of the Si	gnals and	1 svster	ns.								
• Understa	nd linear ti	ime invariant syste	ms and a	ble to o	btain m	athemat	ical modelling of	of the sy	stem.				
Apply the	e concepts	of frequency doma	ain repres	entatio	ns to an	alyze co	ontinuous and di	iscrete t	ime sig	gnals/s	systems		
• Understa	nd and app	oly the Z-Transform	n, to the a	analysis	s and de	scription	n of LTI discret	e-time s	ystem	s.	-		
• Able to a	pply the ki	nowledge to model	a system	ı									
UNITs]	Descrip	tions					H	lrs.		
	An Intro	oduction to Signa	als and	System	ns: Def	inition	of signal and	system	ls,				
	Classific	ation of signals: c	ontinuou	s time	and dis	crete tin	ne signal, even	and od	d,				
	periodic Element	and non-periodic,	determin	listic ai	id non-	determi	nistic, energy ai	nd powe	er.				
	propertie	ary signals/Functions ramp rectangul	ar triano	ular si	, sille, onum (unit n Deratio	npuise, unit ste	molitu	is le				
Ι	scaling.	addition. multipli	cation.	lifferen	tiation.	integra	tion. time scal	ing. tin	ne		8		
	shifting,	and time folding.	System p	ropertie	es: linea	rity, add	itively and hom	nogeneit	y,				
	causality	v, stability, reliabili	ty. Introd	luction	to diffe	rent typ	es of systems li	ike caus	al				
	& non ca	ausal systems, stat	ic& dyna	amic, st	able &	instable	, linear& nonlir	near, tin	ne				
	variant &	time invariant sys	tems.	τ. 1		<u> </u>							
	Linear	1 ime- Invariant S	ystems:	Introdu	of the	impulse	ution: impulse	respon	se				
II	for LTL	systems, differenti	al and di	fferenc	e equati	on for 1	LTI Systems. S	ingulari	tv		8		
	functions	s, sterns, enrerend s.			e equi		,,		cy				
	The res	ponse of LTI s	system t	o con	nplex e	xponen	tial, Fourier s	series(F	S)				
Ш	represent	tation of continuo	us time p	eriodic	signals	, conve	rgence of Four	ier serie	s,		8		
	Propertie	es of CT-FS, FS	represen	tation	of Disc	rete Tir	ne(DT) periodi	ic Signa	ıl,		0		
	Propertie	es of DI-FS.	aignola: t	ha aant	inuoua	ima Ea	mior Transform	(CT F	۲) (۲				
	FT for	periodic signals	Prope	ties o	f CT-I	T the	convolution	nroperf), V				
IV	Represer	ntation of DT-FT (for perio	dic and	aperiod	lic signa	ls), properties of	of DT-F	т,		8		
	Sampling	g Theorem, and Re	presentat	ion of	CT sign	als by it	s samples, record	nstructio	on				
	of a sign	al from its samples	, aliasing	.									
	The z tra	ansform Basic prir	ciple of	z-trans	form, d	efinition	, region of con	vergenc	e,				
v	system f	unctions, poles an	d zeros	of syste	ems and	l sequer	ices, properties	of RO	С,		8		
	of L TL sy	es of z-transform, i	nverse z	-transic	orm usir	ig, Anal	ysis and charac	terizatio	on				
Total Hours		ystem using Z-dall	51011II.							4	40		
Course Out	comes:										10		
CO 1: Acqui	ire knowle	dge of basics, fund	amentals	of sign	nal								
CO 2: Under	rstanding t	the fundamentals for	or LTI sy	stem.									
CO3: To kno	ow the con	cept of Fourier Ser	ries.										
CO4: To kno	ow the con	cept of Fourier Tra	ansform.										
CO5: Apply	the fundat	mentals of Z-Trans	form.										
Text Book &	k Referen	ce Books-											
1. T. K. R	awat, Sign	als and Systems, C	Dxford U	niversit	y Press.								
2. A.V. O	ppenheim,	A.S. Willsky and	I.T. You	ng, "Sig	gnals an	d Syster	ns", Prentice Ha	ull.					

1. B.P. Lathi, "Signal Processing and Linear Systems", Oxford University Press.														
2. Dou	iglas K	. Lindne	er, "Intr	oductio	n to Sig	nals and	d Syster	ns", Mo	Graw F	Iill Inte	rnational	l Edition.		
3. J. N	agrath,	S. N. S	haran, l	R. Ranja	an, S. K	umar, "	Signals	and Sy	stems",	Tata M	cGraw H	ill Publi	shing Co	mpany
Ltd.	, New 1	Delhi					U	•					U	
List/Link	List/Links of e-learning resource													
• ł	https://archive.nptel.ac.in/courses/108/104/108104100/													
Modes of	Modes of Evaluation and Rubric													
The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester														
practical examination.														
CO-PO Mapping:														
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$														
CO-1 3 2 1 1 2 CO-1 3 2 1 1 2														
CO-2	CO-2 2 2 1 1 2													
CO-3	3	1	2	1									1	2
CO-4	3	1	2	1									1	2
CO-5	3	2	1										1	2
Suggestiv	ve list o	of expe	riments	:										
1. Introdu	iction t	o MAT	LAB											
2. Genera	tion of	continu	ious tin	ne signa	ls.									
3. Basic c	operatio	ons on t	he signa	als.										
4. System	ns and t	heir pro	perties.											
5. Convol	lution of	of signa	ls.		1.0									
6. Transfo	6. Transformation of signals into time and frequency domains.													
Recommendation by Board of studies on														
Approval	Approval by Academic council on													
Compiled and designed by														
Subject h	andled	by depa	artment					Depar	tment o	f IT				

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ST BHON TECHNOLOGICAL IN		S	AMRAT	Г ASHO	OK TE	CHNOL	OGICAL	INST	TITUT	Е				
	(An Autonomous Institute Affiliated to RGPV Bhopal) DEPARTMENT OF IT													
and the	(An Autonomous Institute Affiliated to RGPV Bhopal) DEPARTMENT OF IT emester/Year IV/II Program B.Tech – Internet of Things													
VIDISHA M.P.	-			-	JEPAK	TMENI	OFIT							
Semester/Ye	ear	IV/II		Pro	ogram	4	B. 7	ſech	– Inte	rnet o	of Thin	igs		
Subject Category	DC	Subject Code:	IC) 404	Su Na	bject ame		Fo	undati	on of	юТ			
	I I	Maximum	Marks A	Allotted	1		1		Cont	act H	ours	Total		
	T	<u>`heory</u>			Practic	cal	Total	-	-		J	Credits		
ES	MS 20	Assignment		ES	LW	Quiz	Marks	S	<u>L</u>	T 1	P	4		
00	20	10	10	vef	- Inly 20	-	100		3		U	4		
Prerequisite	es:			<i>w.</i> c.n. (July 2									
NA														
Course Obj	ective:													
To mak	te students	s know the IoT eco	system.											
To prov	vide an u	nderstanding of the	e technol	ogies a	nd the	standards	s relating to	o the	Interne	et of				
Things.	1 1 1 11													
	elop skills	s on lo1 technical p	lanning.	Docorir	tions						Ľ	Inc		
UNITS	Introduc	ction & concepts:	lefinition	and c	haracter	istics of	IoT. physi	cal d	lesign	of	I .	115.		
Ι	IoT, Log	gical Design of IoT	, IoT ena	abling t	echnolo	gies, IoT	levels and	deve	elopme	nt		8		
	template	es, IoT and M2M, I	oT desig	n Meth	odology				Ĩ					
	IoT Net	working: Connecti	vity Tech	nologi	es, Gate	way Pre	fix Allotme	ent, I	mpact	of				
II	Mobility	y on Addressing,	Multiho	oming,	Deviat	tions fro	m Regula	r W	eb, Io	Т		8		
	Connect	tivity Technologie	UCOIS(IP	V4, IPV	0, MQI	802 15	$\frac{7}{1}$, AMPP at $\frac{7}{1}$		$\frac{WQP}{WPA}$	N				
III	RFID, H	HART and Wireless	HART,	NFC, E	Bluetoot	h, Z-Way	ve, ISA 100).11A	A.	۰,		8		
	Wireless	s Sensor Network:	Introdu	ction, (Compon	ents of	Sensor Noo	de, N	/lodes	of				
IV	Detectio	on, Challenges in	WSN.	UAV	Networl	k: Introc	luction, U	AV	Netwo	rk		8		
	(Feature	e, Challenges and	Topole	ogy) F	ANET:	Introdu	iction, FA	NET	desig	gn		-		
	Applica	tion of IoT [.] Smart	Homes	– Intro	duction	Origin	of Smart H	Iome	es Sma	art				
	Home 7	Fechnologies. Sma	rt Cities	– Cha	racterist	tics of S	mart Cities	s, Sn	nart Ci	ty				
v	Framew	ork, Challenges in	Smart C	ities. C	onnecte	d Vehicl	es – Introd	uctio	on, leve	els		8		
	of Auto	mation, Vehicle to	Everythi	ng(V2)	X) Parac	ligm, Ve	hicular Ad-	-hoc	Netwo	rk				
Total Hours	(VANE	15)										40		
Course Out	, comes:											-0		
CO1: To une	derstand th	he Fundamentals of	IoT.											
CO2: To kno	ow about	the networking con	cepts of]	IoT.										
CO3: To kn	ow about	the different conne	ctivity te	chnolo	gies.									
CO4: To kno	ow about	the WSN and UAV	network											
CO5: To kno	ow about	the various applicat	ions of Io	oT.										
Text Book		11												
1. Arshde	ep Bagha	and Vijay Madise	tti, "Inter	rnet of	Things	– A han	ds-on appr	oach	", Orie	ent Bl	ackswa	an Private		
Limited	l - New D	elhi.			-									
2. Dr. Jee	2. Dr. Jeeva Jose, Internet of Things, Khanna Publishing House.													
3. Nitesh	3. Nitesh Dhanjani, Abusing the Internet of Things, Shroff Publisher/O'Reilly Publisher.													
Reference B	ooks													
1. Internet	t of $\overline{\text{This}}$	ngs, RMD Sunda	ram Shr	riram I	K Vasu	devan,	Abhishek	S N	agaraja	ın, Joł	n			
Wiley a	and Sons.	a Christon V V-	udever	A hhial	hok C N	Jagonoia		Indo	om Ic	hn				
2. Internet Wilow	vor inn & Sons	gs, Simirani K Vas	suuevan,	AUIIISI	ick S P	nagarajar	i, KIVID SU	muar	a111, JO	1111				
3 Cuno P	z 50118. Pfister "G	etting Started with	the Inte	rnet of	Things	" Shroft	Publisher/	Mak	erMed	ia				
4. Francis	daCosta	, "Rethinking the	Interne	t of T	hings:	A Scala	ble Appro	ach	to Con	nectir	ıg			
Everytł	ning", 1 st	Edition, Apress Pu	blication	is.	0		ff ···				5			

5. Massimo Banzi, Michael Shiloh Make: Getting Started with the Arduino, Shroff													
Publisher/Maker Media Publishers.													
List/Links of e-learning resource													
 https://onlinecourses.nptel.ac.in/noc19_cs65/preview 													
Modes of Evaluation and Rubric													
The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester													
practical examination.													
CO-PO Mapping:													
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CO-1 2 1 2 1 2													
CO-2 2 1 1 2													
CO-3 2 1 1 2													
CO-4 2 1 1 1 2													
CO-5 2 1 1 1 2													
Recommendation by Board of studies on													
Approval by Academic council on													
Compiled and designed by													
Subject handled by department Department of IT													

and BHON TECHNOLOGICAL ME		S	AMRAT	ASH	OK TEO	CHNOL	OGICAL INS	TITUT	E					
(An Autonomous Institute Affiliated to RGPV Bhopal)														
A CAR	(Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) DEPARTMENT OF IT													
VIDISHA M.P.	DEPARTMENT OF IT Semester/Year IV/II Program B.Tech – Internet of Things Subject Category DC Subject Code: IO 405 Subject Name Communication Systems													
Semester/Ye	ear	IV/II		Pro	gram		B.Tech	ı – Inte	rnet o	f Thin	igs			
Subject	DC	Subject Code:	IO	405	Su	bject	Com	munica	tion S	vstem	s			
Category		Morrimum	Montra A	llattad		ame				0	Tatal			
	Т	heory	VIALKS A		ı Practio	ral	Total	Cont	act H	ours	Credits			
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60	20	10	10	-	-		100	3	1	0	4			
			v	v.e.f.	July 2	024								
Prerequisite	s:													
NA														
Course Obje	ective:				-									
• The	e purpose	of the course is t	o teach t	he fun	dament	al princ	ciple of Comm	unicati	ons.					
• 10	equip sti	udents with vario	ous issu	es rela	ated to	analog	ue communic	ation s	uch a	ıs				
	ullation,c	demodulation, tra	nsmuer	s and i	tions	rs and n	ioise periorina	nce.		г	Inc			
UNIIS	Signal	e Analysis I	L Peview	of	Fourie	r Tra	neformation	signa	1	Г	11'8.			
	transfo	s Analysis. I	nronerti	os thre	ugh lir	a a a	tem signal di	sigila	1					
т	in tran	emission bandw	idth and	l rica t	ima a	lear sys	nd nower den	sity and	4		Q			
L	Darsov	val's theorem f	for and		and n	ower	signals con	volution			0			
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11		C Comparison o	anu ueu		UI DOI	5-5C, 5	and TDM	20-20	·,		0			
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	freque	ncy deviation Be	esel's fu	in and	spect	rum an	d transmission	BW o	f					
	FM	NRFM WRFM	nhase	diaora	m of F	Tunn an FM sior	a transmission	i Diri O	1					
Ш	compa	rison of AM and	FM syst	tems		WI SIGI		stem s	',		8			
	Digital	Modulation 1	Block d	liaorar	n of	PCM	system Inter	-symbo	1		0			
	Interfe	rence Compoun	ding De	elta M	ndulatio	on (DM	D Limitation	of DM						
	ADM.	Comparison bety	veen PC	CM & I	DM. DI	PCM.	<i>)</i> , <i>D</i>		,					
	Radio	transmitter and	receive	er: Di	fferent	type of	of AM and	FM						
	transm	itters and receive	rs.AM a	and FN	/I stand	ard bro	adcast calcula	tion						
	of nois	se for signal and	cascade	d stage	es. Nois	se-perfo	rmance of ana	alog						
IV	comm	unication systems	SINR.	Noise	figure.	Line Co	odes.	0			8			
	Data 7	Fransmission: Ge	neration	and	Detecti	on of A	ASK. FSK. P	SK.						
	DPSK	, OPSK.					, ,	,						
	Inform	nation Theory: U	nit of Ir	nforma	tion, E	ntropy.	Rate of Infor	mation	,					
	Joint a	& Conditional E	Entropy,	Mutu	al Info	ormation	n, Channel C	apacity						
V	Shawn	n's Theorem, S	hannon	Hard	er Th	eorem,	Coding Eff	iciency			8			
	Shanne	on Fano Coding,	Hoffma	n Codi	ng, Blo	cks Co	des.	2						
Total Hours											40			
Course Outo	comes:													
CO-1: Expl	ain the fu	ndamentals of an	alog and	l digita	al Signa	uls and (Communicatio	on Syste	em					
CO-2: App	ly Fourie	r Transform to co	mmunic	cation	signals	and der	ive the power	spectra	l dens	sity of	signals.			
CO-3: Defin	ne, formu	late and analyze	various	technic	jues for	r amplit	ude and angle	modul	ation.	2				
CO-4: Anal	lyze diffe	rent techniques f	or digita	I data	transmi	ssion a	nd analyze the	perfor	mance	e of sp	oread			
spect	rumcomn	nunication system	ns.											
CO-5: Und	erstand th	ne fundamentals of	of Inforn	nation	Theory									
Text Book														

- 1. Taub and Schilling: Principles of Communication System, TMH.
- Simon Haykin: Digital Communication, John Wiley. 2.

Reference Books

- 1. G. Kennedy: Electronic Communication System, TMH.
- 2. J. G. Proakis: Digital Communications, MGH.

List/Links of e-learning resource

https://onlinecourses.nptel.ac.in/noc19_cs65/preview •

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO	Mapping:
0010	Trapping.

CO-PO	wiappi	ng:													
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2	
CO-1	1	1	2										1	2	
CO-2	2	2	2										1	2	
CO-3	2	1	2										1	2	
CO-4	2	1	2											2	
CO-5	2	2	1										1	2	
Recomm	Recommendation by Board of studies on														
Approval by Academic council on															
Compiled and designed by															
Subject handled by department								Department of IT							

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE													
(Engineering College), VIDISHA M.P.													
A A A A A A A A A A A A A A A A A A A	P. C.	(4	An Autor	nomou	s Institu	ıte Affili	ated to RGPV	' Bhopal)					
UIDISHA M.R.	1			DEI	PARTM	IENT O	F CS & IT						
Semester/Y	ear	IV/II		Pro	gram		B.Tecl	n – Interi	net o	f Thin	igs		
Subject Category	DLC	Subject Code:	IO	406	Su	oject	Advanc	ed Java I	Prog	ramm	ing		
Category		Maximum	Marks A	llotted	1	inc		~			Total		
	Т	heory			Practic	al	Total	Conta	ct H	ours	Credits		
ES	MS	Assignment	Quiz	ES	LW	Quiz	Marks	L	Т	Р			
				60	20	20	100	0	0	4	2		
			v	v.e.f.	July 20)24							
Prerequisite	es:												
Concepts of	Object Or	riented Programmin	g and con	re Java									
Course Obj	ective:									-			
• To intr	oduce and	d understand stude	nts to pr	ogrami	ning co	ncepts a	nd techniques	using the	e Jav	a lang	uage and		
program	nming en	vironment, class and	d objects.				£	1 :	1	-1-:1:4	1		
• 10 lean	n adout l	abilities in program	ming	anzatio	m mech	anism o	i variables and	1 improve	e ine	aDIIIt	y general		
Be able	to use th	e Java SDK enviror	ment to <i>i</i>	create	dehua a	nd run ei	mple Java prod	ram					
UNITS			Intent to t	Descrir	otions	nu run si		siam		F	Irs.		
	Basic Ja	ava Features - C++	vs JAV	A, JAV	'A virtu	al machi	ne, Exception	Handling		-			
Ι	File and	d Streams, Visibili	ty, Cons	tructor	s, Oper	ator and	Methods Ov	erloading	,		6		
	Static M	Iembers, Inheritance	e: Polym	orphisr	n, Abstr	act meth	ods and Classe	s.					
	Java C	ollective Frame V	Vork -	Generi	cs: Intr	oduction	, Overloading	Generic	:				
	Method	s, Generic Classes,	Collectio	ons: Int	terface (Collection	n and Class Co	ollections	,				
II	Lists, A	Array List and Itera	tor, Link	ced Lis	st, Vecto	or. Colle	ctions Algorit	nms: sort	,		8		
	snume,	til Class Priority	max an	a min and Int	, binary	Search,	Stack Class of Mans Propert	F Package	•				
	Unmodi	ifiable Collections	Queue 2	ina m		Queue, 1	viaps, 110per	ics Class	,				
	Advanc	e Java Features - N	Aultithrea	ading:	Multith	eading v	with GUI, Mor	nitors and	1				
ш	Monitor	r Locks. Networking	g: Manip	ulating	URLs,	Reading	a file on a We	eb Server	,		8		
	Socket	programming, Sec	urity and	the l	Network	, RMI,	Networking, .	Accessing	5		0		
	Databas	ses with JDBC.											
	Advance	e Java Technologie	s - Servle	et: Ove	PRC fr	nd Archi	tecture, Handl	ing HTTP	,				
IV	(ISP) · F	First ISP Example	ISP elen	nents	ISP tag	library	Session trackir	ver rage:	, а		10		
	Cryptog	raphic Architecture	(JCA).	lients, s	or tug	norary, i	Session trucki	1 <u>5</u> , , <i>s</i> uv	•				
	Advance	e Web/Internet P	rogramm	ning (Overvie	w): Stru	uts- Basics of	of MVC	,				
V	architec	ture, action class,	intercept	ors, tag	g library	, validat	tions, Hibernat	e- basics	,		8		
	architec	ture, CRUD, Spring	g- framev	vork in	troducti	on.							
Total Hours	S										40		
Course Out	comes:				1			f 000					
CO1: Use th	e syntax a	and semantics of jav	a progra	mming	langua	ge and ba	isic concepts o	1 UUP.					
CO2: write	Dasic Java	a applications and u	se arrays		N/T 1	IDDC							
CO3: Devel	op reusab	le programs using th	ne concej	ots of K	CMI and	JDBC.							
CO4: Apply	the conce	epts of Serviet and J	SP using	advan	ced tool	S.							
COS: Design	n event dr	riven GUI and web i	related ap	oplicati	ons whi	ch mimic	c the real word	scenarios	•				
Text Book		· "Dec and a	Lav "	MILD	1-1 ;+'								
1. E. Balagi	iruswamy	for a second sec	Java"; I	IVIH PU	ioncatio	IIS							
2. The Con	2. The Complete Reference: Herbert Schildt, TMH												
Reference Books 1 Daital % Daital "IAVA How to Dragram": DHI Deargam													
1. Deiter $\&$	2. Cay Herstmann Big IAVA Wiley India												
2. Cay nors	unden of	al Java Natural D	ua ogrommi	ing M	anning	Dublicati	ons/Drantias II	all					
J. Werlin H	f e-learni	ai, java network Pl	ogramm	111g , 1VI	ammig	uoneati	ons/r tentice H	a11					
http://www.alianalianalianalianalianalianalianalia	s.//archiv	e notel ac in/course	s/106/104	5/1061	05191/								
- nup	s.// archiv	e.mpter.ac.m/course	5/100/10.	1001	0.51.71/								

Modes of Evaluation and Rubric														
The eval	The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester													
practical	examir	nation.												
CO-PO	Mappi	ng:											7001	
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO_1	PO ₁₁	PO ₁₂	PSO1	PSO2
<u>CO-1</u>	2	2	2										1	2
CO-2	2	2	2	1										2
C0-3	2	1	2	1									1	2
CO-4 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 <th2< th=""> 1 1 <th2< th=""></th2<></th2<>														
Suggesti	ve list d	of expe	riments				l		l			l		4
1. Inst	tallatior	n of JDk	ζ.	•										
2. Wr	ite a pro	ogram to	show a	Scope o	f Varia	bles								
3. Wr	ite a pro	ogram to	show	Concept	t of CL	ASS in .	IAVA							
4. Wr	ite a pro	ogram to	show'	Type Ca	asting in	1 JAVA								
5. Wr	ite a pro	ogram to	show	How Ex	ception	Handli	ng is in	JAVA						
6. Wr	ite a Pro	ogram te	o show	Inherita	nce									
7. Wr	ite a pro	ogram to	show]	Polvmo	rphism									
8. Wr	ite a pro	ogram to	show	Access	Specifie	ers (Pub	lic. Priv	vate. Pro	otected)	in JAV	A			
9. Wr	ite a pro	ogram to	show	use and	Advant	ages of	CONST	FRUCT	OR					
10. Wr	ite a pro	ogram to	show	Interfac	ing bety	veen tw	o classe	s						
11. Wr	ite a pro	ogram to	o Add a	Class to	o a Pacl	age								
12. Wr	ite a pro	ogram to	show	Life Cy	cle of a	Thread								
13. Wr	ite a pro	ogram to	o demor	istrate A	AWT.									
14. Wr	ite a pro	ogram to	o Hide a	ı Class										
15. Wr	ite a Pro	ogram to	o show	Data Ba	ise Con	nectivit	y Using	JAVA						
16. Wr	ite a Pro	ogram te	o show	"HELL	O JAV	A" in E	xplorer	using A	Applet					
17. Wr	ite a Pro	ogram to	o show	Connec	tivity u	sing JD	BC	e						
18. Wr	ite a pro	ogram to	o demor	nstrate n	nultithr	eading u	ising Ja	va.						
19. Write a program to demonstrate applet life cycle.														
20. Write a program to demonstrate concept of servlet.														
Recomm	endatio	on by Bo	oard of	studies of	on i									
Approva	l by Ac	ademic	council	on										
Compile	d and d	esigned	by											
Subject l	Subject handled by department Department of IT													
	Subject handled by department Department of 11													



SAMRAT ASHOK TECHNOLOGICAL INSTITUTE

(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

DEPARTMENT OF IT

Subject CategoryDCSubject Code:10 501Subject NameArtificial Intelligence & Machine LearningMaximum Marks AllottedTotal Contact HoursTotal CreditsE5MSAssignmentQuizE5LWQuizMarksLTP602010103010101503024Prerequisites:IData Structures2.Knowledge on statistical methodsCourse Objective:To understand computational learning theory.To study the pattern comparison techniques.Identify problems that are amenable to solution by Al methods, and which Al methods may be suited to solving a given problem.UNITSDescriptions
Maximum Marks Allotted Total Total Total Total ES MS Assignment Quiz ES L Total ES MS Assignment Quiz ES L T P 60 20 10 10 30 10 10 150 3 0 2 4 W.e.f. July 2024 Prerequisites: 1. Data Structures
Theory Practical Total Credits ES MS Assignment Quiz ES LW Quiz Marks L T P 60 20 10 10 30 10 10 150 3 0 2 4 W.e.f. July 2024 Prerequisites: 1. Data Structures 2 Knowledge on statistical methods 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5<
ES Ivis Assignment Quiz Iviands L I P 60 20 10 10 30 10 10 150 3 0 2 4 W.e.f. July 2024 Prerequisites: 1. Data Structures 2. Knowledge on statistical methods Course Objective: • This course explains machine learning techniques such as decision tree learning, Bayesian learning etc. • To understand computational learning theory. • • To study the pattern comparison techniques. • • Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem. UNITs
Id Id <td< td=""></td<>
Prerequisites: 1. Data Structures 2. Knowledge on statistical methods Course Objective: • This course explains machine learning techniques such as decision tree learning, Bayesian learning etc. • To understand computational learning theory. • To study the pattern comparison techniques. • Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem. UNITs Descriptions
 Data Structures Knowledge on statistical methods Course Objective: This course explains machine learning techniques such as decision tree learning, Bayesian learning etc. To understand computational learning theory. To study the pattern comparison techniques. Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem. UNITs Descriptions Hrs.
 2. Knowledge on statistical methods 2. Knowledge on statistical methods Course Objective: This course explains machine learning techniques such as decision tree learning, Bayesian learning etc. To understand computational learning theory. To study the pattern comparison techniques. Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem. UNITs Descriptions Hrs.
 Course Objective: This course explains machine learning techniques such as decision tree learning, Bayesian learning etc. To understand computational learning theory. To study the pattern comparison techniques. Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem. UNITs Descriptions Hrs.
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 To understand computational learning theory. To study the pattern comparison techniques. Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem. UNITs Descriptions Hrs.
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 Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem. UNITs Descriptions Hrs.
to solving a given problem. UNITs Descriptions Hrs.
UNITs Descriptions Hrs.
INTRODUCTION Machine-Learning Paradigms: Introduction. Machine Learning
Systems, Forms of Learning: Supervised and Unsupervised Learning,
reinforcement – theory of learning – feasibility of learning – Data Preparation–
training versus testing and split. Supervised Learning: Regression: Linear
Regression, multi linear regression, Polynomial Regression, logistic regression,
Non-linear Regression, Model evaluation methods.
Classification: – support vector machines – soft margin SVM – going beyond
linearity – generalization and over fitting – regularization – validation-Naïve
II Bayes classification, Ensemble Learning: BOOSTING - AdaBoost –Stumping 8
Gradient Boosting Machines and XGBoost -BAGGING -Subagging -Different
Ways to Combine Classifiers-Random forest Classifier
Unsupervised learning Nearest neighbor models – K-means – clustering around
medoids – silhouettes – hierarchical clustering – k-d trees – locality sensitive
III hashing – non-parametric regression. Clustering trees – learning ordered rule 8
lists – learning unordered rule lists – descriptive rule learning – association rule
mining – first-order rule learning.
Neural Networks - The Perceptron -The Perceptron Learning Algorithm -
LINEAR SEPARABILITY: The Perceptron Convergence Theorem - The Exclusive
IV IV Algorithm Different Output Activation Exercise Convential and Datable 8
Algorithm -Different Output Activation Functions -Sequential and Batch
Training - Local Minima - Picking Up Momentum- Minibatches and Stochastic
The AL Droblems. The Underlying Assumption AL Techniques, Level of the
Model Criteria for Success Some general references and Final Word
Broblems and State Space Search Defining Problems as a State Space Search
V Production Systems Production Characteristics Production System 8
Characteristics and issues in the design of Soarch Drograms additional
nrohlems Generate-and-Test Hill Climbing Rest-First Search Problem

	Reduction, Constraint Satisfaction, Means-Ends Analysis.							
Total Hours		40						
Course Out	comes:							
CO-1 Under	stand the concepts of computational intelligence like machine learning.							
CO-1 Understand the concepts of computational intelligence like machine learning.CO-2 Ability to get the skill to apply machine learning techniques to address the real time prob different areas.								

CO-3 Understand the Neural Networks and its usage in machine learning application.

CO-4 Describe various searching methods and reasoning in AI.

CO-5 Uses of Knowledge Representation Techniques.

Text Book & Reference Books-

- 3. Machine Learning Tom M. Mitchell, MGH
- 4. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis
- 5. Artificial Intelligence -By Elaine Rich And Kevin Knight (2nd Edition) Tata Mcgraw-Hill
- 6. "PROLOG Programming For Artificial Intelligence" -By Ivan Bratko(Addison-Wesley

List/Links of e-learning resource

https://nptel.ac.in/courses/106102220

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping:

-																
	COs	PO1	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2	
	CO-1	1	1	2	1									1	2	
	CO-2	2	1	1	1	2								1	2	
	CO-3	2	1	2	1			1						1	1	
	CO-4	2	1	2	1										2	
	CO-5	2	1			1								1		

List of Experiments:

- 1. Implementation of Python Basic Libraries such as Statistics, Math, Numpy and Scipy
- 2. Implementation of Python Libraries for ML application such as Pandas and Matplotlib.
- 3. Creation and Loading different datasets in Python
- 4. Write a python program to compute Mean, Median, Mode, Variance, Standard Deviation using Datasets
- 5. Write a Python program to implement Simple Linear Regression and plot the graph.
- 6. Implementation of Multiple Linear Regression for House Price Prediction using sklear
- 7. Implementation of Logistic Regression for iris using sklearn
- 8. Implementation of random forest algorithm
- 9. Implementation of navie bayes classifier algorithm and plot the graph.
- 10. Implementation of SVM classification and plot the graph.

Recommendation by Board of studies on

Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT



SAMRAT ASHOK TECHNOLOGICAL INSTITUTE

(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

DEPARTMENT OF IT

Semester/Ye	ar V/III Program B.Tech – Internet of								Thing	S			
Subject Category	DC	Subject Code: IO 502 Subject Operating System									от		
		Maxim	um Mar	ks Allotted			<u> </u>	Con	tact Ho	urs	Total		
50	The	eory	0:-	Pra	actical	0	Total		-		Credits		
ES 60	20	Assignment 10	<u>Quiz</u>	E5 30	10	10	150	L 2	0	P 2	4		
	20	10	10	wef.In	$\frac{10}{10}$	4	150	3	U	-	-		
Prereauisit	es:				<u></u>	-							
Course Obi	ective:												
 Knowl 	edge on \	/arious Opera	ting Svs	tems of IoT.									
UNITs				Descript	tions						Hrs.		
	Process	es. Tools. To	ol chai	ns and Hard	dware:	Desi	gn to Code	-A Pra	ctical				
	Approad	ch, The Stm3	2cube S	Software Toc	ol, The	Pract	ical Tool Set,	The S	tm32				
I	Graphic	Graphical Tool- Stm32cube Mx Details, The Stm32cubehal, Free RTC											
	Configu	Configuration in A Cube Project, The Stm32cube Cubeide Developme											
	Platforn	Platform.											
	Introdu	cing Micropy	thon: N	vicropython	Featu	res, N	Vicropython	Limita	tions,				
	What D	oes Micropyth	non Run	On?							o		
	Experim	enting With	Python	On Your Po	:, How	Micro	opython Wor	ks, Of	f And		0		
	Running	g With Microp	ython.										
	Micropy	thon Hardv/	vare:	Getting Sta	arted	with	Micropytho	on Bo	oards,				
ш	Micropy	/thon-Ready	Boards,	Networking	g with	The F	Pyboard, Gett	ing St	arted		8		
	with Wi	py, Connectin	g to Yo	ur Wifi Netw	ork, M	icropy	rthon-Compat	ible Bo	bards,		•		
	Other B	oards, Breako	ut Boar	ds and Add-(Ons.								
	How Ic	o Program In	Micro	python: Bas	sic Con	icepts	, Basic Data	Struct	tures,		0		
IV	Stateme	ents, Modular	ization;	Modules, Fu	Inction	s, And	l Classes, Lear	ning P	tnon		8		
	By Exam	iple.	lowe 10) lat Carai M	lindow	. 10 1	lat Cara Fast	Iroc T	hinge				
V		and Cotting	tows It	vith Window		t Corr		lies, i	nings		8		
Total Hour		eeu, Getting S	starteu		VS 10 IC		Ξ.				40		
	comes.										40		
CO-1 Unde	rstanding		chnique	es of Cube Sc	oftware								
CO-2 Know	ledge on	Micro Python	Feature		Jitwart	. 1001.							
CO-3 Unde	rstand an	d Acquire Kno	wledge	on Micropy	thon H	ardwa	are						
CO-4 Apply	Basic Da	ta Structures a	and Fun	ictions of Mic	cro Pvt	hon.							
CO-5 Know	nowledge on Windows 10 For lot Operating System.												
Text Book	kt Book & Reference Books-												
1. Jim C	ooling. F	Real-Time Or	perating	g Systems B	Book 2	- The	Practice: U	sing S	tm Cu	be. F	reertos		
And t	he Stm32	2 Discovery	Board (Engineering	g of Re	eal-Ti	me Embedd	ed Sys	tems)	Jim			
Cooli	ng, Isbn-	10: 1973409	933, Is	bn-13: 978-	19734	09939	9.	5					
2. Charle	es Bell, N	Micropython	For the	e Internet of	Thing	gs, A l	Beginner's G	huide t	o Prog	grami	ning		
with F	ython or	n Microcontr	ollers,	Apress, Isbr	n-13 (I	Pbk):	978-1-4842-	3122-	7, Isbr	n-13	-		
(Elect	ronic): 9	78-1-4842-3	123-4.	-									
3. Charle	es Bell W	Vindows 10 I	For the	Internet of	Things	s 1st E	Edition. Apre	ss. Isb	n-13 ((Pbk)	: 978-		

1-4842-2107-5 Isbn-13, (Electronic): 978-1-4842-2108-2.

List/Links of e-learning resource

• https://nptel.ac.in/courses/106102220

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO N	Aappin	g:														
	COs	PO ₁	PO ₂	PO₃	PO ₄	PO₅	PO ₆	PO ₇	PO ₈	PO9	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2	
	CO-1	1	1	2	1									1	2	
	CO-2	2	1	1	1	2								1	2	
	CO-3	2	1	2	1			1						1	1	
	CO-4	2	1	2	1										2	
	CO-5	2	1			1								1		
Suggesti	ive List	of Exp	erimer	nts												
Writing	; Micro	pytho	n cod	e for:												
1.	LED b	olinkir	ng.													
2.	LCD	Displa	y unit													
3.	PIR S	ensor.														
4.	Potent	tiomet	er uni	t.												
5.	Relay	unit.														
6.	Wi-Fi	enabl	ing.													
7.	Smok	e Dete	ctor.													
8.	Thern	nister.														
9.	Traffi	c light	s.													
		Ũ														
Recomm	nendati	on by E	Board o	of stud	ies on											
Approva	I by Aca	ademic	cound	cil on												
Compile	d and d	lesigne	d by													
Subject	handleo	d by de	partm	ent					Depar	rtment	of IT					

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal)													
the saig shrow	1			D	EPART	MEN.	Т	OF IT					
Semester/Ye	ar	V/III		Pre	ogram			B.Tech	– Inter	net of	Things	6	
Subject	DC	Subject Code:	10	503	Subje	ect		Ad-hoc & S	ensor	Netwo	orks fo	r loT	
Category		Maxim	um Marke	Allottor	Nam Nam	ie						Total	
	Т	heory		Anottet	Practical			Total	Cont	act Ho	ours	Credits	
ES	MS	Assignment	Quiz	ES	LW	Quiz	:	Marks	L	т	Р		
60	20	10	10	30	10	10		150	3	0	2	4	
				w.e.f.	July 202	24							
Prerequisite	s:												
Computer N	Vetwork	s, Mobile Comp	uting										
Course Obje	ctive:												
• To unde	rstand t	he concepts of s	sensor ne	tworks	5.								
To unde	rstand t	he MAC and tra	nsport pr	otocol	s for ad h	oc net	two	orks.					
To unde	rstand t	he security of se	ensor net	works.									
• To unde	rstand t	he applications	of adhoc	and se	nsor netv	vorks.							
UNITs				Descri	iptions						Н	lrs.	
	Introdu	uction to Ad Ho	c Networ	ks - Cł	naracteris	tics of	f N	1ANETs, App	licatio	าร			
	of MA	NETs and Chall	enges of	MANE	Ts. Rout	ing in	Μ	ANETs - Crit	teria fo	or			
	classifi	cation, Taxono	my of N	/ANET	routing	algor	rith	ims, Topolo	gybase	ed			
I	routing	g algorithms-Pr	oactive:	DSDV;	Reactive	: DSR	R, A	AODV; Hybr	id: ZR	P;		8	
	Positio	on-based routin	ng algori	thms-	Location	Servi	ces	s-DREAM, C	luorun	n-			
	based;	Forwarding	Strategies	s: Gre	edy Pac	:ket,	Re	stricted Dir	ection	al			
	Floodii	ng-DREAM, LAR	•										
	Data T	ransmission -	Broadcast	Storr	n Probler	n, Rel	bro	badcasting So	cheme	S-			
	Simple	e-flooding, Pro	bability-l	based	Method	ds, A	٩re	a-based N	lethod	s,			
11	Neight	or Knowledge-	based: SE	BA, Mu	iltipoint F	Relayir	ng,	AHBP. Mult	icastin	g:		8	
	Iree-b	ased: AMRIS,	MAODV	; Me	sh-based:	ODI	MR	RP, CAMP;	Hybri	d:			
	AIVIRO	ute, MCEDAR.		0				Cuestien O		-1			
	Geoca	sting: Data-trai	nsmission	Orier	ited-LBIVI	; KOU	ite dias	Creation O	riente	a-		0	
111	Georo	RA, MGR. TCP (OC TCF	, blocor	overv	viev	w, TCP and N	/IANE I	s,		8	
	Basics	of Wireless	Soncore	and	Lower	Lavor	le	scups: Appli	ication	C			
IV/	Classifi	ication of sense	Selisuis r networ	anu ka Ara	LUWEI	Layer	nc.	or network		3, al		0	
ĨV	laver I	MAC laver Link	laver Roi	iting l	aver	01 30	:115	of fietwork,	FIIYSIC	ai		0	
	linner	Laver Issues o	$\frac{1}{1}$	ransn	ort laver	High.	_ام	vel annlicatio	n lav	or			
V	sunnoi	t Adapting to	n the inl	herent	dvnami	r nati	ure	of WSNs	Sonsi	or l		8	
v	Netwo	rks and mobile	rohots		aynann		urc		501150			0	
Total Hours	neemo		100013.								4	40	
Course Outc	omes:												
CO1: Ability	/ to und	lerstand the sta	te-of-the	-art re	search in	the e	me	erging subjec	t of A	d Hoc	and	Wireless	
Sensor Net	works							· - ·					
CO2: Ability	to solve	e the issues in r	eal-time a	pplica	tion deve	lopme	ent	based on AS	SN.				
CO3: Ability	to cond	duct further res	earch in t	he dor	nain of AS	SN							
CO4: Ability	to unde	erstand layers											
CO5: Under	standin	g the concept o	f dynamic	: natur	e of WSN	s							
Text Book &	Referen	ce Books-											
1. Ad Hoc	and Sen	sor Networks –	Theory a	and Ap	plications	s, Carl	os	Corderio Dh	arma	P. Ag	garwa	l, World	
Scientifi	c Publica	ations, March 20	006, ISBN	- 981-	-256-681	-3.							

2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman).

List/Links of e-learning resource

• https://archive.nptel.ac.in/courses/106/105/106105160/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping:

0101															
COs	PO1	PO ₂	PO ₃	PO ₄	PO₅	PO ₆	PO ₇	PO ₈	PO9	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2	Ī
CO-1	1	2	2										1	2	
CO-2	3	2	2	2									2	1	
CO-3	3	2	2	2									2	1	
CO-4	3	2	2	2									2	1	
CO-5	2	2	1	1									1	2	
															_

Suggestive list of experiments:

Note: Implement Experiment No: 1 to 5 using NS2/NS3 Simulation Tool. Implement Experiment No: 6 to 10 using MATLAB Tool.

1. Create a sample wireless topology using Simulation Tool.

- 2. Create a mobile Ad-hoc networks using Simulation Tool.
- 3. Implement an Ad-hoc On-demand Distance Vector protocol using Simulation Tool.
- 4. Implement a Transmission Control Protocol using Simulation Tool.
- 5. Implement an User Datagram Protocol using Simulation Tool.
- 6. Implement a Low Energy Adaptive Hierarchy protocol using Simulation Tool.
- 7. Implement a Power Efficient Gathering in Sensor Information System using Simulation Tool.
- 8. Implement a Sensor Protocol for Information via Negotiation (SPIN) using Simulation Tool.
- 9. Implement a Power Efficient and Delay Aware MAC protocol using Simulation Tool

10.Implement a Scheduling based protocol for WSNs using Simulation Tool.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT

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Semester/Ye	ar	V/III		Pr	ogram			B.Tech	– Interr	et of	Thing	S
Subject	DE	Subject Code:	10	504	Subje	ect		IoT Com	municat	ion F	Protoc	ols
Category		Maxim	DE-	-I (A) Allottor	Nam d	ne						Total
	т	heory			Practical			Total	Conta	oct Ho	ours	Credits
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60	20	10	10	-	-	-		100	3	0	0	3
Durana and alter				w.e.f.	July 202	24						
Prerequisite	s:											
Course Ohie	ctive											
• In this co	ourse. le	arners will be g	oing to le	arn at	oout vario	ous pro	otoc	cols designe	d for th	ne im	melar	entation
of the In	ternet o	of Things (IoT) a	oplication	S.							ipieiii	cincacion
UNITS			spileation	Descri	intions						н	Irs.
	Introd	uction: IoT a	chitectur	e ou	tline. sta	andard	s	- IoT Tec	hnolog	v		
	Fundai	mentals- Device	es and ga	atewa	vs, Local	and w	vide	e area netv	working	5		
I	Data r	management, E	Business	proces	sses in lo	oT, Ev	ery	rthing as a	Servic	e		8
	(XaaS),	, M2M and IoT A	Analytics.				•	-				
	lot Re	eference Archit	ecture: I	ntrodu	uction, Fu	unctior	nal	View, Info	rmatio	n		
Ш	View,	Deployment a	nd Opera	itional	View, C	other I	Rel	evant Archi	itectura	al 👘		8
	views.	Real-World D	esign Co	onstrai	ints- Intr	oducti	on,	, Technical	Desig	n		0
	constra	aints.			·					_		
Ш	loT Da Wirele	ta Link Layer: P ss HART, ZWave	HY/MAC I e, Bluetoo	Layer (oth Lov	(3GPP M1 v Energy,	C, IEEE Zigbee	E 80 e Sn	02.11, IEEE nart Energy,	802.15) , DASH7	7		8
IV	Netwo	rk Layer Protoc	cols: Netv	vork L	ayer-IPv4	,IPv6, (6Lc	WPAN, 6Ti	SCH,NC),		8
	IOT Tr	ansport & Sess	sion Lave	r Prot	ocols: Tr	anspor	τL	aver (TCP,	MPTCF	·.		
V	UDP, D	DCCP, SCTP)- (T	, LS, DTLS)	– Sess	sion Laye	r-HTTP	, C	OAP, XMPP,	, amqf	,		8
	MQTT.				·							
Total Hours											4	40
Course Outc	omes:											
CO1: Under	stand fu	undamentals of	IoT archit	ecture	e outline a	and sta	inda	ards				
CO2: Under	stand a	nd analyze diffe	rent arch	itectur	ral views.	المحديقة			. 1			
CO3: Under	stand tr	ne importance c	of IoT Data	a LINK I sport	Layer & N	etwori	K Lā	ayer Protoco	DIS.			
CO5. Under	stand th	le importance c	of Session	l aver	Protocols							
Text Book &	& Refere	ence Books-		Layer		•						
1. Daniel	Minoli	. "Building the	Internet	of Tł	nings wit	h IPvé	5 ai	nd MIPv6:	The E	volv	ing W	Vorld of
M2M 0	Commu	inications". ISI	BN: 978-	1-118	-47347-4	4. Will	lv I	Publication	s .2016	5	0 '	
2. Jan Ho	ller. Vl	asios Tsiatsis.	Catherin	e Mul	ligan. St	efan A	ve	esand. Stam	natis Ka	arno	uskos	. David
Bovle.	"From	Machine-to-N	Iachine 1	o the	Internet	of Th	nin	gs: Introdu	iction f	o a	New	Age of
Intellio	ence".1	lst Edition. Ac	ademic F	Press.	2015							8- 01
3. Bernd	, Scholz-	Reiter. Floriar	n Michah	elles.	"Archite	cting	the	e Internet of	f Thing	2s".	ISBN	978-3-
642-19	156-5 e	e-ISBN 978-3-	642-1914	57-2. S	Springer	2016				, ~,	_~ 01	
List/Links of	e-learnin	ng resource		., _,	<u>-r501</u> ,	2010	•					
• http	os://npte	l.ac.in/courses/10	06105166									
Modes of Ev	aluation	and Rubric										

The eva	luation	modes	consist	t of per	rforman	ice in t	wo mio	d seme	ster Tes	sts, Qui	z/Assign	ments, 1	term wo	ork, end
semeste	r practio	cal exan	nination).										
CO-PO N	/lapping	;:												
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2
CO-1	2	2	2										1	2
CO-2	3	2	2	2									2	1
CO-3	3	2	2	2									2	1
CO-4	3	2	2	2									2	1
CO-5	2	2	1	1									1	2
Suggesti	ve list o	of exper	iments:											
Recomm	endatio	on by Bc	oard of s	studies o	on									
Approva	l by Aca	demic c	ouncil o	on										
Compile	d and d	esigned	by											
Subject h	nandled	by dep	artmen	t			0	Departm	ent of I	Т				

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VIDISHA M.P.	1		(An Aut	onomo r		te Affili MFN	iate T (ed to RGPV B OF IT	nopal)			
Semester/Yea	ar	V/III		Pr	ogram			B.Tech	– Interi	net of	Thing	5
Subject	DE	Subject Code	10	504	Subje	ect		5G an	d loT Te	echno	logies	
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ES	MS	Assignment	Quiz	ES	LW	Quiz		Marks	L	Т	Р	
60	20	10	10	30 wef	10 10 20	10 74		150	3	0	0	3
Prerequisites	s:			W.C.I.	July 20							
•												
Course Obje	ctive:											
• Studen	ts will b	be explored to	the inter	conne	ction and	l integ	grat	tion of the p	physica	al wo	orld a	nd the
cyber s	pace. T	hey are also a	ble to des	sign &	develop	o IoT I	De	vices.				
UNITs	0			Descr	iptions			Evel at an a	£ :I	-	H	lrs.
1	techno	ew of 5G Broad	abana Wi 4G (ITE	reless	Commun A ITEA	Pro)	זs: ∆י	EVOIUTION O	of 5	e G		8
I	require	ements, Regula	tions for 5	, 111, G, Spe	ectrum Ar	nalysis	an	d Sharing fo	r 5G.	J		0
	The 50	G wireless Pro	pagation	Chann	els: Char	inel m	od	leling requir	ement	s,		
П	propag	ation scenario	s and cha	llenges	s in the 5	G mod	deli	ing, Channel	Mode	ls		8
	for mm	Wave MIMO S	ystems, 3	GPP st	andards f	or 5G,	, IE	EE 802.15.4				
	Introdu	uction to Inter	net of Th	ings –	Definitio	n and	Ch	naracteristics	s of lo	Г,		
	Physica	al Design of Id	01 - 101 5 IoT o	Proto	COIS, IOI	comm	nun	nication mod	dels, lo	ot		
111	Netwo	rks. Cloud Cor	nputing. B	ig data	a analytic	s. Con	nm	unication pr	rotocol	s.		8
	Embed	lded Systems,	loT Leve	ls and	Templa	tes, Do	om	nain Specific	: IoTs	-		-
	Home,	City, Environr	nent, Ene	ergy, F	Retail, Log	gistics,	A	griculture, I	ndustr	y,		
	health	and Lifestyle.		<u> </u>								
117	loT and	d M2M – Softw	are define	ed netv	works, ne	twork	tui T c	nction virtua	lizatio	n,		0
IV	with N	FTCOZE VANGI			SNMP N	S OI IO IFTOPF	i J FFR		agemei	IL .		0
	loT Ph	vsical Devices	and En	dpoint	s - Intro	ductic	on	to Raspbe	rry Pl	-		
V	Interfa	, ces (serial, SPI,	I2C). Pro	gramn	ning – Pyt	hon pi	rog	, gram with Ra	, aspberi	y		0
v	PI with	n focus of inte	rfacing ex	kterna	gadgets	, contr	roll	ling output,	readin	g		0
Tatal Hauna	input f	rom pins.										40
Course Outco	omes:											40
CO1: Able t	o under	stand the appli	cation are	as of I	oT.							
CO2: Able t	o realize	the revolution	of Intern	et in N	obile De [،]	vices, (Clo	oud & Sensor	Netwo	orks.		
CO3: Able t	o under	stand building I	plocks of I	nterne	et of Thing	gs and	ch	aracteristics	•			
CO4: Under	stand lo	I and M2M.	acoboro		focus of	intorf	aci	na ovtornal	radaat	-		
Text Book &	Referen	g the concept R ce Books-	aspberry	PIWIC	TIOCUS OF	merfa	aCl	ng external (gaugets	».		
1. Interne	t of Thi	ings - A Hand	s-on Apr	roach	, Arshde	ep Ba	hg	a and Vijay	/ Madi	setti.	Univ	versities
Press, 2	2015, IS	SBN: 9788173	719547		,	1	8	,,		,		
2. Getting	g Started	d with Raspbe	erry Pi, M	latt Ri	chardson	n & Sl	hav	wn Wallace	e, O'Re	illy ((SPD), 2014,
ISBN:	<u>97</u> 8935	0239759	-							_		
List/Links of	e-learnir	ng resource										

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO N	lapping	:												
COs	PO1	PO2	PO ₃	PO ₄	PO₅	PO ₆	PO ₇	PO ₈	PO9	PO1	PO ₁₁	PO ₁₂	PSO1	PSO2
CO-1	2	2	2										1	2
CO-2	3	2	2	2									2	1
CO-3	3	2	2	2									2	1
CO-4	3	2	2	2									2	1
CO-5	2	2	1	1									1	2
Suggesti	ve list o	f exper	iments:											
Recomm	endatio	on by Bc	oard of s	tudies d	on									
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Subject		Subject Code		10	504	Subj	ect		\A/:	-			-
Category	DE	Subject Code		DE	-I (C)	Nan	ne		VVI	reless	netw	Ork	
		Maxim	um Ma	rks /	Allotte	d				Cont	act Ho	ours	Total
	T	heory	0		50	Practica	Quia		Total	<u> </u>	-		Credits
ES 60	20	Assignment	Quiz 10		ES	LW	Quiz		100	L 2	0	0	3
00	20	10	10		- wef	Inly 20	24		100	5	U	v	5
Prerequisite	s:					. Ju ly 20							
Wireless Se	nsor Ne	tworks.											
Course Obie	ctive:												
To study	the fun	damentals of w	vireles	s Ad	l-Hoc l	Networks							
 To study 	, the one	eration and ner	forma	nce	ofvar	ious Ad H	oc wir	واد	ss network	nrotoci	hls		
 To study 	the arc	hitecture and n	rotoco		of Var		or not			protoco	515.		
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		rotocols: Introc	luction		1, 1550 1100 ir	n Designir	$\sigma > M$		nrotocol fo				
	Wirele	ss Networks)esign	g02	als of	a MAC P	rotocc	רכ אן f	for Ad Hoc	Wirele	55		
	Netwo	rks Classificati	ons of	M	AC Pro	a miner	ontent	tio	n - Based Pi	rotocol	\$		
II	Conter	ntion - Based P	rotoco	ols v	with re	eservatio	n Mec	ha	nisms. Cont	ention	_		8
	Based	MAC Protocols	with S	che	duline	z Mechan	isms. N	MA	C Protocols	that us	e		
	Directi	onal Antennas.	Other	MA	C Pro	tocols.	,				-		
	Routin	g Protocols: Int	roduc	tion	n, Issu	es in Des	gning	al	Routing Prot	tocol fo	or		
	Ad Ho	c Wireless Ne	tworks	5, C	lassifi	cation of	Routi	ing	Protocols,	Table	-		
111	Driven	Routing Proto	cols, C	n –	Dema	and Routi	ng Pro	oto	cols, Hybrid	Routin	g		8
	Protoc	ols, Routing	Proto	cols	s wit	h Efficie	ent F	loc	oding Mecl	nanism	s,		
	Hierard	chical Routing P	rotoc	ols,	Power	r – Aware	Routir	ng	Protocols.				
	Transp	ort Layer Prot	ocols:	Int	roduct	tion, Issu	es in	De	signing a T	ranspo	rt		
	Layer I	Protocol for Ad	Hoc \	Vire	eless N	Vetworks,	Desig	gn (Goals of a T	ranspo	rt		
IV	Layer	Protocol for Ad	d Hoc	Wir	reless	Network	s, Clas	sif	ication of T	ranspo	rt		8
	Layer S	Solutions, TCP C	over A	d Ho	oc Wir	eless Net	works,	, O	ther Transpo	ort Laye	er		
	Protoc	ol for Ad Hoc W	/ireles	s Ne	etwork	<s.< th=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></s.<>							
	Wirele	ss Sensor Netw	orks: I	ntro	oducti	on, Senso	r Netv	vor	rk Architectu	ire, Dat	a		
V	Dissem	nination, Data	Gath	erin	g, M.	AC Proto	COIS 1	tor	Sensor N	etwork	s,		8
	Locatio	on Discovery, Q	uality	от а	Senso	or Netwo	rκ, ενc	ועוכ	ing Standard	is, Uthe	er		
Total Hours	issues.												40
	omes												+0
CO1: Stude	nts will k	he able to unde	rstand	the	hasis	of Ad-bo	c wire	lec	s networks				
CO2: Stude	nts will	be able to unde	erstan	h b	esign	operation	and t	the	performan	ce of M	IAC Ia	aver n	rotocols
of Ad Hoc v	vireless	networks.										, -: P	
CO3: Stude	nts will l	be able to unde	rstand	de	sign. a	peration	and th	ne i	performance	e of rou	ting i	oroto	col of Ad
Hoc wireles	s netwo	ork.			0,0			- 1					
CO4: Stude	ents will	be able to ur	nderst	and	desig	gn, opera	tion a	nd	the perform	mance	of tr	anspo	ort layer
protocol of	Ad Hoc	wireless netwo	rks.									•	
CO5: Stude	ents will	be able to un	dersta	nd	senso	r networ	k Arch	ite	cture and w	vill be	able	to dis	stinguish

betwee	n proto	cols us	sed in A	dhoc v	vireless	s netwo	orks and	d wirel	ess sen	sor net	works.			
Text Bo	ok & R	eferen	ce Boo	ks-										
1. Ad	Hoc	Wirel	ess N	etwork	ks: Ar	chitect	tures a	and P	rotoco	ls - (C. Siva	a Ram	Murth	ny and
B.S	.Manc	j, 2004	4, PHI											
2. Win	reless	Ad- h	oc and	Sense	or Net	works	: Proto	ocols,	Perform	mance	and C	ontrol	- Jagar	nathan
Sar	angapa	ani. CF	RC Pre	ss.				,					U	
List/Link	s of e-le	earning	resourc	e										
•	https://	/archive	.nptel.a	ic.in/co	urses/1	06/105/	/106105	5160/						
Modes o	of Evalua	ation ar	nd Rubr	ic		· ·								
The eva	luation	modes	consist	of pe	rformar	nce in t	wo mic	d seme	ster Te	sts, Qui	iz/Assign	ments, t	term wo	ork, end
semeste	semester practical examination.													
CO-PO N	CO-PO Mapping:													
COs	CO-PO Mapping: COs PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO1 PO11 PO12 PS01 PS02 PS02													
CO-1	2	2	2										1	2
CO-2	3	2	2	2									2	1
CO-3	3	2	2	2									2	1
CO-4	3	2	2	2									2	1
CO-5	2	2	1	1									1	2
Suggesti	ve list o	f exper	iments:											
Recomm	endatio	on by Bc	oard of s	studies o	on									
Approva	l by Aca	demic c	ouncil o	on										
Compile	d and d	esigned	by											
Subject h	nandled	by dep	artment	t			0	Departm	nent of I	Т				

S ISHON TECHNOLOGICAL A	A		SAMRA ⁻	T ASH	ЮК ТЕС	HNOLO	DGICAL INS	TITUTE			
			(En	ginee	ring Col	lege), '		.P.			
The cel	a la		(An Aut	onomo	ous Institu	te Affilia	ted to RGPV B	hopal)			
VIDISHA M.P.	1			D	DEPART	MENT	OF IT				
Semester/Ye	ar	V/III		Pr	ogram		B.Tech	– Intern	et of	Things	5
Subject	OE	Subject Code:	10	505 L (A)	Subje	ect	IoT Com	municat	ion F	rotoc	ols
Category		Maximu	um Marks	Allotte	d						Total
	Т	heory			Practica		Total	Conta	ct Ho	ours	Credits
ES	MS	Assignment	Quiz	ES	LW	Quiz	Marks	L	Т	Р	
60	20	10	10	-	-	-	100	3	0	0	3
Dura na stalita				w.e.f.	July 202	24					
Prerequisite	s:										
Course Ohie	ctive										
 In this compared 	ourse le	arners will he g	ning to le	arn al	out vario	us prot	ocols designe	d for th	e im	nlem	entation
of the In	ternet c	of Things (IoT) ar	nlication	c					c m	picin	cillation
			pheation	Descri	intions						rc
UNITS	Introdu	uction: IoT ar	chitectur		tling sta	ndards		hnology	,	П	15.
	Fundai	mentals- Device	es and g	e ou ateway	unie, su vs. Local	and wi	de area net	working	′		
I	Data r	management. B	Business	proces	sses in lo	oT. Ever	rvthing as a	Service	,		8
	(XaaS)	. M2M and IoT A	Analytics.	p. 0 0 0 0		,,	,				
	lot Re	eference Archite	ecture: I	ntrodu	iction, Fi	Inctiona	l View, Info	rmatior	1		
	View,	Deployment ar	nd Opera	tional	View, C	ther Re	elevant Arch	itectura			0
11	views.	Real-World D	esign Co	onstrai	ints- Intr	oductio	n, Technical	Desigr	۱		8
	constra	aints.									
	IoT Da	ta Link Layer: Pl	HY/MAC I	Layer ((3GPP MT	C, IEEE	802.11, IEEE	802.15)	,		8
	Wirele	ss HART, ZWave	e, Bluetoo	oth Lov	v Energy,	Zigbee S	Smart Energy	, DASH7	·		0
IV	Netwo	ork Layer Protoc	ols: Netv	vork L	ayer-IPv4	,IPv6, 6	LoWPAN, 6Ti	SCH,ND	,		8
	DHCP,	ICMP, RPL, COR	PL, CARP				. (700		_		
N		ansport & Sess	SION Laye	r Prot		ansport	Layer (ICP,	MPICP	,		0
v	MOTT	JCCP, SCIP)- (11	ls, Dils)	- ses	sion Laye	-HIIP,	COAP, XIVIPP,	, AIVIQP	,		8
Total Hours	INQT.	•							_		10
Course Outc	omes:									-	+0
CO1: Under	rstand fu	undamentals of	IoT archit	ecture	e outline a	nd stan	dards				
CO2: Under	rstand a	nd analyze diffe	rent arch	itectur	al views.						
CO3: Under	rstand th	ne importance o	f IoT Data	a Link I	Layer & N	etwork	Layer Protoco	ols.			
CO4: Under	rstand th	ne importance o	f lot Tran	sport.							
CO5: Under	rstand th	ne importance o	f Session	Layer	Protocols	•					
Text Book	& Refere	ence Books-									
1. Daniel	Minoli	, "Building the	Internet	of Th	nings wit	h IPv6	and MIPv6:	The Ev	volv	ing W	Vorld of
M2M (Commu	inications", ISE	3N: 978-	1-118	-47347-4	4, Willy	Publication	s ,2016			
2. Jan Ho	oller, Vl	asios Tsiatsis,	Catherin	e Mul	ligan, St	efan Av	vesand, Stam	natis Ka	rno	uskos	, David
Boyle,	"From	Machine-to-M	Iachine t	to the	Internet	of Thi	ngs: Introdu	iction to	o a	New	Age of
Intellig	gence", l	lst Edition, Ac	ademic F	Press,	2015						
3. Bernd	Scholz-	Reiter, Florian	Michah	elles,	"Archite	cting th	ne Internet o	f Thing	,s",	ISBN	978-3-
642-19	0156-5 e	e-ISBN 978-3-0	642-1915	57-2, \$	Springer,	2016.					
List/Links of	e-learnin	ng resource									
 http 	os://npte	l.ac.in/courses/10	06105166								
Modes of Ev	aluation	and Rubric									

The eva	luation	modes	consist	t of per	rforman	ice in t	wo mio	d seme	ster Tes	sts, Qui	z/Assign	ments, 1	term wo	ork, end
semeste	r practio	cal exan	nination).										
CO-PO N	/lapping	;:												
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2
CO-1	2	2	2										1	2
CO-2	3	2	2	2									2	1
CO-3	3	2	2	2									2	1
CO-4	3	2	2	2									2	1
CO-5	2	2	1	1									1	2
Suggesti	ve list o	of exper	iments:											
Recomm	endatio	on by Bc	oard of s	studies o	on									
Approva	l by Aca	demic c	ouncil o	on										
Compile	d and d	esigned	by											
Subject h	nandled	by dep	artmen	t			0	Departm	ent of I	Т				



SAMRAT ASHOK TECHNOLOGICAL INSTITUTE

(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

DEPARTMENT OF IT

Semester/Ye	ar	V/	/111		Progr	am	B.Tec	h – Inte	rnet of	Things	6
Subject Category	OE	Subject	t Code:	IO 5 OE- I	ю5 (В)	Subject Name	Oper	ating Sy	stems	for lo	Г
		Ma	aximum Ma	arks Allot	ted			Con	tact Ho	urs	Total
	Theo	ory			Prac	tical	Total				Credits
ES I	MS As:	signment	Quiz	ES	LW	Quiz	Marks	L	T	P	
60	20	10	10	-		-	100	3	0	0	3
Duouo avviaita				w.e	e.i. Ju	ly 2024					
Prerequisite	s:										
Data Struct	active										
	ective:	·	a alaima 1		40.010.0	i ann an an alt	an desision	442.2.1		~ D	
• 1 his c	course ex	kplains m	lachine le	earning	techn	iques such	as decision	tree I	earnin	ig, B	ayesian
learni	ng etc.										
• To un	derstand	computat	tional lea	rning tł	neory.						
• To stu	dy the pa	attern cor	nparison	techniq	ues.						
 Identif 	y problen	ns that are	e amenabl	le to sol	ution k	by Al method	ls, and which	Al met	hods r	nay b	e suited
to solv	<i>ing</i> a give	n problem	า.							,	
UNITs				D	escript	ions					Hrs.
	Introdu	ction - W	ell-posed	learnin	g prol	olems, desig	ning a learn	ing sy	stem,		
	Perspec	tives and	issues in i	machine	e learn	ing Concept	learning and	the ge	neral		
	to speci	fic orderir	ng – introc	luction,	a conc	ept learning	task, concep	t learn	ng as		•
I	search,	find-S: fin	ding a ma	iximally	specif	ic hypothesi	s, version spa	ces an	d the		8
	candida	te elimina	ation algo	, orithm,	remarl	ks on versio	n spaces and	d canc	idate		
	eliminat	tion, induc	tive bias.	,			·				
	Decisior	n Tree I	Learning	– Intr	oducti	on, decisio	n tree rep	resent	ation,		
	appropr	iate prob	lems for	decisio	on tree	e learning,	the basic de	ecision	tree		
II	learning	, algorithm	n, hypothe	esis spac	ce sear	ch in decisio	n tree learnir	ng, indu	uctive		8
	bias in c	lecision tr	ee learnin	g, issue	s in de	cision tree le	arning.	0,			
	Artificia	l Neural	Networks	-1– Intr	oducti	on, neural	network rep	resent	ation,		
	appropr	iate prob	lems for	neural	netwo	ork learning	perceptions	, mult	ilaver		
	network	ks and the	e back-pro	opagatio	on alg	orithm. Artif	icial Neural	, Netwo	rks-2-		
	Remark	s on the	Back-Pro	pagatio	n algo	rithm. An il	lustrative ex	ample:	face		_
111	recognit	tion. adv	anced to	ppics ir	n arti	ficial neura	l networks.	Evalu	ation		8
	Hypothe	eses – Mo	tivation.	estimati	on hvi	oothesis acc	uracy. basics	of sam	pling		
	theory.	a genera	l approad	h for d	eriving	g confidence	e intervals. d	ifferen	ce in		
	error of	two hypo	theses, co	mparin	g learn	ing algorithr	ns.				
	Bayesia	n learning	– Introdu	iction, E	Bayes t	heorem, Bay	es theorem	and co	ncept		
	learning	, Maximu	m Likeliho	ood and	least	squared erro	or hypothese	s, maxi	mum		
	likelihoo	,, d hypoth	eses for p	redictin	g prob	, abilities, mir	nimum descri	, ption le	ength		
	principle	e. Baves o	, potimal cl	assifier.	Gibs	algorithm. N	laïve Baves o	lassifie	er. an		
	example	e: learning	to classif	v text. E	Bavesia	n belief net	works, the EN	/ algor	ithm.		
IV	Comput	ational I	earning	, theory	– In	troduction	probably I	earnin	g an		8
	approxi	mately co	orrect hvr	othesis	. samı	ole complex	ity for finite	hypot	hesis		-
	space.	sample co	mplexity	for infir	nite hv	pothesis sp	aces. the mis	take h	ound		
	model c	of learning	. Instance	-Based	Learni	ng- Introduc	tion. k-neares	t neigl	bour		
	algorith	m, locally	/ weighte	d regre	ession	radial bas	is functions	case-l	based		
	reasonii	ng. remark	ks on lazv	and eag	er lear	ning.					

	v	The Mode Probl Produ Chara probl Redu	Al Pro el, Cri ems a uction acteris ems. ction,	blems teria nd Sta Syst tics, a Gene Constr	, The for Su te Spa ems, and iss rate-au rate-au	Under uccess, ice Sea Prod sues i nd-Tes atisfac	lying Som arch, D luctior n the t, Hill tion, N	Assum e ger Definin n Chi desig I Clim Jeans-	ption, eral r g Prob aracte nof bing, Ends A	AI Te referer lems a ristics, Search Best- Analysi	cchniqu nces, o ns a Sta Pro Pro First S.	ues, Le one Fi ate Spa ductior grams, Search,	vel of nal Wo nce Sea n Syst additic , Prob	the ord. rch, tem onal lem	8	
Tota	l Hours	;													40	
Cour	se Out	comes	:													
CO-1	. Under	stand	the co	ncepts	s of co	mputa	tional	intelli	gence	like ma	chine	learnin	g.			
CO-2	2 Ability	to get	t the s	kill to a	apply r	nachin	lear	ning te	echniq	ues to	addres	ss the r	eal tim	e probl	ems in	
diffe	rent ar	eas.														
CO-3	Under	stand	the Ne	eural N	letwor	ks and	l its us	age in	machi	ne leai	ning a	pplicat	ion.∙			
CO-4	Descri	be var	IOUS SE	earchir	ng met	hods a	and rea	asonin	g in Al	•						
CO-5	Deek C		viedge	e Repre	esenta	tion ie	ecnniq	ues.								
	xt Book & Reference Books- Machine Learning – Tom M. Mitchell, - MGH Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis															
	Machine Learning – Tom M. Mitchell, - MGH Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis Artificial Intelligence -By Elaine Rich And Kevin Knight (2nd Edition) Tata Mcgraw-Hill															
2. 2	Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis Artificial Intelligence -By Elaine Rich And Kevin Knight (2nd Edition) Tata Mcgraw-Hill															
3. 1	Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis Artificial Intelligence -By Elaine Rich And Kevin Knight (2nd Edition) Tata Mcgraw-Hill "PROLOG Programming For Artificial Intelligence" -By Ivan Bratko(Addison-Wesley															
List/	Links o	f e-lea	rning	resour	<u>се</u>	mm		nemg	,cncc	-Dy I		Ιαικοί	nuurs	<u> </u>	sicy	
,	h	ttps://	nptel.	ac.in/c	ourse	s/1061	02220)								
Mod	es of E	valuat	ion an	d Rub	ric			·								
The	evaluat	ion m	odes c	onsist	of per	forma	ince in	two r	nid se	meste	⁻ Tests	, Quiz/	Assignr	nents,	term w	/ork,
end	semest	er pra	ctical e	examin	ation.								Ũ			-
CO-P	О Марр	oing:														
	COs	PO1	PO ₂	PO₃	PO ₄	PO₅	PO ₆	PO ₇	PO ₈	PO ₉	PO_1	PO ₁₁	PO ₁₂	PSO1	PSO2	
	CO-1	1	1	2	1									1	2	
	CO-2	2	1	1	1	2								1	2	
	CO-3	2	1	2	1			1						1	1	
	CO-4	2	1	2	1										2	
	CO-5	2	1			1								1		
Reco	mmend	ation b	y Board	d of stu	dies or	1										
Appr	oval by	Acaden	nic cou	ncil on												
Subie	oneu an	u uesig Iled by	denart	ment					Denar	tment	of IT					
Jubje		iicu by	uepart	ment					Depai	unent						

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CAL)			(En	ginee	ring Col	lege),	, VI	IDISHA M	.P.			
San Cel	Ę		(An Aut	onomo	ous Institut	e Affili	iate	d to RGPV B	hopal)			
VIDISHA M.P.	4			DEP	ARTME	NT O)F (CS & IT				
Semester/Ye	ar	V/III		Pro	ogram			B.Tech	– Interr	net of	Thing	5
Subject	OE	Subject Code:	10	505	Subje	ect		Ad-hoc & S	Sensor N	letwo	orks fo	or IoT
Category	_	Maxim	OE-	1 (C)	Nam	e						Tatal
	т			Anottet	Practical			Total	Conta	act Ho	ours	Credits
ES	MS	Assignment	Quiz	ES	LW	Quiz		Marks	L	т	Р	cicuito
60	20	10	10	30	10	10		150	3	0	2	4
				w.e.f.	July 202	24						
Prerequisite	s:											
Computer N	Networks	, Mobile Comp	uting									
Course Obje	ctive:	_										
• To unde	rstand th	e concepts of s	sensor ne	tworks	5.							
To unde	rstand th	e MAC and tra	nsport pr	otocol	s for ad h	oc net	wo	rks.				
To unde	rstand th	e security of se	ensor net	works.								
To unde	rstand th	e applications	of adhoc	and se	nsor netv	vorks.						
UNITs				Descri	ptions						H	lrs.
	Introdu	ction to Ad Ho	c Networ	ks - Cł	naracteris	tics of	M	ANETs, App	lication	s		
	of MAN	NETs and Chall	enges of	MANE	Ts. Rout	ng in	MA	ANETs - Cri	teria fo	or		
	classific	ation, Taxono	my of N	/ANET	routing	algori	ithr	ms, Topolo	gybase	d		
I	routing	algorithms-Pr	oactive:	DSDV;	Reactive	: DSR,	, A	ODV; Hybr	id: ZRF);		8
	Positio	n-based routin	ng algori	ithms-l	Location	Servic	ces-	-DREAM, C	Juorum	1-		
	based;	Forwarding	Strategies	s: Gre	edy Pac	ket, F	Res	stricted Dir	ectiona	al		
	Floodin	g-DREAM, LAR	Dua a dia a di	Ctown	. Drahlar	a Dah		adaaatina C				
	Data II Simplo	flooding Pro		. Storn	n Probler	n, Red Ic		accasting S	chemes Acthod	5-		
	Neighb	or Knowledge-	hasad. SE	A M	Iltinoint F	is, A Iolovini	a d	AHRD Mult	icasting	,		8
	Tree-ha	sed: AMRIS	MAODV	· Me	sh-hased.		б, / ЛП	P CAMP	Hybrid	5. -		0
	AMRou	te. MCEDAR.	1111 100	, 1010	Sir Buscu.	ODI	••••	, c/ ((v)) ,	i iyon			
	Geocas	ting: Data-trar	nsmission	Orier	nted-LBM	: Rout	te	Creation O	rienteo	-		
	GeoTO	RA, MGR. TCP o	over Ad H	oc TCF	protocol	overvi	view	v, TCP and N	MANET	5,		8
	Solutio	ns for TCP over	Ad hoc									
	Basics	of Wireless,	Sensors	and	Lower	Layer	lss	sues: Appl	ication	5,		
IV	Classifie	cation of sense	r networ	ks, Arc	hitecture	of ser	nso	or network,	Physica	al		8
	layer, N	1AC layer, Link	layer, Ro	uting L	ayer.							
	Upper	Layer Issues o	f WSN: T	ranspo	ort layer,	High-l	lev	el applicati	on laye	r		
V	suppor	t, Adapting to	o the in	herent	dynami	c natu	ıre	of WSNs,	Senso	r		8
	Networ	ks and mobile	robots.									
Total Hours												40
Course Outc	omes:	watand the sta	to of the	ort ro	coorch in	+ h a an		raina cubior	t of Ad		and	Miroloco
Sensor Net	vorks	erstand the sta	le-oi-the	-art re	Search	the en	ner	iging subjec		пос	anu	vvii eiess
CO2: Ahility	v to solve	the issues in r	al-time a	nnlica	tion deve	lonme	nt l	based on Δ	SN.			
CO3: Ability	to cond	uct further res	earch in t	he don	nain of A	SN						
CO4: Ability	to unde	rstand lavers										
CO5: Under	standing	the concept of	f dynamic	natur	e of WSN	s.						
Text Book &	Referenc	e Books-	- ,									
		oncor Notwork	s _ Theor	vond	Applicati	me Ca	arlo	s Corderio	Dharm	D /	\ agor	wo1
1. Ad H	loc and S	ensor network	s = 11001	y anu i	пррпсан	ль, Ca	ano	5 Cordenio	Difarma	11.1	Aggar	wai,
IV V Total Hours Course Outc CO1: Ability Sensor Netv CO2: Ability CO3: Ability CO3: Ability CO4: Ability CO5: Under Text Book &	Classifie layer, N Upper support Networ omes: / to unde works / to solve / to cond / to unde rstanding Reference	cation of senso <u>AC layer, Link</u> Layer Issues o t, Adapting to erstand the sta the issues in re uct further rese rstand layers the concept o <u>e Books-</u>	r networ layer, Rou f WSN: T o the inl robots. te-of-the- eal-time a earch in the f dynamic	ks, Arc uting L Transpo herent -art re- applica he don	chitecture ayer. ort layer, dynami search in tion deve nain of AS e of WSN	the en s.	nso leva ure mer	or network, el application of WSNs, rging subject based on AS	Physica on laye Sensc t of Ad	Hoc	and	8 8 40 Wireless

2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman).

List/Links of e-learning resource

• https://archive.nptel.ac.in/courses/106/105/106105160/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping:

	2													
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO₅	PO ₆	PO ₇	PO ₈	PO9	PO1	PO ₁₁	PO ₁₂	PSO1	PSO2
CO-1	1	2	2										1	2
CO-2	3	2	2	2									2	1
CO-3	3	2	2	2									2	1
CO-4	3	2	2	2									2	1
CO-5	2	2	1	1									1	2
		-	-											

Suggestive list of experiments:

Note: Implement Experiment No: 1 to 5 using NS2/NS3 Simulation Tool. Implement Experiment No: 6 to 10 using MATLAB Tool.

1. Create a sample wireless topology using Simulation Tool.

- 2. Create a mobile Ad-hoc networks using Simulation Tool.
- 3. Implement an Ad-hoc On-demand Distance Vector protocol using Simulation Tool.
- 4. Implement a Transmission Control Protocol using Simulation Tool.
- 5. Implement an User Datagram Protocol using Simulation Tool.
- 6. Implement a Low Energy Adaptive Hierarchy protocol using Simulation Tool.
- 7. Implement a Power Efficient Gathering in Sensor Information System using Simulation Tool.
- 8. Implement a Sensor Protocol for Information via Negotiation (SPIN) using Simulation Tool.
- 9. Implement a Power Efficient and Delay Aware MAC protocol using Simulation Tool
- 10. Implement a Scheduling based protocol for WSNs using Simulation Tool.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
complica and designed by	
Subject handled by department	Department of IT

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE																			
		(Engineering College), VIDISHA M.P.																	
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VIDISHA da ang a	M.P.				•		DEI	PAR1	ME	NT C	DF	CS &	IT						
Semester	/Year		V/III Program B.Tech – Internet										net of	of Things					
Subject Categor	t Vy	DLC	Subject Code:			IO 506 Subject Name								ab					
				Maxim	um Ma	rks /	Allotte	ed						act H	ours	Total			
		T	heory					Pra	ctical			Total				ours	Credits		
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Prerequi	sites:	d	Mieroor	مليمه															
To introduce IoT development boards and integration of concore with it																			
I o introduce io I development boards and integration of sensors with it.																			
UNITS		Descriptions Hrs.														rs.			
		Using Raspberry Pi																	
		1. Calculate the distance using distance sensor.																	
	2. Basic LED functionality.																		
	3. Calculate temperature and humidity using DHT sensor.																		
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Course O	utcom	nes:																	
CO1 : To	devel	op the	e ability o	of unde	erstan	ding	g of Ic	T Dev	elopr	nent	boa	ards							
CO2: To	integ	rate th	, ne sensoi	rs with	the d	evel	lopme	ent bo	ards.										
СОЗ : То	send	the da	ita over t	the clo	ud.		•												
Text Boo	k & Re	ferenc	e Books-																
1.	Devel	oping	IoT proj	ects w	ith ES	P, S	Secon	d Edit	ion, F	Packt	Puł	olicatio	n.						
2.	Devel	oping	IoT proj	ects w	ith Ar	duir	10, Se	cond	Editio	on, Pa	ickt	Public	ation.						
3.	Devel	oping	IoT proj	ects w	ith Ra	spbe	erry P	i, Sec	ond E	Editio	n, I	Packt P	ublicati	on.					
List/Links	s ot e-l	earnin	g resourc	ce															
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semester	uation nracti	moue ical eva	es consist	torpe	norma	ince	in tv	vo mi	u sen	iester	re	sis, Qu	iz/Assigi	imen	115, 1	ern wo	ork, end		
CO-PO M	lappin	g:																	
$CO_{1} = O_{1} = O_{$													PSO2						
CO-1	1	2	2	-4	5	+	- 0	-1			- 3	1	-11		14	1	2		
CO-2	3	2	2	2						1						2	1		
CO-3	3	2	2	2					ł	+			1			2	1		
Suggestiv	ve list (of expe	eriments:		1		I		I			1	L			_			
Using Ra	spber	ry Pi																	
	- 1- 2-01	,																	

1. Calculate the distance using distance sensor.										
2. Basic LED functionality.										
3. Calculate temperature and humidity using DHT sensor.										
Using Arduino Board										
1. Calculate the distance using distance sensor.										
2. Basic LED functionality.										
3. Calculate temperature and humidity using DHT sen	sor.									
Using ESP Board										
1. Calculate the distance using distance sensor.										
2. Basic LED functionality.										
3. Calculate temperature and humidity using DHT sensor.										
Recommendation by Board of studies on										
Approval by Academic council on										
Compiled and designed by										
Subject handled by department Department of IT										

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE																			
	(Engineering College), VIDISHA M.P.																		
ALL REFER	est	(An Autonomous Institute Affiliated to RGPV Bhopal)																	
VIDISHA N	L.P.					D	EPA	RTME	NT C	DF I	Γ								
Semester	r/Year		VI/III Program							B.Tech – Internet of Things									
Catego	orv	DC	Subjec	t Code:	IO 60	601 Subject Name IoT Cloud Processing a									and Analytics				
0.008	, <u> </u>			Maxim	um Mar	ks All	lotted	l				C	onta	et	Total				
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Prerequ																			
Course Objective:																			
Knowledge on IoT networking connectivity protocols and IoT Analytics for the cloud processing.																			
UNI	UNITS Descriptions Hrs.														rs.				
		IoT de	evices, N	Networki	ng basic	cs, Io	T ne	tworking	connect	tivity	protocols,	IoT							
Ι		networking data messaging protocols, Analyzing data to infer protocol and 6													6				
device characteristics. IoT Analytics for the Cloud: Introduction to elastic analytics, Decouple key understand understand																			
												8							
II components, Cloud security and analytics, Designing data processing for analytics. Applying big data technology to storage										0									
	Exploring IoT Data: Exploring and visualizing data. Techniques to understand													2					
111	data quality, Basic time series analysis, Statistical analysis.												8						
Data Science for IoT Analytics: Introduction to Machine Learning, Feature																			
IV		engine	ering wi	ance	10														
		tradeof	f, Use ca	ases for a	leep lear	ning	with	lo I data.	alteria	Data	anta Mana	aina							
V	V Strategies to Organize Data for Analytics: Linked Analytical Datasets, Managing 8													8					
Total H	ours	untu Iu			n strateg	<i>.</i>								4	0				
Course	Outcon	nes:																	
CO1: In	nplemei	nt the a	chitectu	ral comp	onents a	nd pr	otoco	ols for appl	ication	devel	opment								
CO2: Id	entify d	lata ana	lytics an	d data vi	isualizati	ion to	ols as	s per the pr	oblem	chara	cteristics.								
CO3: Le	earning	data ex	ploratio	n technic	ues.														
CO4: T	o get to	o know	the diff	ferent da	ata scier	nce te	echni	ques.											
COS: Fo	orm the	e strate	gies to	organize	e data.														
1 Ars	ok a k hdeen l	elerend Rahga a	nd Vija	8- v Madise	tti "Inte	rnet o	f Thi	ngs _ A H	ands or	Ann	roach" Un	iversi	ties P	ress	2015				
2. Key	vin. Tov	wnsend	. Carles.	Cufí. Al	til, inte	Robe	rt Da	vidson. "G	etting S	Starte	d with Blue	tooth	lies I	1055,	2013.				
Lov	w Energ	gy" O'R	eilly.	,					~~										
3. Ma	dhur Bl	hargava	"IoT Pr	ojects w	ith Bluet	ooth 1	Low	Energy, Pa	ckt Puł	olishir	ng, August	2017.							
4. Rol	oin Hey	'don," E	Bluetooth	1 Low E1	nergy: Tl	he De	velop	er's Handb	ook", l	Pearso	on, October	2012							
5. Ku	mar Sau	ırabh,"	Cloud C	Computin	g", W1le	y Ind	1a, 1s	t Edition, 2	2016.										
List/Lin	ks of e-	learnir	ig resou	rce		05/10	06106	1(()											
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The eval	uation	modes a	niu Kub consist o	of perform	nance in	two 1	mid •	emester Te	ests Ou	iz/Ae	signmente	term	work	end	semester				
practical	examir	nation.	5110101 0	- Periori					, Q u				01 M	, enu	Semester				
CO-PO	Mappi	ng:																	
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PC	P ₇ PO ₈	PO ₉	PO	P1 PO ₁₁	PO	12	PSO1	PSO2				
CO-1	3	1	2											1	2				
CO-2	3	2	2	1						<u> </u>				1	2				
CO-3	3	2	2	1						 				2	1				
CO-4	3	2	2	1						<u> </u>				2	1				
CO-5	3	2	1											1	1				
Suggesti	ve list	of expe	riments	:															
- 1. Install Virtualbox/Vmware Workstation with different flavors of linux or windows OS on top of windows7 or 8.
- 2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
- 3. Install Google App Engine. Create a hello world app and other simple web applications using python/java.
- 4. Find a procedure to transfer the files from one virtual machine to another virtual machine.
- 5. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)
- 6. Install Hadoop single node cluster and run simple applications like word count.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT

ST LUID TECHNOLOGICE H		SAMRA	T ASH Engine	OK 7 eering	TECHNOI g College).	LOGIC VIDIS	CAL INST HA M.P.	FITU	JTE	2				
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Semester/Year	r	VI/III		Progr	am		B.Tech – In	terne	t of T	hing	şs			
Subject Category	DC	Subject Code:	IO 602	2 S	ubject Name	Program	nming Langu	ages	for I	T				
-		Maximu	ım Marks	Allotte	d		1	C	ontac	et	Total			
	T	heory			Practical		Total	I	Hours	5	Credits			
ES	MS	Assignment	Quiz	ES		Quiz	Marks		T	P				
60	10	10	10	30	10	10	150	3	0	2	4			
D			v	v.e.i. J	uly 2024									
Prerequisites	:													
Course Object	ctive:													
1. This pr	ogram a	ims to train studen	ts to be eq	uipped	with a solid th	neoretical	foundation,							
systema	atic prof	essional knowledge	e and stro	ng prac	tical skills in t	he Raspb	erry Pi.							
2. The co	urse focu	uses on higher-leve	l operatin	g syste	ms, advanced	networki	ng, user inter	faces	,		_			
multim	edia and	uses more comput	ting intens	sive Io7	applications	as examp	les using Ras	spber	ry Pi	runn	ing			
Linux a	as the pla	attorm of choice.		<u> </u>					1	•	-			
UNITs Descriptions Hrs.														
	Gettin	g Started with Ras	berry P1:	Basic 1	unctionality o	f Raspbei	$rry P_1 B + boa$	ard,						
	setting	up the board, con	iguration	and use	e, booting Ras	poerry Pi	3, Download	aing						
	an Operating System, format an SD card and booting the OS, Interfacing Hardware with the Beenharmy Bi Beenharmy Bi Beenate Access operates the													
Ţ			6											
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without needing a GUI interface. Basics of Python programming language: Programming on the Raspberry Pi.														
	Pythor	n on Raspberry Pi,	Python Pr	ogrami	ning Environr	nent, Pytł	non Expressi	ons,						
Strings, Functions and Function arguments, Lists, List Methods, Control Flow.														
	Introd	lucing Micro Pyth	on: Micro	oPytho	n Features, Mi	croPytho	n Limitation	s,						
	Experi	menting with Pyth	on on PC,	Install	ing Python 3 d	on Windo	ws 10, Runn	ıng						
II	Progra	thon Console, Run	ning Pyth rotor Tho	ON Run F	valuata Drint	Loon (PF	FDI Consola)			8			
	Off an	d Running with M	icroPytho	n Addi	tional Hardwa	re Basic	Electronics), Kit						
	Bread	board and Jumper V	Wires and	3 Exar	nples.	ire, Busie	Lieeuonies	i iii,						
	IoT Pl	hysical Servers an	d Cloud	Offerin	gs: Introducti	on to Clo	ud Storage							
ш	models	s and communicati	on APIs.	Web Se	erver – Web se	erver for I	oT, Cloud fo	or			0			
111	IoT, P	ython web applicat	ion frame	work. I	Designing a RI	ESTful w	eb API.				0			
	Conne	cting to APIs.												
	Bakin	g Pi: Powering Ra	spberry Pi	, Form	atting SD card	ls, Installi	ng and							
	Connec	cting Raspberry pi,	How to to	ell Rasp	berry pi is wo	orking, Ins	stalling							
IV	Conne	cting Via Local Co	mputer N	ig Kasp Ietwork	Connecting V	Nia Wirel	ass Network				10			
	Undati	ing and Upgrading	Setting u	n a Ho	st Name. Conr	ecting R	aspherry pi v	, vith						
	SSH, C	Creating Simple Ra	spberry p	i applic	ation.		aspeens pr (
	FIRST	F Project on Java:	Bill of M	Iaterial	s, Getting Star	ted with I	NetBeans,							
V	Down	loading and Config	uring Net	Beans,	Revisiting He	lloRaspb	erryPi, Brew	ing			8			
v	Java, C	Communicating wi	th a USB	Scale, (Coffee Calcula	tor, Asyn	nchronous				0			
	Comm	unication, Coffee	Brewing F	kecipe,	Commercial I	licensing.	•				40			
Total Hours										4	40			
Course Outco	omes:	ndemoniali CD T												
CO1: Knowin	ig the fu	nuamentals of R- F	1 f M: D	there										
CO2: Underst	landing t	the plant concepts of	I WIICTOPY	unon.										
CO4: Transf	landing t	the working of D	u web ser	ver.										
CO4: 10 get t	U KNOW	the concents of	1 NatRoom	7										
Toxt Rook		g the concepts of .	inerBeans	5.										
Text BOOK &	Referen	ICE DOOKS-												

1. Simon Monk, "Programming the Raspberry Pi: Getting Started with Python", January 2012, McGraw Hill Professional.

2. MicroPython for the Internet of Things, A Beginner's Guide to Programming with Python on Microcontrollers, Charles Bell, Apress.

3. Raspberry Pi with Java: Programming the Internet of Things (IoT) (Oracle Press) 1st Edition.

4. Eben Upton and Gareth Halfacree, "Raspberry Pi User Guide", August 2016, 4th edition, John Wiley & Sons

5. Alex Bradbury and Ben Everard, "Learning Python with Raspberry Pi", Feb 2014, JohnWiley & Sons

6. Michael Margolis, "Arduino Cookbook", First Edition, March 2011, O'Reilly Media, Inc 7. The official raspberry Pi Projects Book,

List/Links of e-learning resource

• https://archive.nptel.ac.in/courses/106/105/106105166/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping:

CO-PO	wappn	ng:												
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2
CO-1	3	1	2										1	2
CO-2	3	1	2	1									1	2
CO-3	3	2	2	1									2	1
CO-4	3	1	2	1									2	1
CO-5	3		1										1	1

Suggestive list of experiments:

- 1 Program to On Board blink LED
- 2 Program to blink External LED
- 3 Program to Control LED using Button
- 4 Program for Boot Button LED
- 5 Program to Get input from two switches and switch on corresponding LEDs.
- 6 Program to Flash an LED at a given on time and off time cycle, where the two times are taken from a file.
- 7 Program to read Buntton 35
- 8 Program to Switch on a relay at a given time using sleep function, where the relay's contact terminals are connected to a load.
- 9 Program for Buzzer
- 10 Program for Thermistor

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT

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Semester/Yea	r	VI/III		Progra	am		B.Tech – In	terne	t of T	hing	s
Subject	DE	Subject Codes	IO 603) ₆	ubiect Nome		ЪТ	Soon	nit.		
Category	DE	Subject Code.	DE –II	A ^{SI}	ubject Maine		101	Secu	IIIy		
		Maximu	ım Marks	Allotte	<u>d</u>			C	ontac	t	Total
EC		heory	0	FC	Practical	0	Total Marka	<u>1</u>	lours	n	Credits
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00	20	10	10	of I			100	3	-	•	3
Dronoquisitos	•		N	.e.i. J	uly 2024						
Prerequisites	•										
Course Obje	ctive										
1. Understand	the fund	lamentals, various	attacks and	d impor	tance of Secu	rity aspec	cts in IoT.				
2. Understand	the tech	niques, protocols a	ind some i	dea on a	security towar	ds Gamir	ng models.				
3. Understand	the oper	rations of Bitcoin b	lockchain	, crypto	-currency as a	pplicatio	n of blockcha	ain			
technology.											
4. Understand	the esse	ential components of	of IoT.								
5. Understand	security	and privacy challe	enges of Ic	oT.							
UNITS]	Descrip	otions					H	rs.
	Funda	mentals of IoT and	Security a	and its 1	need, Prevent	Unauthor	rized Access	to			
т	Sensor	r Data, Block ciphe	ers, Introdu	action to	o Blockchain,	Introduct	tion of loT	•			
1	foulto	es, 101 Security Re	quirement:	s, MZM	T Security, Me	ssage inte	egrity, Model	ling			0
	device	and adversaries, D	interence a	mong i	of devices, co	mputers,	, and embedd	eu			
	IoT an	od cyber-physical s	vstems RF	ID Sec	urity Authent	icated en	cryption				
	Byzan	tine Generals prob	lem sensor	rs and a	ctuators in Io	Г. IoT sec	curity				
II	(vulne	rabilities, attacks, a	and counte	rmeasu	res), Cyber		2				8
	Physic	cal Object Security	, Hash fun	ctions,	Consensus alg	orithms a	and their				
	scalab	ility problems, Acc	celeromete	r, photo	presistor, butto	ons.					
	Securi	ty engineering for	IoT develo	opment	Hardware Sec	urity, Me	erkle trees an	d			
	Ellipti	c curves digital sig	natures, vo	erifiable	e random func	tions, Zei	ro-knowledge	e			
III	lifecyc	ns motor, LED, vid	rator. 101	v Protect	y ption Manager	mont So	oure IoT				8
	Databa	ases Public-key cr	vnto (PKI)) block	chain the chai	llenges a	and solutions				
	analog	g signal vs. digital s	signal.	, 010 C R	chun, the chu	nenges, u	ind solutions,				
	Data P	Privacy Networking	g Function	Securit	ty Trees signat	ture algor	rithms proof	of			
ПV	work,	Proof of stake, Net	working i	n IoT, I	Device/User A	uthentica	tion in IoT I	Tc			0
1 v	Netwo	orking Protocols, C	rypto-curr	encies,	alternatives to	Bitcoin	consensus,			-	10
	Bitcoi	n scripting languag	ge and thei	r use Re	eal-time comn	nunicatio	n.				
	Introd	uction to Authentic	cation Tecl	hniques	Secure IoT L	ower Lay	vers, Bitcoin	P2P			
V	networ	rk, Ethereum and S	mart Cont	tracts, E	Sandwidth effi	ciency, L	Data				0
v	Distrik	vortniness in 101 S	ecure 101	Higher	Layers,	rification	n challongos				8
	data at	nalytics in IoT - sit	nnle data a	act Lai analyzii	iguages and ve	enneation	ii chanenges				
Total Hours	uutu u		iipie dutu t	anar y 211	ig methods.					4	40
Course Outco	omes:										
CO1: Incorp	orate the	best practices lear	nt to ident	ify the	attacks and mi	tigate the	e same.				
CO2: Adopt t	the right	security technique	s and prote	- cols du	uring the desig	n of IoT	products.				
CO3: Assimi	late and	apply the skills lea	rnt on cipł	ners and	l block chains	when app	- propriate.				
CO4: Descrit	be the ess	sential components	of IoT.								
CO5: Find ap	propriate	e security/privacy	solutions f	or IoT.							
Text Book &	Referen	nce Books-									
1. B. Russe	ll and D	. Van Duren, "Prac	tical Inter	net of T	Things Security	y," Packt	Publishing, 2	2016.			
2. FeiHU,	'Security	and Privacy in Int	ternet of T	hings (l	loTs): Models	, Algorith	nms, and Imp	leme	ntatio	ons",	CRC
Press, 20	J16.										

- 3. Narayanan et al., "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction,"
- 4. Princeton University Press, 2016.
- 5. A. Antonopoulos, "Mastering Bitcoin: Unlocking Digital Cryptocurrencies," O'Reilly, 2014.
- 6. T. Alpcan and T. Basar, "Network Security: A Decision and Game-theoretic Approach,"
- 7. Cambridge University Press, 2011.
- 8. Security and the IoT ecosystem, KPMG International, 2015.
- 9. Internet of Things: IoT Governance, Privacy and Security Issues" by European Research Cluster.
- 10. Ollie Whitehouse, "Security of Things: An Implementers' Guide to Cyber-Security for Internet of Things Devices and Beyond", NCC Group, 2014
- 11. Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guide to Blockchain Technology and Blockchain Programming', Create Space Independent Publishing Platform, 2017.

List/Links of e-learning resource

• https://archive.nptel.ac.in/courses/106/106/106106129/

Modes of Evaluation and Rubric

CO-PO	Mappi	ng:													
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2	
CO-1	3	1	2										1	2	
CO-2	3	2	1	1									1	2	
CO-3	3	2	1	1									2	1	
CO-4	3	2	2	1									2	1	
CO-5	3	2	1										1	1	
Suggesti	ive list o	of exper	riments	:											
Recomm	nendatio	n by Bo	oard of s	tudies o	on										
Approva	l by Ac	ademic	council	on											
Compile	d and d	esigned	by												
Subject l	handled	by depa	artment				Depar	rtment c	of IT						

ST SHOT TECHNOLOGICE H	SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College) VIDISHA M P												
I CIA I			(Engine	ering	g College),	VIDIS	HA M.P.	•					
And cent		(An Aut	onomou	ıs Ins	titute Affi	liated 1	to RGPV	Bha	opal)			
VIDISHA M.P.				DEP	ARTMEN	T OF I	T						
Semester/Year		VI/III		Progr	am		B.Tech – Ir	terne	t of T	hing	;s		
Subject Category	DE	Subject Code:	IO 603 DE -II	B SI	ıbject Name		Cry	otogra	phy				
		Maximu	m Marks	Allotte	d			C	ontac	et	Total		
	Т	heory			Practical		Total	I	Iours		Credits		
ES	MS	Assignment	Quiz	ES	LW	Quiz	Marks		Т	Р			
60	20	10	10	6 1	1 2024		100	3	-	-	3		
Dronoquicitor			W	.e.1. J	uly 2024								
rierequisites:													
Course Object	tive:												
1. Gain in-depth knowledge on Lightweight Cryptography and its relation to the new security in													
RFID tags.													
2. Apply proactive and defensive measures to counter potential threats, attacks and intrusions.													
UNITS Descriptions Hrs.													
T	Anu-c Securi	ty Networked RF	I KFID - A ID System	Anti-Co s PC N	Jetwork Archi	na Suppr tecture A	y Chain A Security				6		
1	Primer	r.	iD bystem	.s, 1 C 1	cetwork 7 frem	teeture, 1	rbecurry				U		
	Securi	ity and Privacy C	urrent St	atus - A	Addressing Ins	ecurities	and Violatio	ons					
П	of Priv	acy, RFID Tag Vi	ulnerabiliti	ies in R	FID Systems,	From Ide	entification t	0			8		
	Auther	ntication – A Revi	ew of RFI	D Prod	uct						0		
	Auther	ntication Techniqu	es.	System	for a Safe & S	Secure Su	nnly Chain (and					
	How it	t is Applied. The F	otential of	f RFID	and NFC in A	nti-Coun	terfeiting.	ana			_		
111	Improv	ving the Safety and	d Security	of the			,				8		
	Pharm	aceutical Supply C	Chain.										
	Crypt	ographic Solution	ns - Produc	ct Spec	ific Security B	ased on I	RFID						
IV	Frehan	ology, Strengtheni	ng the Sec	curity of eration	f Machine-Rea 2 REID again	adable Do	bility and				10		
	Clonin	lg.		cration	2 Ki iD again	st macea	onity and						
	Low-c	cost Cryptograph	ic Solution	ns: A R	andom Numb	er Genera	ator for						
V	Applic	cation in RFID Tag	gs, A Low-	-Cost S	olution to Clo	ning and	Authenticati	on			8		
,	Based	on a Lightweight	Primitive,	Lightw	eight Cryptog	raphy for	Low Cost				0		
Total Hours	KFID.										10		
Course Outcou	mes:								1		+0		
CO1: Ability t	o learn	Cryptographic bas	ed solution	ns, attac	ks and intrusi	ons.							
CO2: Understa	and secu	rity and privacy is	sues in rad	dio freq	uency identifi	cation (R	FID) system	ıs.					
CO3: Understa	anding r	nultiple ways to at	tack and d	efend i	n industrial sy	stems.							
CO4: Underst	anding	the concepts of	basics of	crypto	graphy soluti	ions.							
CO5: Applica	tion of	low cost cryptog	graphy so	lutions	•								
Text Book & I	Referen	ce Books-	1 4 1	1 0	1 1 1 7 7 * *	N 11							
1. Internet of 1 Press 2015 IS	hings BN: 079	A Hands-on Appro	oach, Arsh	deep B	anga and Vija	y Madise	tti, Universi	ties					
 Press, 2015, ISBN: 9788173719547 Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759 													
3. Jonathan Ro	driguez,	, "Fundamentals of	f 5G Mobi	le Netv	vorks", John V	Viley & S	ons.						
4. Amitabha Gl	hosh and	d Rapeepat Ratasu	k "Essenti	als of I	TE and LTE-	A", Cam	bridge Univ	ersity					
Press.			A.T.1			(A.T.	D						
5. Athanasios C	J. Kanat	tos, Konstantina S	. Nikita, P	anagiot	is Mathiopoul	os, "New	Directions	In					
6. Theodore S	6 Theodore S Rappaport Robert W Heath Robert C Danials James N Murdock "Millimeter												
Wave Wireless	Comm	unications", Prenti	ce Hall Co	ommun	ications.								
List/Links of e	-learni	ng resource											

•	https://	archive.	nptel.ac	.in/cour	:ses/106	/105/10	610516	2/						
Modes of	of Evalu	ation a	nd Rub	oric										
The eval	uation 1	nodes c	onsist o	f perfor	mance i	in two n	nid sem	ester Te	ests, Qu	iz/Assig	nments,	term wo	rk, end s	semester
practical	examin	ation.												
CO-PO	Mappi	ng:												
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2
CO-1	3	2	2										1	2
CO-2	3	1	2	1									1	2
CO-3	CO-3 3 1 2 1 2 1													
CO-4	3	2	2	1									2	1
CO-5	3	2	1										1	1
Suggesti	ive list o	of exper	iments	:										
Recomm	nendatio	n by Bo	ard of s	tudies c	on									
Approva	Approval by Academic council on													
Compile	d and d	esigned	by											
Subject 1	handled	by depa	artment				Depar	tment o	of IT					

The second secon	a market	:	SAMRAT (E (An Autor	' ASHC Enginee Iomous D	OK TEC Ting Col Institut EPART	HNOLO(llege), VII e Affiliate MENT O	GICAL INS' DISHA M.P ed to RGPV F IT	TITU Bhoj	TE pal)		
Semester/	Year	VI/III		Prog	gram			B.T	ech –	IT	
Subject Category	DE	Subject Code:	IO 603 DE –II C	S	ubject N	ame	Informa	ation	Theor	ry &	Coding
		Maximum	Marks Al	lotted				0	Contac	t	Total
]	Theory			Practic	al	Total		Hours	5	Credits
ES	MS	Assignment	Quiz	ES	LW	Quiz	Marks		T	P	
60	20	10	10	f			100	3	U	U	3
Prerequisite	s:		w.c		ly 2024						
Basic Knowle	edge of pr	obability.									
Course Obje	ctive:										
• To understa	nd Inform	nation properties and	l source co	ding tee	chniques	•					
• To acquire l	knowledge	e about error coding	technique	s for ef	ficient tra	ansmission	n.				
• To understa	nd variou	s compression algor	thms for c	lata, Im	age and	video.			1	T	
UNIIS	Informa	tion_Entropy_Inform	Desc nation rat	cription	ns ification	of code	os _ Kraft	Mc		H	Irs.
	Millanir	ne quality-Source c	oding theo	orem-Sl	hannon -	- Fano co	oding – Huff	fman			
Ι	coding-	Extended, Huffmar	coding -	- Joint	and con	nditional	entropies-M	utual			8
	informa	tion-Discrete memo	ory less cl	hannels	–BSC- I	BEC – C	hannel capa	city-			
	Shannoi	n limit.									
п	Text: A Perceptu MEGAu Predicti	daptive Huffman Co ual coding-Masl udiolayersI,II,III,Do ve Coding.	oding – Ar king te lbyAC3-	ithmetio echniqu Spee	c Coding es – ch: C	g – LZW a Psycł hannel	llgorithm–Au noacousticme Vocoder-Li	udio: odel- inear			8
ш	Image a READ- estimati	and Video Formats- JPEG – Video C on - Motion comper	-GIF–TIFI Compressionsation - H	F– SIF- on: Prin .261 -M	-CIF – (nciples-I IPEG sta	QCIF–Ima , B, P fi indard.	age compress rames - Mo	sion: otion			8
IV	Definition distance Linear decoder	ons and Principles decoding –Single J block codes – C – Cyclic Redundanc	s: Hammi parity code yclic cod cy check co	ng we es – Ha es –Sy odes.	ight-Han mming c yndrome	nming di codes – Ro calculati	stance-Minin epetition cod on-Encoder	mum les – and			8
v	Convol Sequent	utional codes-cod ial search and Viter	le tree—ti bi algorithi	rellis-sta m– Prin	ate diag	gram-Enc Turbo cod	oding–Decoo ling.	ding:			8
Total Hours							<u> </u>		40		
Course Outc	omes:										
CO-1: Apply	the suital	ble coding schemes	for inform	ation							
CO2: Make u	use of cod	ing schemes for text	t compress	10 n.	70						
CO-3: Illustr	e the vario	inpression schemes	ntrol codes	inu inia S	ge						
CO-5: Const	ruct the co	ode tree and state dia	agram for e	error co	ntrol cod	les.					
Text Book &	Referen	ce Books-	0								
1. Ranj	jan Bose,	"Information Theor	y, Coding a	and Cry	ptograpł	ny", Tata I	McGraw Hill	l, 2nd	editic	on.	
2. P.S.	Satyanara	ayana, "Concepts of	Informatio	on Theo	ory and C	oding", D	ynaram Pub	licatio	on, 20	05	
3. Rich	ard B. W	ells, "Applied Codir	ng and Info	ormation	n Theory	for Engir	neers" Pearso	on Ed	ucation	n, LP	E 2004.
4. Shu	Lin and D	Daniel Castello, "Err	or Control	Coding	g – Funda	amentals a	and Application	ions",	secor	nd ed	ition 2004
5. Tho	mas M Co	over, Joy Thomas, "l	Elements o	of Inform	mation T	heory", M	GH 2006.				
List/Links of	fe-learnii	ng resource									
https://www.interview.com/interview.com	s://archive	e.nptel.ac.in									
woodes of Ev	aluation	and KUDFIC									

The	The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester															
prac	ctical exa	aminati	on.													
CO	-PO Ma	pping:	:													
	COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2	
	CO-1	3	3	2	3	1							2	3	1	
	CO-2		2	3	2	3										
	CO-3 2 1 2 3 2 1															
	CO-4 2 3 2 1 2															
	CO-5		1	2	3									2		
Sug	gestive	list of e	experir	nents:												
Rec	ommend	lation b	y Boai	d of st	udies of	n										
Арр	oroval by	/ Acade	emic co	ouncil o	n											
Compiled and designed by																
Sub	Subject handled by department Department of IT															

ST LHON TECHNOLOGICAL AND	SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P.													
			(Engine	ering	College),	VIDIS	HA M.P.	DI	•					
VIDISHA M.P.		(An Aut	onomou	IS INS	titute Aiii N RTMEN'	lated t	O KGPV	Bho	pal)				
Semester/Year	•	VI/III		Progr	am		B.Tech – In	terne	t of T	Thing	ĮS			
Subject	DE	Subject Code:	IO 604	S.	ubiect Name	Mobile	Application	Deve	lopm	ent f	or IoT			
Category		Maxim	DE – III um Marks	A ~ Allotte	d			C	onta	•t	Total			
	Г	Theory			Practical		Total	I	Hours	5	Credits			
ES	MS	Assignment	Quiz	ES	LW	Quiz	Marks	L	Т	Р				
60	20	10	10				100	3	0	0	3			
D			W	.e.t. J	uly 2024									
rrerequisites:														
Course Objective:														
Students will learn mobile application development for Internet of Things (IoT) devices.														
UNITs Descriptions Hrs. In The dust Concentralization Int Deschart Deschart of Life and a LeT Deschart Int Deschart Concentralization Int Deschart Deschart of Life and a LeT Deschart														
Ior Product Conceptualization: IoT Product Development Lifecycle, IoT Product Conceptualization:														
Conceptualizations														
	I FD f	logramming runua	o display n	eung i	Started, 101 Pr	ogram to	read I DR 1	ovel						
I	and di	splay on screen, A	ndroid AP	K to pe	rform read wri	ite operat	tion, Particle				6			
	androi	d APK to control I	LED intens	ity, LE	D switching w	ith HTM	IL interface,							
	Cloud	based motion dete	ction, Disp	olaying	temperature se	ensor dat	a on termina	1,						
	Publis.	hing sensor values	on the clo	ud, Per	forming comp	utation o	n sensor valu	ues.						
	IoT Programming Applications: Gas level detection using MQ2 sensor, Blink													
	Tempe	erature and Gas Se	nsor with E	Blynk N	<i>Iobile</i> Applica	ation, Priz	nting real-tir	ne						
п	Date a	nd Time values on	serial tern	ninal, E	Display temper	ature val	ue on serial				8			
11	termin	al, Display temper	ature value	es on 10	5*2 LCD displ	ay					0			
	Interfa	cing: Interfacing c	of Nokia 51	10 disp	play, display ir	nage on I	Nokia 5110,	_						
	interfa	ice to get coordinat	ing battery	chargi	ng level status	, GPS tra	icking device	•						
	IoT P	roduct Hardware	Developn	nent: P	roduct realizat	ion, Con	nection diag	ram						
	of IoT	product, Engineer	ing board o	levelop	ment, Product	board cu	ustomization	and						
III	optimi	zation, Flowchart	of IoT	• 1	. ,.	1 .	.1 1	1			8			
	wareh	ouse monitoring s	system, w	ireless	communicatio	on betwe	een the mul	tiple						
	IoT A	dvance Wireless	Interfaces:	Blueto	ooth communio	cation be	tween maste	r						
IV	and sla	ave module, Data v	visualizatio	n on T	hingSpeak clo	ud using	webhook	-			10			
	service	es, Storing data int	o google e	xcel sh	eet and sendin	g the she	ets to emails							
V	IoT P	roduction System	: IoT Ware	ehouse	Monitoring Sy	stem, Io	T Product				8			
Total Hours	Раска	ging, ruture of for	Product L	evelop	ment.					4	40			
Course Outco	mes:										10			
CO1: Underst	and sigr	nificance of IoT pr	ogramming	g funda	mentals.									
CO2: Underst	and and	analyze IoT progr	amming ap	oplicati	ons.									
CO3: Develop	os IoT aj	pplications using s	tandardized	d hardv	vare.									
CO4: Discuss	concept	ts of IoT Advance	Wireless In	nterface	es and IoT Pro	duction S	System.							
CO5: To get	the bas	ics of production	system.											
1 IoT Product	Develo	nment with Progra	mming. St	enwise	programming	annroac	h with Partic	le						
Development	board K	Kindle Edition by N	Aahesh Jad	hav an	d Tejas Sarang	g Patil.		10						
2. Kale, Vivek	2. Kale, Vivek. Parallel Computing Architectures and APIs: IoT Big Data Stream Processing 1st													
edition, CRC I	edition, CRC Press, 2019.													
3. IoT Product	Develo	pment with Progra	mming: St	epwise	programming	approac	h with Partic	le						
List/Links of	ooara K e-learni	ing resource	manesh Jad	nav an	u rejas sarang	g ratif.								
LIST LINKS UI	c-ical III	ing resource												

•	https://	archive.	nptel.ac	.in/cour	ses/106	/106/10	610615	6/						
Modes of	of Evalu	ation a	nd Rub	oric										
The eval	uation 1	modes c	onsist o	f perfor	mance	in two n	nid sem	ester Te	ests, Qu	iz/Assig	gnments,	term wo	rk, end s	semester
practical	examin	nation.												
CO-PO	Mappi	ng:												
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2
CO-1	2	1	2										1	2
CO-2	3	2	2	1									1	2
CO-3	CO-3 3 2 2 1 2 1													
CO-4	3	2	2	1									2	1
CO-5	2	2	1										1	1
Suggesti	ive list o	of exper	iments	:		• •	• •			• •			• •	
Recomm	nendatio	n by Bo	ard of s	studies o	n									
Approva	Approval by Academic council on													
Compile	Compiled and designed by													
Subject l	handled	by depa	artment				Depa	rtment o	of IT					

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P.													
(Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) DEPARTMENT OF IT													
A A A	ALLE		(An A	Autono	mous	Institute	Affiliated	to RGPV I	Bhopa	al)			
VIDISHA M.	T.				<u>)EP</u>	ARTN	IENT (<u>)FIT</u>					
Semester/Ye	ar	VI/III		10.4	P:	rogram		B.Tec	h – Ir	terne	t of T	hings	
Category	DE	Subject Code:		DE –	DU4 III B	Subjec	et Name		Web I	Engine	ering		
		Maximu	m Ma	rks All	otted				(Conta	ct	Total	
		Theory	~			Practical		Total		Hours	5	Credits	
ES 60	MS 20	Assignment	Qu 1	niz A	ES	LW	Quiz	Marks		T 1	P	4	
00	20	10	1	WP	- f In	- lv 2024	-	100	3	1	U	4	
Prerequisit	es:			w.c	.1. Ju	1y 2024							
Troroquisio													
Course Obj	ective:												
• Under	stand th	e characteristics of	f weł	o applic	ations	8							
• Learn	to Mod	el web application	s										
• Be aw	Be aware of Systematic methods												
• Be far	Be familiar with the testing techniques for web applications												
UNITs	Be familiar with the testing techniques for web applications NITs												
	Intro	duction To W	eb]	Engin	eerin	g And	Requir	ements	Engi	neer	ing,		
	Introduction To Web Engineering And Requirements Engineering , Motivation, Categories of Web Applications, Characteristics of Web												
	Motivation, Categories of Web Applications, Characteristics of Web Applications, Product-related Characteristics, Usage related Characteristics,												
Ι	Devel	lopment-related	Cha	racter	istic,	Evolut	tion of	web en	gine	ering	; _	8	
	I Development-related Characteristic, Evolution of web engineering – Requirements Engineering Activities RE Specifics in Web Engineering,												
	Princi	iples for RE of	We	b Ap	olicat	ions, A	dapting	RE Meth	ods	to V	Veb		
	Appli	cation Developm	ent,	Requi	remei	nt Types	s, Notatio	ons, Tools					
	Web	Application	ı	Arcl	nitect	ures	&	Modelli	ng	V	Veb		
	Appli	ications:							C				
	Introd	luction- Categor	izing	g Arc	hitect	tures, S	pecifics	of Web	Ap	plicat	tion		
	Archi	tectures, Compo	nent	ts of	a Ge	eneric V	Veb Ap	plication	Arch	itect	ure,		
п	Layer	ed Architectures	, 2-l	Layer	Arch	itectures	s, N-Lay	er Archite	ectur	es D	ata-	Q	
11	aspec	t Architectures, 1	Data	base-c	entric	e Archit	ectures,	Architectu	ıres	for V	Veb	0	
	Docu	ment Managem	ent,	Archi	tectu	res for	Multin	nedia Da	ta N	lode	ling		
	Speci	fics in Web E	ngin	eering,	Lev	vels, As	spects, 1	Phases C	ustor	nizat	ion,		
	Mode	ling Requiremen	ts, F	Iyperte	ext M	lodeling	, Hyperte	ext Structi	ure N	lode	ling		
	Conce	epts.											
	Web	Application I)esig	'n									
	Introc	luction, Web De	esign	from	an	Evolutio	onary Pe	erspective,	Info	orma	tion		
	Desig	n, Software Des	sign:	A Pr	ograi	nming .	Activity,	Merging	Info	orma	tion		
	Desig	n and Software	Desi	ign, Pr	obler	ns and	Restricti	ons in Int	egra	ted V	Veb		
ш	Desig	n, A Proposed S	truc	tural A	Appro	oach, Pro	esentatio	n Design,	Pres	senta	tion	8	
	of No	des and Meshes	, De	vice-ir	depe	ndent D	evelopm	ient, Appr	oach	es, I	nter	0	
	actior	n Design, User	Inte	ractior	n Use	er Inter	face Org	ganization	, Na	ivigat	tion		
	Desig	n, Designing a	a Li	ink R	epres	sentatior	n, Desig	gning Lir	nk I	ntern	als,		
	Navig	ation and Orie	ntati	on, S	tructu	ired Di	alog for	Comple	x A	ctivit	ties,		
	Interp	lay with Technol	logy	and A	rchite	ecture, F	unctiona	l Design.					
	TEST	ING WEB AP	PLI	CATI	UNS		o		• •	_	-		
	Introc	luction, Fundam	ienta	uls, To	ermin	ology,	Quality	Characte	eristi	cs,]	l'est		
IV	Objec	tives, Test Lev	els,		of	the Te	ster, Te	st Specif	1CS	in V	Veb	8	
	Engin	eering, Test App	roac	thes, C	onve	ntional A	Approac	hes, Agile	App	roac	hes,		
	Test	Scheme, Three	Tes	st Din	nensi	ons, Ap	oplying	the Sche	me	to V	Veb		

											_				
		Applications, Test Methods and Techniques, Link Testing, Browser Test Usability Testing, Load, Stress, and Continuous Testing, Testing Secu													
		Usabili	ty Test	ing, L	oad, S	stress,	and C	Continu	ious T	esting	, Testir	ig Secu	ırity,		
		Test-dr	iven D	evelop	pment,	Test	Autor	nation	, Ben	efits a	ind Dra	awback	s of		
		Autom	ated Te	st, Tes	t Tool	s.									
		WEB	PROJI	ECT I	MANA	GEM	IENT								
v		Unders	tanding	Scope	e, Refi	ning F	ramew	ork A	ctivitie	es, Bui	lding a	Web To	eam,	8	
v		Managi	ing Ris	sk, De	evelop	ing a	Sche	dule,	Manag	ging (Quality,	Mana	ging	0	
		Change	e, Track	ing the	e Proje	ect. Int	roduct	ion to	node J	S – we	eb socke	ets.			
Total I	Hours													40	
Course	e Outo	omes:													
CO-1:	: Unde	erstand a	nd apply	y the ch	naracter	ristics (of web	applica	tions b	y requi	rements	enginee	ering.		
CO-2:	: Cate	gorizing	web arc	hitectu	re and	model	web ap	plicatio	ons.						
CO-3:	: Desi	gn and d	evelopn	nent of	web ap	plicati	ons.								
CO-4:	Appl	ying var	10us test	t on we	b appli	cations	S.								
CO-5: Toyt B	ook ti Kannal, Dirgit Droll, "Wah Enginaaring", John Wilay and Song Ltd														
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2. Ou	ris Re	tes "W	ecky-Thompson, "Web Programming", Cengage Learning. s, "Web Programming: Building Internet Applications", Third Edition, W												
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Modes	of Ev	aluation	and Rub	oric	102001										
The ev	aluatio	n modes	consist c	of perfor	rmance	in two	mid sem	nester To	ests, Qu	iz/Assig	gnments,	term wo	rk, end	semester	
practica	al exai	nination.		_							-				
CO-PO) Map	ping:	1 = -		1 = 0	1 = 0	1 = -	1 = 0			1 = -		1		
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<u> </u>	2	1	2										1	2	
CO-2	3	2	2	1							-		1	2	
CO-3	3	2	2	1									1	2	
CO-4	3	2	<u></u>	1									1	2	
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2. Write JavaScript to validate the following fields of the Registration page. 1. First Name (Name contains alphabets and the length should not be less than 6 characters). 2. Password (Password (should		
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- 3. Develop and demonstrate the usage of inline, internal and external style sheet using CSS
- 4. Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems: a) Input: Click on Display Date button using onclick() function Output: Display date in the textbox b) Input: A number n obtained using prompt Output: Factorial of n number using alert c) Input: A number n obtained using prompt Output: A multiplication table of numbers from 1 to 10 of n using alert d) Input: A number n obtained using prompt and add another number using confirm Output: Sum of the entire n numbers using alert

- 5. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next in the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).
- 6. Write an HTML page including any required JavaScript that takes a number from text field in the range of 0 to 999 and shows it in words. It should not accept four and above digits, alphabets and special characters.
- 7. Develop and demonstrate PHP Script for the following problems: a) Write a PHP Script to find out the Sum of the Individual Digits. b) Write a PHP Script to check whether the given number is Palindrome or not
- 8. Create an XML document that contains 10 users information. Write a Java Program, which takes User Id as input and returns the user details by taking the user information from XML document using DOM parser or SAX parser.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT

ST LINON TECHNOLOGICAL REAL	SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P.												
(Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) DEPARTMENT OF CS & IT													
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Subject Catagory	DE	Subject Code	: n	IO 604 F III C	Subjec	t Name		τ	JI/UX	•			
Category		Maximum	Marks	Allotted				~			Total		
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Prerequisites:	compu	tor programmin	a with a	nu progr	ommina	longuag	a lika C/C	1 Iou	10				
Course Object	ive.		g with a	iny progra	amming	Tanguag	e like C/C+	+, Jav	а.				
• The aim o	f the U	I/UX course is t	o provi	de studen	ts with t	he know	ledge of us	ser- ce	ntere	d des	ion user-		
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• Also usability testing methods, interface technologies and user centered design in corporate													
• Also usability testing methods, interface technologies and user centered design in corporate perspective.													
perspective. UNITs Descriptions Hrs.													
	Introd	uction to the	UI: W	hat is U	Jser Int	erface 1	Design (U	I) -T	ne				
	Relatio	onship Between	UI and	d UX, R	oles in	UI/UX,	A Brief H	istoric	al				
	Overv	iew of Interfac	e Desi	gn, Inter	face Co	nventior	ns, Approa	ches	to				
Ι	Screen	n Based UI, Te	mplate	vs Conte	ent, For	mal Eler	ments of I	nterfa	ce		7		
	Design	Design, Active Elements of Interface Design, Composing the Elements of Design UI Design Process Visual Communication design											
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	compo	onent in Interface	e Desig	n.			~ .						
	Introd	uction to UX: U	X Basic	s-Found	lation of	UX desi	ign, Good a	ind po	or				
II	design	, Understanding	Y OUT	Jsers, De	signing	the Expe	rience Eler	nents	10		7		
	design	xperience, visu		gii Filineij	pies, Pui		Layout, III	ciacii	л П				
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111	Develo	oping and Releas	sing Yo	ur Desigi	n.		,		0'		7		
	UI/UZ	X Design Tools:	User S	tudy- Int	erviews,	writing	personas: u	iser ai	nd				
	device	e personas, Use	r Conte	ext, Build	ling Lo	w Fideli	ty Wirefra	me ar	nd				
IV	High-I	Fidelity Polished	l Wirefr	ame Usir	ng wire f	framing '	Tools, Crea	ting tl	ne		7		
	workir	ng Prototype u	ising P	rototypin	ng tools	, Sharir	ng and Ex	xportii	ng				
	Design	<u>1.</u>	~ .										
	Inform	hation and Dat	a Study	y: Under	rstanding	g and c	ollection of	of dat	a,				
V	metho	ds of collecting	data, to	ols for co	ollecting	data, an	alysing dat	a, usii	ng		7		
	data a	analytics tools	like G	oogie an	arytics	for user	experience	ce, ne	at				
Total Hours	паррі	ing tools.									35		
Course Outcon	nes:								<u> </u>				
CO1: Underst	and iter	rative user-cente	red des	ign of gra	aphical u	ser inter	faces.						
CO2: Apply the	he user	Interfaces to dif	ferent d	levices ar	nd requir	ements.							
CO3: Create h	nigh qua	ality professiona	l docun	nents and	artifacts	s related	to the desig	gn pro	cess.				
CO4: Student	s are c	apable of progra	amming	using m	ainstrea	m progra	amming lar	nguage	es, ca	n con	duct fine		
software-engin	neering	practices to in	npleme	nt proble	m-solvi	ng scher	nes as cor	rect,	ettici	ent, a	and well-		
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Text Book &	merciit	application don	ams										
Text Book &													
1. A Project	Guide	to UX Design:	For use	r experie	nce desi	gners in	the field or	in the	e mał	cing (2nd. ed.).		

Reference Books

- 1. The Elements of User Experience: User-Centered Design for the Web and Beyond, Second Edition Jesse James Garrett, Pearson Education. 2011
- 2. The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques, Third Edition Wilbert O. Galitz, Wiley Publishing, 2007.
- 3. The UX Book Process and Guidelines for Ensuring a Quality User Experience, Rex Hartson and Pardha S. Pyla, Elsevier, 2012.

List/Links of e-learning resource

• https://onlinecourses.nptel.ac.in/noc21_ar05/preview

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping:

0.0-1	r O Iviaj	ping:														
	COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2	
	CO-1	3	2	1			1							1	2	
	CO-2	3	2	1										1	2	
	CO-3	3	2	1							1				1	
	CO-4	3	2	1	1	1			1						1	
	CO-5	3	2	1										1	1	
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Subje	ect hand	led by	departn	nent						Depar	tment of	of CS &	IT			

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D	• •					W.6	e.t. J	uly 2024								
Prerequ	usites:															
Course	Objecti	¥0.														
Kno	Knowledge on IoT networking connectivity protocols and IoT Analytics for the cloud processing.															
	Descriptions Hrs.															
UNI	15	IoT de	In the interview of the													
I		networ	etworking data messaging protocols, Analyzing data to infer protocol and 6													
1		device	evice characteristics.													
		IoT A	T Analytics for the Cloud: Introduction to elastic analytics, Decouple key													
II		compo	omponents, Cloud security and analytics, Designing data processing for 8													
		analyti	alytics, Applying big data technology to storage.													
Ш		Explor	xploring IoT Data: Exploring and visualizing data, Techniques to understand													
		data qu	data quality, Basic time series analysis, Statistical analysis.													
117		Data S	cience .	for lol	Analyt	1cs: I	ntrodu	action to N	/lach1	ne Le	arning, Fea	ature		1	0	
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Total H	ours		,			0,								4	0	
Course	Outcon	nes:														
CO1: In	nplemei	nt the ar	chitectu	ral com	ponents	and p	rotoco	ols for appli	catior	n deve	lopment					
CO2: Id	lentify d	lata ana	lytics an	nd data v	isualiza	tion to	ools as	s per the pro	oblem	chara	cteristics.					
CO3: Le	earning	data ex	ploratio	n technic	ques.											
CO4: T	o get to	o know	the dif	ferent d	ata scie	ence t	echni	ques.								
CO5: Fo	orm the	e strate	gies to	organiz	e data.											
Text Bo	ok & R	eferenc	e Book	S -												
6. Ars	shdeep 1	Bahga a	nd Vija	y Madise	etti, "Int	ernet	of Th	ings – A Ha	nds o	n App	roach", Un	iversi	ties P	ress,	2015.	
7. Kev	vin, Tov	wnsend,	, Carles,	Cufi, A	kiba anc	I Rob	ert Da	vidson, "Ge	etting	Starte	d with Blue	tooth				
8 Ma	w Energ	gy O'R	enny. "Iot Pr	oiecte w	ith Plue	tooth	Low	Energy Da	let Du	hlichi	ng August	2017				
9 Rol	bin Hev	iaigava idon " F	Bluetootl	h Low E	nerøv· T	The D	evelor	per's Handh	ook"	Pears	on Octobei	2017. r 2012				
10. Ku	mar Sai	irabh."	Cloud C	Computir	ng". Wil	ev Ind	dia. 1s	t Edition. 2	016.	1	,	. 2012	•			
List/Lin	ks of e-	learnin	g resou	rce		<u> </u>	, 10	- 20111011, 2	0101							
•	https://	archive	.nptel.ac	.in/cour	ses/106/	/105/1	06104	5166/								
Modes	of Evalu	lation a	and Rub	oric												
The eval	uation	modes c	consist o	of perform	mance in	n two	mid s	emester Te	sts, O	uiz/A	ssignments.	term	work	, end	semester	
practical	examir	nation.		1					, x		<i>Js</i> ,			,		
CO-PO	Mappi	ng:														
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PC	\mathbf{P}_7 \mathbf{PO}_8	PO ₉	PC	\mathbf{PO}_{11}	PO	12	PSO1	PSO2	
CO-1	3	1	2											1	2	
CO-2	3															
CO-3	3	2	2	1										2	1	
CO-4	3	2	2	1										2	1	
CO-5	3	2	1											1	1	

Suggestive list of experiments:	
Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT

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GIA			(Engine	ering	College).	VIDIS	HA M.P.							
No. Contraction	Image: Contege (Engineering Contege), ViDISHA M.I. (An Autonomous Institute Affiliated to RGPV Bhopal) DEPARTMENT OF IT Year VI/III Program B.Tech – Internet of Things													
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Prerequisites:	:				v									
Course Objec	tive:	• • • • • •	1	• 1	·.1 1·1.4	. 1	6 1.4							
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4 The co	ine pror	ises on higher-leve	e and stron	ig praci ø syster	ns advanced	networkir	ong user inter	faces						
multim	edia and	uses more compu	ting intens	ive IoT	applications a	as exampl	les using Ra	spber	, ry Pi	runn	ing			
Linux a	s the pla	atform of choice.	e		11	1	e	1	2		e			
UNITs			J	Descrip	otions					H	lrs.			
	Gettin	g Started with Ras	pberry Pi:	Basic f	unctionality o	f Raspber	ry Pi B+ boa	ard,						
	setting	up the board, con	figuration	and use	e, booting Ras	pberry Pi	3, Downloa	ding						
	an Operating System, format an SD card and booting the OS, Interfacing													
I	Rasph	erry Pi in "headles	s mode" F	aspoen Bash Co	y FI Kelliole A	onerating	Raspherry F	Pi	hopal) $ \begin{array}{c c c c c c c c c c c c c c c c c c c $	6				
1	withou	it needing a GUI in	terface.	Jush et	, initiality inite, i	operating	erates the Raspberry Pi 6	0						
	Basics	of Python program	nming lan	guage:]	Programming	on the Ra	aspberry Pi.							
	Pythor	n on Raspberry Pi,	Python Pr	ogramn	ning Environn	nent, Pyth	non Expressi	ons,						
	Strings	s, Functions and Fu	unction arg	guments	s, Lists, List N	Iethods, C	Control Flow	/.						
	Introd	lucing Micro Pyth	ion: Micro	Pythor	i Features, Mi	croPytho	n Limitation	s,						
	Experi	then Console Run	on on PC,	Installi	ng Python 3 c	on windo	ws 10, Runn	ing						
II	Progra	ims with the Intern	reter. The	Run. E	valuate. Print	Loop (RF	EPL Console).			8			
	Off an	d Running with M	icroPythor	n, Addi	tional Hardwa	re, Basic	Electronics	Kit,						
	Bread	board and Jumper	Wires and	3 Exan	nples.									
	IoT Pl	hysical Servers an	nd Cloud (Offerin	gs: Introducti	on to Clo	ud Storage							
III	model	s and communicati	on APIs.	Web Se	rver – Web se	rver for I	oT, Cloud fo	or			8			
	101, P	ython web application	tion frame	WORK. L	Designing a RI	2ST ful we	ed API.							
	Bakin	σ Pi · Powering Ra	snherry Pi	Form	atting SD card	s Installi	ng and							
	connec	cting Raspberry pi,	How to te	ell Rasp	berry pi is wo	rking, Ins	stalling							
W	Raspbi	ian with NOOBS,	Networkin	ig Rasp	berry Pi, Coni	necting w	ith Ethernet,				10			
1 V	Conne	cting Via Local Co	omputer N	etwork,	, Connecting V	Via Wirel	ess Network	,			10			
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	SSH, C	Creating Simple Ra	aspberry p		ation.	(Jat Danas		-					
	Down	l Project on Java	: Bill OI M	Boons	, Getting Star	lloRasphe	vetBeans, arryPi Brow	ina						
V	Java. (Communicating wi	th a USB S	Scale. (Coffee Calcula	tor. Asvn	chronous	mg			8			
	Comm	unication, Coffee	Brewing R	lecipe,	Commercial L	licensing.								
Total Hours										4	40			
Course Outco	mes:													
CO1: Knowin	g the fu	ndamentals of R- I	Pi											
CO2: Underst	anding t	he basi concepts o	f MicroPy	thon.										
CO3: Underst	anding t	the cloud server an	d web serv	/er.										
CO4: To get t	o know	the working of R-I	Matri	_										
CO5: Unders	tanding	g the concepts of	NetBeans	5.										

Text Book & Reference Books-

1. Simon Monk, "Programming the Raspberry Pi: Getting Started with Python", January 2012, McGraw Hill Professional.

2. MicroPython for the Internet of Things, A Beginner's Guide to Programming with Python on Microcontrollers, Charles Bell, Apress.

3. Raspberry Pi with Java: Programming the Internet of Things (IoT) (Oracle Press) 1st Edition.

4. Eben Upton and Gareth Halfacree, "Raspberry Pi User Guide", August 2016, 4th edition, John Wiley & Sons

5. Alex Bradbury and Ben Everard, "Learning Python with Raspberry Pi", Feb 2014, JohnWiley & Sons

6. Michael Margolis, "Arduino Cookbook", First Edition, March 2011, O'Reilly Media, Inc

7. The official raspberry Pi Projects Book,

List/Links of e-learning resource

• https://archive.nptel.ac.in/courses/106/105/106105166/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping:

0100	mappi	ug.												
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2
CO-1	3	1	2										1	2
CO-2	3	1	2	1									1	2
CO-3	3	2	2	1									2	1
CO-4	3	1	2	1									2	1
CO-5	3		1										1	1
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Category	OE	Subject Code:	OE - II	C S	ubject Name		ІоТ	Secu	rity							
		Maximu	ım Marks	Allotte	d			C	ontac	et	Total					
	Г	Theory			Practical		Total	I	Hours	5	Credits					
ES	MS	Assignment	Quiz	ES	LW	Quiz	Marks	L	Т	Р						
60	20	10	10				100	3	-	-	3					
			W	.e.f. J	uly 2024											
Prerequisites:	:				-											
Course Objec	tive:															
1. Understand	the func	lamentals, various	attacks and	d impoi	rtance of Secur	rity aspec	cts in IoT.									
2. Understand	the tech	iniques, protocols a	ind some i	dea on	security towar	ds Gamir	ng models.									
3. Understand	the open	rations of Bitcoin b	lockchain	, crypto	o-currency as a	pplicatio	n of blockch	ain								
technology.																
4. Understand	the esse	ential components of	of IoT.	Ŧ												
5. Understand	security	and privacy challe	enges of Ic	<u>.</u>					1							
UNITS				Descrip	otions					H	rs.					
	Funda	mentals of IoT and	Security a	and its i	need, Prevent	Unauthor	rized Access	to								
т	Sensor	r Data, Block ciphe	ers, Introdu	iction t	o Blockchain,	Introduct	tion of lol	1			<i>(</i>					
1	device	es, 101 Security Re	quirement	s, M2M	Security, Me	ssage inte	egrity, Mode	ling	6							
	davior	and adversaries, D	interence a	mong I	of devices, co	inputers,	, and embedd	lea								
	LoT or	28. A cubor physical s	vetome DE		urity Authort	icated on	aruntion									
	Byzan	tine Generals prob	lem sensoi	rs and a	utily, Authenti octuators in Io7		cryption									
П	(vulne	rabilities attacks	and counte	ermeasu	res) Cyber	1.101 500	currey				8					
п	Physic	cal Object Security	Hash fun	ctions.	Consensus alg	orithms a	and their				0					
	scalab	ility problems, Acc	eleromete	r, photo	presistor, butto	ons.										
	Securi	ity engineering for	IoT develo	opment	Hardware Sec	urity, Me	erkle trees ar	nd								
	Ellipti	c curves digital sig	natures, ve	erifiable	e random func	tions, Zer	ro-knowledg	ge								
Ш	system	ns motor, LED, vib	rator. IoT	securit	у						Q					
111	lifecyc	cle, Front-end Syste	em Privacy	y Proteo	ction, Manager	ment, Seo	cure IoT				0					
	Databa	ases, Public-key cr	ypto (PKI)), block	chain, the chal	llenges, a	and solutions	,								
	analog	g signal vs. digital s	signal.													
	Data F	Privacy Networking	g Function	Securi	ty Trees signat	ture algoi	rithms proof	of								
IV	work,	Proof of stake, Net	working 1	n IoT, I	Device/User A	uthentica	ation in IoT I	01			10					
	Netwo	orking Protocols, C	rypto-curr	encies,	alternatives to	Bitcoin	consensus,									
	Introd	in scripting languag	e and ther	hniquos	Secure LoT L		II.	DJD								
	netwo	rk Etheroum and S	mart Cont	tracts F	Secure 101 L	ciency T	Jers, Dicolli Data	r2r								
V	Trusty	vorthiness in IoT S	ecure IoT	Higher	Lavers	ciclicy, L	Jala				8					
·	Distril	buted consensus. Si	mart Conti	act La	registers,	erification	n challenges				0					
	data a	nalytics in IoT - sir	nple data a	analyzi	ng methods.											
Total Hours		,		<u> </u>	0				1	2	40					
Course Outco	mes:															
CO1: Incorpo	orate the	best practices lear	nt to ident	ify the	attacks and mi	tigate the	e same.									
CO2: Adopt th	he right	security techniques	s and proto	- cols du	uring the desig	n of IoT	products.									
CO3: Assimil	ate and	apply the skills lea	rnt on ciph	ners and	l block chains	when an	propriate.									
CO4: Describ	e the es	sential components	of IoT			PI	· · r ·····									
CO5: Find and	propriat	e security/privacy	solutions f	or IoT												
Text Book &	Referer	ice Books-														
12. B. Russe	ll and D	. Van Duren. "Prac	tical Inter	net of 7	Things Security	y," Packt	Publishing.	2016								
13. FeiHU, "	Security	v and Privacy in Int	ernet of T	hings (1	IoTs): Models.	Algorith	nms, and Imr	oleme	ntatio	ons".	CRC					

Press, 2016.

- 14. Narayanan et al., "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction,"
- 15. Princeton University Press, 2016.
- 16. A. Antonopoulos, "Mastering Bitcoin: Unlocking Digital Cryptocurrencies," O'Reilly, 2014.
- 17. T. Alpcan and T. Basar, "Network Security: A Decision and Game-theoretic Approach,"
- 18. Cambridge University Press, 2011.
- 19. Security and the IoT ecosystem, KPMG International, 2015.
- 20. Internet of Things: IoT Governance, Privacy and Security Issues" by European Research Cluster.
- 21. Ollie Whitehouse, "Security of Things: An Implementers' Guide to Cyber-Security for Internet of Things Devices and Beyond", NCC Group, 2014
- 22. Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guide to Blockchain Technology and Blockchain Programming', Create Space Independent Publishing Platform, 2017.

List/Links of e-learning resource

• https://archive.nptel.ac.in/courses/106/106/106106129/

Modes of Evaluation and Rubric

CO-PO	Марри	ng:												
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2
CO-1	3	1	2										1	2
CO-2	3	2	1	1									1	2
CO-3	3	2	1	1									2	1
CO-4	3	2	2	1									2	1
CO-5	3	2	1										1	1
Suggesti	ive list o	of expen	riments	:										
Recomm	nendatio	n by Bo	oard of s	tudies o	on									
Approva	l by Ac	ademic	council	on										
Compile	d and de	esigned	by											
Subject l	nandled	by depa	artment				Depar	rtment c	of IT					

TOMOGOUSE IN TOMOGOUSE	SAMRAT ASHOK TECHNOLOGICAL INSTITU' (Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhop DEPARTMENT OF IT nester/Year VI/III Program B.Tech – Interview whiteot												
Semester/Yea	ar	VI/III		Pro	gram		B.Tee	ch – Ir	nterno	et of Tl	nings		
Subject	DLC	Subject Code	e: IO	606	Sub	oject	Lab	VIEW	Pro	gramm	ning		
Category		Movimum	Montra Alla	ttad	Na	me			 74-	8			
	Т	heory	Marks And	Jueu	Practic	·al	Total		Jonta Hour	ici ·s	10tal Credits		
ES	MS	Assignment	Ouiz	ES	LW	Ouiz	Marks	L	T	Р	Creatis		
-	-	-	-	30	10	10	50	0	0	4	2		
	•	•	w.	e.f. Ju	ıly 202	24							
Prerequisites	:												
Basic Knowle	edge of Pro	ogramming.											
Course Obje	ctive:												
To impai	rt adequat	e knowledge on v	irtual instru	mentat	tion for	acquisiti	ion and analy	vsis of	real t	ime app	plication.		
UNITS	NITs Descriptions												
	1. Study of labVIEW and its Environment. I Front Panel Window Block diagram and Connector Pane												
		I. Front Panel Window, Block diagram and Connector Pane II Menus and Palettes											
		II. Menus and Palettes III. Basic Operations and Configuration Options											
	III. Basic Operations and Configuration Options												
	2	IV. Date Ty	pes tio Onomote	ma and	Creatin	~ Via na	ina Docio Ar	i then at	i.				
	۷.	Study Of Alfulling	ene Operan	ns and	Cleatin	ig vis us	ang basic Ai	nime	.10				
	3	Study of Logical	Operators	and Cr	ooting J	lie neine	Logical On	oration					
	3. 4	Study of Compa	operations	and Cro	eating v	asting Venting	logical Opt	ration	•				
	+.	Comparative On	erations	ators ar	iu CJI v	veating v	is using						
	5	Study of Array a	nd Their ba	sic On	erations	and dev	eloning VIS	using					
	5.	these arrays	na men ba	sie op	crations	and dev	cloping vis	using					
	6.	Study of Control	Structures	using:									
		I. For Lo	op and Whi	le Looi	n								
		II. Shift R	egister and	Tunne	[
		III. Case an	nd Sequence	e Struc	ture								
	7.	Study of Data Pl	otting:										
Ŧ		I. Wave	form Graph										
1		II. Wave	form Chart										
		III. XY G	raph										
	8.	Study of NI ELV	IS-II Proto	Type I	Board.								
		I. Instrum	ent Control										
		II. Introduc	ction of Osc	cillosco	pe								
		III. Functio	n Generator	and P	ower Sı	ıpply							
		IV. Digital	Multimeter										
		V. Digital	Reader and	Writer									
		VI. Dynami	ic System A	nalyze	r								
	9.	Measure the pass	sive compo	nents v	alues us	sing NI E	LVIS-II pro	to type	e				
	10	board.											
	10.	A paluze the above	using Lab	VIEW.		nonto	ing NI EL VI	сп					
	11.	Analyze the char	acteristic 0	active	compo	ments us	III III EL VI	S-11					
	12	Design a voltage	u. dividar air	mit or	tha NI	EI VIC I	I proto turco	boord					
	12.	Design and tosti	a r the PCC	un on	ule INI . with fue	LLVIS-I	nerator and	ooard.					
	13.	oscilloscope usir	ig me KC C	S-II nr	oto type	hoard	nerator and						
	14	Plot the frequence	v response	of hasi	c 741 C	n_Amn	circuit using	NI					
	17.	r for the frequence	, response	JI Dasi	U , TI C	'h Yuuh	encon using	1 1 I					

ELVIS-II proto type board.																
Tot	Total Hours Course Outcomes:														40	
Co	urse Ou	tcomes	•											<u> </u>		
CO	1: To e	ducate	about ti	he basi	c conce	pt of V	Ί.									
CO	2: To m	ake the	m unde	erstand	the pro	gramm	ning con	ncepts	of VI.							
CO	3: To C	Configu	re the i	nterfac	e vario	us data	acquisi	ition ha	ırdware	like D	AQ, N	I ELVIS	-II and	Sensors.		
CO	4 : To pr	ovide a	n insig	ht to va	arious c	commo	n instru	iment i	nterface	es.						
CO	5 : To in	npart en	igineeri	ing kno	wledge	e on vai	rious ar	nalysis	tools of	f LabV	IEW.					
Tey	kt Book	& Refe	rence	Books-	-											
1.	Jovitha	a Jerom	ne, Virt	ual Inst	trument	tation U	Jsing L	abVIE	w, PHI	Public	ation, I	ndia 20	10.			
2.	Sanjay	Gupta	ı, Virtu	al Inst	rument	ation U	Jsing L	abview	2E, N	/IcGraw	-Hill I	Educatio	on (India	a) Pvt Li	mited, In	ndia
	2010.	-					•									
Lis	t/Links	of e-lea	rning	resour	ce											
1.15																
Modes of Evaluation and Rubric																
The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester																
pra	In evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.															
CO	-PO Ma	apping	:													
	COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2	1
	CO-1	2	1	2										1	2	1
	CO-2	3	2	2	1									1	2	1
	CO-3	3	2	2	1									2	1	1
	CO-4	3	2	2	1									2	1	
	CO-5	2	2	1										1	1	1
Sug	ggestive	list of e	experin	nents:				•		•		•			•	
			_ -													
Recommendation by Board of studies on																
Approval by Academic council on																
Compiled and designed by																
Sub	ject han	dled by	depart	tment					Dep	partmer	nt of IT					



(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Subject Category DC Subject Code: IO 701 Subject Name Data Analytics for IOT Maximum Marks Allotted Practical Total Contact Hours Total Credits ES MS Assignment Quiz ES L T P 60 20 10 10 30 10 10 150 3 0 2 4 Prerequisites: 7. To understand IoT Analytics and Challenges w.e.f. July 2024 V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V												
Category DC Subject Code: 10 701 Name Data Analytics for IoT Maximum Marks Allotted Maximum Marks Allotted Contact Hours Total Credits ES MS Assignment Quiz ES L T P 60 20 10 10 30 10 10 150 3 0 2 4 Prerequisites: 7. To understand IoT Analytics and Challenges w.e.f. July 2024 V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V <td< td=""></td<>												
Maximum Marks Allotted Total Contact Hours Total Credits Theory Total Quiz Total Credits ES Ms Assignment Quiz ES LW Quiz Marks Total Credits 60 20 10 10 Total Contact Hours Credits 60 20 10 10 10 150 3 0 2 4 Prerequisites: Venter to the protocol and device characteristics 9 To Explore and visualize data, and techniques to understand data quality Course Objective: • This course explains machine learning techniques such as decision tree learning, Bayesian learning etc. • To understand computational learning theory. • To study the pattern comparison techniques. • Identify problems that are amenable to solution by Al methods, and which Al methods may be suited to solving a given problem. UNITs Descriptions Hrs.												
Theory Practical Total Total Credits ES MS Assignment Quiz ES LW Quiz Marks L T P 60 20 10 10 30 10 10 150 3 0 2 4 Weight State												
ES MS Assignment Quiz Marks L I P 60 20 10 10 30 10 10 150 3 0 2 4 W.e.f. July 2024 Prerequisites: 7. To understand IoT Analytics and Challenges 8. To Analyze the IoT data to infer the protocol and device characteristics 9 To Explore and visualize data, and techniques to understand data quality Course Objective: • This course explains machine learning techniques such as decision tree learning, Bayesian learning etc. • To study the pattern comparison techniques. • Identify problems that are amenable to solution by Al methods, and which Al methods may be suited to solving a given problem. UNITs Descriptions Hrs.												
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Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem. UNITs Descriptions Hrs.												
to solving a given problem. UNITs Descriptions Hrs.												
UNITs Descriptions Hrs.												
UNITs Descriptions Hrs.												
Defining IoT Analytics and Challenges: Introduction to IoT, applications, IoT 8												
architectures, introduction to analytics, IoT analytics challenges.												
IoT Devices and Networking Protocols: IoT devices, Networking basics, IoT												
II networking connectivity protocols, IoT networking data messaging protocols, 8												
Analyzing data to infer protocol and device characteristics.												
IoT Analytics for the Cloud: Introduction to elastic analytics, Decouple key												
III components, Cloud security and analytics, Designing data processing for 8												
analytics, Applying big data technology to storage.												
IV Exploring IoT Data: Exploring and visualizing data, Techniques to understand 8												
data quality, Basic time series analysis, Statistical analysis.												
Data Science for IoT Analytics: Introduction to Machine Learning, Feature												
V engineering with IoI data, Validation methods, Understanding the bias- 8												
Variance tradeoff, Use cases for deep learning with IoT data.												
Total Hours 40												
Course Outcomes:												
Course Outcomes: CO-1 Understand the fundamentals of IoT Analytics and Challenges												
Course Outcomes: CO-1 Understand the fundamentals of IoT Analytics and Challenges CO-2 Understand and analyze IoT Devices and Networking Protocols												
Course Outcomes: CO-1 Understand the fundamentals of IoT Analytics and Challenges CO-2 Understand and analyze IoT Devices and Networking Protocols CO-3 Apply IoT Analytics for the Cloud.												
Course Outcomes: CO-1 Understand the fundamentals of IoT Analytics and Challenges CO-2 Understand and analyze IoT Devices and Networking Protocols CO-3 Apply IoT Analytics for the Cloud. CO-4 Understand exploring and visualizing data.												
Course Outcomes:CO-1 Understand the fundamentals of IoT Analytics and ChallengesCO-2 Understand and analyze IoT Devices and Networking ProtocolsCO-3 Apply IoT Analytics for the Cloud.CO-4 Understand exploring and visualizing data.CO-5 Uses of Knowledge Representation Techniques.												
Course Outcomes:CO-1 Understand the fundamentals of IoT Analytics and ChallengesCO-2 Understand and analyze IoT Devices and Networking ProtocolsCO-3 Apply IoT Analytics for the Cloud.CO-4 Understand exploring and visualizing data.CO-5 Uses of Knowledge Representation Techniques.Text Book & Reference Books-												
Course Outcomes:CO-1 Understand the fundamentals of IoT Analytics and ChallengesCO-2 Understand and analyze IoT Devices and Networking ProtocolsCO-3 Apply IoT Analytics for the Cloud.CO-4 Understand exploring and visualizing data.CO-5 Uses of Knowledge Representation Techniques.Text Book & Reference Books-1. Minteer, Andrew, Analytics for the Internet of Things (IoT), Packt Publishing Ltd. July 2017,												

- 2. Kai Hwang, Min Chen, Big-Data Analytics for Cloud, IoT and Cognitive Computing, Wiley.
- 3. Hwaiyu Geng, Internet of Things and Data Analytics Handbook, Wiley

4.	John Soldatos, Building Blocks for IoT Analytics Internet-of-Things Analytics, River
	Publishers Gerardus Blokdyk
	r uonshers Gerardus Diokayk.

List/Links of e-learning resource

https://nptel.ac.in/courses/106102220

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping: PO_1 PO₂ PO₃ **PO**₄ PO₅ PO₆ **PO**₇ PO₈ PO9 PO_1 **PO**₁₁ PO₁₂ PSO1 PSO2 COs CO-1 2 1 1 2 1 1 CO-2 2 1 1 1 2 1 2 CO-3 2 1 2 1 1 1 1 CO-4 2 1 2 1 2 CO-5 2 1 1 1

List of Experiments:

•

1. Implement and analyse linear regression

2. Implement and analyse logistic regression

3. Implement and analyse Decision tree algorithm

4. Implement and analyse Random forest algorithm

5. Implementation of two sample T-test and paired two sample T-test in excel.

6. Implementation of one way and two way ANOVA in excel.

7. Implementation of word count example using MapReduce.

8. Implementation of MapReduce program to count unique number of times a song is played based on user id and track id

Recommendation by Board of studies on

Approval by Academic council on

Compiled and designed by

Subject handled by department

Department of IT



(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Semester/Yea	r		VII/IV Program B.Tech – Internet							hings			
Semester/Year VII/IV Program B.Tech – International Subject DE Subject DE – Subject Name IoT System A Category DE Code: IV (A) IV (A) IV IV													
Subject Category DE Subject Code: DE – IV (A) Subject Name IoT System Arch Maximum Marks Allotted Contact Contact Contact Contact Theory Practical Total Hours													
IV (A) Maximum Marks Allotted Conta Theory Practical Total Hou ES MS Assignment Quiz ES LW Quiz Marks L Total Hou 60 20 10 10 3 1 W.e.f. July 2024													
		Theory			Prac	tical	Total	ł	lours	Credits			
ES	MS	Assignment	Quiz	ES	LW	Quiz	Marks	L	ТР				
60	20	10	10	-	-	-	100	3	1 0	4			
			W.	e.f. July	2024	1							
Prerequisites:													
Knowledge of	on con	cepts of IoT ap	oplications a	nd IoT	archit	ectures, Eve	nt driven a	analy	vsis and	security			
testing IoT sy	/stems												
Course Obje	ctive:												
• This co	ourse e	explains machi	ine learning	techni	ques	such as dec	ision tree	lear	ning, B	ayesian			
learning	g etc.												
• To und	erstand	d computationa	al learning t	heorv.									
To stud	v the t	nattern compar	ison techniq										
				lution h		athada and .	مور ۸۱ مام زمان	م ما + م	da maay k				
 Identify to coluin 	proble	ens that are am	enable to so	lution by	AIM	ethods, and v	which AI m	etho	us may t	be suited			
to solving a given problem. UNITs Descriptions Hrs													
UNITS	Ts Descriptions The IoT Landscape: What Is IoT? Applications, Architectures, Wireless												
	The IoT Landscape: What Is IoT? Applications, Architectures, WirelessNetworks, Devices, Security and Privacy, Event-Driven Systems. IoT SystemArchitectures: Introduction, Protocols Concepts, IoTOriented Protocols,												
I	Netw	orks, Devices, S	Security and	Privacy	, Eve	nt-Driven Sy	stems. Iol	Syst	tem	8			
1	Archi	tectures: Intro	duction, Pr	otocols	Con	cepts, loloi	riented Pr	otoc	ols,				
Databases, Time Bases, Securit													
	IoT Devices & Event-Driven System Analysis: The IoT Device Design Space, Cost												
	of Ow	vnership and Po	wer Consum	iption, C	ost pe	er Transistor	and Chip Si	ze, D	outy				
	Cycle	and Power Con	sumption, P	latform I	Design	1. Event-Drive	en System /	Analy	/SIS:				
П	Intro	duction, Motiva	ating Examp	le, lol	Netw	ork Model,	Events, Ne	etwo	rks,	8			
	Devic	es and Hubs, Sir	ngle-Hub Ne	tworks, I	Vlulti-	hub Network	s, Network		dels				
	and P	hysical Networl	ks, loT Event	Analysis	s, Eve	nt Population	is, Stochast	ic Ev	ent				
	Popu	lations, Enviro	nmental Int	teraction	n Mo	deling, Ever	nt Transpo	ort	and				
	Migra	ation.											
	Indus	trial Internet of	Things: Inti	oductio	n, Ind	ustry 4.0, Inc	dustrial Int	erne	tof	-			
111	Thing	s (lloT), lloT	Architectu	re, Basi	ic Te	chnologies,	Applicatio	ns	and	8			
	Challe	enges.											
	Secur	ity and Safety:	Introduction	, System	s Seci	urity, Networ	k Security,	Gen	eric				
IV	Appli	cation Security,	, Applicatior	Proces	s Sec	urity and Sa	fety, Relia	ble-a	nd-	8			
	Secur	e-by-Design lo	oT Applicat	ions, R	un-Tir	ne Monitor	ing, The	ARN	ИЕТ	-			
	Appro	oach, Privacy an	d Dependab	ility.									
	Secur	ity Testing IoT S	systems: Intr	oductior	n, Fuzz	Testing for S	Security, W	hite-	Box				
V	Fuzzir	ng, Black-Box	Fuzzing, Fu	zzing In	dustr	ial Control	Network S	Syste	ms,	8			
Fuzzing Modbus, The Modbus Protocol, Modbus/TCP Fuzzer.													
Total Hours	Total Hours 40												
Course Outc	omes:												
CO-1 Unders	tand lo	T applications a	ind IoT Archi	tectures	•								
CO-2 Learn a	bout lo	oT devices and e	event driven	analysis									
CO-3 Unders	tand a	nd analyze lloT.											

 ${\bf CO-4}$ Understand safety and security testing of IoT systems.

CO-5 Understand safety and network system of IoT systems.

Text Book & Reference Books-

- 1. Dimitrios Serpanos, Marilyn Wol, Internet-of-Things (IoT) Systems Architectures, Algorithms, Methodologies, ISBN 978-3-319-69714-7.
- 2. Internet of Things A hands-on approach, Arshdeep Bahga, Vijay Madisetti, Universities Press, 2015.
- 3. The Internet of Things Key applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi and Wiley, 2012 (for Unit 2).
- 4. . "From Machine-to-Machine to the Internet of Things Introduction to a New Age of Intelligence", Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand. David Boyle and Elsevier, 2014.

List/Lin	List/Links of e-learning resource													
•	https:/	//online	ecourse	es.npte	l.ac.in/	noc22_	_cs53/p	oreviev	N					
Modes	of Eval	uation	and Ru	ubric										
The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.														
CO-PO Mapping:														
COs	PO1	PO ₂	PO₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2
CO-1	1	1	2	1									1	2
CO-2	2	1	1	1	2								1	2
CO-3	2	1	2	1			1						1	1
CO-4	2	1	2	1										2
CO-5	2	1			1								1	
List of E	Experim	nents:												
Recomm	nendatio	on by Bo	oard of s	studies o	on									
Approva	l by Aca	demic o	ouncil o	on										
Compile	d and d	esigned	by											
Subject	handled	by dep	artmen	t				D	epartme	nt of IT				



(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Semester/Year VII/IV Program B.Tech – Internet of Things								5						
Subject Category	ter/Year VII/IV Program B.Tech – Internet of ect DE Subject Code: IO 702 Subject DE – IV (B) Name Embedded System													
		Con	tact Ho	urs	Total									
	Theo	ory	0:-	50	Pract	ical	Total		-		Credits			
ES 1	VIS AS	10	10 10	E3		Quiz	100	2	1	P 0	4			
	20	10	10	We	f Jul	v 2024	100	5	-		-			
Prerequisite	s:					<u>, 2021</u>								
Knowledge	on conc	epts of Ic	T applica	tions a	nd IoT	architectur	es, Event dr	iven ar	nalysis	and	security			
testing IoT	systems	•							,		,			
Course Obj	ective:													
• This c	course ex	xplains m	achine le	earning	techn	iques such	as decision	tree 1	earnir	ng, Ba	ayesian			
learnii	ng etc.	1		U		1				U,				
• To un	derstand	computat	tional lea	rning th	neorv.									
To stu	dy the n	attern con	nnarison	technia	mes									
 Identif 	iuy inc pa	ns that are	amonahl	e to sol	ution h	w Al method	ts and which	Almo	hode	nav h	a suitad			
to solv	y problem ing a give	n nrohlem	י מווופוומטו ח			y Al method		Arme	.11003 1	nay D	e suiteu			
UNITs Descriptions Hrs. The IoT Landscape: What Is IoT2 Applications Architectures Wireless														
UNITS .	UNITs Descriptions The IoT Landscape: What Is IoT? Applications, Architectures, Wireless Networks Devices Security and Privacy Event-Driven													
	JNITs Descriptions Hrs. I The IoT Landscape: What Is IoT? Applications, Architectures, Wireless Networks, Devices, Security and Privacy, Event-Driven Systems. IoT System Architectures: Introduction, Protocols Concepts, IoTOriented Protocols, Databases, Time Bases, Securit 8													
I	Archited	ocols,		8										
	Databas	,												
	IoT Devices & Event-Driven System Analysis: The IoT Device Design Space, Co													
	of Ownership and Power Consumption, Cost per Transistor and Chip Size, Duty													
	Cycle ar	nd Power (Consumpt	ion, Plat	tform [Design. Even	t-Driven Syst	em Ana	alysis:					
	Introduo	ction, Mo	tivating E	ixample	, IoT	Network M	odel, Events	, Netv	/orks,		8			
	Devices	and Hubs	, Single-Hu	ub Netw	/orks, N	Aulti-hub Ne	etworks, Netv	vork M	odels		0			
	and Phy	sical Netw	vorks, IoT	Event A	nalysis	, Event Pop	ulations, Stoc	hastic	Event					
	Populat	ions, Env	vironment	al Inte	raction	Modeling	, Event Tra	nsport	and					
	IVIIgratio	on.	ь .f ть:											
	Things		oT Archi	s: intro	auctio	1, Industry 4	+.U, industria	i interr			0			
	Challon	(1101 <i>),</i> 11	OT AICH	lecture	, DdSI		gies, Applic	auons	anu		0			
	Security	yes. v and Safet	ty: Introdu	iction 9	System	s Socurity N	letwork Secu	rity G	noric					
	Annlicat	tion Secur	rity Annli	cation	Proces	s Security a	and Safety F	Reliable	-and-					
IV	Secure-	by-Design	loT An	plicatio	ns. Ri	un-Time M	lonitoring. 1	he A	RMET		8			
	Approad	ch, Privacy	and Depe	endabili	tv.									
	Security	· Testing Ic	T System	s: Introd	, duction	, Fuzz Testir	ng for Security	, Whit	e-Box					
V	, Fuzzing,	Black-Bc	ox Fuzzin	g, Fuzz	ing In	, dustrial Co	ntrol Netwo	rk Sys	tems,		8			
	Fuzzing	Modbus, 1	The Modb	us Proto	ocol, N	lodbus/TCP	Fuzzer.	•						
Total Hours	S										40			
Course Out	comes:													
CO-1 Under	rstand IoT	application	ons and lo	T Archit	tecture	s.								
CO-2 Learn	about lo	T devices a	and event	driven a	analysis	5								
CO-3 Under	rstand an	d analyze	lloT.											
CO-4 Under	rstand saf	fety and se	ecurity tes	ting of I	oT syst	ems.								

CO-5 Understand safety and network system of IoT systems.

Text Book & Reference Books-

- 1. Dimitrios Serpanos, Marilyn Wol, Internet-of-Things (IoT) Systems Architectures, Algorithms, Methodologies, ISBN 978-3-319-69714-7.
- 2. Internet of Things A hands-on approach, Arshdeep Bahga, Vijay Madisetti, Universities Press, 2015.
- 3. The Internet of Things Key applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi and Wiley, 2012 (for Unit 2).
- 4. . "From Machine-to-Machine to the Internet of Things Introduction to a New Age of Intelligence", Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand. David Boyle and Elsevier, 2014.

List/Links of e-learning resource

• https://onlinecourses.nptel.ac.in/noc22_cs53/preview

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping:

•																
	COs	PO ₁	PO ₂	PO ₃	PO ₄	PO₅	PO ₆	PO ₇	PO ₈	PO9	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2	Ī
	CO-1	1	1	2	1									1	2	
IГ	CO-2	2	1	1	1	2								1	2	
IГ	CO-3	2	1	2	1			1						1	1	
IГ	CO-4	2	1	2	1										2	
	CO-5 2 1 1 1 1															
l	ist of E	xperim	nents:													
F	Recomm	endatio	on by Bo	oard of s	studies o	on										
A	Approval by Academic council on															
(Compiled and designed by															
5	Subject handled by department Department of IT															



(Engineering College), VIDISHA M.P.

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Semester/Year VII/IV Program B.Tech – Internet of Things													
Semester/Year VII/IV Program B.Tech – Internet of Things Subject Category DE Subject Code: IO 702 DE – IV (C) Subject Name Real time Systems													
Category		Ma	aximum Ma	DE – IV (G arks Allotter	() 1	Name			-		Total		
	Theo	ory			- Practi	ical	Total	Con	tact Ho	urs	Credits		
ES M	VIS As	signment	Quiz	ES L	w	Quiz	Marks	L	Т	Р			
60 2	20	10	10	-	-	-	100	3	1	0	4		
				w.e.f.	July	y 2024							
Prerequisite	s:												
Computer 0	Drganizati	ion and Op	perating S	ystem									
Course Obj	ective:												
To pro	vide broa	d underst	anding of	the requir	emer	nts of Real T	ime Operat	ng Syste	ems.				
To ma	ke the stu	ident unde	erstand, a	pplications	s of tł	hese Real Ti	ime features	using c	ase stu	idies.			
UNITS				Desc	cripti	ons					Hrs.		
	Introduo	ction: Intr	oduction	to UNIX/L	INUX	, Overview	of Commar	ids, File	I/O,(
I	open, ci	reate, clos	e, Iseek, r	ead, write	e), Pro	ocess Contr	ol (fork, vfo	rk, exit,	wait,		8		
	waitpid,	exec).											
	Real Ti	me Opera	ating Sys [®]	tems: Brie	ef Hi	istory of (ວS, Defining	, RTOS	The				
	Schedul	er, Object	ts, Service	es, Charac	terist	tics of RTO	S, Defining	a Task,	asks				
II	States	and Sch	neduling,	Task O	perat	tions, Stru	icture, Syn	chroniz	ation,		8		
	II States and Scheduling, Task Operations, Structure, Synchronization, 8 8 Communication and Concurrency. Defining Semaphores, Operations and Use, Defining Message Queue, States, Content, Storage, Operations and Use 8 III Objects, Services and I/O: Pipes, Event Registers, Signals, Other Building Blocks, Component Configuration Basic I/O Concepts I/O Subsystem 8												
	Objects, Services and I/O: Pipes, Event Registers, Signals, Other Building Blocks, 8												
	III Objects, Services and I/O: Pipes, Event Registers, Signals, Other Building Blocks, Component Configuration, Basic I/O Concepts, I/O Subsystem 8												
III Component Configuration, Basic I/O Concepts, I/O Subsystem													
Exceptions, Interrupts and Timers: Exceptions, Interrupts, Applications, Processing of Exceptions and Spurious Interrupts, Real Time Clocks,													
IV	IV Component Configuration, Basic I/O Concepts, I/O Subsystem o IV Exceptions, Interrupts and Timers: Exceptions, Interrupts, Applications, Processing of Exceptions and Spurious Interrupts, Real Time Clocks, Programmable Timers, Timer Interrupt Service Routines (ISR), Soft Timers, 8												
	Program	imable li	mers, lin	ner Interr	upt S	Service Rou	itines (ISR),	Soft II	mers,				
	Operation	ons.					l. c.l.						
V	Case Sti	udies of R	IOS: RI LI	nux, Micro	50/03	S-II, VX WO	rks, Embedd	ed Linux	k, and		8		
Tatalllaum	Tiny US.										40		
											40		
Course Out	comes:	nlain roal	time con	conto cue	h ac	pro omntiv	o multitack	ng tac	(prior	ition	priority		
inversions			ontoxt cu	vitching or	n as Na cur	pre-emptiv nchronizativ	e multilask	latoney	c prior	illes,	priority		
and seman	hores	ciusion, c	UNICAL SW	ntening, ai	iu syi		n, interrupt	latency	anune	spon	se time,		
CO-2 Able c	lescribe h	low a real-	time one	rating syst	em ki	ernel is imn	lemented						
CO-3 Explai	n how the	e real-time	oneratin	ig system i	mple	erner is imp ments time	manageme	nt.					
CO-4 Discus	ss how tag	sks can co	mmunicat	te using se	mapł	hores, mailt	poxes, and g	ueues.					
CO-5 Be ab	le to impl	ement a re	eal-time s	vstem on a	an en	nbedded pr	ocessor.						
Text Book &	& Referer	nce Books-		/		p							
1 Real T	ime Con	cents for	Embedde	ed System	s _ (Ding Li Fl	sevier 201	1					
2 Embod	Inte Con		hitaatuma	Duconom		a and Daai	on hy Doily	$\frac{1}{2}$	оо л т	יז <i>דו</i> אי			
2. Ellibed	ided Syst	ems- Arc	miecture	, Program	mm	g and Desi	gii by Kajka	imai, 2	007, 1	MH			
5. Advan	ced UNI	X Program	mming, F	kichard St	even	ns.							
4. Embed	Ided Linu	ıx: Hardv	vare, Soft	tware and	Inter	rtacing – I	Dr. Craig Ho	ollabau	gh.				
List/Links o	f e-learni	ng resour	ce										
• http	os://onlin	ecourses	nptel.ac.ir	n/noc22_c	s53/r	oreview							

Modes of Evaluation and Rubric

CO-PO N	CO-PO Mapping:													
COs	PO1	PO2	PO₃	PO ₄	PO₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2
CO-1	1	1	2	1									1	2
CO-2	2	1	1	1	2								1	2
CO-3	2	1	2	1			1						1	1
CO-4	2	1	2	1										2
CO-5	CO-5 2 1 1 1 1													
List of E	List of Experiments:													
Recomm	endatio	on by Bc	oard of s	studies o	on									
Approva	Approval by Academic council on													
Compile	Compiled and designed by													
Subject h	Subject handled by department Department of IT													



(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Semester/Year VII/IV Program B.Tech – Internet of Things Subject IO 702 Subject										5			
Subject Category	Image: state with the state with t												
		Ma	aximum Ma	rks Allotte	ed			Con	tact Ho	urs	Total		
FC	Theo	ory	0:-	FC	Pract	ical	Total		-		Credits		
ES 1	VIS AS: 20	signment	Quiz	ES	LVV	Quiz	100	L 2	1	P 0	Δ		
	20	10	10	wei	- f Inl	v 2024	100	5	-	U	-		
Prerequisite	s:				1. 9 41	y 2024							
Computer	 Organizati	ion and Or	perating S	vstem									
Course Ob	ective:		0	/									
To pro	vide stud	ents with	a good de	epth of k	nowle	dge of Desig	gning Industr	ial IOT	Svsten	ns for	various		
applica	ations.					-0	5		-,				
UNITS				De	script	ions					Hrs.		
	Introdu	ction to In	dustrial Ir	nternet a	nd Us	e-Cases: Inc	ustrial Inter	net- Ke	y IloT				
	Technol	ogiesInno	vation an	d the II	oT -K	ey Opportu	nities and B	enefits	-The		•		
I	Digital	and Hum	an Workf	orce - L	ogisti	cs and the	Industrial I	nternet	- IOT		8		
	Innovati	ions in Ret	ail.										
	The Te	chnical ar	nd Busine	ess Innov	vators	of The In	dustrial Inte	ernet:	Cyber				
Ш	Physical	Systems	(CPS) – IP	Mobility	/ – Ne	twork Virtu	alization - SE	DN (Sof	tware		8		
	Defined Networks)- The Cloud and Fog – Role of Big Data in IIOT - Role of Machine learning and AI in IIOT IIOT Reference Architecture: Industrial Internet Architecture Framework (IIAF) -Industrial Internet Viewpoints Architectural Topology: The Three-Tier												
	Machine learning and AI in IIOT IIOT Reference Architecture: Industrial Internet Architecture Framework (IIAF) -Industrial Internet Viewpoints Architectural Topology: The Three-Tier Topology- Key System Characteristics- Data Management- Advanced data												
	IIOT Reference Architecture: Industrial Internet Architecture Framework (IIAF) -Industrial Internet Viewpoints Architectural Topology: The Three-Tier 8												
III IIOT Reference Architecture: Industrial Internet Architecture Framework (IIAF) -Industrial Internet Viewpoints Architectural Topology: The Three-Tier Topology- Key System Characteristics- Data Management- Advanced data analytics.									8				
IIOT Reference Architecture: Industrial Internet Architecture Framework (IIAF) -Industrial Internet Viewpoints Architectural Topology: The Three-Tier Topology- Key System Characteristics- Data Management- Advanced data analytics. Protocols for Industrial Internet Systems: Legacy Industrial Protocols - Modern	data		-										
	analytics. Protocols for Industrial Internet Systems: Legacy Industrial Protocols - Modern												
	Protoco	Is for Indu	Istrial Inte	rnet Syst	tems:	Legacy Indu	strial Protoc	OIS - IVI	odern				
IV	Commu	nication	Protocols	-Proximit	ty No	etwork Col	mmunication	i Prote	CoAD		8		
	(Constra	s Commu	lication Dr	echnolog	giesua	iteways: inc	iustrial gates	Nays -	COAP				
	Middley	vare Softv	Vara Datte	arns and		Datforms D	ublish/Subsc	riha Da	torn				
	MOTT			NS- Mide	llewa	re Δrchitec	ture- SigFox		WAN				
V	Augmer	nted reality	v- Real-W	orld Sma	rt Faci	tories Applic	ation of IIOT		tudv:		8		
	Health r	nonitoring	, lot smar	t citv. Sm	nart ir	rigation. Rol	oot surveillar	nce.					
Total Hour	S	(,			0, -					40		
Course Out	comes:												
CO-1 Ident	ify the Key	y opportui	nities and	benefits	in Ind	ustrial IoT.							
CO-2 Able of	describe h	iow a real-	time opei	rating sys	stem k	ernel is imp	lemented.						
CO-3 Apply	virtual ne	etwork to	demonstr	ate the u	se of	Cloud in Ind	ustrial IoT.						
CO-4 Sumn	narize Leg	acy Indust	rial and N	1odern C	ommı	unication Pro	otocols.						
CO-5 Descr	CO-5 Describe Middleware Architecture, LoRaWAN- and Augmented reality.												
Text Book	& Referer	nce Books	-										
1. Gilchr	ist, Alasc	lair, "Indı	ustry 4.0	The Indu	ustria	I Internet of	f Things", A	press,	2017.				
2. Zaigha	ım Mahr	nood, "T	he Intern	et of Tl	hings	in the Ind	ustrial Sect	or: Se	curity	and	Device		
connec	ctivity, sn	nart envir	onments	and Ind	ustry	4.0 (Spring	er), 2019.						
3. Sabina	Jeschke	e, Christia	an Brech	er, Houl	bing	Song, Dan	da B. Rawa	at "Ind	ustria	l Inte	rnet of		
Things	: Cyber 1	manufact	uring Sys	tems" (S	Spring	ger), 2017.							

- 4. Industrial IoT Challenges, Design Principles, Applications, and Security by Ismail Butun (editor)
- 5. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014

List/Links of e-learning resource

• https://onlinecourses.nptel.ac.in/noc20_cs69/preview

Modes of Evaluation and Rubric

CO-PO N	CO-PO Mapping:													
COs	PO1	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO1	PO ₁₁	PO ₁₂	PSO1	PSO2
CO-1	1	1	2	1									1	2
CO-2	2	1	1	1	2								1	2
CO-3	2	1	2	1			1						1	1
CO-4	2	1	2	1										2
CO-5	O-5 2 1 1 1 1													
List of E	List of Experiments:													
5.														
Recomm	endatic	on by Bo	oard of s	tudies o	on									
Approva	l by Aca	demic c	ouncil o	on										
Compiled and designed by														
Subject h	Subject handled by department Department of IT													



(Engineering College), VIDISHA M.P.

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DEPARTMENT OF IT

Semester/Year			VII/IV Program B.Tech – Internet						of T	hings		
Subject Category	Jject Jegory DE Subject Code: ID 703 DE - V (B) Subject Name AR and Conta											
		Maxii	num Marks A	lotted				C	ontac	:t	Total	
		Theory			Pract	ical	Total	I	lours		Credits	
ES	MS	Assignment	Quiz	ES	LW	Quiz	Marks	L	Т	Ρ		
60	20	10	10	-	-	-	100	3	1	0	4	
			W.6	e.f. July	7 202 4							
Prerequisites:												
Computer Or	ganizat	tion and Operat	ing System									
Course Object	tive:											
The obje	ective c	of this course is	to provide a	a founda	ation t	o the fast-gr	owing field	d of <i>i</i>	AR ai	nd m	nake the	
students	aware	of the various	AR devices.			0	U					
• To give historical and modern overviews and perspectives on virtual reality. It des												
fundamentals of sensation, perception, technical and engineering aspects of virtual reality												
UNITS Descriptions												
Introduction to Augmented Reality: What Is Augmented Reality - Defining												
augmented reality, history of augmented reality, The Relationship Between												
Augmented Reality and Other Technologies-Media, Technologies, Other Idea												
	Augm	iented Reality a	ind Other Te	cnnolog	ies-ivie	edia, Techno	logies, Oth	er Id	eas	ĺ	•	
Related to the Spectrum Between Real and Virtual Worlds, applications of augmented reality Augmented Reality Concepts- How Does Augmented Reality Work? Concepts Related to Augmented Reality, Ingredients of an Augmented Reality Experience.												
												augmented reality Augmented Reality Concepts- How Does Augmented Reality Work? Concepts Related to Augmented Reality, Ingredients of an Augmented Reality Experience. AR Devices & Components: AR Components – Scene Generator, Tracking
	Augm	nented Reality E	xperience.							<u> </u>		
AR Devices & Components: AR Components – Scene Generator, Tracking												
	syste	m, monitoring	system, disp	lay, Gar	ne sce	ene. AR Devi	ices – Opti	cal S	ee-	ĺ	8	
	Throu	ugh HMD, Virtu	ual retinal s	ystems,	Moni	tor bases sy	ystems, Pr	oject	ion	ĺ	0	
	displa	ays, Video see-t	hrough syste	ems.								
	Intro	duction to Virtu	ial Reality: D	efining	Virtual	Reality, His	tory of VR,	Hur	nan	ĺ		
	Physi	ology and Perce	eption, Key E	lements	s of Vir	tual Reality	Experience	, Vir	tual	ĺ	0	
111	Realit	ty System, Inter	face to the V	/irtual V	Vorld-I	nput & outp	out- Visual,	Aura	al &	ĺ	ð	
	Hapti	c Displays, Appl	lications of V	irtual Re	eality.					ĺ		
	Repre	esenting the Vi	rtual World:	Repres	entatio	on of the Vi	rtual World	d. Vis	sual			
	Repre	esentation in VI	R. Aural Rep	resentat	ion in	VR and Hap	tic Repres	ental	ion	ĺ		
IV	in VR	. Case Study: G	HOST (Gene	ral Hap	tics Or	en Software	- Toolkit) s	oftw	are	ĺ	8	
	devel	opment toolkit								ĺ		
	Visua	Percention &	Rendering	Visual	Perce	ntion - Per	cention of	Dei	hth	 		
	Perce	ention of Motion		n of Colc	n Con	hining Sour	ces of Infoi	mat	ion	ĺ		
V	Visua	l Rendering -Ra	y Tracing ar	nd Shadi	ing Ma	dels Raster	rization (c	rrec	ting	ĺ	8	
	Ontic			tongy or	ng Mc	no Potos		mee	ing	ĺ		
	Optic			tency ai	iu riai	ne rates.				 	40	
Total Hours												
	mes:		البلجا اممرميا			of AD						
CO-1 Describe	e now i	AR Systems Wor	K and list the	е арриса								
CO-2 Underst	and ar	iu analyze the h	aroware rec	Juiremei	IT OT A	К. - () / D						
CO-3 Describ	e now	VK systems wor	к and list the	e applica	ations							

CO-4 Understand the design and implementation of the hardware that enables VR systems to be built

CO-5 Describe Augmented reality.

Text Book & Reference Books-

- 1. Allan Fowler-AR Game Development^{||}, 1st Edition, A press Publications, 2018, ISBN 978-1484236178
- 2. Augmented Reality: Principles & Practice by Schmalstieg / Hollerer, Pearson Education India; First edition (12 October 2016), ISBN-10: 9332578494
- 3. Virtual Reality, Steven M. LaValle, Cambridge University Press, 2016.
- 4. Understanding Virtual Reality: Interface, Application and Design, William R Sherman and Alan B Craig, (The Morgan Kaufmann Series in Computer Graphics)". Morgan Kaufmann Publishers, San Francisco, CA, 2002.
- 5. Developing Virtual Reality Applications: Foundations of Effective Design, Alan B Craig, William R Sherman and Jeffrey D Will, Morgan Kaufmann, 2009.

List/Links of e-learning resource

https://nptel.ac.in/courses/121106013

Modes of Evaluation and Rubric

CO-PO Mapping:															
COs	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁	PO ₁₁	PO ₁₂	PSO1	PSO2	
CO-1	1	1	2	1									1	2	
CO-2	2	1	1	1	2								1	2	
CO-3	2	1	2	1			1						1	1	
CO-4	2	1	2	1										2	
CO-5	2	1			1								1		
List of Experiments:															
Recommendation by Board of studies on															
Approva	Approval by Academic council on														
Compiled and designed by															
Subject handled by department								De	Department of IT						


SAMRAT ASHOK TECHNOLOGICAL INSTITUTE

(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

DEPARTMENT OF IT

Semester/Year		VII/IV	Program		B.Tech – Internet of Things							
Subject Category		DE	Subject Code:	IO 703 DE – V (C)	Sul	bject Name	Ed	Edge Comp		uting		
		Maxi	mum Marks A	•	Conta		t	Total				
		Theory				tical	Total	Hours		;	Credits	
ES	MS	Assignment	Quiz	ES	LW	Quiz	Marks	L	Т	Ρ		
60	20	10	10	-	-	-	100	3	1	0	4	
w.e.f. July 2024												
Prerequisites:												
Course Objective:												
• Knowledge on how edge computing and Internet of Things (IoT) can be used as a way to meet												
applicat	ion der	mands in intellig	ent loT syste	ems.								
UNITs				Descrip	tions						Hrs.	
	Іот а	nd Edge Comp	outing Defin	ition ar	nd Us	e Cases: Int	roduction	to E	dge			
	Comp	outing Scenario	s and Use ca	ses - Ed	ge cor	nputing purp	ose and de	efinit	ion.			
1	Edge	computing use	e cases. Edg	ge com	outing	hardware a	rchitecture	es. E	dge		8	
	platfo	orms. Edge vs F	og Computi	ng. Con	nmuni	cation Mode	ls - Edge.	Fog	and		-	
	M2M			0,	-			-0				
	IOT A	Int Architecture and Core Int Modules-A connected ecosystem Int versus										
	mach	ine-to-machine	versus. SCA	DA. The	e valu	e of a netw	ork and M	etcal	fe's			
	and	Beckstrom's la	ws. IoT and	l edge	archit	tecture. Role	of an a	rchit	ect			
Ш	Understanding Implementations with examples. Example use case and											
	denloyment Case study - Telemedicine nalliative care Requirements											
	Imple	mentation Use	case retros	nective		Sumative cu	re, nequi	cinc	1103,			
	Rasnk	herryPi: Introdu	iction to R	asnherr	vPi 4	hout the F	asnherryPi	Bo	ard			
	Hardy	ware Lavout and	d Pinouts O	nerating	y i, i Sveta	ms on Rasnh	erryPi Cor	figu	ring			
ш	Rasnh	herryPi Program	mming Base	herryPi	Con	necting Rase	herry Pi	via (SCH		8	
	Repute access tools Interfacing DHT Sonsor with Di Di as Websoniar Di											
	Camera Image & Video Processing using Di											
	Imnle	mentation of N	Aicrocomnut	ter Racr	herry	Pi and devic	e Interfacir	וס F	dge	-		
	to Cloud ProtocoleProtocole MOTT MOTT publich subseribe MOTT											
IV	architecture details MOTT state transitions MOTT packet structure MOTT											
	data types MOTT communication formate MOTT 2.1.1 working everyte											
	Edgo	computing wit	h Pasaharay	Di Indu	ctrial	and Comme	rcial IoT ar	ne. d Fr				
V	Work	with Pacaborry	nin Kaspberryer, muusunar and commercial for and Edge,									
Total Hours											40	
											40	
CO_1 Unders	tand us	se of the IoT are	hitocturo wi	th its on	titios	and protocol	from the		lovic	00		
CO-2 Security	v and n	rivacy issues rol	lated to the	area of	adre e	omputing on	d loT	101 (JEVIC	c 3.		
CO-2 Unders	y and p tand th	n Pasabara/Pi a		and its c	omno	nonts	u 101.					
CO-5 Understand the KaspberryPi architecture and its components.												
Text Book 9	Refere			valuate	its pe	normance.						
	Edaa	Computing f	on Anabitaa	ta Ca	aand	Edition by	Domers I -		hik 12	ahar	" Doolrt	
$\begin{bmatrix} 1 & 101 \\ 0 & 101 \end{bmatrix}$	Euge	computing f		us - Se	cond	Edition, by	Perry Le	a, P	uon	sner	. Packt	
Publishing, 2020, ISBN: 9781839214806.												

2. Raspberry Pi Cookbook, 3rd Edition, by Simon Monk, Publisher: O'Reilly Media, Inc., 2019,

ISBN: 978149204322.

- 3. Fog and Edge Computing: Principles and Paradigms by Rajkumar Buyya, Satish Narayana Srirama, wiley publication, 2019, ISBN: 9781119524984.
- 4. David Jensen, "Beginning Azure IoT Edge Computing: Extending the Cloud to the Intelligent Edge, MICROSOFT AZURE.

List/Links of e-learning resource

• https://onlinecourses.nptel.ac.in/noc24_cs66/preview

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping:

co i o mobhing.																
COs	PO1	PO ₂	PO₃	PO ₄	PO₅	PO ₆	PO ₇	PO ₈	PO9	PO1	PO ₁₁	PO ₁₂	PSO1	PSO2		
CO-1	1	1	2	1									1	2		
CO-2	2	1	1	1	2								1	2		
CO-3	2	1	2	1			1						1	1		
CO-4	2	1	2	1										2		
CO-5	2	1			1								1			
List of E	List of Experiments:															
·																
Recomm	Recommendation by Board of studies on															
Approva	Approval by Academic council on															
Compile	d and de	esigned	by													
Subject handled by department								De	Department of IT							

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE																
(CTA)			(Engineering College), VIDISHA M.P.													
A CREWE			(An Autonomous Institute Affiliated to RGPV Bhopal)													
UIDISHA M.R.				DEP	ARTN	IENT OF I	Т									
Semester/Year			VII/IV Program B.Tech – Inte								rnet of Things					
Subject Category		PROJ	Subject Code:	IO 704	Sub	ject Name	Major Project Prelim									
		Maxi	mum Marks A	llotted				t	Total							
			Pract	ical	Total Hours				Credits							
ES	MS	Assignment	Quiz	ES 60	LW 40	Quiz	Marks		T O	P 8	4					
				e.f. Jul	v 2024	- 	100	U	U	0						
Prerequisites:					<u>j = • =</u>	-										
Course Object	tive:															
Knowled	ge on	how edge con	nputing and	Intern	et of 1	hings (IoT)	can be use	ed as	аv	vay	to meet					
applicati	on dei	mands in intellig	ent loT syste	ems.						1						
UNITS		Foob dofine	d involopt	Descrip	tions	ha fuana	lia di catini / [wala		Hrs.					
	a)	Each defined	a project	needs /socio	t0 tochniv	be from	industry/F	kesea	ircn							
	b)	organization/Govt.organization/socio-technical issues.														
	stu	b) Project identification should be based on Analysis carried out by the students after completion of B.F. Semester 6th Evamination but before														
	sta	starting of the 7th Semester.														
Procedure	c) F	c) Problem definition for the project needs to be submitted by every student														
	in t	in the first week of the 7th Semester to his/her college.														
	d) I	d) Each definition will be evaluated based on merit in the beginning of the														
	7th	7th semester itself by the College.														
	Fac	Facilitation: You may contact your Major Project In charge co-														
	ord	linator/Faculty /	Department	Head f	or skilt	ulAnalysis .										
	1.1	he project wor	k will be in-ł	nouse i	ndustry	/ project, wh	iere studen	nt nee	ed							
	to	to implement project related to any domain of industry like education,														
		2 Students are required to get approval of project definition from the														
	Z. : dor	department.														
	3. After approval of project definition students are required to report their															
	project work weekly to respective internal guide. 4. Maximum 4 students															
	can allow working in particular project group.															
Cuidliness	5.1	5. The students are required to identify their project within two weeks of														
Guidiness:	the	the commencement of the classes and they are required to follow all the														
	rule	rules and instructions issued by department.														
	6. I	6. Each student or student group would work under the guidance of the														
	Fac	ulty from the (College. In ca	ase any	/ probl	em/other is	sue arises	for tl	he							
	smo	ooth progress o	of Inter Dep	artmen	ital pro	oject work d	liscovery/P	ractio	al							
	Ira	ining, it should	be immedi	lately t	rough	to the not	lice of the	maj	or							
		ject in charge co	borumators/	Faculty	+ Droio	ct cunoncic [)ra rapart t									
	/. Hor	ad of the Depar	tment with t	the rem	i Proje	t synopsis f f guide in th	eir Collego	u the duri	ะแ กด							
	Eig	hth week of the	semester			i guiue ili lli	en conege	uurii	ъ							
Total Hours	1 - 18									1	40					
Course Outco	mes:									1						

On successful completion of theproject student should be able to:

CO1: Identify the problem domain correctly and to represent problem using mathematical structures and logics.

CO2: Analyze possible solution strategies and investigate problem domain and design feasible solutions for it.

CO3: Make use of cutting edge tools and technologies to derive solutions for the problems and carried a detailed studied about the feasibility and societal impact of solutions

CO4: Acknowledges the previous work and support required in the solution. Justify the role of individual in project work. Demonstrate leadership skills in team work.

CO5: Present and communicate the importance of solutions of problem domain. Conduct and accomplish all the subtasks for project completion in time and cost effective manner and conclude the project work with possible scopes.

Text Book & Reference Books-

List/Links of e-learning resource

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CO-1	3	3	2										2	2		
CO-2	2			2		1	2			1			2			
CO-3			3		3	2	3						2	2		
CO-4									3				1			
CO-5					2					3	3	3		2		
List of E	List of Experiments:															
Recommendation by Board of studies on																
Approval by Academic council on																
Compiled and designed by																
Subject handled by department								De	Department of IT							