Pondicherry Engineering College, Puducherry – 605014

(An Autonomous Institution of Government of Puducherry affiliated to Pondicherry University)



Curriculum and Syllabi for

B.Tech. (Information Technology)

(With Effect from Academic year 2018-19)

(Approved in Fifth Academic Council Meeting held on 6th May 2019)

CURRICULUM

The Curriculum of B. Tech. (Information Technology) is designed to fulfil the Program Educational Objectives (PEO) and the Program Outcomes (PO) listed below.

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

DEO1	Core Competence: To provide students a solid foundation in mathematical, scientific and								
PEOI	engineering approaches along with core fundamentals of IT discipline.								
DEO2	Industry compliance: To excel in development of real world / inter disciplinary applications with								
the acquired skills of analysis, design, implementation, testing and interpretation.									
	Professionalism: To inculcate in student professional attitude and effective communication skills								
PEUS	to groom them so as to work in any team.								
	Entrepreneurial skills: To groom the undergraduate students with managerial skills and								
PE04	administrative skills in order to make them successful IT entrepreneurs.								
DEOE	Continuous Learning: To motivate students in order to transform them as lifelong learners and								
PEOS	innovators in their area of interest.								

PROGRAM OUTCOMES (PO)

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.										
PO2	Problem analysis : Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.										
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.										
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.										
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations										
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.										
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.										
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.										
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.										
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.										
PO11	Project management and finance : Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.										
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.										

PROGRAM SPECIFIC OUTCOMES (PSO)

PSO1	Graduates should be able to clearly understand the concepts and principles in the field of information technology required for solving real-time problems of current trends.
PSO2	Graduates should be able to develop Innovative Ideas that will eventually motivate them to pursue <i>Higher Studies and Research</i> in the field of Information Technology.

Distribution of credits among the subjects grouped under various categories:

Courses are grouped under various categories and the credits to be earned in each category of courses are as follows:

SI. No.	Category	Credits	Course Category Code (CCC)
1	Humanities, Social Sciences and Management Courses	6+2/3*	HSM
2	Basic Science Courses (Mathematics, Physics, Chemistry and Biology)	25.0	BSC
3	Engineering Science Courses (Workshop, Drawing, Basics of Electrical/Mechanical/Computer etc.,)	17.5	ESC
4	Professional Core Courses	68.5	PCC
5	Professional Elective Courses (from chosen discipline)	15	PEC
6	Open Elective Courses (from other technical/ emerging disciplines)	10	OEC
7	Professional Activity Courses (Project Work, Entrepreneurship, Seminar, Internship, Comprehensive Test)	14	РАС
8	Mandatory non-Credit Courses (Environmental Sciences, Induction, Indian Constitution, Essence of Indian Traditional Knowledge, Professional Ethics)	Non- credit	MCC
	Total	156	

*included in the 10 credits under open elective category

Semester-wise Courses and Credits

Semester I

Course	Course		СГТ	Р	eriods		Cradita
Code	Course		SEI	L	Т	Р	Credits
FY201	Induction Programme	MCC	-	-	-	-	0
MA201	Mathematics - I	BSC	ΤY	3	1	0	4
PH201	Physics	BSC	ΤY	3	1	0	4
CY201	Chemistry	BSC	ΤY	3	1	0	4
HS201	English for Communication	HSM	ΤY	2	0	2	3
ME201	Workshop and Manufacturing Practice	ESC	LB	0	0	3	1.5
PH202	Physics Laboratory	BSC	LB	0	0	3	1.5
CY202	Chemistry Laboratory	BSC	LB	0	0	3	1.5
	Total					11	10 E
	lotal				25		19.5

Semester II

Course	Course))))		CET	Р	eriods		Cradita
Code	Course		SET	L	Т	Р	Credits	
MA202	Mathematics - II	BSC	ΤY	3	1	0	4	
EE201	Basic Electrical Engineering	ESC	ΤY	3	1	0	4	
CS201	Programming for Problem Solving	ESC	ΤY	3	0	0	3	
ME202	Engineering Graphics and Computer Aided Drawing	ESC	ΤY	2	0	4	3	
CE201	Environmental Science	MCC	-	3	-	-	0	
EE202	Basic Electrical Engineering Laboratory	ESC	LB	0	0	3	1.5	
CS202	Programming Laboratory	ESC	LB	0	0	3	1.5	
	Total			14	2	10	17	
					26		1/	

CCC - Course Category Code, SET – Semester Exam Type, TY – Theory, LB – Laboratory, PR - Project

Semester III

Course	Course			Р	eriods		Cradita
Code	Course		JEI	L	Т	Р	creats
EC233	Electronic Circuits	ESC	ΤY	3	-	-	3
IT201	Digital System Design	PCC	ΤY	3	-	-	3
IT202	Data Structures	PCC	ΤY	3	-	-	3
IT203	Object Oriented Programming using C++ &	DCC	ту	2			2
	Java	FUU	11	5	-	-	5
SH201	Biology for Engineers	BSC	ΤY	3			2
IT204	Digital Laboratory	PCC	LB	-	-	3	1.5
IT205	Data Structures Laboratory	PCC	LB	-	-	3	1.5
IT206	Object Oriented Programming Laboratory	DCC	ID			2	1 5
	(C++ & Java)	PLL	LD	-	-	5	1.5
SH202	Indian Constitution	MCC	-	3	-	-	0
	Tatal			18	-	9	10 E
	Total				27		19.2

Course	Open Elective / Heners / Miner Course	CCC SET	ссс	ссс	ссс	ссс	CCC SI	CCC SET	CC SET	CCC SET Periods				Crodits
Code	Open Elective, Honors, Minor Course									L	Т	Р	creats	
ZZOXX	Open Elective	OEC	ΤY	3	-	-	3							
ITH01	Programming Paradigms	PCC	ΤY	3	1	-	4							
ITM01	Data Structures and Algorithms	PCC	ΤY	3	1	-	4							

Semester IV

Course	Course		CET	Р	eriods		Cradita
Code	Course		SET	L	Т	Р	Credits
MA206	Mathematics for Computing	BSC	ΤY	3	1	-	4
IT207	Operating Systems	PCC	ΤY	3	-	-	3
IT208	Computer Architecture	PCC	ΤY	3	-	-	3
IT209	Microprocessors and Applications	PCC	ΤY	3	-	-	3
IT210	Design and Analysis of Algorithms	PCC	ΤY	3	-	-	3
IT211	Operating Systems Laboratory with UNIX / Linux	PCC	LB	-	-	3	1.5
IT212	Microprocessor Laboratory	PCC	LB	-	-	3	1.5
IT213	Design and Analysis of Algorithms Laboratory	PCC	LB	-	-	3	1.5
Total			15	1	9	20 5	
	lotal				25		20.5

Course	Open Elective / Heners / Miner Course	ссс	ссс	ссс	ссс	ссс	CCC SET	CCC SET	Р	Crodits
Code	Open Elective/ Honors/ Minor Course						SET	L	Т	Р
ZZOXX*	Open Elective	OEC	ΤY	3	-	-	3			
ITH02	Advanced Data Structures	PCC	ΤY	3	1	-	4			
ITM02	Java and Internet Programming	PCC	ΤY	3	1	-	4			

*ZZ in ZZOXX is the Department Code of the department offering Open Elective

Semester V

Course	Courses				Period	s	Cradita
Code	Course		L	Т	Р	Credits	
IT214	Database Management System	PCC	TY	3	-	-	3
IT215	Resource Management and Graph Theory	PCC	ΤY	3	1	-	4
IT216	Computer Networks	PCC	ΤY	3	1	-	4
IT217	Information Coding Techniques	PEC	ΤY	3	-	-	3
ITYXX	Program Elective – I	PEC	ΤY	3	-	-	3
17219	Database Management System	PCC	IB	_	_	2	15
11210	Laboratory	FCC	LD	-	-	5	1.5
IT219	Computer Networks Laboratory	PCC	LB	-	-	3	1.5
17220	Information Coding Techniques	PCC	LB			2	1 5
11220	Laboratory			-	-	5	1.5
SH203	Essence of Indian Traditional Knowledge	MCC	-	3	-	-	0
	Total			18	2	9	21 E
	lotal				29		21.5

Course	Open Elective / Heners / Miner Course	CCC SET	Periods			Crodits	
Code	Open Elective/ Honors/ Minor Course CC		SET	L	Т	Р	Creats
ZZOXX	Open Elective	OEC	ΤY	3	-	-	3
ITH03	Biometrics	PCC	ΤY	3	1	-	4
ITM03	Data Communication and Computer Networks	PCC	ΤY	3	1	-	4

Semester VI

Course	Course	CCC SFT		Р	eriods		Credits	
Code	Course		SET	L	Т	Р	creats	
IT221	Software Engineering	PCC	ΤY	3	-	-	3	
IT222	Automata and Formal Languages	PCC	ΤY	3	1	-	4	
IT223	Web Technology	PCC	ΤY	3	-	-	3	
ITYXX	Program Elective – II	PEC	ΤY	3	-	-	3	
ITYXX	Program Elective – III	PEC	ΤY	3	-	-	3	
EP201	Entrepreneurship	PAC	ΤY	3	-	-	2	
IT224	Web Technology Laboratory	PCC	LB	-	-	3	1.5	
IT225	Software Engineering Laboratory	PCC	LB	-	-	3	1.5	
	18	1	6	21.0				
	Total			25			21.0	

Course	Open Elective/ Honors/ Minor Course		CET	Р	Crodite		
Code	Open Elective, Honors, Minor Course		JEI	L	Т	Р	creats
ZZOXX	Open Elective	OEC	ΤY	3	-	-	3
ITH04	Advanced Java Programming	PCC	ΤY	3	1	-	4
ITM04	Information Systems and Organization	PCC	ΤY	3	1	-	4

Semester VII

Course	Courso	CCC SET		Р		Credits		
Code	Course		JET	L	Т	Р	creats	
IT226	Artificial Intelligence	PCC	ΤY	3	1	-	4	
HS202	Industrial Economics and Management	HSM	ΤY	3	-	-	3	
ITYXX	Program Elective – IV	PEC	ΤY	3	-	-	3	
ITYXX	Program Elective – V	PEC	ΤY	3	-	-	3	
IT227	Artificial Intelligence Laboratory	PCC	LB	-	-	3	1.5	
IT228	Seminar	PAC	LB	3	-	-	1	
IT229	Mini Project	PCC	PR	-	-	3	1.5	
IT230	Professional Ethics	MCC	-	2	-	-	0	
	Total			17	1	6	17	
	Total				24		17	

Course	Open Elective / Heners / Miner Course		CET	Р	Credit		
Code	Open Elective, Honors, Minor Course		JET	L	Т	Р	S
ZZOXX	Open Elective	OEC	ΤY	3	-	-	3
ITH05	Introduction to Data Science	PCC	ΤY	3	1	-	4
ITM05	IoT and Python Programming	PCC	ΤY	3	1	-	4

Semester VIII

Course	Course CCC SI		CET	Р	Credits		
Code	Course			L	Т	Р	Credits
SWOXX	Open Elective through SWAYAM	OEC	-	-	-	-	2
SWOXX	Open Elective through SWAYAM	OEC	-	-	-	-	2
IT231	Comprehensive Test	PAC	-	-	-	-	1
IT232	Internship	PAC	-	-	-	-	2
IT233	Project Work	PAC	PR	-	-	-	8
	Total			-	-	-	15
	Total						12

List of Professional Electives

Professional Electives	Course Code	Course	Semester	
	ITY01	Compiler Design		
Drofossional Flastiva	ITY02	Object Oriented Analysis and Design	N N	
Professional Elective –I	ITY03	Introduction to Business Intelligence	V	
	ITY04	Computer Hardware and Troubleshooting		
	ITY05	C# and .Net Programming		
	ITY06	Real-time Systems		
Drofossional Flastiva II /III	ITY07	Mobile Computing	M	
	ITY08	Image Processing	VI	
	ITY09	Cloud Computing		
	ITY10	Internet of Things		
	ITY11	Big Data Analytics		
	ITY12	Software Project Management		
Brofossional Flostiva IV //	ITY13	Data Mining and Data Warehousing	VII	
	ITY14	Distributed Computing	VII	
	ITY15 Information Security			
	ITY16	Introduction to Machine Learning		

List of Open Electives

SI. No	Course Code	Course
1	ITO01	Business Process
2	ITO02	Object Oriented Software Engineering
3	ITO03	Introduction to Operating Systems
4	ITO04	Introduction to Database
5	ITO05	Web Engineering

Department : F	artment : First year Programme: B.Tech								
Semester : F	irst		Course C	Categor	y Code	: MCC S	emester l	Exam Type	: -
Course Code	Cours	0	Perio	ds / We	eek	Credit	Max	kimum Ma	rks
course coue	Cours	e	L	Т	Р	С	CA	SE	TM
FY201	Induct	tion Programme	-	-	-	Non-Credit	-	-	-
Prerequisite	-								
	The	course will enable the student to							
	CO1	Acquire social awareness & knowl	edge for s	self-dev	/elopme	ent			
Course	CO2	Be aware of nature & environmen	t consciou	us and	of Inno	vative nature.			
Outcome	CO3	Develop holistic attitude and harn	nony in th	e indiv	idual, fa	amily, and soc	iety		
	CO4	Know about the art and culture, la	anguage a	nd liter	ature o	of this vast sec	ular natio	on	
	CO5	Integrating technical Education fo	r betterm	ent of s	society				
UNIT-I	Profic	iency in English				Periods: 12			
Communication skills – Diagnostic test on Grammar – Synonyms, Antonyms, Tenses, Sentence Completion,									
Idioms & Phr	ases, C	One word substitution, Homopho	ones, Hor	nonym	is, Use	of Preposit	ions, Sul	oject-verb	CO1
agreement – V	Vriting	– Paragraph writing, Letter writing,	Essay wri	ting, St	ory Dev	elopment.			
UNIT-II	Bridge	e course in Mathematics				Periods: 12			-
Fundamentals	of diffe	rential and integral calculus: Theory	, Practice	& Test	Ξ.				
Limit of function	on-Func	amental results on limits-Continuit	ty of a fui	nction-	Concep	ot of different	tiation- C	oncept of	
derivative- Slo	pe of a	curve-Differentiation Techniques- I	Derivative	s of ele	ementa	ry functions f	rom first	principle-	
Derivatives of	inver	se functions-Logarithmic differen	tiation- I	Vietho	d of s	ubstitution-	Different	lation of	CO2
parametric iui	ar func	tions Method of integration (Deco	ns- Hign moosition	er ora	er der	bod of substi	grais or tution ir	togration	
by parts) - De	di iunc finito ir	tions-method of integration (Deco	. Properti		Ju, mei Dofinito	integrals- Re	duction	formulae	
Area and volum	ne-len	of curve- surface area of a solid	rioperti		Jennite	integrais- ne	uuction	ionnuiae-	
UNIT-III	Unive	rsal human values	•			Periods: 12			1
Current Status	of the	society (Sources of fear)-Reformati	on throug	h edu	cation-S	anskar-What	is succes	s (getting	
good marks. co	ollege a	idmission. Job etc)-What is aim of	life (happ	iness.	Prosper	rity and conti	nuity of l		
and prosperity	/)-What	t is required for happiness (rela	ationship,	physic	cal faci	, lities)-Relatio	, nship in	volves all	
emotions and	feeling	s-Physical facility-material things re	equired fo	or life-E	Differen	ce between a	animal ar	nd human	60 2
consciousness-	Animal	consciousness-depending on mone	ey, accum	ulating	g mone	y by wrong r	neans et	cHuman	03
consciousness-	right th	ninking, right understanding, right	feeling-H	appine	ss thro	ugh Harmony	in the i	ndividual,	
family, society	and na	ature, leading to fearlessness in th	e society	is the	purpos	e of holistic e	educatior	or value	
education.									
UNIT-IV	Litera	ry activities				Periods: 12			T
Team building activities – Quiz – Oral Exercises – Group discussion, Debate, Extempore, Role play. CO4									CO4
UNIT-V	Creati	ve arts				Periods: 12			
Introduction to	o painti	ng & renowned artworks – Docun	nentary &	Short	films –	- Music – Voo	cal, Instru	imental –	CO5
Dance – Classic	al, Cine	ematic – Mimicry – Mime.							
Lecture Periods: 60Tutorial Periods: -Practical Periods: -Total Periods: 60									
Reference Boo	ks								
-									

Department : N	lathema	ntics	Progra	mme:	B.Tech.				
Semester : F	i rst		Course	e Categ	ory Coo	le: BSC	Semester Ex	am Type: ⁻	ГҮ
Course Code	Course	Name	Perio	ods / W	/eek	Credit	Max	imum Ma	rks
	course		L	Т	Р	С	CA	SE	TM
MA201	Mathe	matics-I	3	1	-	4	40	60	100
Prerequisite:	-								
	CO1	To apply differential calculus	to noti	ons of	curvatu	ire, evolute	es and involu	tes and th	ey will
		have a basic understanding o	of Beta a	nd Gar	nma fu	nctions			
6	CO2	The mathematical tools need	led in ev	/aluatir	ng mult	iple integra	lls and their ι	isage.	
Course	<u> </u>	The effective mathematical	tools fo	or the	solutio	ns of diffei	rential equat	ions that	model
Outcome	CO3	physical processes							
	CO4	Able to solve simultaneous li	near dif	ferenti	al equa	tions			
CO5 Understands Vector calculus and its applications									
UNIT-I	UNIT-I Differential Calculus Periods: 12								
Curvature, radi	us of cur	vature, evolutes and involutes. I	Beta and	d Gamr	na func	tions and t	heir properti	es.	CO1
UNIT-II	Multi v	variable calculus				Periods: 1	12		<u>-</u>
Multiple Integrals, change of order of integration in double integrals, Applications: Plane areas (double									
integration), Cl	nange o	f variables (Cartesian to polar), Doub	le and	triple	integratio	ns, Volumes	by triple	CO2
integration – M	ass, Cen	ter of mass and Gravity (constar	nt and va	ariable	densiti	es).			
UNIT-III	First o	rder Ordinary Differential Equat	ion			Periods: 1	L2		
Exact equation	s, First o	order linear equations, Bernoull	li's equa	ation, E	quatio	ns not of f	irst degree,	equations	
solvable for p,	equatio	ons solvable for y, equations s	olvable	for x	- Claira	aut's type	- simple ap	plications,	CO3
orthogonal traj	ectories,	growth and decay.	- •						
UNIT-IV	Higher	Order Ordinary Differential Equ	uation		····	Periods: 1			
Linear differen	tial equ	ations of higher order - with	constar	nt coet	ticients	, the oper	rator D, Eule	er's linear	604
variation of nar	ameters	method	imuitan	eous ii	near u	nerentiar	equations, so	biution by	C04
	Vector	Calculus				Periods: 1	12		
Gradient diver	gence ar	ad curl their properties and rela	ations 9	Scalar li	ine inte	grals vect	or line integr	als scalar	
surface integra	ls. vecto	r surface integral. Theorems of	Green.	Stokes	and G	auss diver	gence (witho	ut proof).	CO5
Simple applicat	ions invo	olving cubes, sphere and rectang	ular par	allelep	ipeds.		Benee (mane	p	
Lecture Periods	: 45	Tutorial Periods: 15	Practio	cal Peri	ods:-		Total Period	s: 60	
Reference Bool	<s:< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></s:<>								
1. Veerara	ajan T, Ei	ngineering Mathematics I , McG	raw-Hill	Educat	ion(Ind	ia) Private	Limited, 2014	4	
2. Veerarajan T, Engineering Mathematics II, McGraw-Hill Education(India) Private Limited, 2015									
3. Venkat	araman	M.K., Engineering Mathematics,	Vol. 1&1	I, The N	lationa	l Publishing	g Company, C	hennai, 20)08.
4. Erwin K	reyszig,	Advanced Engineering Mathema	atics (9 t	:h Ed), .	lohn W	iley & Sons	, New Delhi,	2011.	
5. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, Eleventh Reprint, 2010.									
6. Bali N.	and Goy	al M., Advanced Engineering Ma	ithemat	ics, Lax	mi Pub	lications P	/t. Ltd., New	Delhi, 9 [™] E	dition,
2011.									

Department : Mathematics Programme : B.Tech										
Semester : S	econd		Cours	e Categ	ory Coc	de: BSC	Semester Ex	kam Type:	ТҮ	
Course Code	Course	Name	Periods / Week Credit Maximum Mar							
			L	T	Р	C	CA	SE	TM	
MA202	Mathe	matics-II	3	1	-	4	40	60	100	
Prerequisite:	-									
	CO1	Understands Matrix theory								
	CO2	The tool of Fourier series for	learnin	g advar	iced En	gineering	Mathematics			
Course	CO3	The tool of Fourier transforn	n for lea	irning a	dvance	d Enginee	ring Mathem	atics		
Outcome	CO1	The tools of differentiation	of fund	ctions o	f a con	nplex vari	able that are	e used in	various	
Cuttonic	C04	techniques dealing engineer	ing prot	olems.						
	COF	The tools of integration of	f functio	ons of	a comp	olex varia	ble that are	used in	various	
	CO5	techniques dealing engineer	ing prob	olems.						
UNIT-I	Matric	es				Periods:	12			
Inverse and ra	nk of a	matrix, System of linear equ	uations,	Symme	etric, Sl	kew Symi	metric and C	Drthogona	I	
matrices, Eigen	values a	and Eigenvectors of a real mat	rix, Cha	racteris	tic equ	ation, Pro	operties of Ei	genvalues	. CO1	
Cayley-Hamilto	n Theore	em (statement only), Diagonaliz	ation of	matrice	es.					
	Fourie	Series	• •			Periods:	12			
Dirichlet's cond	ditions -	Expansion of periodic functio	ns into	Fouriei	series	- Change	of interval-	Half-range	; ;	
Fourier series.	Complex	analysis	t mean	square	value	- Parseva	is theorem	on Fourie	CO2	
	Eourio					Dorioda	12			
Equipier Integra		mansform	transfor	m Inv	orco Ec	Periods:	12 nsform dofi	nition and	4	
nronerties - Fy	aluation	of integrals- Fourier cosine and	l sine tr	ansforn	n defin	itions and	l evaluation o	of integral	: CO3	
using cosine an	d sine tra	ansforms		unsionn	i, uciii			integrai	,	
	Comple	ex Valued function and Conform	nal Mai	oning		Periods:	12			
Definition of a	Complex	valued function f(z) and its de	erivative	e - Analy	/tic fun	ctions -Ne	ecessarv conc	lition for a	3	
function f(z) to	be analy	tic (in Cartesian) - Cauchy-Riem	ann equ	uation -	statem	ent of C-F	, Requation in	polar form	۱	
-sufficient cond	dition fo	r f(z) to be analytic(statement	t only)-	harmo	nic fun	ction- Ha	rmonic and o	orthogona		
properties of a	nalytic fu	inction – Construction of analyt	ic funct	ions. Co	onforma	al mapping	g – Simple an	d standard	1 004	
transformation	s like w	= z ² , e ^z , z+c, cz, sinz, 1/z, B	ilinear	transfo	mation	ı (excludii	ng Schwarz-	Christoffe	1	
transformation).	-								
	Comple	ex Integration	/	•	c) I	Periods:	12	,		
Cauchy's Integr	al theor	em, Cauchy's integral formula	(Withou	ut proo	f) and	problems,	laylor's and	Laurent's	\$	
theorem Cont	our integ	ration - Evaluation of real inte	residue	unit cir	valuatio	semi-circ	ular contour	(excluding	; CO5	
poles on bound	aries).		grais			30111-0110		(Excluding	>	
Lecture Period	s: 45	Tutorial Periods: 15	Practi	cal Peri	ods:		Total Perio	ds: 60		
Reference Boo	ks:						1			
1. Veerara	ajan T., E	ngineering Mathematics II, Mc	Graw-H	ill Educa	ation(In	dia) Priva	te Limited, 20)18		
2. Veerara	ajan T., T	ransforms and Partial Different	ial Equa	tions , N	ИcGraw	/-Hill Educ	ation(India) F	Private Lim	ited,	
2016										
3. Venkat	araman	M.K., Engineering Mathematics	s, Vol. II	and III,	The Nat	tional Pub	lishing Comp	any, 2008.		
4. Erwin K	reyszig,	Advanced Engineering Mathem	atics (N	inth Edi	tion), Jo	ohn Wiley	& Sons, New	Delhi, 201	.1	
5. Kaman	a B.V., Hi	igner Engineering Mathematics,	, Tata IVI		HIII Nev	v Deihi, El	eventn Keprii vt. Ltd. Now	π, 2010. Dolbi Nim	+h	
U. Dali N.	2011.	ai wi., Auvanceu Engineering Ma	aniemdi	LICS, Lax			VI. LIU., NEW	Denn, Mill	L11	

Department : Physics	Progra	amme :	B.Tech	•						
Semester : First/Second	Cours	e Categ	ory Coo	de: BSC Se	mester Ex	am Type: T	Y			
Course Code Course	Peri	ods / W	/eek	Credit	Max	kimum Mar	ks			
Course coue course	L	Т	Р	С	CA	SE	ТМ			
PH201 Physics	3	1	-	4	40	60	100			
Prerequisite -			4	<u>.</u>		£				
The course will enable the stu	dent to:									
CO1 Understand electric and magnet	etic fielo	d & pot	ential							
CO2 Study the basics of dielectric m	naterials	and its	impor	tance						
CO3 Understand the concepts of wa	ave med	hanics	and its	applications						
CO4 To study the optical phenomer	na arisin	g due t	o interf	erence, diffra	ction and	polarizatio	n			
CO5 To discuss the fundamentals of Lasers, fiber optics and its real time applications										
UNIT-I Electromagnetic theory				Periods: 12						
Brief review of electrostatics, electric field and potent	ial – div	/ergenc	e and	curl of electro	ostatic fiel	d – Gauss				
law and its applications, Laplace's equation in one, two	and thr	ee dim	ension.							
Brief review of magnetostatics, Biot-Savart law – diverg	gence ar	nd curl	of stati	c magnetic fie	eld – Ampe	ere's law –	CO1			
magnetic vector potential – comparison of electrostatic	s and m	lagneto	statics.	,						
UNIT-II Dielectrics				Periods: 12						
Dielectric polarization and its mechanisms – dielectric	loss – c	dielectr	ic brea	kdown – calc	ulation of	electronic				
polarizabilities and ionic polarizabilities – temperature	e and fr	equenc	y depe	ndence of po	larization	 internal 	CO2			
field in solids – Clausius-Mossotti relation – ferroelectri	city – fe	rroelec	tric hys	teresis.						
UNIT-III Quantum mechanics				Periods: 12						
Matter Waves – de Broglie hypothesis – uncertainty pri	inciple –	- Schröc	dinger v	vave equation	ns – time o	dependent				
- time independent - physical significance of wave for	unction	– appl	ication	to particle in	a one di	mensional	CO3			
potential box – concept of quantum mechanical tunr	neling (v	vithout	deriva	tion) – applic	ations of	tunneling				
(qualitative) to alpha decay, tunnel diode, scanning tun	neling n	nicrosco	ope.							
UNIT-IV Wave optics				Periods: 12			1			
Interference: airwedge – Newton's rings – Michelson'	s interfe	eromet	er – ty	pes of fringes	– determ	ination of				
wavelength of a light source.										
Diffraction: concept of resolution of spectral lines – Ra	ayleign s	criteri	on – re	solving powe	r of gratin	g, prism &	CO4			
telescope.	ular an	ط ماانم+:	مما مما	arization au	artar and	half wave				
Polarisation: Basic concepts of double refraction – circ	uiar and		to pola	arization – qu rimotor	arter and	nair wave				
LINIT V Lasors and Eiber ontics	rentsn		le pola	Doriode: 12						
Lasers: Principles of laser – spontaneous and stimula	tad am	iccionc	- Finst	tein's theory	of matter	· radiation				
interaction $- A$ and B coefficients $-$ nonulation inversion	ion and	laser a	ction -	- ontical reso	nators(qua					
types of lasers – Nd:YAG, CO2 laser, GaAs laser – industrial & medical applications of lasers (apy two)										
Fiber optics: Principle and propagation of light in opti	cal fihe	r – niin	rerical	aperture and	accentan	ce angle –	CO5			
sten index and graded index fiber – qualitative ideas of attenuation in ontical fibers – fiber ontic										
communication (schematic), active and passive fiber on	tic sens	ors. en	doscon	e.		and optio				
Lecture Periods: 45 Tutorial Periods: 15	Practi	cal Peri	ods: -	Тс	tal Period	ls: 60				
Reference Books										

- 1. David Griffiths, Introduction to Electrodynamics, 3rd Edition, Eastern Economy Edition., 2011
- 2. A.S. Vasudeva, Modern Engineering Physics, S. Chand & Co, 2006.
- 3. D. J. Griffiths, "Quantum mechanics", Pearson Education, 2014.
- 4. V. Rajendran, Engineering Physics, 2nd Edition, TMH, New Delhi 2011
- 5. Avadhanulu M. N., Engineering Physics, S. Chand & Co, 2007
- 6. David Halliday, Robert Resnick and Jearl Walker, Fundamentals of Physics, Wiley publications, 2013
- 7. H.J. Pain, The physics of vibrations and waves, Wiley publications, 2005
- 8. Ajoy Ghatak, Optics, 5th Edition TMH, New Delhi, 2012
- 9. Orazio Svelto, 2nd Edition, plenum Press, Principles of Lasers, 1982.
- 10. K. Thyagarajan and Ajoy Ghatak, Lasers Fundamentals and Applications, 2nd Edition, Springer 2010.

Department : P	hysics		Programme : B.Tech.							
Semester : F	irst/Seco	ond	Course	e Cate	gory Co	de: BSC	Semester E	Exam Type	e: LB	
Course Code	Course		Perio	ods / V	Veek	Credit	Ma	ximum N	1arks	
Course Coue	Course	:	L	Т	Р	С	CA	SE	TM	
PH202	Physic	s Laboratory	-	-	3	1.5	40	60	100	
Prerequisite	-				. <u>.</u>			<u></u>		
	Th	e students will learn to experin	nentally	meas	ure:					
	CO1	Optical parameters related	to the c	oncep	ts inclu	ded in theo	oretical currio	culum		
Course	CO2	Characteristic parameters of	of Laser	and o	ptical fi	ber				
Outcome	CO3	Thermal conductivity and p	ressure	coeffi	cients					
	CO4	Magnetic field, electrical co	onductiv	vity and	d Hall c	oefficient				
CO5 Young's modulus, Rigidity modulus and acceleration due to gravity										
Choice of 10-12	2 experir	ments from the following								
1. Radius of	fcurvatu	ure of a Lens - Newton's rings								
2. Thicknes	s of a th	in object by air – wedge								
3. Spectron	neter – r	r – resolving power of a prism								
5. Spectron	heter – h	ter - hollow prism / ordinary & extraordinary rays by calcite prism*								
6. Lorent's	Half sha	de polarimeter – determination	n of spe	cific ro	tatory p	ower				
7. Determir	nation of	f wavelength of a laser source	using tra	ansmis	sion gra	ting, reflec	tion grating	(vernier		
calipers)	& partic	le size determination								
8. Determir	nation of	f numerical aperture & accepta	ance ang	gle of a	n optica	al fiber			CO2	
9. Determin 10 Michelso	n's inter	recomption coefficient	ormate	eriais u	sing las	er.				
11. Coefficie	nt of the	ermal conductivity - radial flow	method	3						
12. Coefficie	nt of the	ermal conductivity – Lee's disc	method						CO3	
13. Jolly's bu	lb appar	ratus experiment – determinat	ion of α	*						
14. Magnetis	sm: I – H	curve								
15. Field alo	ng the a	xis of a coil carrying current								
16. Vibration	magnet	ometer – calculation of magne	tic mon	nent &	pole st	rength			CO4	
17. Electrical	conduc	tivity of semiconductor – two p	probe / f	four pr	obe me	thod*				
18. Hall effec	ct in a se	miconductor*								
19. Determination of Young's modulus and rigidity modulus										
*Demonstratio	n evneri	iments	Ium						CO5	
Demonstratie										
Lecture Periods	s: 45	Tutorial Periods: -	Practi	cal Per	iods: -		Total Period	ls: 45		
Reference Boo	ks					i				
1. Physics Pra	ctical Ob	oservation Manual, Departmen	t of Phy	sics, P	ondiche	rry Enginee	ering College	2.		

Department : C	hemistry	/	Progra	mme :	B.Tech						
Semester : Fi	rst/Seco	ond	Course	e Categ	ory Co	de: BSC	Semester	Exam Type	e: TY		
	C		Peric	ods / W	/eek	Credit	M	aximum N	/larks		
Course Code	Course		L	Т	Р	С	CA	SE	TM		
CY201	Chemis	stry	3	1	-	4	40	60	100		
Prerequisite:	-		<u>.</u>		<u>.</u>						
	The co	urse will enable the student to:									
	CO1	Analyse microsconic chemist	trv in tei	rms of	orhital	structure	and intermo	olecular fo	nces		
6	CO1	Pationalize the bulk properti	ios and r	nroces), Structure					
Course	02			proces							
Outcome	CO3	Study the concepts of electro	ocnemis	stry and	a its ap	plications		•			
	CO4	Understand the mechanism	of chem	nical re	actions	and synthe	sis of molec	cules			
	CO5	Comprehension of the conce	epts of a	analytic	al tech	niques.					
UNIT-I	Chemio	al bonding and isomerism				Periods: 1	2				
Chemical bondi	ng-valer	ice bond theory, overlapping of	f orbital	ls. Hyb	ridizatio	on in carbo	n compound	ds-sp, sp ²	and		
sp ³ . Electron pa	ir repuls	ion. Hybridization and shape of	water a	and am	monia	molecules.	Molecular o	orbital the	ory-		
combination of	atomic	omic orbitals. Bond order. Molecular orbital diagrams for homonuclear diatomic molecules-									
(hydrogen to ne	eon). Ion). Ionic, dipolar and van der Waals interactions.									
Structural and	stereo i	somerism-geometrical isomeri	sm in a	alkenes	. Optic	al isomeris	m-optical a	ctivity, cl	niral CC	,,	
carbon. Optical	isomeri	omerism in lactic acid and tartaric acid. Enantiomers, diastereomers and meso compounds.									
Resolution of ra	icemic m	nic mixtures, racemization, asymmetric synthesis, Walden inversion.									
UNIT-II	Water	chemistry and reaction kinetics	S			Periods: 1	2				
Water chemist	ry-hard	and soft water, removal o	of hardı	ness k	by ion	exchange	and zeolit	e proces	ses.		
Determination	of hardn	ess by EDTA method. Desalinati	ion-Reve	erse os	mosis.						
Adsorption-ads	orption	of gases on solids-Freundlich	and La	angmu	ir adso	rption isot	herms. Fact	tors affec	ting CC)2	
adsorption of g	ases on	solids. Chemical kinetics-rate	of a rea	action,	factors	affecting r	ate of react	tion, first	and		
second order ra	te equat	tions Half-life of reactions									
	ate equations. Half-life of reactions.										
UNIT-III	Electro	de potential and corrosion				Periods: 1	2		I		
UNIT-III Electrode poter	Electro	de potential and corrosion ctromotive force, reference ele	ctrodes	-hydro	gen, Ag	Periods: 1 g/AgCl, calo	2 mel and gla	ss electro	des.		
UNIT-III Electrode poter Nernst equation	Electro ntial, elec n and ap	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr	ctrodes ation ce	-hydro ell. Bat	gen, Ag teries-P	Periods: 1 /AgCl, calo rimary and	2 mel and glas secondary	ss electro batteries.	des. Dry		
UNIT-III Electrode poter Nernst equation cell, alkaline ba	Electro ntial, elec n and ap ttery, Ni-	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr -Cd battery and lead-acid batter	ctrodes ation ce ry. Fuel (-hydro ell. Bat cell-Hy	gen, Ag teries-F drogen	Periods: 1 /AgCl, calo rimary and -oxygen fue	2 mel and gla secondary el cell.	ss electro batteries.	des. Dry CC)3	
UNIT-III Electrode poter Nernst equation cell, alkaline bat Corrosion-dry a	Electro ntial, elec n and ap ttery, Ni- nd wet	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr -Cd battery and lead-acid batter corrosion, mechanism of electi	ctrodes ation ce ry. Fuel o rochemi	-hydro ell. Bati cell-Hy ical coi	gen, Ag teries-F drogen rrosion,	Periods: 1 (/AgCl, calo Primary and -oxygen fue , galvanic, p	2 mel and glas secondary el cell. pitting and o	ss electro batteries. concentra	des. Dry tion)3	
UNIT-III Electrode poter Nernst equation cell, alkaline bat Corrosion-dry a cell corrosion. F	Electro ntial, ele n and ap ttery, Ni- nd wet actors ir	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr -Cd battery and lead-acid batter corrosion, mechanism of electu fluencing corrosion. Corrosion	ctrodes ration ce ry. Fuel rochemi control	-hydro ell. Bat cell-Hy ical co by cath	gen, Ag teries-F drogen rrosion, nodic p	Periods: 1 (/AgCl, calo rimary and -oxygen fue , galvanic, protection. A	2 mel and gla secondary el cell. bitting and d nodization.	ss electro batteries. concentra	des. Dry tion)3	
UNIT-III Electrode poter Nernst equation cell, alkaline bar Corrosion-dry a cell corrosion. F UNIT-IV	Electro ntial, elec n and ap ttery, Ni nd wet actors in Introdu	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr Cd battery and lead-acid batter corrosion, mechanism of electi influencing corrosion. Corrosion action to reaction mechanism	ctrodes ation ce ry. Fuel o rochemi control	-hydro ell. Batt cell-Hy ical cor by cath	gen, Ag teries-F drogen rrosion, nodic p	Periods: 1 (AgCl, calo Primary and -oxygen fue galvanic, p rotection. A Periods: 1	2 mel and glas secondary el cell. bitting and d nodization. 2	ss electro batteries. concentra	des. Dry tion)3	
UNIT-III Electrode poter Nernst equation cell, alkaline bar Corrosion-dry a cell corrosion. F UNIT-IV Introduction to	Electro ntial, electro n and ap ttery, Ni- nd wet actors in Introdu reactio	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr -Cd battery and lead-acid batter corrosion, mechanism of electro influencing corrosion. Corrosion action to reaction mechanism in mechanism-factors influence	ctrodes ration ce ry. Fuel rochemi control ing a re	-hydro ell. Batt cell-Hy ical con by cath eactior	gen, Ag teries-F drogen rrosion, nodic p	Periods: 1 (AgCl, calo rimary and -oxygen fue galvanic, p rotection. A Periods: 1 olytic and	2 mel and glas secondary el cell. bitting and d nodization. 2 heterolytic	ss electro batteries. concentra bond fiss	des. Dry tion ion.)3	
UNIT-III Electrode poter Nernst equation cell, alkaline bar Corrosion-dry a cell corrosion. F UNIT-IV Introduction to Reaction intern	Electro ntial, electro n and ap ttery, Ni- nd wet actors in Introdu reaction nediates	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr -Cd battery and lead-acid batter corrosion, mechanism of electro fluencing corrosion. Corrosion action to reaction mechanism n mechanism-factors influenci -carbonium ion, carbanion, fre	ctrodes ration ce ry. Fuel o rochemi control ing a re radice	-hydro ell. Batt cell-Hy ical col by cath eactior als anc	gen, Ag teries-F drogen rrosion, nodic p n, home I carbe	Periods: 1 g/AgCl, calo primary and -oxygen fue galvanic, p rotection. A Periods: 1 olytic and nes. Electro	2 mel and gla secondary el cell. bitting and c nodization. 2 heterolytic ophiles and	ss electro batteries. concentra bond fiss nucleoph	des. Dry tion ion. iles.)3	
UNIT-III Electrode poter Nernst equation cell, alkaline bar Corrosion-dry a cell corrosion. F UNIT-IV Introduction to Reaction intern Mechanism of	Electro ntial, electro n and ap ttery, Ni- nd wet actors ir Introdu reaction nediates free ra	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr -Cd battery and lead-acid batter corrosion, mechanism of electro fluencing corrosion. Corrosion action to reaction mechanism n mechanism-factors influence -carbonium ion, carbanion, fre dical substitution-chlorination	ctrodes ration ce ry. Fuel o rochemi control ing a re re radica of me	-hydro ell. Bat cell-Hy ical con by cath eactior als anc ethane.	gen, Ag teries-F drogen rrosion, nodic p n, hom l carbe Mech	Periods: 1 (AgCl, calo primary and -oxygen fue galvanic, protection. A Periods: 1 olytic and nes. Electro anism of e	2 mel and glas secondary el cell. bitting and o nodization. 2 heterolytic ophiles and electrophlic	ss electro batteries. concentra bond fiss nucleoph substitut	des. Dry tion cc ion. iles. ion- cc)3	
UNIT-III Electrode poter Nernst equation cell, alkaline bat Corrosion-dry a cell corrosion. F UNIT-IV Introduction to Reaction intern Mechanism of bromination of	Electro ntial, electro n and ap ttery, Ni- nd wet actors in Introdu reaction nediates free ra benzen	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr -Cd battery and lead-acid batter corrosion, mechanism of electron fluencing corrosion. Corrosion action to reaction mechanism In mechanism-factors influence -carbonium ion, carbanion, fre dical substitution-chlorination e. Nucleophilic substitution-S _{N2}	ctrodes ration ce ry. Fuel o rochemi control ing a re se radica of me 2-hydrol	-hydro ell. Batt cell-Hy ical con by cath eactior als anc thane. lysis of	gen, Ag teries-F drogen rrosion, nodic p n, hom I carbe Mech	Periods: 1 (AgCl, calo rimary and -oxygen fue , galvanic, p rotection. A Periods: 1 olytic and nes. Electro anism of e /l bromide,	2 mel and glas secondary el cell. bitting and d nodization. 2 heterolytic ophiles and electrophlic S_N1 -hydroly	ss electro batteries. concentra bond fiss nucleoph substitut ysis of t-b	des. Dry tion ion. iles. ion- utyl cc)3	
UNIT-III Electrode poter Nernst equation cell, alkaline bat Corrosion-dry a cell corrosion. F UNIT-IV Introduction to Reaction intern Mechanism of bromination of	Electro ntial, electro ntial, electro ntial, electro ntial, electro nd wet actors in Introdu reaction nediates free ra benzen ation re	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr -Cd battery and lead-acid batter corrosion, mechanism of electro fluencing corrosion. Corrosion action to reaction mechanism n mechanism-factors influenci -carbonium ion, carbanion, fre dical substitution-chlorination e. Nucleophilic substitution-S _{N2} actions-E1 and E2. Addition rea	ctrodes ration ce ry. Fuel o rochemi control ing a re radica of me 2-hydrol actions-r	-hydro ell. Batt cell-Hy ical col by cath eactior als anc thane. lysis of nucleo	gen, Ag teries-F drogen rrosion, nodic p n, home l carbe Mech methy philic a	Periods: 1 g/AgCl, calo primary and -oxygen fue galvanic, p rotection. A Periods: 1 olytic and nes. Electro anism of e l bromide, nd electrop	2 mel and gla secondary el cell. bitting and c nodization. 2 heterolytic ophiles and electrophlic S_N1 -hydroly hilic. Synthe	ss electro batteries. concentra bond fiss nucleoph substitut ysis of t-b esis of asp	des. Dry tion ion. iles. ion- utyl irin,)3	
UNIT-III Electrode poter Nernst equation cell, alkaline bar Corrosion-dry a cell corrosion. F UNIT-IV Introduction to Reaction intern Mechanism of bromination of bromide. Elimin paracetamol, su	Electro ntial, electro ntial, electro nd ap ttery, Ni- nd wet actors in Introdu reaction rediates free ra benzen- nation re ulfanilam	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr -Cd battery and lead-acid batter corrosion, mechanism of electro fluencing corrosion. Corrosion action to reaction mechanism In mechanism-factors influenci -carbonium ion, carbanion, fre dical substitution-chlorination e. Nucleophilic substitution-S _{N2} actions-E1 and E2. Addition real tide and chloroquine.	ctrodes ration ce ry. Fuel o rochemi control ing a re e radica of me 2-hydrol actions-r	-hydro ell. Bat cell-Hy ical con by cath eactior als anc thane. lysis of nucleo	gen, Ag teries-F drogen rrosion, nodic p nodic p nodic p nodic p nodic p nodic p nodic p	Periods: 1 (AgCl, calo primary and -oxygen fue galvanic, protection. A Periods: 1 olytic and nes. Electro anism of e l bromide, nd electrop	2 mel and glas secondary el cell. bitting and o nodization. 2 heterolytic ophiles and electrophlic S _N 1-hydroly hilic. Synthe	ss electro batteries. concentra bond fiss nucleoph substitut ysis of t-b esis of asp	des. Dry tion cc ion. iles. ion- utyl irin,)3	
UNIT-III Electrode poter Nernst equation cell, alkaline bat Corrosion-dry a cell corrosion. F UNIT-IV Introduction to Reaction intern Mechanism of bromination of bromide. Elimin paracetamol, su UNIT-V	Electro ntial, electr	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr -Cd battery and lead-acid batter corrosion, mechanism of electro fluencing corrosion. Corrosion action to reaction mechanism in mechanism-factors influence -carbonium ion, carbanion, fre dical substitution-chlorination e. Nucleophilic substitution-S _{N2} actions-E1 and E2. Addition rea ide and chloroquine.	ctrodes ration ce ry. Fuel o rochemi control ing a re e radica of me 2-hydrol actions-r	-hydro ell. Batt cell-Hy ical con by cath eaction als anc thane. lysis of nucleo	gen, Ag teries-F drogen rrosion, nodic p n, home l carbe Mech methy philic a	Periods: 1 (AgCl, calo primary and -oxygen fue , galvanic, p rotection. A Periods: 1 olytic and nes. Electro anism of e l bromide, nd electrop Periods: 1 pricible coord	2 mel and glas secondary el cell. bitting and o nodization. 2 heterolytic ophiles and electrophlic S_N1 -hydroly hilic. Synthe	ss electro batteries. concentra bond fiss nucleoph substitut ysis of t-b esis of asp	des. Dry tion ion. iles. ion- utyl irin, CC)3	
UNIT-III Electrode poter Nernst equation cell, alkaline bat Corrosion-dry a cell corrosion. F UNIT-IV Introduction to Reaction intern Mechanism of bromination of bromide. Elimin paracetamol, su UNIT-V Absorption and and instrument	Electro ntial, electro ntial, electro ntial, electro ntial, electro nterv, Ni- nterv, Ni	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr -Cd battery and lead-acid batter corrosion, mechanism of electron fluencing corrosion. Corrosion action to reaction mechanism in mechanism-factors influence -carbonium ion, carbanion, fre dical substitution-chlorination e. Nucleophilic substitution-SN2 actions-E1 and E2. Addition reac ide and chloroquine. ical techniques on of radiation. Beer-Lamberts	ctrodes ration ce ry. Fuel o rochemi control ing a re e radica of me 2-hydrol actions-r	-hydro ell. Batt cell-Hy ical col by cath eactior als anc thane. lysis of nucleo	gen, Ag teries-F drogen rrosion, nodic p n, hom l carbe Mech ^c methy philic a et and	Periods: 1 (AgCl, calo rimary and -oxygen fue galvanic, p rotection. A Periods: 1 olytic and nes. Electro anism of e l bromide, nd electrop Periods: 1 visible spec-	2 mel and gla secondary el cell. bitting and o nodization. 2 heterolytic ophiles and electrophlic S _N 1-hydroly hilic. Synthe 2 troscopy-ba	ss electro batteries. concentra bond fiss nucleoph substitut ysis of t-b esis of asp	des. Dry tion cc ion. iles. ion- utyl irin, cc ples)3	
UNIT-III Electrode poter Nernst equation cell, alkaline bar Corrosion-dry a cell corrosion. F UNIT-IV Introduction to Reaction intern Mechanism of bromination of bromide. Elimin paracetamol, su UNIT-V Absorption and and instrument	Electro ntial, electro ntial, electro nd ap ttery, Ni- nd wet actors in Introdu reaction rediates free ra benzen- nation re ilfanilam Analyti emissio ation. Ba	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr -Cd battery and lead-acid batter corrosion, mechanism of electro fluencing corrosion. Corrosion action to reaction mechanism In mechanism-factors influence -carbonium ion, carbanion, fre dical substitution-chlorination e. Nucleophilic substitution-S _{N2} actions-E1 and E2. Addition rea- ide and chloroquine. ical techniques on of radiation. Beer-Lamberts asic principles and instrumenta	ctrodes ration ce ry. Fuel o rochemi control ing a re e radica of me 2-hydrol actions-r	-hydro ell. Bat cell-Hy ical con by cath eactior als anc thane. lysis of nucleo traviole atomic	gen, Ag teries-F drogen rrosion, nodic p n, hom I carbe Mech Mech i methy philic a et and c absor	Periods: 1 (AgCl, calo rimary and -oxygen fue galvanic, p rotection. A Periods: 1 olytic and nes. Electro anism of e l bromide, nd electrop Periods: 1 visible spec ption spect Conductor	2 mel and glas secondary el cell. bitting and o nodization. 2 heterolytic ophiles and electrophlic S _N 1-hydroly hilic. Synthe 2 ctroscopy-ba rometry, ho	ss electro batteries. concentra bond fiss nucleoph substitut ysis of t-b esis of asp asic princi ollow cath	des. Dry tion cc ion. iles. ion- utyl irin, ples ode cof)3	
UNIT-III Electrode poter Nernst equation cell, alkaline bar Corrosion-dry a cell corrosion. F UNIT-IV Introduction to Reaction intern Mechanism of bromination of bromide. Elimin paracetamol, su UNIT-V Absorption and and instrument lamp. Conduct	Electro ntial, electr	de potential and corrosion ctromotive force, reference ele plications. Electrolyte concentr -Cd battery and lead-acid batter corrosion, mechanism of electro fluencing corrosion. Corrosion action to reaction mechanism in mechanism-factors influence -carbonium ion, carbanion, fre dical substitution-chlorination e. Nucleophilic substitution-S _{N2} actions-E1 and E2. Addition rea ide and chloroquine. cal techniques on of radiation. Beer-Lamberts asic principles and instrumenta ivalent and molar conducta	ctrodes ration ce ry. Fuel o rochemi control ing a re e radica of me 2-hydrol actions-r law. Ult ation of nce, ce	-hydro ell. Batt cell-Hy ical con by cath eactior als anc ethane. lysis of nucleop traviole atomic ell cor	gen, Ag teries-F drogen rrosion, nodic p 1 carbe di carbe Mech methy philic a et and c absor istant.	Periods: 1 (AgCl, calo rimary and -oxygen fue galvanic, p rotection. A Periods: 1 olytic and nes. Electro anism of e l bromide, nd electrop Periods: 1 visible spec ption spect Conductor	2 mel and glas secondary el cell. bitting and o nodization. 2 heterolytic ophiles and electrophlic S _N 1-hydroly hilic. Synthe 2 ctroscopy-ba rometry, ho netric titrat	ss electro batteries. concentra bond fiss nucleoph substitut ysis of t-b esis of asp asic princi ollow cath tion-types	des. Dry tion ion. iles. ion- utyl irin, ples ode of cC)3))4	
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Department : C	hemistr	γ	Programme : B.Tech.							
Semester : F	irst/Sec	ond	Course	e Cate	gory Coo	de: BSC	Semester	[.] Exam Typ	e: LB	
Course Code	Course	<u>م</u>	Peric	ods / V	Veek	Credit	N	laximum N	Marks	
	course		L	Т	Р	С	CA	SE	IT	М
CY202	Chem	istry Laboratory	-	-	3	1.5	40	60	10	00
Prerequisite	-									
	The st	udents will learn to:								
	CO1	Determine rate constants and	d order d	of read	tions					
Course	<u> </u>	Measure molecular/system p	ropertie	s such	as surf	ace tension	, viscosity,	partition c	oeffici	ient,
Outcome	02	hardness of water, adsorption	n, sapon	ificati	on value	e and acid v	alue			
	CO3	Analyze quantitatively the co	ntents o	f samp	oles					
	CO4	Use conductivity, potentiome	etric and	chron	natogra	phic technic	ques			
	CO5	Analyse a salt sample								
Choice of 10-12	2 experi	ments from the following:								T
1. Kinetic	study o	f acid hydrolysis of ethyl acetat	e							CO1
 Determ Partitio Total h Freund Saponid Saponid Chlorid Determ Determ<	n of bei ardness lich adsi fication e conte nination nination nination amberts sium co acid con ed oxyg nination	of surface tension and viscosity nzoic acid between benzene an of water - Determination by EE orption isotherm - Adsorption of value and acid value of an oil nt of water - Determination by of oxalic acid by permanganom of ferrous by permanganometr of ferrous and ferric by dichror of carbonate and bicarbonate i law - Determination of ferrous ntent in water - Determination tent in vinegar en content in water - Determin of available chlorine in bleachin	y d water DTA met of acetic Mohr's m hetry ry metry in a mixt by color by EDTA ation by ng powc	hod acid o metho cure rimetr a meth Wink ler.	on charco od y nod ler's me	oal				CO2
17. Conduc 18. Potenti 19. Thin lay	ctometri iometric yer chro	ic titration titration matography								CO4
20. Chemic	al analy	rsis of salt for cations and anion	IS							CO5
Lecture Period	s:	Tutorial Periods: -	Practio	al Per	riods: 4	5 T	otal Period	ls: 45		
Reference Bool 1. Lab Manual, 2. V. Venkates Sons, New D	ks Depart waran, Delhi, 20	ment of Chemistry, Pondicherry R. Veeraswamy and A.R. Kular 01.	y Engine ndaivelu	ering , Basic	College, C Princip	Puducherry bles of Prac	y, 2018. tical Chem	istry, Sulta	an Cha	and &

 J. Mendham, R.C. Denney, J.D. Barnes and M. Thomas, Vogel's Text Book of Quantitative Chemical Analysis, Pearson Education, New Delhi, 2002.

Department : H	umaniti	ies and Social Sciences	Programme : B.Tech									
Semester : F	irst/Sec	ond	Course	e Categ	ory Coo	de: HSM	Semester E	Exam Type	e: TY			
Course Code	Course		Perio	ods / W	/eek	Credit	Ma	aximum N	1arks			
Course Coue	Course	2	L	Т	Р	С	CA	SE	ТМ			
HS201	Englisł	n for Communication	2	-	2	3	40	60	100			
Prerequisite	-					<u> </u>						
	CO1	To help the learners to develop	their te	echnica	al comm	nunication s	kills					
	CO2	To equip the learners with skill	s requir	ed for	develop	oing their re	ading prowe	ess.				
Course	CO3	To enhance the writing skills of	learner	s by pr	oviding	practice in	writing.					
Outcome	<u> </u>	To instil confidence in learners	s to dev	elop ti	neir spe	eaking skills	and enable	them to	articulate			
	CO4	with ease.										
	CO5 To facilitate vocabulary enhancement and grammatical correctness in communication.											
UNIT-I	TECHN	CHNICAL COMMUNICATION Periods: 12										
Nature of Tee	chnical communication – Forms of Technical Communication – General and Technical											
Communication	n – Impo	ortance and need –Organization	in Tecł	nnical (Commu	nication – S	Style – ABC	of Techni	cal co1			
Communication	n –Techr	nical Communication Skills.							01			
UNIT-II	COMP	REHENSION AND ANALYSIS				Periods: 1	2					
Technical and	Non-Teo	chnical passages – Reading met	thods –	Skimn	ning –	Scanning-	Extensive a	nd Intens	ive coa			
reading – Inferr	ing – Co	ontextual meaning – summary – r	note ma	king.					02			
UNIT-III	PRACT	ICE IN WRITING				Periods: 1	2					
Sentence Struct	tures – I	Use of phrases and clauses in se	ntences	– cohe	erence i	in writing –	principles for	or paragra	iph			
writing –Essay \	Writing -	 describing – defining – classify 	ring – Βι	usiness	letters	– memorar	ndum – inst	ructions -	- E- CO3			
mail –reports.	•					•						
UNIT-IV	SPEAK	ING PRACTICE				Periods: 1	2					
Pronunciation -	-Basics	of Phonetics- Conversations and	d dialog	ues –fo	ormal p	resentation	s – Group [Discussion	s – CO4			
Extempore spea	aking – [Debates- Role Plays– interview sk	kills.									
UNIT-V	GRAM	MAR AND VOCABULARY BUILDI	NG			Periods: 1	2					
Word formation	n – root	words from foreign languages	and the	ir use	in Engli	sh – Prefixe	es and suffix	kes –subje	ect-			
verb agreemen	t – Art	icles – voice – preposition– in	nportan	ce of p	ounctua	ntion – Red	undancies –	- synonyr	ns, CO5			
Antonyms and s	standaro	d abbreviations– Indianisms.										
Lecture Periods	s: 30	Tutorial Periods: -	Practio	cal Peri	iods: 30)	Total Period	ds: 60				
Reference Bool	(S											
1. Sudarshana,	N.P and	C. Savitha. English for Technical	Comm	unicatio	on. Noi	da: CUP, 20	16.					
2. Shoba, K N a		des Joavani Rayen. Communicat	Ive Engl	lish. Ch	ennai:	CUP, 2017.						
 KIZVI, ASTIFAT Daniel Iones 	, IVI. Eff Fnølick	Pronouncing Dictionary Cambr	idge I In	enn: N iversitv	/ Press	, 2017. 2003						
5. Dutt, Kiranm	nai P and	d Geetha Rajeevan. Basic Commu	inication	n Skills.	New D	elhi: CUP,2	013					

6. Sanjay Kumar and Pushpalata. Communication Skills. New Delhi: OUP, 2011.

7. Mohan, Krishna and Meera Banerji. Developing Communication Skills. 2nd edition. Delhi: Macmillan, 2012.

8. Relevant material from newspapers, magazines and journals will be used for integrated practice.

Department : N	lechani	cal Engineering	Programme : B.Tech									
Semester : Fi	irst/Sec	ond	Course	Categor	y Code	: ESC	Semeste	er Exam Ty	ype: L	3		
Course Code	Course	<u>_</u>	Perio	ds / We	ek	Credit	M	aximum N	Marks			
course coue	Course		L	Т	Р	С	CA	SE	ΪT	N		
ME201	Work	shop and Manufacturing Practice	0	0	3	1.5	40	60	10)0		
Prerequisite												
	CO1	To convey the basics of mechan experience in making the differen	ical tools t carpent	used in ry joint:	n carpe S	entry see	ction and	l establisi	n hand	ls on		
Course	CO2	To gain knowledge on types of t some exercises	tools and	machi	nes use	ed in sh	eet meta	al shop ar	nd per	form		
Outcome	CO3	To develop basic welding and fitting joints using the hand tools and establish the importance of joints and fitting in engineering applications										
	CO4	To gain knowledge of the different machines used in manufacturing processes which are commonly employed in the industry, to fabricate components using different materials										
	CO5	To carry out simple manufacturing operations in lathe, drilling and shaping machine										
UNIT-I	Carpe	ntry				Period	s: 9					
Study of tools a	nd mac	hines in carpentry			·							
Practice on :1.H	lalf Lap j	joint 2.Corner Mortise joint and 3.	Dovetail	joint						CO1		
UNIT-II	Sheet	Metal				Period	s: 9					
Study of tools a	nd mac	hineries in sheet metal shop								roz		
1.Frustum of co	ne 2.W	aste collection tray and 3.Rectangu	lar box							002		
UNIT-III	Weldiı	ng and Fitting				Period	s: 9					
Lectures/demo preparation 2. \	nstratio /-Fitting	ns/videos on Welding and fitting gand 3. Simple lap joint	operatio	ons wit	n simp	le exerc	cise. 1. F	iling and	Job	CO3		
UNIT-IV	Study	of tools and machines				Period	s: 6					
Study of tools a	nd mac	hines in manufacturing lab										
1. Lathe machir	ne 2.Dri	lling machine and 3.Shaping machi	ne							CO4		
UNIT-V	Simple	e Exercises in Lathe/Drilling machir	e/Shape	r		Period	s: 12					
Simple operation	ons in la	the, drilling and shaping										
1.Facing and Tu	urning	2.Step Turning 3.Drilling in a fla	t plate w	vith diff	erent o	drill dim	ensions a	and 4.Cub	e in	CO5		
Shaping												
Lecture Periods	s: 3	Tutorial Periods: -	Practica	l Period	ls: 42	•	Total Per	iods: 45				
Reference Bool	٢S											
 Hajra Choudl and Vol. II 20 Kalpakjian S. India Edition 	hury S.K)10, Me And Ste , 2002.	K., Hajra Choudhury A.K. and Nirjhar dia promoters and publishers privat even S. Schmid, "Manufacturing Eng	Roy S.K., te limited gineering	, "Eleme , Mumb and Teo	ents of bai. chnolog	Worksho gy", 4th o	op techno edition, P	ology", Vo Pearson Eo	ol. I 20 ducati	08 on		

3. H.N.Gupta, R.C.Gupta and Arun Mittal, Manufacturing Processes, New Age Publications, 2001.

Department : N	1echani	cal Engi	neering	Progra	mme :	B.Tech)					
Semester : Fi	irst/Sec	ond		Course	e Categ	ory Co	de: ESC	Semester I	Exam Type	: TY		
Course Code	Course	~		Perio	ods / V	/eek	Credit	M	aximum M	arks		
Course Code	Course	2		L	Т	Р	С	CA	SE	TM		
ME202	Engine Aided	eering G Drawin	iraphics and Computer g	2	-	4	3	40	60	100		
Prerequisite	-											
	CO1	Stude engine	nts learn to properly dim eering drawing practice.	nension	and ar	notate	engineerin	g drawings	as per sta	ndards of		
Course	CO2	Stude solids	nts are made to follow ar	nd unde	rstand	the bas	sics of engin	eering draw	ving with s	imple		
Outcome	CO3	Stude	nts can properly apply ar	nd produ	ice sec	tional v	riews.					
	CO4	Students are able to properly create multi-view orthographic drawings from three dimensional										
	diagrams. Students are able to present a drawing in orthographic and isometric projections.											
	CO5 Students learn the application of engineering graphics through computer-aided drafting.											
UNIT-I							Periods: 1	.8				
Introduction to	Engine	ering g	raphics, Standards for E	ngineeri	ng Dra	iwing p	oractice, Let	tering, Line	work and	I		
Dimensioning, F	Projectio	on of Lir	nes, Projection of Planes							CO1		
UNIT-II							Periods: 1	.8				
Projections of s	imple so	olids								CO2		
UNIT-III							Periods: 1	.8				
Sections of solid	ds and I	Develop	ment of surfaces							CO3		
UNIT-IV							Periods: 1	.8		<u>.</u>		
Isometric Proje	ctions a	nd Orth	ographic Projections							CO4		
UNIT-V							Periods: 1	.8				
Introduction to CAD script.	Compu	iter Gra	phics and Drafting, Auto	o CAD, 2	-D dia	grams	of simple g	eometries u	ising Auto	CO5		
Lecture Periods	s: 30		Tutorial Periods: -	Practio	al Per	iods: 60)	Total Perio	ds: 90	i		
Reference Bool	٢S			<u>.</u>								
 K.R. Gopala K.Venugopa BIS, Engined T. Jeyapoov N.D. Bhatt, K.V. Natara M. B. Shah Agrawal B. 	krishna al, Engir ering Dr van, Eng Enginee jan, A Tr and B. C & Agrav	and Suc neering I rawing p ineering ering Dra ext Bool C. Rana, val C. M	dhir Gopalakrishna, Engir Drawing & Graphics + Au practices for Schools & Co g Graphics using AUTOCA awing, 49 th edition, Charo k of Engineering Drawing Engineering Drawing, 2 nd I. (2012), Engineering Gra	neering (to CAD, Illege, SF D, 7 th ec otar Pub , Dhanal dedition aphics, T	Graphic 4 th edit 2 46: 20 lition, ' lishing lakshm , Pears MH Pu	cs, Inzir tion, Ne D03. VIKAS F House i Publis on Pub blicatic	nc Publisher ew Age Int'll Publishing H , 2014. Shers, 2006. lications, 20 on	s, 2007. Publication ouse (P) Ltd)18.	Ltd., 2004. ., 2015.			

10. http://en.wikipedia.org/wiki/CATIA

Department : E	lectrical	and Electronics Engineering	ring Programme : B.Tech								
Semester : F	irst/Secc	ond	Cours	e Cate	gory Co	de: ESC	Semester	Exam Ty	pe: TY		
Course Code	Course		Peri	ods / V	Veek	Credit	N	laximum	Marks		
	course		L	Т	Р	С	CA	SE	TM		
EE201	Basic E	lectrical Engineering	3	1	-	4	40	60	100		
Prerequisite	-										
	CO1	To understand the basic cor	ncepts	of DC c	ircuits a	and theore	ms.				
	CO2	To explain the concepts of A	AC circu	iits and	d resona	ance.					
Course	CO3	To understand the basic cor	ncepts	of mag	netic ciı	rcuits and t	transformer	•			
Outcome	CO4	To explain the working prine	ciple, co	onstru	ction, ap	pplications	of electrica	l machine	es.		
	CO5	To Gain knowledge of wo earthing.	rking c	of pow	er plan	its and fui	ndamentals	of switc	h gear and		
UNIT-I	DC Circ	uits				Periods:	12				
Electrical circui	t elemen	ts (R, L and C) - Definition of V	/oltage	, Curre	nt, Pow	ver and Ene	ergy – Ohm'	s law, Kir	choff		
current and vo	ltage law	ge laws, analysis of simple circuits with DC voltage – Division of current in series and parallel									
circuits – Star-	ar-delta conversion – Node and mesh method of analysis of DC circuits – Network Theorems: CO1										
Thevenin, Nort	on and S	uperposition Theorems.									
UNIT-II	AC Circuits Periods: 12										
Representation	of sinu:	soldal waveforms, peak and r	ms val	ues, p	hasor r	epresentat	tion, real po	ower, rea	ictive		
power, appare	nt powe	r, power factor. Analysis of si	ingle-pl	nase a	c circuit	ts consistii	ng of R, L, (C, RL, RC	, RLC CO		
combinations (series ar	id parallel). Resonance: Series	s and p	arallel	resona	ince. Inree	e-phase bala	anced cir	cuits:		
				ower	measur	Denie der		eter metn	00.		
UNIT-III	Transic	ormers		Forod		Periods:					
Laws of Electro	characte	c induction – Ampere's circuit	.dl IdW, mor: C	Falau	dy S Idw	nd working	Idw – Dol i Tosses in	transform	meric co		
regulation and	efficienc	v. Auto-transformer and three-	-phase	transfo	ormer co	onnections		transion			
	Flectric	al Machines	price			Periods	12				
Elementary co	ncept of	rotating machines – Flemm	ning's	right h	nand ar	nd left ha	nd rule – I	DC Mach	nines:		
Construction a	nd worki	ng of DC Machines - Generato	or and	Motors	s – Emf	equation	of DC gener	ator and	back		
emf of DC mot	or –char	acteristics - Types of DC Mac	hines.	AC Ma	chines:	Construct	ion and wor	rking of S	Single CO		
phase & three	ohase ind	luction motors and synchronou	us gene	erator (qualitat	tive approa	ach only).	-	-		
UNIT-V	Power	Plants and LT Switch gear				Periods:	12				
Power Plants:	Layout	of thermal, hydro and nucle	ear po	wer ge	eneratio	on (block	diagram ap	proach d	only).		
Components of	AC trans	smission and distribution syste	ms – O	ne-line	diagrai	m.			CO		
Components of	LT Swite	chgear: Switch Fuse Unit (SFU)	, MCB,	ELCB,	мссв, -	Types of W	/ires and Ca	bles. Eart	hing.		
Elementary cal	culations	for energy consumption.		_				-			
Lecture Period	s: 45	Tutorial Periods: 15	Practi	cal Pe	riods: -	<u> </u>	Total Perio	ds: 60			
Reference Boo	ks		•	" ~		.	<u> </u>	~ 1 7			
1. D. P. Kotha	ari and L.	J. Nagrath, "Basic Electrical En	gineeri	ng″, 3r	d Editio	on, Tata Mo	Graw Hill, 2	017.			
2. D. C. Kulsh	iresntha,	Basic Electrical Engineering",	I ata IV		[,] HIII, 20)11. DIN 1			014		
5. Kajenora I											
1 I C Dobro		amontals of Electrical Enginee	ring" (g", 3ra Dyford	Edition	i, PHI Learr	ning Private i	Limited, 2	2014.		

E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
 V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

Department : E	lectrical	and Electronics Engineering	Programme : B.Tech								
Semester : F	irst/Sec	ond	Cour	se Cat	egory (Code: ESC	Semes	ter Exam ⁻	Гуре: LB		
Course Code	Course	<u></u>	Peri	ods / V	Veek	Credit	М	aximum N	Лarks		
Course Coue	Course	-	L	Т	Р	C	CA	SE	TM		
EE202	Basic E	lectrical Engineering Laborator	·y -	3 1.5 40 60							
Prerequisite	-										
	CO1	To understand the principle	s of domest	tic wiri	ng and	l electrical	compon	ents.			
Course	CO2	To illustrate handling of me theorems	asuring inst	rumer	nts and	demonst	rate the o	concepts	of network		
Outcome	CO3	CO3 To analyze RL,RC,RLC circuits									
	CO4	To introduce concepts of sir	ngle/three p	hase o	circuits						
	CO5	To demonstrate the working	g principle o	of elec	trical m	nachines					
Any 10 experim	nents										
 Study of: Ba lamp holde Study of far Stair case w Bedroom w 	tudy of: Basic safety precautions. Concepts of domestic wiring- wires, switches, plugs, sockets, fuses and imp holders. tudy of fan and tube light connections and earthing tair case wiring. edroom wiring.										
 Use of mea Verification Verification 	suring ir 1 of Thev 1 of Sup	nstruments. Verification of Kirch renin and Norton theorems erposition Theorem.	off's voltag	e and	current	t law			CO2		
 8. Impedance 9. Measurement 10. Resonance 	calculat ent of po : Series a	ion of R-L, R-C & R-L-C circuits a ower & power factor in a single and parallel.	nd verificat phase AC ci	ion. rcuit u	sing th	ree Amme	eter Meth	nod	СО3		
 Measureme Measureme Measureme Energy mea 	ent of va ent of th asureme	nrious line and phase quantities ree phase power using two wat nt using single phase energy me	for a three tmeter met eter.	phase hod.	star/de	elta ac circ	uit.		CO4		
14. Load test o 15. Load test o	n a singl n a singl	e phase transformer. e phase induction motor.							CO5		
Lecture Period	s:	Tutorial Periods:	Practical P	eriods	: 45	Tot	tal Period	ds: 45			
Reference Boo	ks										
1. Laboratory	Manual	, Department of Electrical and E	lectronics E	nginee	ering, P	ondicherr	y Enginee	ering Colle	ege.		

Department : Computer Science and Engineering Programme : B.Tech	g Programme : B.Tech									
Semester : First/Second Course Category Code: ESC Semest	er Exam Type:	ТҮ								
Course Code Course Credit Credit	Maximum Ma	arks								
L T P C C/	SE	ТМ								
CS201 Programming for Problem Solving 3 3 40	60	100								
Prerequisite -										
CO1 Understood the phases of problem solving techniques for simple prob	ems.									
CO2 Able to write programs using the basic language constructs.										
COURSE Able to build a larger programs using function oriented approaches.										
CO4 Could write efficient programs using advanced concepts to optimize t	e memory.									
CO5 Could write programs to access data from the secondary storage effic	entlv.									
UNIT-I Algorithmic Problem Solving Periods: 9	,									
History and Classifications of Computers – Components of Computer – Working Principle	of Computer	_								
Hardware – Software and its Types – Applications of Computers. Generations of Programm	ng Languages	_								
Introduction to Number System. Problem solving techniques: Program development life-cycle	- Algorithms	- CO1								
building blocks of algorithms - Algorithmic problem solving-Flowchart– Pseudo code.	f algorithms - Algorithmic problem solving-Flowchart– Pseudo code.									
UNIT-II Data, Expressions, Statements Periods: 9										
Introduction to C – C Program Structure – C Tokens: Keyword, Identifiers, Constants, Variables	and Data typ	es								
(simple and user-defined) – Operators and its types – Operator Precedence – Expression Ev	aluation – Ty	pe CO2								
Conversion – Managing Input/output operations-Branching Statements – Looping Statements.										
UNIT-III Arrays and Functions Periods: 9										
Arrays – Two dimensional arrays, Multidimensional arrays. Character arrays.		_								
Functions: Function Prototype, Passing Arguments to Function – Call by Value and Call by Refe	erence – Neste	ed CO3								
function call – Library Functions – User-defined Functions – Recursion.										
Strings – String I/O functions, String Library functions – Storage classes.										
Structures Arrays and structures. Nested structures. Structure as argument to functions. I	nion Dointors									
Declaration Initialization and Accessing Pointer variable – Pointers and arrays – nointers as argu	ment and retu	rn CO4								
value – Pointers and strings - Pointers and structures										
UNIT-V File Management Periods: 9		l								
Introduction to File Concepts in C – File types – I/O operations on files – File modes – Random	access to files	. —								
Command line arguments. Dynamic Memory Allocation: MALLOC, CALLOC, FREE, REALLOC.	Introduction	to cor								
preprocessor: Macro substitution directives - File inclusion directives -Compiler Contr	ol directives	- 05								
Miscellaneous directives										
Wiscenarieous un ectives.										
Lecture Periods: 45Tutorial Periods: -Practical Periods: -Total Period	riods: 45									
Lecture Periods: 45 Tutorial Periods: - Practical Periods: - Total Period Reference Books Fractical Periods: - Practical Periods: - Practical Period	riods: 45									
Lecture Periods: 45 Tutorial Periods: - Practical Periods: - Total Period Reference Books 1. Balagurusamy. E, "Programming in ANSI C", Tata McGraw Hill, Seventh Edition, 2017. 1.	riods: 45									
Lecture Periods: 45 Tutorial Periods: - Practical Periods: - Total Period Reference Books 1. Balagurusamy. E, "Programming in ANSI C", Tata McGraw Hill, Seventh Edition, 2017. 2. Byron Gottfried & Jitender Chhabra, "Programming with C", Schaum's Outlines Series, 2017. 2. Drian W. Karnishan & Damia Ditabia (The C Due wanting here and "Difference Series, 2017.	riods: 45									

4. Ashok N Kamthane, "Computer Programming", Pearson education, Second Edition, 2012.

Department : Computer Science and Engineering Programme : B.Tech										
Semester : F	irst/Secor	nd	Cours	e Categ	gory Co	ode: ESC	Semeste	r Exam Typ	e: LB	
			Perie	ods / W	/eek	Credit	Ň	/laximum N	Лarks	
Course Code	Course		L	T	Р	С	CA	SE	τN	1
CS202	Program	nming Laboratory	-	-	3	1.5	40	60	100	0
Prereauisite	-			.LL		. L	L	LL		
	CO1	Understood the program e	diting a	nd com	pilatio	on environm	ent.			
	<u> </u>	Able to write simple (prog	orams II	sing me	nst from	nuently used	control st	ructures		
Course	CO2	Apply the methods proble				unctions		uctures.		
Outcome	CO3	Apply the methods problem	nis usinį	g arrays	. and n					
	CO4	Learnt to handle data proc	cessing u	using st	ructure	es for simple	applicatio	ns.		
	CO5	Write programs that could	handle	file i/o	and po	ointers.				
Programming l	Jsing C									
1. Study of Com	npilation a	and execution of simple C pro	ograms							
2. Basic C Progr	rams									
a. Arith	imetic Ope	erations								CO1
b. Area	and Circu	Imference of a circle								COI
c. Swap	ping with	and without Temporary Vari	ables							
3. Programs usi	ing Branch	ning statements								
a. To cł	neck the n	umber as Odd or Even								
b. Grea	itest of Th	ree Numbers								
c. Cour	nting Vowe	els								
d. Grad	ling based	l on Student's Mark								
4. Programs usi	ing Contro	ol Structures								CO 2
a. Com	puting Fac	ctorial of a number								COZ
b. Fibo	nacci Serie	es generation								
c. Prim	e Number	⁻ Checking								
d. Comp	outing Sum	n of Digit								
5. Programs usi	ing Arrays									
a. Sum	of 'n' num	nbers								
b. Sorti	ing an Arra	ау								
c. Matr	ix Additio	n, Subtraction, Multiplication	n and Tr	ranspos	e					CO3
6. Programs us	ing Functio	ons								05
a. Com	puting nC	r								
b. Facto	orial using	g Recursion								
c. Call b	y Value an	nd Call by Reference								
7. Programs usi	ing String	Operations								
a. Palin	drome Ch	necking								
b. Sear	ching and	Sorting Names								
8. Programs usi	ing Structı	ure								CO4
a. Stud	ent Inform	nation System								
b. Emp	loyee Pay	Slip Generation								
c. Elect	tricity Bill (Generation								
9. Programs us	ing Pointe	rs								
a. Point	ter and Ar	ray								
b. Poin	ters as arg	gument and return value								
c. Point	ter and Sti	ructure								CO5
10. Programs u	sing File C	Operation								-
a. Cour	iting No. c	of Lines, Characters and Black	к Spaces	S						
b. Cont	ent copy l	from one file to another								
c. Read	ling and W				• •					
Lecture Period	s: -	Tutorial Periods: -	Practi	cal Per	iods: 4	45 T	otal Period	ds: 45		
Reference Boo	ks									
-										

Department : Civil	Engine	ering	Programme : B.Tech									
Semester : First	/Second	ł	Cours	e Categ	gory Co	de: MCC	Semester Ex	(am Type	:-			
Course Code	Course	2	Peri	ods / W	/eek	Credit	Max	imum M	arks			
	course	-	L	Т	Р	С	CA	SE	ТМ			
CE201	Enviro	nmental Science	3	-	-	Non-Crea	dit -	-	-			
Prerequisite	-											
	CO1	Able to understand about the available	enviro	nment	and na	tural resou	irces					
	CO2	Able to design the Rainwater of domestic water	harvest	ing and	d adopt	ing the me	thods for rec	ycle and	reuse			
Course Outcome	CO3	Able to address the environm depletion of natural resources	ble to address the environmental issues namely pollution, epletion of natural resources and degrading ecosystem									
Course Outcome	CO4	Able to develop models for resource and energy management, which are environmental friendly and work for sustainable development of the huma										
	CO5	Able to participate in the Green initiatives in the society i.e. Energy conservation and a										
	CO6 Able to make the solid waste segregation and conduct events related environmental issues.											
Activity – 1						Periods:	9					
Water resources-	Water C	vcle, Distribution, Groundwate	r flow, [Deman	d for w	ater, Wate	r pollution- c	auses	CO1			
and effects, Water	⁻ Act (19	74).	,			,	·					
Activity – 2		-				Periods:	9					
Rainwater Harvest	ing-Met	hodology, components, design	of rain	water ł	narvest	ing system	for a single h	iouse (as				
per IS:15797-2008)								CO2			
Activity – 3						Periods:	9					
Domestic waste w	ater- De	finition, Characteristics, Recycl	ing and	Reuse	of dom	nestic wast	e water.					
Activity – 4						Periods:	9					
Air Pollution- defir	nition, cl	assification, causes, Sources, ef	fects a	nd cont	rol me	asures, Air	Act (1981)					
Activity – 5						Periods:	9		CO3			
Solid Waste mana	gement	 Causes- effects and control m 	neasure	s of Ur	ban an	d industria	l waste, Wast	te				
management initia	atives in	India for human well-being.										
Activity – 6						Periods:	9	-	CO4			
Renewable and no	on-renev	vable energy resources- use of	alterna	ting en	ergy so	urces – En	ergy manage	ment.				
Activity – 7			D. I			Periods:	9	•				
Green Buildings- D	etinitio	n, Importance, building envelop	be, Prob	lems ir	1 existii	ng building	s, Energy use	in Iding				
assessment system	Juse gas	semissions and muoor air ponu	tion, gr		Istruct	Ion materia	ais, Green bu	nung				
Activity – 8	ii, Case s	study				Periods	9		CO5			
Importance of Tre	e Planta	tion Display of usefulness of tr	ees Me	athod o	f tree i	planting Id	ontify the tre	200				
available in the PF	C campi	us. Mass Plantation inside/outs	ide the	campu	s in ass	sociation w	ith the H2FC	/NSS of				
PEC, Store the tree	es to the	e planted by the dignitaries with	n the he	lp of h	orticult	ure of PEC		,				
Activity – 9		, , , ,		•		Periods:	9					
Collection and seg	regatior	n of solid waste in the PEC camp	ous in a	ssociat	ion wit	h the H2EC	/NSS of PEC					
Activity – 10	-					Periods:	9		CO 6			
Invite guest Lectur	es from	the Environmental experts of I	OSTE (fo	or envir	onmer	tal issues),	/REAP (for er	ergy				
efficient buildings)/Town and Country Planning/PWD of Puducherry, conducting competitions to students in												

the topics of slogan making, post	er and seminar presen	tations, debate and observin	g the important national									
and international days on environmental issues to bring awareness among the students and public.												
Activity Periods: 45	tivity Periods: 45 Tutorial Periods: - Practical Periods: - Total Periods: 45											
Reference Books	•		· · · · · · · · · · · · · · · · · · ·									
 P.Yugananth, R.Kumaravela 2017. John Pichtel, Waste Manage V.S.K.V.Harish, Arunkumar, Anubha Kaushik and C.P.Kau Delhi, 2010. S.S.Dara, A text book of Env 2014. 	n, Environmental Scien ement Practices: Munic Green Building Energy ushik, Environmental Sc ironmental Chemistry a	ce and Engineering, Scitech P ipal, Hazardous and Industria Simulation and Modeling, Els ience and Engineering, New Ind Pollution Control, S.Chan	Publications (Inida) P.Ltd., Delhi, al, CRC Press,2014 sevier Science & Technology,2018 Age International (P) Ltd., New d and Company Ltd., New Delhi,									

- 6. IS:15797:2008, Roof Top Rainwater Harvesting-Guidelines, BIS, New Delhi
- 7. Energy Conservation Building Code, 2017, Bureau of Energy Efficiency, Ministry of Power, Government of India.

Department : ECE			Programme:	B. Tec	h. (IT)						
Semester : Third			Course Categ	gory Co	de: ES	SC 5	Semester	Exam	Type:	ТҮ	
Course Code	C		Periods	/ Weel	(Credit	N	1aximu	ım Ma	rks	
Course Code	Cours	se Name	L	Т	Р	С	CA	SE	٦	ГМ	
EC233	Electi	ronic Circuits	3	-	-	3	40	60	1	L OO	
Prerequisite	Nil										
	CO1	Understand th	e theory of did	odes ar	nd the	ir applicati	ons.				
	CO2	Acquire an in-	depth knowled	lge abo	out va	rious trans	sistor con	figurat	ions a	nd also	
Course Outcome	<u> </u>	Analyze the transistors at low frequencies and the need for nower amplifiers									
Course Outcome	CO3		nalyze the transistors at low frequencies and the need for power amplifiers.								
	C04	oscillation to c	e kilowieuge	011 03	scillato	JIS allu t	ne conu	шоп	requir	eu ioi	
	COE	OSCIllation to occur.									
	Diode	DS Examine the behaviour of operational amplifier and its application.									
				ما:م ام		Ferious.			·: c:	CO1	
Diode current equation	on, v-i	characteristics	of PN Junction	aloae	– Hai	f wave and		ve rect	litiers	01	
Vith and Without filte	ers - De		e factors and i	ectific	ation	emciency-	Clippers,	Clamp	bers -		
	Trans	Sisters	a photodiode -	- const	ructio	Doriodo		acteris	sucs.		
UNII-II	Trans	listors		-		Periods:	3			I	
Construction, working	g & cha	aracteristics of I	BJT (CE, CB an	d CC c	onfigu	irations) ai	nd JFET,	– oper	ating	CO2	
point, Transistor biasi	ng and	BJT and FET bia	s circuits.			· _ · ·	-				
UNIT-III	Ampl	ifiers				Periods:	9				
'h' parameters- Small	signal	low frequency r	nodel of BJT -A ss A Amplifier.	Analysi – Class	s of Cl B Am	t, CB and C plifier – Cl	C amplifi	iers– P Nifiers	ower	CO3	
		ators	SS A Ampimer		DAIII	Periods:		JIIIEIS.	•	<u> </u>	
Eeedback concent g	osciii	characteristics	of positive fee	dhack	Bark	hauson Cri	itorion-Co	nctru	ction	CO1	
working ,characterist	ics and	l derivation of	frequency of	oscilla	tion f	or Hartley	, Colpitts	and	Wien	C04	
bridge oscillators - cry	stal os	cillator.	, ,			,	, I				
UNIT-V	Opera	ational Amplifie	er			Periods:	9			<u>.</u>	
Introduction to op-a	mp, C	haracteristics c	of op-amp, O	p-amp	para	meters -	Equivale	nt circ	cuit -	CO5	
Applications: Inverti	ng an	d non-invertin	g amplifier,	summ	ner, s	ubtractor,	voltage	e follo	ower,		
differentiator, integra	tor, coi	mparator, first c	order low pass	and hi	gh pas	s active filt	ters.				
Lecture Periods: 45		Tutorial Pe	riods: - Pra	actical	Perio	ds:	Total Per	iods: 4	5		
Reference Books:											
1. J. Millman, C.Halkia	s and S	atyabrata, "Elec	tronic devices	and Ci	rcuits'	', Third edi	ition, Mc	Graw H	lill, 201	10.	
2. Robert L. Boylester 11th Edition, 2013.	ad and	Louis Nashelsky	y, "Electron De	evices	and C	ircuits The	ory ", Pre	entice	Hall o	f India,	
3. David A. Bell, "Elect	ronic D	evices and Circu	uits", Prentice	Hall of	India,	5th Editio	n, 2008.				
4. Theodore F. Bogart	, "Elect	ronic Devices ar	nd Circuits", Pe	arson	Educa	tion India,	2011.				
		11171020021				-					

https://nptel.ac.in/courses/117103063/
 Samuel Y. Liao, "Microwave Devices and Circuits", Prentice Hall, 3rd Edition, 1996.

7. S. Salivahanan and et.al., "Electronic Devices and Circuits", Tata Mcgraw Hill, Fifth Reprint, 2008.

Department : I	Department : Information Technology					Programme: B. Tech. (IT)							
Semester :	۲hird		Со	urse C	ategory	Code: PCC	Sem	ester Ex	am Typ	e: TY			
Course Code	C	- Nores	Pe	riods	/ Week	Credit		Maxi	mum M	arks			
Course Code	Course	e Name	L	Т	Р	С	CA	SE		ТМ			
IT201	Digita	l System Design	3	-	-	3	40	60		100			
Prerequisite:	-												
	CO1	Understand the binary r	numb	er sys	tems and	d Boolean a	lgebra						
Course	CO2	Design any combination	al log	gic usi	ng only c	of universal	gates,	MSI gat	es and P	2LDs			
Outcomo	CO3	Design and implement s	eque	ential l	ogic circ	uits of any c	omple	xity.					
Outcome	CO4	Understand the memory	y and	prog	rammabl	le logic array	ys						
	CO5	Simulate and validate th	ne coi	rrectn	ess of th	e digital circ	uits us	ing VHD) L packa	iges			
UNIT-I	Numb	er Systems and Boolean	Algel	bra		Periods: 9)						
Binary number	system	is and conversion - Binary	y arit	hmet	c-Binary	codes - Boo	olean a	algebra	- Basic				
operations - I	Basic Th	eorems - Boolean funct	tions-	Cano	nical for	ms - Simpl	ificatio	n of B	oolean	CO1			
functions-Karnaugh maps - Tabulation method.													
UNIT-II	Comb	inational Logic		Periods: 9	9								
Adders – subtractors – code converters – binary parallel adder –BCD adder – magnitude													
comparator –	encode	rs – decoders – multiple	exers	– de	multiple	exers- Binary	y Mult	iplier –	Parity	CO2			
generator and checker.													
UNIT-III Sequential circuits Periods: 9													
Sequential Circ	cuits -la	tches – flip flops – analy	sis of	t clocł	ked sequ	ential circu	its – st	ate red	uction				
and assignme	nts. Re	gisters and Counters:	Regis	ters	– shift	registers –	ripple	e coun	ters –	CO3			
synchronous c	ounters	- other counters				T							
	Memo	ory and Programmable Lo	ogic			Periods: 9)						
Random acces	s memo	ry – memory decoding - e	error	detec	tion and	correction -	- Read	only me	emory				
– Programmab		Array – Programmable Al	rray L	_Ogic-	Sequent	Ial program	mable	devices	tation	CO4			
	CPLDS,	regas. Design at the reg	ister		aco froo	docign Lat	tch from	ever no	tation				
	Introd	uction to VHDI	хашр	ле – к	acenee	Deriode: 0		e uesigi	I				
Introduction		Design flow program	ctru	icturo	types	and consta	onte f	unction	s and				
procedures li	oraries a	and nackages-Data-Flow	Desci	rintio	, types ns∙ Hiøhl	ights of Dat	ta flow	unction descri	ntions	CO5			
Structure of da	ita-flow	description. Data type-ve	ectors	S. VHD	L for con	nbinational	circuit	s.	500113,				
Lecture Period	s: 45	Tutorial Periods: -	Pra	actical	Periods	:-	Tota	l Perioc	ls: 45				
Reference Boo	oks:												
1. M. Mc	rris Ma	no and Michael D. Ciletti,	Digi	tal Sys	stems: W	/ith an Intro	ductio	n to the	e Verilog	g HDL, Sixth			
Editior	n, Pearso	on, 2018.	C	•									
2. Samir	Palnitka	r, VERILOG HDL – A Guide	e to D	igital	Design a	nd Synthesi	s, Pear	son Edu	ucation I	nc., Second			
Edition, 2012.													
3. J. Bhasker, VHDL Primer, Prentice Hall of India Pvt. Ltd, Third Edition, 2006.													
4. Thoma	is L. Floy	d and R.P. Jain, Digital Fu	Indan	nenta	ls, Pearso	on Educatio	n, Tent	h editio	n, 2008				
5. Leach	Malvino	, Digital Principles and Ap	plica	tions,	Tata Mc	Graw Hill, Fi	ifth ed	ition, 20	05.				
6. Charle	s H. Rot	h, Fundamentals of Logic	Desig	gn, Th	omson B	rooks/Cole,	Fifth e	dition,	2003.				
7. Thoma	is C Bart	ee, Computer Architectu	re an	d Logi	c Design,	, McGraw H	ill, Sing	gapore,	2002.				

Department : Ir	Technology	Programme: B. Tech. (IT)								
Semester : T	⁻ hird		Subjec	t Categ	gory: PC	C S	Seme	ster Exa	m Type	: TY
			Perio	ods / W	/eek	Credi	t	Maxi	imum N	1arks
Course Code	Course Na	ame	L	Т	Р	С		CA	SE	ТМ
IT202	Data Stru	ctures	3	-	-	3		40	60	100
Prerequisite	CS201 – P	Programming for Problem So	lving							
	CO1	Comparative study of sorting applications	g and sea	arching	algoritl	hms and a	pplyi	ng them	ı in	
<u> </u>	CO2	To design, analyze and imple	ment lir	near da	ta struc	tures usin	g C			
Outcome	CO3	To design, analyze and imple	ment no	on - line	ear data	structure	s usi	ng C		
	CO4	Learn the basics of tree base	d search	i techn	iques ne	eeded for	adva	nced co	urses	
CO5 Identify and use appropriate data structure to solve a given problem										
UNIT – I	Sorting A	nd Searching Techniques						Peric	ods: 9	
Sorting algorithms – Insertion sort - selection sort – shell sort – bubble sort – quick sort – heap sort- merge sort – radix sort – searching – linear search – binary search. Comparison of sorting algorithms and searching algorithms									CO1	
UNIT – II	Lists							Perio	ods: 9	
Array implementation – linked list – doubly linked list – circular linked list – multi lists – applications of CO2 , linked lists								CO2, CO5		
UNIT – III	Stacks an	d Queues						Perio	ods: 9	
Stack – array an – application of	d linked im stacks and	plementation of stacks – que queues –expression evaluati	eue – arr on – prie	ay and ority qเ	linked l ueues –	list implen double er	nenta nded	ation of o queues	queues	CO2, CO5
UNIT – IV	Non-Linea	ar Data Structures						Perio	ods: 9	
Binary tree – arr graphs – represe	ray and link entation –	ed implementation of binary breadth first search – depth f	trees – irst sear	applica ch – sp	ation of banning	trees – tre trees – ap	ee tra plica	versals tion of g	_ graphs	C03, CO5
UNIT – V	Advanced	Search Techniques						Perio	ods: 9	
Binary search tro collision resolut	ee – B-tree ion and op	indexing – B+ trees – Tree in en addressing	dexing -	- AVL tı	rees - Ha	ash table -	– has	h functio	ons –	CO4, CO5
Lecture Periods	: 45	Tutorial Periods: -	Practic	al Peri	ods: -		٦	Total Pe	riods:45	5
References			<u>.</u>							
 Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, —Fundamentals of Data Structures in C, Second Edition, University Press, 2008. Bichard Gilberg, Bebrouz and A. Forouzan, "Data Structures: A Pseudocode Approach with C" Second 										
 Mark Allen Weiss, —Data Structures and Algorithm Analysis in C, Second Edition, Pearson Education, 2010. Venkatesan R and Lovelyn Rose S, —Data Structures, Wiley India Pvt Ltd, New Delhi, 2015. Salaria R S, —Data Structures and Algorithms using C. Eifth Edition. Khanna Rook Publishing, New Delhi 										

- 2012.6. D. Samanta, Classic Data Structures, 2nd Edition, PHI, 2009
- 7. Reema Thareja, Data Structures Using C, Oxford University Press, 2011.

Department : Information Technology Programme: B. Tech. (IT)									
Semester :	Third	Cou	irse Ca	tegory Co	de: PCC	Semeste	er Exam	Туре: ТҮ	
	Course Nore -	Pe	eriods ,	/ Week	Credit	Max	imum N	larks	
Course Code	Course Name	L	Т	Р	С	CA	SE	ТМ	
IT203	Object Oriented Programming using C++ and Java	3	-	-	3	40	60	100	
Prerequisite:	CS201 – Programming for Proble	m Sol	ving	<u>.</u>		L			
	CO1 Understands the basic Co	oncep	ts of O	OPs (C++)				
	CO2 Implements object orien	ted pi	rogram	is in C++					
Course	CO3 Understands the basics of	of Java	3						
Outcome	CO4 Learns Inheritance and P	olym	orphisi	n, Packag	es, Interfa	aces(Java)			
	CO5 Learns Exception Handlin	, าg. Th	reads.	Applets(J	ava)				
UNIT-I	Basics of Object Oriented Program	nmin	g	1-1	,	Per	iods: 9		
Object Oriente	ed Programming - Concepts – Object	ts – Cl	lasses -	– Method	s - Messa	ges –Abst	raction		
- Encapsulatio	n – Inheritance – Abstract Classes –	Polvn	norphi	sm. Intro	duction To) C++ – Cl	asses –		
Access Specifiers – Function and Data Members –Function Overloading – Friend Functions –									
Static Member	rs – Obiects – Pointers and Obiects -	- Cons	stant C	biect–Ne	sted Class	– Local C	lasses		
UNIT-II	Constructors and Overloading, Ex	ceptio	on Han	dling, Inł	neritance	and Per	iods: 9	<u>.</u>	
	Polymorphism	•		0,					
Constructors -	– Default Constructor – Parameter	ized (Constru	uctors – (Constructo	or with D	ynamic		
Allocation – C	Copy Constructor – Destructors –	Opera	ator O	verloadin	ig – Over	loading t	hrough		
Friend Functio	ons – Exception Handling – Try-Cato	ch-Thr	row Pa	radigm –	Exception	n Specifica	ation –		
Terminate and	d Unexpected Functions – Uncaugh	t Exce	eption	- Inherita	nce – Puł	olic, Privat	te, and	CO2	
Protected Derivations – Multiple Inheritance – Virtual Base Class - Virtual Functions – Pure Virtual									
Functions									
UNIT-III Basics of Java Periods: 9									
Creation of Java, importance of Java to internet, byte code, Java buzzwords, data types, declaring									
variables, dyn	amic initialization, scope and life	time	of va	riables, a	arrays, op	erators, o	control		
statements, t	ype conversion and casting, com	piling	and	running	of simple	Java pr	ogram.		
Concepts of cl	asses and objects, class fundamenta	als De	claring	objects,	assigning	object ref	erence	CO3	
variables, intro	oducing methods, constructors, usa	age of	f statio	with dat	ta and me	ethods, us	age of		
final with data	a, access control, this key word, ove	rload	ing me	thods an	d construe	ctors, para	ameter		
passing - call b	y value, nested classes and inner cla	asses,	explor	ing the St	ring class.				
UNIT-IV	Inheritance and Polymorphism, Pa	ackag	es, Int	erfaces (J	ava)	Per	iods: 9		
Basic concepts	s, member access rules, usage of s	super	key w	ord, form	ns of inhe	ritance, n	nethod		
overriding, ab	stract classes, dynamic method dis	patch	, using	g final wit	h inherita	nce, the	Object		
class. Definin	g, Creating and Accessing a Pao	ckage,	, Und	erstandin	g CLASSP	ATH, im	oorting	CO4	
packages, diff	ferences between classes and int	erface	es, de	fining an	interface	e, implem	enting		
interface, appl	lying interfaces, variables in interfac	e and	exten	ding inter	faces.				
UNIT-V	Exception Handling, Threads, App	olets (Java)			Per	iods: 9		
Concepts of E	Exception handling, types of excep	tions,	usage	e of try, o	catch, thr	ow, throw	vs and		
finally keywo	rds, Built-in exceptions, creating	g owr	n exce	eption su	ub classe	s, Conce	pts of		
Multithreading	g, differences between process ar	nd thr	ead, t	hread life	o, e cycle ,c	reating m	nultiple		
threads using Thread class, Runnable interface, Synchronization, thread priorities, inter thread CO								CO5	
communicatio	n, daemon threads, deadlocks, thre	ad gro	oups.						
Applets - Con	cepts of Applets, differences betw	een a	applets	and app	olications,	life cycle	e of an		
applet, types of	of applets, creating applets, passing	paran	neters	to applet	S.			_	
Lecture Periods: 45 Tutorial Periods: - Practical Periods: - Total Periods: 45									
Reference Boo			~ "	D -	E .1 · ·	<u> </u>	E	D	
1. Ira Po	ni, "Object Oriented Programming	using	C++",	Pearson	Education	i, Second	Edition	Reprint,	
2004.	in the second	N A -	"	Duin					
2. S. B. L	Lippman, Josee Lajole, "Barbara E.	IVI00,	°C++	Primer",	FOURTH ED	ition, Pea	Irson EC	lucation,	
2005.	Nustrup "The Cul Brogramming Lan	au 200	" This	d Edition	Boarcon !	ducation	2004		

3. B. Stroustrup, "The C++ Programming Language", Third Edition, Pearson Education, 2004.

- 4. D. S. Malik, "C++ Programming: From Problem Analysis to Program Design", 2012.
- 5. E. Balaguruswamy, "Object-Oriented Programming with C++", Sixth Edition, TMH, 2013.
- 6. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi, 2002.
- 7. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons, 2005.
- 8. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI, 2004.
- 9. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education, 2002.
- 10. Core Java 2, Vol 2, Advanced Features, Cay. S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education, 2004.

Department : Chemistry Programme: B. Tech.											
Semester :	Third		Subjec	t Catego	ory: BSC	Sen	nester Ex	am Type: ˈ	TY		
Course Code	Course	Name	Per	iods / W	eek	Credit	Max	imum Ma	rks		
Course Coue	Course	name	L	Т	Р	С	CA	SE	ТМ		
SH201	Biolog	y for Engineers	3	-	-	2	40	60	100		
Prerequisite	-										
	After s	tudying the course, the student wil	l be able	to:							
	CO1	Convey that classification per se is	s not wh	at biolog	gy is all a	about but	highlight	the unde	rlying		
	COI	criteria, such as morphological, biochemical and ecological									
	<u> </u>	lighlight the concepts of recessiveness and dominance during the passage of genetic									
Outcomes	COZ	naterial from parent to offspring									
	<u> </u>	Convey that all forms of life have	Convey that all forms of life have the same building blocks and yet the manifestations are as								
	COS	liverse as one can imagine									
	CO4	Gain a basic understanding of enz	yme act	ion and f	factors	affecting t	heir acti	/ity.			
	CO5	Identify and classify microorganisi	ms.								
UNIT-I	Classification Periods: 9										
Classification outline based on (a) cellularity- Unicellular or multicellular (b) ultrastructure prokaryotes or											
eukaryotes (c) Energy and Carbon utilisation -Autotrophs, heterotrophs, lithotropes (d) Ammonia											
excretion –	aminot	elic, uricoteliec, ureotelic (e) H	abitats-	acquat	tic or	terrestria	al (e) ľ	Molecular	CO1		
taxonomy thr	ee majo	or kingdoms of life.									
UNIT-II	Geneti	CS				Periods	: 9				
Mendel's law	s, Conce	ept of segregation & independent	assortm	ent. Co	ncept o	f allele. R	lecessive	ness, and	CO3		
dominance. S	ingle ge	ne disorders in humans – Sickle cel	l disease	, Phenyl	ketonui	ria.					
UNIT-III	Bio-mo	blecules				Periods	: 9				
Carbohydrate	s: Types	s, Structural & functional importa	nce. Lip	ids: Cla	ssificati	on - Simp	ole, com	pound, &			
derived, Impo	ortance	of lipid soluble vitamins. Amino	acids –	genera	l struct	ure, esse	ntial ami	ino acids.			
Proteins - Lev	els of p	rotein structure, structural & funct	tional in	portanc	e of pr	oteins, En	zymes- D	Definition,	CO3		
Enzyme Activi	ty & Un	its, Specific Activity, Specificity, Fac	tors affe	ecting en	nzyme a	ctivity. N	ucleic aci	ds: Types			
and importan	ce.										
UNIT-IV	Metab	olism				Periods	: 9				
Introduction:	Food ch	ain & energy flow. Definitions - Ana	abolism	& Catabo	olism. P	hotosynth	iesis: Rea	ction and	CO1		
importance.	ilycolysi	s & TCA cycle. ATP – the energy cur	rency of	cells					0.04		
UNIT-V	Microb	biology				Periods	: 9				
Concept of s	ingle ce	elled organisms. Concept of spe	cies &	strains.	Identi	fication 8	& classifi	cation of	CO5		
microorganisms. Virus – Definition, types, examples.											
Lecture Perio	ds: 45	Tutorial Periods: -	Practio	al Perio	ds: -	Tot	al Period	ls: 45			
Reference Books:											
1. Biology: A	global a	approach: Campbell, N. A.; Reece, J.	. B.; Urry	, Lisa; Ca	ain, M,L	.; Wasseri	man, S. A	.; Minorsk	ху, Р.		
V.; Jackso	V.; Jackson, R. B. Pearson Education Ltd										

2. Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H. John Wiley and Sons

3. Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freemanand Company

4. Molecular Genetics (Second edition), Stent, G. S.; and Calender, R. W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher

5. Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C.Brown Publishers.

Department: I	:: Information Technology Programme: B. Tech. (IT)										
Semester : 1	۲hird		Course	Course Category Code: PCC			Semeste	Semester Exam Type: LB			
Course Code	Course Norse		Perio	Periods / Week Credit				Maximum Marks			
Course Code	Cours	Course Marine		Т	Р	С	CA	SE	TM		
IT204	Digita	al Laboratory	-	-	3	1.5	40	60	100		
Prerequisite	-	-									
	CO1	To perform fundamental operations on digital circuits.									
Course	CO2	To design combinational digital circuits									
Outcome	CO3	To design sequential circu	To design sequential circuits								
	CO4	CO4 Design complex digital circuits using VHDL									
Cycle 1 Implemen • Full ac	i tation lder/fu	of logic circuits using gates Il subtractor		1					CO18		

	 Code converters Parity generator Design of priority Implementation Design of decode 	and Checker y encoder of Boolean functions u er, Demultiplexer	sing MUX		CO2
	Cycle 2 Implementation of c • Synchronous cou • Asynchronous cou • Binary multiplier • Decimal Adder • Universal shift re • Design of Arithm	ircuits using MSI inters ounters egister etic unit			CO3
	Cycle 3 • Design and Imple Language (VHDL)	ementation of combin) - Adder/ Subtractor, E	ational circuits using Verilo Binary multiplier.	og Hardware Description	CO4
Leo	ture Periods: -	Tutorial Periods: -	Practical Periods: 45	Total Periods: 45	
Re	ference Books				
1. 2.	M. Morris Mano and Edition, Pearson, 201 Samir Palnitkar, VERI Edition, 2012.	Michael D. Ciletti, Digi 18. LOG HDL – A Guide to	ital Systems: With an Introc Digital Design and Synthesi	duction to the Verilog HDL	, Sixth Second

Department: Information Technology Programme : B. Tech.(IT)												
Semester :	Third	Course	e Categ	ory Co	de: PCC	Semes	ter Exam T	ype: LB				
Course	- ··	Perio	ods / W	/eek	Credit	redit Maximum Marks						
Code	Course Name	L	Т	Р	С	CA	se	TM				
IT205	Data Structures Laboratory	-	-	3	1.5	40	60	100				
Prerequisite												
Course Outcome	Able to understand and impleme Able to apply linear and non-line	ent basio ar data s	: data s structu	structur res in p	es using roblem s	C olving						
Choice of 10-	12 experiments from the followin	Ig										
Implementati	Implementation of:											
1. S	orting algorithms											
2. S	earching algorithms											
3. S	ingly Linked List operations											
4. C	Ooubly Linked List operations											
5. A	an application using linked list											
6. S	tack operations using any of the re	epresent	ation									
7. C	Queue operations using any of the r	represer	ntation									
8. A	an application using Stack / Queue											
9. B	linary Tree operations using any or	ne of the	e repre	sentatio	on							
10. B	inary tree traversal algorithms											
11. A	An Application using Binary Tree											
12. G	Graph Traversals using any one of t	he repre	esentat	ion								
13. A	13. An Application using Graph											
14. A	An Application using Binary Search	Tree										
15. H	lashing: Collision Resolution Techn	iques										
Lecture Perio	ods: - Tutorial Periods: -		Practio	Total Perio	ods: 45							

Department :	nformati	on Technology	Programme : B. Tech.(IT)						
Semester :	Third		Cou	rse Cat	tegory C	ode: PCC	Semest	er Exam T	ype: LB
Course Code	Course	Namo	Per	riods /	Week	Credit	Maximum Marks		
Course Code	Course	ename	L	Т	Р	С	CA	SE	TM
IT206	Object Labora	t Oriented Programming atory (C++ and Java)	-	-	3	1.5	40	60	100
Prerequisite									
C	CO1	Learns the Basics of C++ and	Java						
Outcome	CO2	Learns the Programming feat	tures of C	C++ and	d Java				
outcome	CO3	Learns Advanced C++ Program	mming ar	nd Java	3				
LIST OF EXPERIMENTS									
<u>C++ Programs</u>									
1. Imple	ment Pro	ograms to demonstrate the u	use of C	lasses,	Object	s, Constru	ctor and	Destruct	or,
Contr	ol Structu	ires, Arrays and Pointers.							
2. Imple	ment Pro	grams to demonstrate the use	of differ	ent typ	pes of ov	verloading	and type	casting.	
3. Imple variou	ment Pro Is types o	ograms to demonstrate the u of Inheritance.	se of Vir	tual Ba	ase Clas	ses, Pure	Virtual F	unction a	nd
4. Imple	ment Pro	grams to demonstrate the use	of differ	ent typ	bes of Po	olymorphis	m		CO1,
5. Imple	ment Pro	grams to demonstrate the use	of Excep	tion Ha	andling				CO2,
Java Program	5								CO3
6. Imple	ment Pro	grams to demonstrate the use	of Packa	ges					
7. Imple	ment Pro	grams to demonstrate the use	of Interf	aces					
8. Imple	8. Implement Programs to demonstrate the use of Event Handling (if necessary)								
9. Implement Programs to demonstrate the use of Thread Handling									
10. Imple	ment Pro	grams to demonstrate the use	of Apple	ts		•			
Lecture Periods: - Tutorial Periods: - Practical Periods: 45 Total Periods: 45									

Department : Science and Humanaties Programme : B. Tech.(IT)										
Semester : T	hird			Subjec	t Catego	ory: MC	C Se	emester Ex	am Type:	-
Course Code	Course	Name		Per	iods / W	/eek	Credit	Мах	kimum Ma	rks
			•	L	Т	Р	C	CA	SE	ТМ
SH202	Indian	Consti	tution	3	-	-	-	-	-	-
Prerequisite	-									
	The co	urse wi	Il enable the students to	:						
	CO1	under	stand the essence and si	gnificance of	of the co	onstituti	on			
Course	CO2	recog	nize ones fundamental d	uties and ri	ghts		- •			
Outcome	CO3	appre	clate the structure and fu	unctions of	legislati	ure, exe	cutive ar	nd judiciary	/	
	CO4	under	stand the functioning of	state gover	nments	and un	ion territ	tories		
	CO5	under	stand the centre-state re	elations and	i functio	ning of	Constitu	tional bodi	es	
UNII-I The Making of	Introa		of Indian Constitution	combly Co		Indian	Period	IS: U9 tion		
The Making of	indian Co	onstitui	tion - The Constituent Ass	sembly - So mblo	urces of	Indian	Constitu	tion -		CO1
	State	Rights	and Duties	inde.			Period	lc• ∩Q		
State and Unio	n Territo	ries – (itizenshin - Fundamenta	l Rights - Di	roctivo (Princinle	of Stat	e Policy -		
Fundamental D	uties	1103 - 0			lective	incipie	5 01 514	e roncy -		CO2
UNIT-III	Union	Goverr	nment				Period	ls: 09		
Union Governn	nent - Tl	ne Pow	ers and Functions of the	President,	Vice-P	resident	, Counci	l of Minist	ers, Prime	2
Minister, Judici	ary, Sup	reme (Court - Judicial Review -	Judicial Act	ivism- P	ublic In	, terest Li	tigation - F	Power and	CO3
Functions of th	e Parliar	nent -B	udget Power and Functio	ons of Parlia	iment, S	peaker	of Lok Sa	abha.		
UNIT-IV	State 0	Govern	ments				Period	ls: 09		i
State Governm	ents – G	overno	r - State Council of Minis	sters - Chie	f Ministe	er- Legis	lative As	sembly- H	igh Courts	5
- Union Territo	ries -Pan	chayat	i Raj Institutions - 73th a	nd 74th Co	nstitutic	onal Am	endmen	t – Gram P	anchayats	CO4
- Block Panchay	/ats - Mu	unicipal	ities.							
UNIT-V	Union	State	Relations, Constitutional	Bodies			Period	ls: 09		
Centre – State	e Relatio	ons - P	ublic Service - Election	Commissio	on - NI	ΓΙ Ayog,	, Emerg	ency Powe	ers of the	
President- Cor	stitutio	n Ame	ndment Procedure- Rig	ht to Info	rmation	Act -	Right t	o Educatio	on. Majoi	· CO5
Constitutional /	Amendm	nents ar	nd their impact on Indian	Political Sy	stem.	-		-	-	
Lecture Period	s: 45		Tutorial Periods:	Praction	cal Perio	ods:	T	otal Period	ls: 45	
Reference Book	s:									
1. Austin, Gra	anville. T	he Indi	an Constitution: Corners	tone of a N	ation. O	xford U	niversity	Press, 199	9.	
2. Basu, Durg	ga Das, e	t al. Int	roduction to the Constitu	ution of Ind	ia. 20th	ed., Tho	proughly	Rev, Lexis	Nexis But	ter
Worths Wa		agpur,	2008. Itara Tha Oufard Llandha	al af tha lu	dian Ca			مريد بالم	the Dress of	0010
3. Choudhry,	Sujit, et rviproi M	al., eui Iulwoni	tors. The Oxford Handbo	wan The C		on of In	dia (Univ		Dubliching	2010. 2016)
4. Daksili, Fa	Raipov	'Politice	and Ethics of the Indian	Constitutio	n^{\prime} 2000	ווו וט ווט ג		Versai Law	FUDIISIIIIE	5, 2010)
6 Raieev Bh	argava -	The Pr	omise of India's Secular [Democracy'	2010	,				
7. Chakrabar	tv. Bidvi	ut. India	's Constitutional Identity	: Ideologica	, 2010 al Belief	s and Pr	eference	s (Routled	ge. 2019)	
8. Javal. Nira	ia Gopal	. and Pi	ratapBhanu Mehta. The (Dxford Com	panion	to Politi	cs in Ind	ia. Oxford	Universitv	Press.
2010	, ,		, ,					,	,	,
9. Kashyap, S	Subhash	C., Our	Constitution: An Introdu	ction to Inc	lia's Con	stitutio	n and Co	onstitutiona	al Law (NB	T India,
1994)										
10. Kashyap, S	Subhash	C. Our	Parliament: An Introduct	ion to the P	arliame	nt of Ind	dia. Revi	sed edition	, National	Book
Trust, Indi	a, 2011.									
11. Subhash C	. Kashya	p Our C	Constitution Paperback –.	. (NBT India	, 2012).				• • •	_
12. Laxmikant	h, M. q	uot; IN	DIAN POLITY & quot, N	1cGraw-Hill	Educat	ion & c	quot; Co	nstitution	of India 8	& quot;.
Ministry o	t Law an	d Justic	e, Govt. of India.							
Department : N	Mathematics Programme : B. Tech.(IT)									
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Semester: Fou	ırth		Cours	se Cate	egory (Code: BSC	Exam 7	Гуре: т	1	
			Peric	ods / V	Veek	Credit	Ma	ximum	Marks	
Course Code		Course Name	L	Т	Ρ	С	СА	SE	тм	
MA206	Mat	hematics For Computing	3	1	-	4	40	60	100	
Prerequisite			<u>.</u>			L		LL.		
	CO1	Develop knowledge of logi	cal con	nectiv	ity, co	mpound pro	position	ıs, form	al	
	COI	symbols of propositional lo	ogic and	d find	exact v	alue of expr	essions.			
Course	CO2	Use the formal symbol to p	oredica	te logi	С					
Outcome	CO3	Knowledge of Inference t	heory o	of the	predic	ate calculus				
	CO4	Construct sample spaces o	f rando	om exp	perime	nts and iden	tify the	distribu	tions	
	CO5	Stochastic processes and se	olve Q	Jeuing	theor	y problems				
UNIT – I	MATH	IEMATICAL LOGIC						Perio	ds: 12	
Connectives, St	atemer	nt formulae, well-formed for	mulae	-Tauto	logies	. Equivalence	e of Stat	ement	CO1	
formulae, Duali	ty law-	Tautological implications- F	unctior	hally co	omple	te set of con	nective	S-		
NAND and NO	R conr	nectives						T		
	NORN	AL FORMS AND INFERENCE	THEO	RY				Perio	ds: 12	
Principal conju	Inctive	and disjunctive normal for	orms Ir	nteren	ce cal	culus-validity	of con	clusion	02	
using truth tab	e-Kules	s of interence -Derivation p	rocess	-Conai	tional	proof-indire	ect met	nod of		
		anally of conclusion by these	emetho	Jas				Davia	da. 17	
UNII – III Duadiaata sala			C				:£:	Perio		
formulas symb	lius: Pi	the statement inference		n, var	tables	and quanti rodicato cal	mers-Pro		005	
specification ar	ul gono	ralization-Derivation of cond	lusion	y UI Lising	the ru	leg of inferer	Culus-Ri	ules of		
INIT – IV					the ru		ice thet	Perio	dc· 12	
Random Variat	les an	d their event snaces - Prof	hahility	mass	funct	ion Distribu	tion fur	nctions	CO4	
Special discret	e dist	ributions: Bernoulli, Binom	nial. P	oisson	. Geo	metric. Hvn	er geo	metric.		
Negative Bino	mial. I	Discrete Uniform. Constar	nt and	India	, eee	- Character	ristic fu	inction.		
Reliability, Fail	ure de	nsity and Hazard function	- Som	e imp	ortant	Continuous	s distrib	outions:		
Exponential, Hy	/po exp	, oonential, Erlang, Gamma, H	lyper e	, xpone	ntial, '	Weibull, Gau	issian, L	Iniform		
and Pareto dist	ributio	ns.		•						
UNIT – V	STOCI	HASTIC PROCESSES AND POL	SSON (QUEUE	ING N	10DELS		Perio	ds: 12	
Stochastic Pro	cesses:	Definition, Classification o	of Stoc	hastic	Proce	esses - Bern	oulli Pr	ocess,	CO5	
Poisson proces	s, Mark	ov Process, Markov Chain. T	The Birt	th and	Death	process: M	/M/1, N	1/M/c,		
M/M/1/N, M/N	Л/с/N ([c < N), M/M/c/c, M/M/∞ r	models	only	- deriv	ation of me	an num	ber of		
customer in the	e syster	n, queue and waiting time -	Simple	applic	ations	5.				
Lecture Period	s: 45	Tutorial Periods: 15	Pract	ical Pe	eriods:	- T	otal Pe	riods: 6	0	
Reference Boo	ks:									
1. J.P.Trer	nblay a	nd R.Manohar, Discrete Ma	themat	tical St	ructur	es with appli	ications	to Com	puter	
science	, Tata N	AcGraw-Hill Publishing comp	bany p	/t. Ltd.	, New	Delhi, 2002.				
2. Kishore	S. Triv	edi, Probability and Statistic	s with l	Reliabi	ility, Q	ueuing and C	Compute	er Scien	ce	
Applica	tions, J	ohn Wiley & Sons Inc. Secon	nd Editi	on, 20 	12.					
3. D.Gross 2012.	s and C	.M.Harris, Fundamentals of (Queuin	ig Theo	ory, W	iley Students	s Edition	n, Third	Edition,	
4. J.Medł	ni, Stoc	hastic models in Queuing Th	eory, A	caden	nic Pre	ess, Second E	dition, 2	2012.		
5. J. Medhi, Stochastic Processes, New Age International (P) Ltd., Second Edition, 2012										

Department :	partment : Information Technology Programme : B. Tech.(IT)									
Semester :	Fourth		Cou PCC	irse C	Catego	ry Code:	Semest	er Exam Type: ⁻	ГҮ	
Course Code	Cours	e Name	Per	iods /	'Week	Credit	1	Maximum Mark	ks	
17207	Onor	ting Systems	L 3	I	Р	ر م	CA 40	SE 60	1M	
11207 Proroquisito:	Opera	ating systems	3	-	-	3	40	BU	100	
Freiequisite.	CO1	Able to grash fundame	ntalı	under	standin	g of operati	na syster	nc		
	.01	Lindorstand fundamor		anuer		g of operation	ione cuch		throadc	
	CO2	files semanhores and	meth	od of	handlin	g deadlock		i as processes,	tineaus,	
Course Outcome	CO3	Understand the role o and functions	f OS a	as res	ource m	nanager to s	support v	irtual memory	concept	
	CO4	Understand basic file r	nana	geme	nt techr	iques and s	security			
	CO5	Understand the desigr	n prine	ciples	of prac	tical operat	ing systei	ms Linux and W	/indows	
UNIT-I	Intro	duction				Periods: 7				
Operating sys Distributed ar Operating syst	tem sti nd Spea tem ger	ructure – operations – cial purpose systems – neration.	Servio Virtu	ces – Ial mi	system achine ·	calls – Pro – Operating	otection a g System	and Security - debugging –	CO1	
UNIT-II	Proce	ss Management				Periods: 1	1			
Processes – Th	nreads:	Multicore programming	g – Mi	ultith	reading	models –CF	PU Proces	ss scheduling–	<u> </u>	
Process synch	ronizat	on-Deadlocks								
UNIT-III	Mem	ory Management				Periods: 1	0		T	
Swapping – Co	ontiguo	us Memory allocation –	Pagir	ng – S	egment	ation – Seg	mentatio	on with Paging	CO3	
-Virtual Memo	ory–Der	nand Paging–Page Repla	iceme	ent–A	llocatio	n of frames	-Thrashir	וg		
UNIT-IV	Stora	ge management and Sec	curity			Periods: 8		10 avetama		
System protect	tion – 9	System security	ace –	File-	system	implement	ation – i	/O systems –	CO4	
UNIT-V	Case	Study				Periods: 9)			
Linux system:	Design	principles – Kernel mod	dules	– Pro	cess ma	nagement-	Schedul	ing – Memorv		
management -	– File s	stem – Input and outpu	it - Inf	ter pr	ocess co	ommunicati	on– Netv	vork structure		
– Security.				-					CO5	
Windows OS:	Design	principles -System com	pone	nts –	Termina	al services a	and fast u	user switching		
File system – N	Networ	king–Programmer Interf	ace							
Lecture Period	ds: 45	Tutorial Periods: -	Pra	ctical	Periods	:-	Total Pe	eriods: 45		
Reference Boo	oks:				~	~	~ .	- · · ··		
1. Abran	am Silb	er schatz, Peter Baer Ga	IVIN a	nd Gr	eg Gagr	ie, Operatir	ng Syster	n Concepts, Nii	nth	
2 Willia	n, JUNN m Stalli	ngs Operating Systems I	. Llü, ntern	ZUIZ.	nd Decig	n Principles	Prontice	e Hall of India	g th	
Z. Willar Fditio	n. 2014	ngo, Operating System. I	ntern	ais al	ia Desig	in rinciples	, rienuu		0	
3. Harve Educa	y M. De tion Pv	eitel, Paul Deitel and Dav t. Ltd, 2003.	vid R.	Choff	nes, Op	erating Syst	ems, Thii	rd Edition, Pear	son	
4. Andre Hall, 2	w S. Ta 014.	nnenbaum and Herbert	Bos, I	Mode	rn Oper	ating Syster	ms, Fourt	h Edition, Pren	tice	

5. Gary J. Nutt, Operating Systems, Third Edition, Addison Wesley, 2003.

Department : Information Technology Programme : B. Tech.(IT)											
Semester :	Fourth		Course Cate	egory Co	ode: PCC	Semeste	r Exam T	ype: TY			
Course Code	Course	Namo	Perio	ds / We	ek	Credit	Maxi	imum M	arks		
course coue	Course		L	Т	Р	С	CA	SE	TM		
IT208	Comp	uter Architecture	3	-	-	3	40	60	100		
Prerequisite:											
	CO1	Able to understand Unit.	the basic con	nponent	ts and the	design of	CPU, ALI	J and Co	ntrol		
	CO2	Ability to understan programmed contro	d Processor i I.	mpleme	entation b	y both hai	rdwired a	and Micro	C		
Course Outcome	CO3	Ability to understan cost/performance.	d memory hi	erarchy	and its im	pact on c	omputer				
	CO4	Able to understand processor	the fundame	entals of	f I/O syste	ms and th	neir inter	action w	ith the		
	CO5	Ability to understan for high performanc	d the advant	age of ir design	nstruction	level para	allelism a	nd pipeli	ning		
UNIT-I	Basic (Computer Organizatio	on and Desig	n		Periods:	9				
									1		
Register Trans Bus and men operations, Ar Computer Reg Instruction Cyc	ster Lan nory tra ithmetio gisters - cle- – M	guage and Micro op ansfers, Arithmetic N c logic shift unit Basic - Computer Instructi emory reference Inst	erations: Reg Micro operat Computer O Tons – Comp ructions - Inc	gister Tr tions, lo rganizat outer In: out – Ou	ransfer lan ogic micro tion and D structions tput and I	nguage. R o operatio esign: Ins – Timing nterrupt	egister T ons, shift truction (g and Co	ransfer t micro Codes – ontrol –	CO1		
UNIT-II	UNIT-II Micro-programmed Control and Central Processing Periods: 9 unit										
Organization: modes – data Subtraction, N	general a transf Multiplic	register organization er and manipulation cation, Division algor	– stack orga – program rithms, Float	nizatior contro	– instruc I. Compu nt arithm	tion form ter Arith etic oper	ats – ado metic: Ao ations- I	ddition, Decimal	CO2		
	Memo	ry Organization				Periods:	9		<u> </u>		
Memory hiera	archy –	main memory – aux	iliary memo	ry –Asso	ociate me	mory – C	ache me	mory –	CO3		
	y. Innut-	Output Organization				Periods	9		<u> </u>		
Input-output i – IOP – serial o	nterface commur	e – asynchronous data nication.	a transfer - m	nodes of	f transfer -	– priority	interrupt	– DMA	CO4		
UNIT-V	Pipelir	ne and Vector Proces	sing			Periods:	9		•		
Parallel Proce Processing, Interconnectic Synchronizatio	essing, I Array on Strue on Cache	Pipelining, Arithmetic Processors, Multi ctures, Inter proces e Coherence. Shared I	c Pipeline, I processors sor Arbitrati Memory Mul	nstructi :: Cha on. Inte tiproces	on Pipeli racteristic er Proces ssors.	ne, RISC cs or l ssor Com	Pipeline Multiproo municatio	Vector cessors, on and	CO5		
Lecture Period	ls: 45	Tutorial Periods: -	Practical Pe	eriods: -		Total Pe	riods: 45				
Reference Boo	oks:										
1. M. Mc 2008. 2. Williar Seven	orris Ma n Stallir th editio	no, Computer System ngs, Computer Organi on, 2005.	Architecture	e, Prenti rchitectu	ice-Hall of ure, Prent	India, Pvt ice-Hall of	:. Ltd., Th f India, P\	ird editio /t. Ltd.,)n,		
3. Carl H edition	amache n, 2011.	r, Zvonko G. Vranesic	and Safwat	G. Zaky,	Compute	r Organiza	ition, Mc	Graw-Hi	ll, Fifth		
4. John P 5. P. Pal editior	P. Hayes Chaudh n. 2002.	, Computer Architecti uuri, Computer Organ	ure and Orga ization and D	nisation esign, P	, McGraw rentice-H	Hill, 1998 all of India	3. a, Pvt. Ltc	l., Secon	d		

Department : Information Technology Programme : B. Tech.(IT)										
Semester :	Fourth		Cours	se Categ	gory Co	ode: PCC	Semes	ter Exam	Туре: ТҮ	
Course Code	Cours	o Namo	Peri	iods / W	/eek	Credit	N	laximum I	Marks	
Course Coue	Cours		L	Т	Р	C	CA	SE	TM	
IT209	Micro Applic	processors and cations	2	1	0	3	40	60	100	
Prerequisite:										
	CO1	To learn 8085 Archit	ecture	and Pro	ogramr	ning				
6	CO2	To learn the need ar	nd worl	king of v	various	supporti	ng progr	ammable	chips	
Course	CO3	To learn how to inte	erface I	/O and	memo	ry to Micr	oproces	sor		
Outcome	CO4	To learn 8086 Archit	ecture	and Pro	ogram	ning and	compare	e with 808	35	
	CO5	To learn how to desi	ign sim	ple app	licatio	ns using N	1icropro	cessors		
UNIT-I	Intel 8	8085 Microprocessor				Perio	ods: 9			
Introduction -	Need	for Microprocessors – I	ntel 80)85 Har	dware	- Archite	cture –	Internal		
Registers – Ar	ithmeti	c and Logic Unit – Con	trol Ur	nit – Ins	tructic	on word s	ize - Ad	dressing	CO1	
modes – Inst	ruction	Set – Assembly Langua	age Pro	ogramm	ing -	Stacks an	d Subro	outines -	.01	
Timing Diagra	ms.									
UNIT-II	Intel 8	8085 Interrupts and DM	A			Peric	ods: 9			
8085 Interrupts – Software and Hardware Interrupts – 8259 Programmable Interrupt										
Controller - Data Transfer Techniques – Synchronous, Asynchronous and Direct Memory									CO2	
Access (DMA)	and 82	57 DMA Controller								
UNIT-III	Memo	ory & I/O Interfacing				Perio	ods: 9			
Types of mem	nory – N	Memory mapping and a	ddressi	ng – Co	ncept	of I/O m	ap – typ	oes – I/O		
decode logic -	- Interfa	acing key switches and L	EDs –	8279 Ke	yboar	d/Display	Interfac	e - 8255	CO3	
Programmable	e Peripi	neral Interface – Conce	pt of S	Serial Co	ommu	nication -	- 8251	USART –		
RS232C Interfa	ace.					.				
	Intel	SU86 Microprocessor			.	Perio	oas: 9			
Introduction-I	ntel 808	36 Hardware – Architect	ure – II	nternal	Regist	ers – Ariti	interic a	ind Logic		
Accombly Lon		Addressing modes – inst Programming – Subrouti		i Sel – A	momo	ner Direct	ives.	ntorrunt	CO4	
Assembly Lan	guage F	rogramming - Subrouti	nes -e	kternar	memo	ry Addres	sing – i	nterrupt		
UNIT-V	Micro	pprocessor based System	n Desie	n		Perio	ods: 9		<u> </u>	
Traffic light co	ontrol-1	Temperature control- Wa	ater lev	,el mon	itoring			CO5		
Lecture Period	ls: 30	Tutorial Periods: 1	5 Pra	actical P	eriods	5:	Tota	l Periods:	45	
Reference Boo	Reference Books:									
1. Rame	sh S. Ga	onkar, "Microprocessor	Archit	ecture,	Progra	amming a	nd Appl	ications w	vith 8085",	
Penra	m Inter	national Publications, Fif	th Edit	ion.						
2. Barry	B. Brey	, "The Intel Microproces	sors 8	086/808	88, 801	86/80188	8, 80286	, 80386 a	nd 80486,	
Pentiu	ım, Pe	ntium Pro Processor,	Pentiu	um II,	Pentiu	um III Po	entium	4 – Arc	chitecture,	
Progra	amming	and Interfacing, 8th Edr	n., Pear	son Edu	ication	, 2009.				
3. Krishna Kant, "Microprocessors and Microcontrollers – Architectures, Programming and System										

Design 8085, 8086, 8051, 8096", PHI, 2008.

Departmen	t : Inform a	ition Technology	pgy Programme : B. Tech.(IT)								
Semester	: Fourth		Subjec	t Cate	gory: P	CC Seme	ester E	xam Ty	pe: TY		
Course	<u></u>	N	Peri	ods / V	Veek	Credit	Max	kimum	Marks		
Code	Course	Name	L	Т	Р	С	CA	SE	ТМ		
IT210	Design	and Analysis of Algorithms	3	-	-	3	40	60	100		
Prerequisit	e										
	CO1	Compute time complexity o analyse	f any reci	ursive	and non	-recursive	e algori	thm ar	ıd		
Course	CO2	Learn the design methods g problems	reedy and	d divid	e and co	onquer to	apply	for suit	able		
Outcome	CO3	Learn the design method dy	namic pr	ogram	ming to	apply for	suitab	le prob	lems		
	CO4	Learn the design method ba	ck trackii	ng to a	pply for	suitable j	oroblei	ns			
	CO5	Learn the design methods b	ranch an	d bour	nd to ap	ply for sui	table p	roblen	ıs		
UNIT – I						Per	iods:	9	•		
Introductio order of – a inhomogen Divide and	n: Algorith symptotic eous recur Conquer n	nm – efficiency of algorithms - notations –solving recurrence rences nethod: Introduction, Binary S	- best, wo es – homo search - fi	orst an ogeneo nding	id avera ous recu maximu	ge case ar rrences – ım and mi	nalysis nimum	– the n.	CO1, CO2		
UNIT – II	•			Ŭ		Per	iods: 9)	i		
Divide and Conquer method:– merge sort – quick sort – strassen's matrix multiplication.CO2Greedy method:– General method – Knapsack problem – job sequencing with deadlines –Prim's algorithm – Kruskal's algorithm – Dijkstra's algorithmCO2											
UNIT – III						Per	iods:	9	T		
Dynamic Pr shortest pa Problem – 1	ogrammin ths – Wars Travelling s	p g: - General Method – Princip hall's and Floyd's algorithm – salesman problem	le of opti Optimal	mality Binary	– multi Search	stage gra Tree – 0/1	ph – al L Knap:	l pairs sack	CO3		
UNIT – IV						Per	iods:	9	<u>.</u>		
Back tracki Hamiltoniar	1g: Genera 1 cycle – kr	ıl method – n queen's problen napsack problem	n – sum c	f the s	subsets -	– graph co	olourin	g —	CO4		
UNIT – V						Per	iods:	9	.		
Branch and search – bo solutions fo	Bound : Le unding – F r knapsack	east Cost Search – 15 puzzle: a IFOBB and LCBB– LC branch a c problem & Travelling salesm	n examp nd bounc an proble	e - coi l and F m	ntrol abs IFO brai	stractions nch and b	for LC ound		CO5		
Lecture Per	iods: 45	Tutorial Periods: - P	ractical F	Period	s: -	Tot	al Peri	ods: 4	5		
References											
1. Ellis Algo 2. Ma Edu	Horowitz prithms, Se rk Allen W cation, 20	, Sartaj Sahni and Sangutheva econd Edition, Universities Pre eiss, —Data Structures and Al 10	r Rajasek ess, 2011. gorithm /	aran, - Analysi	–Funda is in C, S	mentals o econd Edi	f Comp tion, P	outer earson			
3. Ana Edu	iny Levitin, cation, 20	, "Introduction to the Des 09.	ign and	Analy	ysis of	Algorithr	ns", P	earson			
4. Tho Algo	mas H Cor orithms, N	men, Charles E Leiserson, Ror IIT Press, England, 2009.	ald L Riv	est and	d Cliffor	d Stein, —	Introd	uction	to		
5. Jon 6. Jeff 7. Par Pea	Kleinberg rey J McCo ag Himans rson Educa	and Eva Tardos, —Algorithm onnell, —Analysis of Algorithm hu Dave and Himanshu Bhalcl ation, 2008	Design, P 1s, Jones 1andra Da	earsor and Ba ave, —	n Educat artlett Pr Design	ion, 2006 ublishers, and Analy	2008. sis of A	Algorith	ıms,		

Departr	ment : Ir	nform	ation Technology	Prog	ramme	: B. T e	ech.(IT)			
Semeste	er : F	ourth		Cour	se Cate	egory C	ode: PCC	Semest	ter Exam	n Type: LB
Course		Course	a Nama	Peri	ods / V	Veek	Credit	Μ	laximum	Marks
Code		cours		L	Т	Р	С	CA	SE	TM
IT211	(Opera with L	ting System Laboratory JNIX / Linux.	-	-	3	1.5	40	60	100
Prerequ	uisite	-				<u>.</u>				
	(01	Able to write shell progr	ams in L	JNIX/L	NUX O	S			
Course	(02	Able to implement scheo semaphores	duling al	gorith	ms, solı	utions to s	ynchroniza	ation pro	blems using
Outcom	ne (C O 3	Able to implement virtua	al memo	ory con	cept ar	nd file syst	em		
	(C O4	Able to develop kernel o	f an OS						
	(C O 5	Able to develop utilities	for an O	S					
3.	Prog etc) Implem	grams ientat	using the I/O system calls	of UNIX	opera	iting sy isk)	stem (ope	n, read, wi	rite,	CO2 &
4.	Implem	entat	ion of synchronization pro	blems u	ising Se	emapho	ore			CO2 &
5.	Implem	entat	ion of basic memory mana	agemen	t scher	nes				<u> </u>
6.	Implem	entat	ion of virtual memory mar	nageme	nt sche	emes				2. CO5
7.	Implem	entat	ion of file systems							a (05
Lecture	Periods	5: -	Tutorial Periods: -	Pract	ical Pe	eriods:	45	Total Perio	ods: 45	
Referen	ice Bool	ks								
1.	William	Stalli	ngs, Operating System, Pr	entice H	all of I	ndia, 6	" Edition,	2009.	2002	
2.	Harvey	IVI. De	Operating Systems, S	econd E	altion,	Pearso	on Educati	on PVt. Ltd n. Addison	, 2002.	2001
э. 1	Odiy J. Δ Tann	ivutt, Ionhai	um Modern Operating Systems: A MOC	stome 7	nd Edit	ion Dre	onu cuillo entice Hall	1, Auuison 2001	wesiey,	2001.
ч. 5	Charles	Crow	lev Onerating System-Δ Γ)esign_0	riente	d Annr	nach Tata	, 2001. McGraw-F	Hill 1990	9
5.	chancs	0.000		0000		~			, 1995	

Department :	rtment : Information Technology Programme : B. Tech.(IT)											
Semester :	Fourth		Cour	se Cate	egory C	Code: PCC	Semest	er Exam T	ype: LB			
Course	Course	Namo	Perio	ods / V	Veek	Credit	М	aximum N	1arks			
Code	Course		L	Т	Р	С	CA	SE	TM			
IT212	Micro	processor Laboratory			3	1.5	40	60	100			
Prerequisite												
	CO1	To learn assembly langu	age pro	gramm	ning us	ing 8085 ins	struction s	set				
Course Outcome	CO2	To learn how to interfac and 8259	e 8085	with S	upport	ing Chips 8	255, 8251	, 8259, 82	53, 8257			
	CO3	To learn assembly langu	age pro	gramm	ning us	ing 8086 ins	struction s	set				
LIST OF EXPE	RIMENT	S										
Assembly Lar	iguage l	Programming Using 8085	Microp	ocess	or							
1. Study	of 8085	5 Microprocessor Trainer I	Kit						CO1			
2. 8-bit	Arithme	tic Operations (Addition,	Subtract	tion, N	lultipli	cation and	Division)					
3. Block	Operat	ions (Move, Exchange, Co	mpare,	Insert	and De	elete)						
4. Code	Conver	ersions										
5. Digita	I Clock	simulation										
6. Movi	ng Displ	ау										
Interfacing Ex	perime	nts Using 8085 Microproc	essor									
1. Music	c Synthe	esizer Interface										
2. Stepp	er moto	or control							CO2			
3. Eleva	c Light (
4. Haili 5 Kovh	c Ligiti (bard and	d SSD Interface										
Accombly Lon		Programming Licing 9096	Microp		~r							
Assembly Lar	nguage i	Microprocessor Trainer I	/i+	ocess	JI							
1. Study 2 8-hit	Arithme	tic Operations (Addition	subtract	tion M	lultinli	cation and	Division)					
2. Block	Onerat	ions (Move Exchange Co	mnare	Insert :	and De				CO3			
4 Code	Conver	sions	iipare,									
5. Digita		simulation										
Lecture Perio	ds: -	Tutorial Periods: -	Pract	ical Pe	eriods:	45 T	otal Perio	ods: 45	<u>i</u>			

Department :	nformation Technology	Program	me : B	. Tech.(IT)			
Semester :	Fourth	Course C	ategor	y Code:	PCC	Semester E	Exam Ty	pe: LB
	a N	Perio	ds / W	eek	Credi	t Maxi	mum M	arks
Course Code	Course Name	L	Т	Р	С	CA	SE	ТМ
IT213	Design and Analysis of Algorithms Laboratory	-	-	3	1.5	40	60	100
Prerequisite								
Outcome	Choose appropriate techniqu Apply C++ / Object oriented C++	ie to solve a features in	a given implen	probler	n analys the algo	sing its char orithm tech	acterist niques	ics using
Choice of 10-1	2 experiments from the follow	wing						
Implementatic 1. Divide and 2. Quick sort 3. Merge sort 4. Improved 5. Greedy te 6. Prim's alg 7. Kruskal's a 8. Dijkstra's 9. Dynamic p 10. Backtrack 11. Backtrack 12. Backtrack 13. Backtrack 14. O/1 knaps 15. 15 puzzle	on of d Conquer technique for finding algorithm t algorithm merge sort algorithm chnique for Knapsack problem orithm algorithm orogramming technique for All ing Technique for 8 queen's pr ing Technique for sum of the su ing Technique for Graph colour ing Technique for Hamiltonian ack problem solution problem solution	g Maximun solution pairs short oblem ubsets prot ring problem Cycle	est pat olem n	1inimun h algori	n thm			
Lecture Period	ls: - Tutorial Periods: -		Practic	al Peric	ods: 45	Total Pe	eriods: 4	45

Department: In	ent: Information Technology Programme : B. Tech.(IT)								
Semester : F	ifth		Course	e Catego	ory Coc	le: PCC	Semeste	r Exam Typ	oe: TY
	<u> </u>	- NI	Period	s / Wee	k	Credit	Maximu	m Marks	
Course Code	Cours	e Name	L	Т	Р	С	CA	SE	TM
IT214	Datak Syste	base Management ms	3	-	-	3	40	60	100
Prerequisite:				1	L				L
	CO1	Learn the Concept	s of Data	abase M	anagei	ment Syste	m		
_	CO2	Understand the Da	ata Mode	el					
Course	CO3	Specify Query with	n Constra	ints					
Outcome	CO4	Know about Norm	alization	of Data	base N	/Janageme	nt Svstem		
	CO5	Know about Trans	actions C	Concept	s and C	Concurrenc	V		
UNIT-I	Datak	ase Management S	vstem C	oncepts	5	Periods:	<u>,</u> 9		
Introduction- S	Significa	ince of Database- I	Database	e Syster	n App	lications-	Data Indepe	endence-	
Data Modelling	for a D	Database- Entities ar	nd their a	, Attribut	es- Ent	tities- Attri	, butes- Relat	ionships	004
and Relationsh	ips Typ	es, Advantages and	d Disadv	antages	of Da	atabase Ma	anagement	System-	CO1
DBMS Vs RDBN	1S Arch	itecture.		-			-		
UNIT-II	Data	base Models				Periods:	9	<u>.</u>	
Data Model ar	d Type	s of Data Models-	Relation	al Data	Mode	l- Hierarch	ical Model-	Network	
Data Model- (Object/	Relational Model-	Object-C	riented	Mode	el- Entity-F	Relationship	Model-	CO3
Modeling using	g E-R C	iagrams- Notation	used in	E-R Mo	odel- F	Relationship	ps and Rela	ntionship	02
Types- Associat	ive Dat	abase Model.							
UNIT-III	SQL					Periods:	9		
Categories of S	QL Cor	nmands- Data Defir	nition- D	ata Mar	nipulat	ion Statem	nents- SELEC	CT- Basic	CO3
Form- Sub-que	ries- Fi	unctions- GROUP B	Y Featur	re- Upd	ating t	he Databa	ase- Data D	efinition	
Facilities Views	- Emb	edded SQL- Decla	ring Va	riables	and	Exceptions	s- Embedd	ing SQL	
Statements.	T						-		
UNIT-IV	Norm	alization				Periods:	9		
Functional Dep	endend	cy- Anomalies in a	Databas	e- Prop	erties	of Normal	ized Relatio	ns- First	CO4
Normalization-	Second	i Normai Form Rela	ition- In	ira Nori	таі ғо	rm- Boyce	-Codd Norn	hal Form	
(BNCF)- Fourth	Norma	i Form.				·	-		
UNII-V	Irans	action and Concurre	ency		- 1	Periods:	9		005
Concept – Tra	Isaction	h State- ACID VS BA	ASE Iran	Saction	s– imp	Controluto	on of Atom	city and	CO5
Durability - Co	mcurren m: Eail	uro Classification	Storago	Structu	rrency		DCK-Baseu P nd Atomicit		
Based Recovery	1 - Shar	low Paging	Storage	Structu			nu Atomicii	y – LUg-	
Lecture Period	s: 45	Tutorial Period	s: -	Practica	al Perio	ods: -	Total Pe	riods: 45	
Reference Boo	ks:					/ U J.		10051 45	
1. A Silbe	rschatz	H Korth, S Sudarsha	an. "Data	base Sv	stem a	ind Concer	ots". McGrav	w Hill Fduc	ation
6 th edit	ion. 20'	17.	, Date						
2. Ramez	Elmasri.	, Shamkant B. Navat	he, "Dat	abase Sv	vstems	: Models. L	anguages. I	Design and	
Application Programming", 6 th edition, 2013.									

Department : I	Department : Information Technology Programme : B. Tech.(IT)										
Semester :	Fifth		Со	urse	Catego	ry Code: P	CC S	Semester	Exar	n Type: TY	
Course Code		Courses Norses	Pe	riod	s/ Week	Credi	t	Maxi	mum	Marks	
Course Code		Course Name	L	Т	P	С		CA	SE	TM	
IT215	Resou	rce Management and Graph Theor	~y 3	1	-	4		40	60	100	
Prerequisite											
	Upon	Completion of the course, the stud	ents sho	uld	be able	to:					
	CO1	Apply integer programming and I	inear pr	ogra	mming	to solve re	al-life	applicati	ons		
Course	CO2	Solve optimization problems and	Use PE	RT ai	nd CPM	for proble	ms in	project m	nanag	gement	
Outcome	CO3	Identify different types of graphs									
	CO4	Solve problems involving vertex a	nd edge	e cor	nnectivi	y, planarit	y and	edge col	oring		
	CO5	Understand the principle of inclus	sion and	exc	lusion						
UNIT – I	LINEA	R AND INTEGER PROGRAMMING						Period	s: 1	5	
Principal comp	onents	of decision problem – Modeling ph	ases – L	P Fc	rmulati	on and gra	phic s	olution –		CO1	
Resource alloc	ation pr	roblems – Simplex method – Sensiti	vity ana	lysis	s - Cuttir	ng plan algo	orithn	n – Branc	h		
and bound me	and bound methods, Multistage (Dynamic) programming.										
UNIT – II	CLAS	SICAL OPTIMIZATION THEORY AN	D OBJEC	T SO	CHEDUL	ING		Period	s: 1	5	
Unconstrained	l exterr	nal problems, Newton – Ralphso	n meth	od	– Equa	lity constr	aints	– Jacob	ean	CO2	
methods – La	grangia	n method – Kuhn – Tucker conc	litions -	- Sii	mple pr	oblems -	Netw	ork diagr	am		
representation	n – Critio	cal path method – Time charts and	resource	e lev	elling –	PERT					
UNIT – III	INTR	ODUCTION TO GRAPH THEORY						Period	s: 8		
Definitions ar	nd Exar	nples, Sub-graphs, Complements,	Graph	lso	omorph	sm, Degre	ee, D	oirected a	and	CO3	
undirected gra	iphs, we	eighted and un weighted graphs									
UNIT – IV	CYCI	ES, PLANARITY AND COLORING						Period	s: 10)	
Walk, Trail, Pa	ath, Cyo	cle, Euler Trails and Circuits, Plan	ar Grap	hs,	Hamilto	n Paths a	nd Cy	ycles, Vei	tex	CO4	
coloring, Edge	colorin	g, Chromatic Polynomials.									
UNIT – V	PRIN	ICIPLE OF INCLUSION AND EXCLUS	ON					Period	s: 12		
The Principle of	of Inclus	sion and Exclusion, Generalizations	of the	Prin	ciple, D	erangemer	nts – I	Nothing i	s in	CO5	
its Right Place,	its Right Place, Rook Polynomials.										
Lecture Period	ls: 45	Tutorial Periods: 15 P	ractical	Peri	ods: -		Total	Periods:	60		
Reference Boo	oks:										
1. H.A. Ta	ha, "Op	erations Research – An Introductior	", Pears	on,	10 th Edit	ion, 2019.					
2. Paneer	Selvam	, 'Operations Research', Prentice Ha	Ill of Ind	ia, 2	nd Editio	n, 2018					
3. Narsing	3. Narsingh Deo, Graph Theory with Applications to Engineering and Computer Science, PHI, 2011										

Department : Information Technology Programme : B. Tech.(IT)									
Semester :	Fifth		Course	Cate	gory	Code: PCC	Seme	ster Exam Typ	oe: TY
Course Code	Course	o Namo	Periods	s/We	eek	Credit		Maximum Ma	ırks
Course Coue	Course		L	Т	Ρ	С	CA	SE	TM
IT216	Comp	uter Networks	3	1	-	4	40	60	100
Prerequisite:			<u>.</u>			<u>.</u>			
	CO1	Learn about netwo	orking co	ncept	S				
Course	CO2	Ability to commun	icate usir	ng ne	tworl	<pre>c protocols</pre>	and		
Outcome	<u> </u>	SUCKELS Know the transport	+ lavor fu	inctio	n c				
Outcome			ing and	routir	115	hniquoc			
		Know orror dotacti	ing and a	orroc	ig tet	modium a			
	LOS	Know error detecti	on and c	orrec	uon,	Deviede: 1	.cess		
Nood for Noty	vorkina	Sonvice Description	connocti	onloc	c	Connoctio	L Oria	ntad Canvicas	
- Circuit and	Packot	- Service Description -	tworks a	und P	s and bysic	al Media -	Wirold	ass Links and	
- Circuit and		wing Delay and Packet		inu r Intori	nysic	ai ivieula –		SI Poforonco	CO1
Model - Servic	o Mode	ols – History of Compute	r Netwo	rking	and t	the Internet	ICK – C F		
		ens – mistory of compute		INIIg		Periods: 1	ι. 7		
Principles of N	l Iotwork	Applications – The We	h and HT	тр _	FTP -	- Flectronic	Mail _	SMTP – Mail	
Message Formats and MIME – DNS – Socket Programming with TCP and LIDP Multimedia									CO2
Message Formats and MIME – DNS – Socket Programming with TCP and UDP. Multimedia									COL
UNIT-III		relepitoriy init inite				Periods: 1	2		
Transport Lave	er Servi	ces – Multiplexing and	De-multi	iplexi	ng —	UDP – Relia	able Da	ta Transfer –	
Go-Back-N and	d Select	tive Repeat. Connection	n-Oriente	ed Tra	anspo	ort: TCP – S	Segmen	t Structure –	
RTT estimation	n – Flov	w Control – Connection	Manage	emen	t – C	ongestion	Control	– TCP Delay	CO3
Modelling – SS	SL and T	LS. Integrated and Diffe	rentiate	d Serv	vices:	Intserv – D) iffserv	, ,	
UNIT-IV		5				Periods: 12	2		<u>1</u>
Circuit Switch	ing - Pa	acket Switching Virtual	Circuit	Switc	hing	– IP – ARF) – DH	CP – ICMP –	
Routing – RIP	– OSPF	– Sub netting – CIDR –	Inter dor	nain	Routi	ng – BGP –	IPV6 B	asic Features	CO4
– Inter Domair	n Multic	ast – Congestion Avoida	ance in N	letwo	rk La	yer.			
UNIT-V						Periods: 12	2		İ
Layer Services	– Frami	ing - Error correction a	nd detec	tion -	– Linł	k Level Flov	v Contr	ol – Medium	
Access – Ether	net – To	oken Ring –FDDI – Wire	less LAN	– Bric	dges a	and Switche	es.		CO5
Lecture Periods: 45 Tutorial Periods: 15 Practical Periods: - Total Periods: 60									
Reference Boo	oks:								
1. James F. k	Kurose,	Keith W. Ross, "Comp	outer Ne	etwor	king,	A Top-Do	wn Ap	proach Featu	ring the
Internet", I	Fourth E	Edition, Pearson Educati	ion, 2008	3.					
2. William Sta	llings, "	Data and Computer Cor	nmunica	tions	" <i>,</i> Nir	hth Edition,	Pearso	n Education,	2011.
3. Larry L. Pet	erson, l	Bruce S. Davie, "Compu	ter Netw	orks:	A Sy	stems App	roach",	Fifth Edition,	Morgan
Kaufmann	Kaufmann Publishers Inc., 2011.								

Department : Ir	nformat	ion Technology	Progra	mme : I	B. Tech.(IT)						
Semester : F	ifth		Course	e Catego	ry Code:	PCC	Semes	ter Exam	Туре: ТҮ			
Course Code	Course	Nama	Pe	riods / W	/eek	Credit	М	aximum I	Marks			
Course Code	Course	lindifie	L	Т	Р	С	CA	SE	ТМ			
IT217	Inform Techni	nation Coding iques	3	-	-	3	40	60	100			
Prerequisite		_										
	CO1	To have fundamenta	ls and re	elation a	mong inf	ormation,	entropy	/ and pro	bability.			
	CO2	To understand the ba	asic loss	less enco	oding tec	hniques						
Course Outcome	СО3	To have basics of ir standards.	nage ar	nd audio	represe	entation, o	coding a	ind appli	cations in			
	CO4	To have basics of vid	eo repre	esentatio	n, codin	g and app	ications	in standa	ards.			
	CO5	To know about vario	us error	control	coding te	echniques						
UNIT-I	Introd	uction				Periods:	9					
Information –	Entropy	- Properties of inform	ation ar	nd Entro	py- Relat	tion betwe	een info	rmation				
and probability	/- Mutua	al and Self-Information	- Coding	g theory	· Code Ef	ficiency a	nd Redu	ndancy-	CO1			
Shannon's the	hannon's theorem – Construction of basic codes.											
UNIT-II	Data C	oding				Periods:	9					
Shannon and F	ano cod	ling - Huffman coding–	Arithme	etic codi	ng - Pred	ictive cod	ing - Rur	n-length	CO2			
Encoding - Ziv-	Lempel	Coding – Predictive Co	ding.									
UNIT-III	Image	and Audio Coding				Periods:	9					
Image Coding	: Image	e representation - Ti	ransforn	nation -	- Quant	ization –	Image	Coding				
Standards: JPE	G and JP	PEG 2000.	(1.5.6)					- I.	CO3			
Audio Coding:	types –	Linear Predictive Codi	ng (LPC)	– Code	Excited	LPC – Pero	ceptual (-oding -				
	Video	Cadina				Dorioda	0					
Video Coding:	Motion	Coung	nnnnat	ion T	upor of	Framos	9 Encod	ing and				
Decoding of Fr	ames – V	Video Coding Standard	s: H.261	. h.263.	MPEG-1.	MPEG-2.	- Encou MPEG-4		CO4			
UNIT-V	Error C	Control Coding		,,		Periods:	9	-				
Linear Block Co	odes – C	vclic Codes – BCH Code	es - Conv	olutiona	l Codes.		-		CO5			
Lecture Period	s: 45	, Tutorial Periods: -	Practio	al Perio	ds: -		Total I	Periods: 4	15			
Reference Boo	ks:		1				. <u>.</u>					
1. Ze-Nia	n Li, Ma	ark S. Drew and Jiang	Chuan	Liu, Fur	damenta	als of Mu	ltimedia	, Springe	r Edition,			
2014.		-										
-	2. Ranjan Bose, Information theory, coding and cryptography, Tata McGraw Hill, 2008.											

3. Andrew J. Viterbi, "Information Theory and Coding", McGraw Hill, 1982.

Department :	Programme : B. Tech.(IT)												
Semester :	Fifth		Course	e Categ	ory Co	ode: PCC	Semeste	er Exam Ty	/pe: LB				
Course	C	Nama	Perio	ds / W	/eek	Credits	Max	kimum Ma	arks				
Code	Course	e Name	L	Т	Р	C	CA	emester Exam Typ Maximum Mar CA SE 40 60 nectivity e database.					
IT218	Databa Systen	ase Management n Laboratory	-	-	3	1.5	40	60	100				
Prerequisite	-		<u>I</u>	<u>I</u>	L	<u>I</u>	<u>I</u>						
	CO1	Design Database for Real-	Time Ar	oplicati	ons								
	CO2	Create Data Models and F	Intity_ R	elation	shin (F-R) Diagr	am						
Course	CO2	Hands-on experience to f	amiliariz		CIF								
Outcomes	CO4	Lise Normalization Rules	and Prin	cinles									
	C05	Familiarize students the k	nowled	opics)BC ar		onnectivi	tv					
1 Creation of	f a Datah	ase and writing SOL querie	es to ret	rieve i	nform	ation from	the data	hase					
1.1 Data Defi	nition La	nguage (DDL).		ineve i				5450.					
a. CR	EATE	d. TRUNCATE											
b. AL	TER	e. RENAME											
c. DR	c. DROP f. COMMENT												
1.2 Data Man	ipulatio	n Language (DML)											
a. INS	SERT	b. UPDATE c. DELETE	d. SELE	СТ									
2. Performing	g Insertio	on, Deletion, Modifying, Al	ltering,	Updati	ng and	d Viewing	records b	ased on					
conditions.									CO1				
3. Creation of	^F Views								CO 2				
3.1. li	mpleme	ntation of Views.							02				
4. Creating a	Databas	e to set various constraints	5.										
(a) Pr	imary Ke	ey, (e) Null, (i). Disable	Constra	aints									
(b) Fc	oreign Ke	ey, (f) Not null, (j). Drop C	Constrair	nts					CO3				
(c) Cł	neck,	(g) Default,											
(d) U	nique,	(h) Enable Constraints,											
5. Creating Re	elationsh	hip between the Databases	5.										
5.1 1	mpieme	ntation of Set Operations	/ Cubau	oriac					CO4				
5.2.1	mpieme	ntation of Nested Queries,	/ Subqu	eries									
6 Creation of	f Databa	se triggers and functions	3						CO5				
6.1 I	mnleme	ntation of Triggers and its	annlicat	ion					COS				
6.2	JDBC and	d ODBC Connectivity	appliedt										
7. Mini proied	t (Appli	cation Development using	Oracle)										
a) Inv	entory (Control System.	,										
b) Ma	, aterial Re	equirement Processing.											
c) Ho	spital M	anagement System.											
d) Ra	ilway Re	servation System.											
e) Pe	rsonal In	formation System.											
f) We	b Based	User Identification System	า.										
g) Tin	netable	Management System.											
h) Hotel Man	agemen	t System	7										
Lecture Perio	ds: -	Tutorial Periods: -	Practio	al Per	iods: 4	5	Total Pe	riods: 45					
Reference Bo	oks		-										
1. Silbert	s, "Data	base System Concepts", 6 ^t	^h Editior	n, McG	raw Hi	ll Educatio	on, 2017.						
2. Elması Educa	ri Rame: tion, 201	z, Navathe Shamkant, "Fu L7.	undame	ntals o	of Dat	abase Sys	tem", 7 th	Edition,	Pearson				
3. Johani	nes Gehi	rke Raghu Ramakrishnan, "	'Databas	se Mar	nagem	ent", McG	iraw Hill E	ducation,	2014.				

Department : Information Technology Programme : B. Tech.(IT)											
Semester :	Fifth		Cour	se Cat	egory	Code: PCC	Semes	ter Exam	Туре: LB		
Course	C	Nama	Peric	ods / V	Veek	Credit	M	aximum N	Marks		
Code	Course	e Name	L	Т	Р	С	CA	SE	TM		
IT219	Comp Labora	uter Networks atory	-	-	3	1.5	40	60	100		
Prerequisite	-										
	CO1	Learn about socket Able to know comn connection	progra nunica	ammir tion de	ng etails c	over TCP					
Course	CO2	Ability to communi	cate us	sing U	DP						
Outcomes	CO3	Know the packet ro	oute wi	thin a	netwo	ork					
	CO4	Apply RPC in real-ti	me ap	plicati	ons						
	CO5 Ability to manage network traffic using different routing algorithms Applications using TCP Sockets like										
1. Applicatior	ns using	TCP Sockets like									
a. Echo	client a	nd echo server							CO1		
b. File ti	ransfer										
c. Date	and tim	e client & server									
d. Chat											
2. Application	ns using	UDP Sockets like									
a. DNS									CO2		
D. SINIVII		Dow Cookota liko									
3. Application	is using	Raw Sockets like							CO3		
h Trace	route								03		
4. Programs I	ising dif	ferent types of RPC							CO4		
5. Experimen	ts using	simulators like OPNET:							CO5		
a. Perfo	rmance	comparison of MAC prot	cools								
b. Perfo	rmance	comparison of Routing p	rotoco	ls like							
i.	Short	test path routing									
ii.	Flood	ling									
iii.	Link S	State									
iv.	Hiera	archical									
c. Study	of TCP	/UDP performance									
6. Mini-proje	ct in imp	plementing network proto	ocols			T_	•	•			
Lecture Perio	ds: -	Tutorial Periods: -	Pra	ctical	Perioc	ls: 45 T	otal Peri	ods: 45			
Reference Bo	OKS				I		A				
I. James F.	Kurose,	Keith W. Ross, "Compl	uter N	etwor	King, I	4 IOP-DOW	n Appro	acn Feat	uring the		
internet",	Fourth	Edition, Pearson Education	on, 200		// NIL.	la Eulisian - D			2014		

2. William Stallings, "Data and Computer Communications", Ninth Edition, Pearson Education, 2011.

Departmen	t : Inform	ation Technology	Progr	amme	: B. Te	ch.(IT)				
Semester	: Fifth		Cours	e Cate	gory Co	ode: PCC	Semest	er Exam T	ype: L	.В
Course Cod	o Cour	ra Nama	Perio	ods / W	/eek	Credit	N	1aximum I	Marks	
Course Cou	e Cour	se name	L	Т	Р	С	CA	Т	M	
IT 220	Infor	mation Coding Laboratory	-	-	3	1.5	40	60	1	00
Prerequisit	е									
	CO1	Learns the Basics of File forr	nats an	d Matl	ab					
Course	CO2	Learns the fundamentals of	basic te	ext, aud	dio, ima	age and vid	eo coding t	echniques	\$	
Outcomes	CO3	Learns the image and video	coding	standa	rds					
	CO4	Learns the error control cod	ing star	ndards						
LIST OF EX	PERIMEN	ſS								
Cycle-1:										
1. Stu	dy of mult	timedia file formats								CO1,
2. Stu	dy of Mat	lab/Python								CO2,
3. Imp	olementat	ion of Shannon-Fano coding								СОЗ,
4. Imp	olementat	ion of Huffman coding								CO4
5. lm	olementat	ion of Arithmetic coding								
6. lm	olementat	ion of Dictionary-based coding								
7. lm	olementat	ion of Linear Predictive coding								
Cycle-2:									,	
8. Stu	dy of JPEG	image coding standard								
9. Stu	dy of JPEG	6-2000 image coding standard								
10. Stu	dy of H.26	ix video coding standards								
11. Stu	dy of MPE	G-x video coding standards							,	
12. Stu	dy of Erro	r Control Coding methods	·•						ļ	
Lecture Per	riods: -	Tutorial Periods: -	Practi	cal Pe	r <mark>iods:</mark> 4	IS '	Total Perio	ds: 45		

Department : I	Humanit	ies and	Social Sciences	Progra	mme :	B. Tech	.(IT)				
Semester : I	Fifth			Subjec	t Catego	ory: MC	C 2	Semeste	er Exa	am Type	: -
Course Code	Course	Namo		Per	iods / W	/eek	Cred	it	Max	imum M	arks
Course Coue	Course			L	Т	Р	С	C/	4	SE	TM
CH203	Essen	e of In	dian Traditional	3	_	_	_	_		_	_
511205	Know	edge		5	_		_			_	
Prerequisite	-										
Course	The co	ourse w	ill enable the student to	:							
Outcomes	CO1	under	rstand connect up and	d explain ba	isics of	Indian	traditi	onal kr	owle	edge in	modern
UNIT-I		Sciem					Perio	ods: 12			
Basic structure	e of India	n know	ledge system, Modern s	science and	Indian k	nowled	ge syste	em, Yog	ga an	d holistio	
health care.											- CO1
UNIT-II		-			-		Perio	ods: 12			
Philosophical t	radition,	Indian	linguistic tradition, India	an artistic tra	dition.						
Lecture Period	ls:		Tutorial Periods:	Practio	cal Perio	ods:	•	Total Pe	eriod	s:	
Reference Boo	oks:										
1. N. Siva	arama kr	ishnan	(Ed.) Culteral Heritage c	of India – Co	urse Ma	ateral, B	haratiy	a Vidya	Bha	van, Mu	mbai 5 th
editior	n, 2014.										
2. Swam	Jitatmai	n and, N	Aodern Physics and Ved	anta, Bharat	iya Vidy	a Bhava	in.				
3. Fritzof	Capra, I	ao of P	hysics.								
4. Yoga S	utra of P	atanjali	i, Ramakrishna Mission,	Kolkatta.				~			
5. R.N. Jr	ia, Scieno	ce of Co	onsciousness Psychother	apy and yog	a Practi	ces, Vidy	yanidhi	Prakas	nan, I	Delhi 20	16.

6. S.C Chaterjee and D.M Datta, An Introduction to Indian Philosophy, University of Calcutta, 1984.

7. Krishna Chaitanya, Arts of India, Abhinav Publications, 1987

Department : Information Technology Programme : B. Tech.										
Semester	: Sixth		Course	Category C	ode: PCC	Semes	ster Exam	n Type: TY		
Course	Cours	o Namo	Perio	ds / Week	Credit		Max	imum Marks		
Code	Cours	endrie	L	T P	С	CA	SE	TM		
IT221	Softw	are Engineering	3		3	40	60	100		
Prerequisite										
	CO1	Understand the Softw	are Moo	del and able	to Identify a	appropria	ate mode	I for given dom	ain.	
_	CO2	Obtain adequate know	wledge a	bout softw	are process r	nodels a	nd estim	ation technique	s.	
Course	CO3	Able to perform work	breakdo	own structu	re and arrive	to deco	mposed	design.		
Outcome	CO4	Could be able to Test	project							
	CO5	Could know the Apply	v softwar	e standard	s for small re	al-time r	projects			
UNIT-I	Intro	Juction to Software Fng	vineering	,	Periods: 9					
The Soft	ware	Engineering Discir	oline	– Evol	ition and	d Im	nact	– Software		
Development	t proiec	ts – Emergence of Soft	ware Eng	vineering –	Computer Sv	/stem Fn	gineering	Software Life		
		Waterfall model – Iter	ative Life	ecvcle mod	el – nrototvr	ning mod	el – Evoli	utionary model		
-spiral mode	l – Intro	duction to Agile				ing mea		actionary model	CO1	
spirarmoue		adetion to Agne.							001	
Case study:	dentifv	appropriate model for a	ziven doi	main- Impo	rtance of agi	le in real	-time svs	tem.		
UNIT-II	Softw	are Project Manageme	nt		Periods: 9					
Responsibiliti	ies of a	Software Project Man	ager – P	roiect Plan	ning – Metr	ics for Pi	roiect Siz	e Estimation –		
Empirical Est	imation	Techniques – COCOM	O – Hal	stead's Sof	tware Science	ce – Staf	fing Leve	el Estimation –		
Scheduling –	Organi	zation and Team struc	tures –	Staffing – I	Risk Manage	ment –	Software	e Configuration		
Management	t.		cures			ene	oontinane	Comparation	CO2	
Requirement	ts Analy	sis and Specification: F	Requiren	nents Gath	ering and Ar	alvsis –	Software	Requirements	001	
specification	– Forn	nal System Specificatio	on – Axi	iomatic Sp	cification -	Algebra	ic Specif	ication – 4GL		
Case study: P	Prepare	SRS report for given do	main.				ie opeen			
UNIT-III	Softw	vare Design			Periods: 9)				
Outcome of	a Desig	zn Process – Character	istics of	a Good So	oftware Des	ign – Co	upling a	nd Cohesion –		
Approaches	to Soft	ware Design – Object	Oriente	d Vs Func	ion Oriente	d Softwa	are Desi	gn approaches		
Function Orio	ented S	oftware Design: Structu	ured Ana	lysis – Data	Flow Diagra	ams – Ap	plying DI	D to Real time	CO3	
systems	- 9	Structured and	Detaile	d Desi	gn-ER re	lation-U	se ca	ase design		
Case study: F	Prepare	SDS report for given do	main wi	th DFD/ER/	Jse Case					
UNIT-IV	Codin	g and Testing		· · · · ·	Periods: 9)				
Coding – Soft	ware D	ocumentation – Testing	– Unit T	esting – Bla	ck Box testir	ng – Whit	te Boxtes	ting – BVA-		
Structural Te	sting – 1	Cest Coverage Criteria B	ased On	Data Flow	Mechanisms	– Regres	sion Test	tingDebugging		
– Program Ar	nalysis t	ools – Integration testin	g – Testi	ing Object (Driented prog	grams – S	System T	esting –Issues.	CO4	
Case study: A	Apply Te	est case generation for g	given dor	main.				C		
UNIT-V	Softw	are Reliability and Qua	lity		Periods: 9					
Software F	Reliabilit	ty – Software Qi	uality	– ISO	9000 –	SEI CN	MM –	Six Sigma.		
Measures An	nd Meas	surements – Software I	Metric-Z	IPF's Law –	Software C	ost Estin	nation –	Function Point		
Models –CO	сомо	Model – Delphi Me	ethod –	Schedulin	g –Softwar	e revers	e engin	eering – Risk	CO5	
Management	t—	Software	е		maintena	nce	_	process		
Case study: Apply software standards for small real-time projects.										
Lecture Peric	ods: 45	Tutorial Periods:	- Pra	ctical Perio	ds: - T	otal Peri	ods: 45			
1. Rajib	Mall, "	Fundamentals of Softwa	are Engin	neering", PH	I Learning, F	ourth Ed	lition, 20	14.		
2. Roge	r S. Pres	ssman, "Software Engine	eering: A	Practition	er's Approac	h", McGr	aw-Hill Ir	nternational Edi	tion,	
Eight	h editio	n, 2010.	-							
3. S. L. I	Pfleeger	and J.M. Atlee, "Softwa	are Engir	neering The	ory and Prac	tice", Pe	arson Ed	ucation, Third e	dition,	
2009										
4. Pank	ajJalote	, "An Integrated Approa	ich to So	ftware Eng	neering", Na	arosa, Th	ird editio	n, 2008.		

5. Ian Sommerville, "Software Engineering", Pearson Education, ninth edition, 2011.

Department : Information Technology Programme : B. Tech.(IT)											
Semester : Si	xth		Subject Ca	ategory Coc	le: PCC	Semeste	er Exam	Туре: Т	Y		
Course Code	Courso	Namo	Per	iods / Weel	<	Credit	Max	imum N	larks		
Course Coue	Course	hame	L	Т	Р	С	CA	SE	TM		
IT222	Autom	ata and Formal Languages	3	1	-	4	40	60	100		
Prerequisite											
	CO1	Design finite state machines	S								
Courso	CO2	Apply pumping lemma for r	egular lang	uages							
Outcome	CO3	Construct parse trees for CF	G and able	to minimiz	e and fir	nd equival	ence of	automa	ta		
Outcome	CO4	Construct push Down autor	nata								
	CO5	Design Turing machine and	analyze uno	decidability							
UNIT-I	Autom	ata			Peri	ods: 12					
Introduction to Finite Automata- Deterministic and Non-Deterministic Finite Automata, Finite Automata with											
ε-moves – equivalence of NFA and DFA, two-way finite automata, minimization of finite automata, Moore CO1											
and Mealy mach	ines-app	plications of finite automata.									
UNIT-II	Regula	r Expressions and Languages			Peri	ods: 12					
Finite automata	a and re	gular expressions, Arden's the	eorem, con	struction o	f Finite	automata	equiva	lent to			
regular expressi	on, Equi	valence of two finite automat	a, Pumping	lemma for	regular	language	s, Applio	cations	CO2		
of pumping lem	ma, Clos	ure properties of Regular Lang	uages.								
UNIT-III	Contex	xt Free Language			Peri	ods: 12					
Context Fee lar	nguages	and Derivation Tree, Ambiguit	ty in Contex	t Free Gra	mmar, S	implificat	ion of C	ontext			
Free Grammar,	Normal	forms for Context Free Gran	mmar, Pum	ping lemm	a for C	ontext Fr	ee Lang	guages,	CO3		
Decision Algorit	hms for (Context free Languages.									
UNIT-IV	Push D	Down Automata			Peri	ods: 12			.		
Acceptance by	Push Do	own Automata, Push Down Au	tomata and	l context Fi	ree Lang	guage, Pa	rsing an	d Push	CO4		
down Automata	– Top D	own Parsing, Bottom up Parsin	ng								
UNIT-V	Turing	Machines			Peri	ods: 12			·		
Elements of Tu	ring Mad	chine, Representation of Turin	g Machine,	Design of	Turing N	/lachine, ⁻	Techniq	ues for			
Turing machine	construc	ction,							CO5		
Decidability an	d Recu	rsively Enumerable language	es: Decidat	oility, Deci	dable l	anguages	, unde	cidable			
languages, Halti	ng probl	em of Turing Machine, Post co	rresponden	ce problem							
Lecture Periods	: 45	Tutorial Periods: 15	Practical	Periods: -		Total P	eriods:	60			
Reference Book	S:		• •	~~~~							
1. Vivek Kulkarni, "Theory of Computation", Oxford University press, 2013.											
2. K.L.P. Mish	ra and N	IM.Chandrasekaran, "Theory c	of Compute	r Science-A	utomata	a Languag	es and	Comput	ation",		
third editio	n, PHI Le	earning Private Ltd, 2009.									
 Jonn E. Hop Publishers, 	ocroft an 2002.	ia Jeffrey D. Uliman, Introducti	ion to Auto	mata Theor	ry, Langi	lages and	Compu	tation,	Narosa		
4. Michael Sip	ser, Intro	oduction to the Theory of Com	putations, E	Brooks/Cole	Thomse	on Learnii	וg, 1997	•			

5. John c. Martin, Introduction to Languages and the Theory of Computation, Tata McGraw-Hill, 2003.

Department : Information Technology Programme : B. Tech.(IT)										
Semester : Six	ĸth			Course	e Cat	egory	Code: PCC	Semes	ter Exam Ty	be: TY
	6	NI		Period	ls / W	/eek	Credit	ſ	Maximum M	arks
Course Code	Course	Name		L	Т	Р	С	CA	SE	ТМ
IT223	Web Te	echnol	ogy	3	-	-	3	40	60	100
Prerequisite										
	CO1	Learn	about internet protoc	cols, wel	b bro	wsers	and servers			
Course	CO2	Know	about Scripting langu	ages						
Course	CO3	Creat	e XML documents and	linclude	Acti	veX C	ontrols			
Outcome	CO4	Web	design using multimed	lia for E	-Com	merc	е			
	CO5	Devel	op Web services and a	ajax pro	gram	ming				
UNIT-I							Periods: 09			
Introduction to	ntroduction to Internet Principles and Components: History of the Internet and World Wide Web-									
HTML - protoco	ls – HTT	P, SM	TP, POP3, MIME, IMA	P. Dom	ain N	lame	Server, Web	Browsei	rs and Web	CO1
Servers, Dynami	c HTML.									
UNIT-II							Periods: 09			
Client Side and	Server S	Side Pr	ogramming: Introduct	ion to J	lava	Script	s and VB Scr	ipts– Ob	oject Based	
Scripting for the	web. Pro	ogramr	ning Java Script and V	B Script	- Strı	ucture	es – Functions	– Array	s – Objects,	<u> </u>
Regular Expressi	ion in ja	va scri	pt. Java Server Pages	- Sessio	on ar	nd Ap	plication mar	nagemer	nt - Session	02
tracking and coo	kies – Ad	ccess a	database from JSP.							
UNIT-III							Periods: 09			
XML and Active	K: Well-f	ormed	XML documents - XM	1L mark	up-w	orkin	g with eleme	nts and	attributes -	
Creating valid	docume	nts-XM	IL objects and DON	1. Activ	eX d	contro	ols: OLE and	Active	X -ActiveX	CO3
Documents, Serv	/er side /	Active-X	X Components, Active	X DLL an	d Act	tiveX	Exe.			
UNIT-IV							Periods: 09			
Multimedia and	Web A	pplicati	on: Multimedia in we	eb desig	gn, A	udio	and video sp	eech syr	nthesis and	
recognition - Ele	ctronic (Comme	erce – E-Business Moc	del – E-N	Лагке	eting	– Online Payr	nents ar	nd Security.	CO4
Search and Desig	gn: Work	king of s	search engines -Optim	ization-	Searc	ch inte	erface.			
UNIT-V							Periods: 09			
Web Services: In	ntroducti	on to \	Neb Services, UDDI, S	OAP, W	SDL,	Web	Service Archit	tecture,	Developing	
and deploying w	eb servio	ces. Aja	ix – Improving web pa	ge perfo	ormar	nce us	sing Ajax, Proរួ	grammin	g in Ajax.	CO5
Lecture Periods:	45		Tutorial Periods: -	Practi	cal Pe	eriods	5: -	Total I	Periods: 45	
Reference Book	s:									
1. N.P. Gopalan	and J. A	kilande	eswari, "Web Technolo	ogy: A D	evelo	per's	Perspective"	, Second	Edition, Pre	ntice-Hall
of India, 2014	ŀ.									
2. Deitel and Deitel, Goldberg, "Internet and World Wide Web – How to Program", Fifth Edition, Pearson Education										
Asia, 2011.	Asia, 2011.									

3. Eric Newcomer, "Understanding Web Services: XML, WSDL, SOAP, and UDDI", Addison-Wesley, 2007.

4. https://books.google.co.in/books/about/WEB TECHNOLOGY.html

Department : IE	DC			Progr	amm	e : B. T e	ech.			
Semester : Si	xth			Cours	se Cat	egory C	Code: PCC	Sem	ester E	xam Type: TY
Course Code	Course	Nama		Perio	ds / ۱	Neek	Credit	ſ	Maxim	um Marks
Course Code	Course	vame		L	Т	Р	С	CA	SE	ТМ
EP201	Entrep	eneu	rship	3	0	-	2	40	60	100
Prerequisite	-									
	CO1	The	student will gain conceptual	unders	standi	ng of E	ntrepreneu	rship	and de	sign thinking.
Course	CO2	The	students will become knowl	edgeab	le abo	out bus	iness mode	l deve	lopme	nt and MVP
Outcome	CO3	The	students will gain knowledge	e about	t costi	ng and	revenue.			
	CO4	The	students will learn about ma	rketing	g and	sales.				
	CO5	Stud	dent will get understanding o	f team	forma	ation ar	nd complia	nce re	quirem	ients.
UNIT – I	Problen	n and	Customer				Periods: 9)		
Effectuation, Fi	ectuation, Finding the flow. Entrepreneurial style, business opportunity, problems worth solving, methods for									
finding problem	is, proble	m int	erviews. Design Thinking, Co	nsume	r and	custon	her, market	types	s, segn	nentation and
targeting, early	adopters	, Gair	ns, Pains and "Jobs-To be do	one, Va	lue P	ropositi	ion Canvas	(VPC)	, Ident	ifying Unique
Value Propositio	on (UVP).			-						
UNIT – II			Business Model and Valida	tion	•		Periods: 9			
Types of Busine	ss Model	s, Lea	in Canvas, Risks. Building so	lution	demo	, soluti	on interviev	ws, pr	oblem	-solution test,
competition, Blu	ue Ocean	Strate	egy. MVP- Build-Measure-Lea	arn fee	dback	loop, N	AVP Intervi	ews, N	/IVP Pr	esentation.
UNIT – III	-		Revenue and Cost		•		Periods: 9	-		
Revenue Stream	ns-Income	e, cos	ts, gross and net margins - pi	rimary	and s	econda	ry revenue	strear	ns- Di	ferent pricing
strategies - pro	duct cost	s and	Operations costs; Basics of	unit co	osting	. Finan	cing New V	entur	e- var	ous sources -
	ation- Pite	ning	to investors.				Dariada. 0			
Difference betu		م جميدا	Iviarketing and Sales		р:Id:	na Diai	Periods: 9			dia company
Difference betw	aloc Blon		huving decisions. Listoning state	ment. kille to	Bullul		a Salas Bro	e, soc		uia- company
Follow-up and c		ning - alo	buying decisions, Listening s	KIIIS, Ld	igets.	Unique	e Sales Plu	JUSILIC	031	r), sales pitch,
		aic.	Team and Sunnort				Periods: 9			
Team Building	- Shared	lean	lershin - role of a good to	am -	team	fit - (lefining ro	lec ar	nd res	nonsihilities -
collaboration to	ools and	tech	niques- project managemer	nt. tim	e ma	nagem	ent. workf		lelegat	ion of tasks
Business regulat	tions - sta	rting	and operating a business - co	moliar	ice re	auirem	ents.	, .	icic bu	
Lecture Periods	: 45		Tutorial Periods:	-	Prac	tical Pe	eriods: -	То	tal Per	iods:45
Reference Book	Reference Books:									
1. Nandan H	l, "Fundai	menta	als of Entrepreneurship", Pre	ntice H	all Inc	dia, 201	3.			
2. Learn WIS	SE-Digital	learr	ning platform by Wadhwani F	oundat	tion, v	www.le	arnwise.or	B		
3. Khanka S	S, "Entre	prene	urial Development", S Chanc	l & Con	npany	, 2007.		-		
4. Sangeeth	4. Sangeetha Sharma, "Entrepreneurship Development"– Prentice Hall India, 2017.									
5. Anil Kuma	ar.S, "Enti	reprei	neurship Development"– Nev	N Age F	Publisl	hers, 20	003.			

Department :	Informa	tion Technology	Programme : B. Tech.(IT)								
Semester :	Sixth		Cour	se Cate	egory C	ode: PCC	Semest	er Exam	Туре: LB		
Course Code	Courco	Nama	Perio	ods / V	Veek	Credit	M	aximum l	Marks		
Course Code	Course	Name	L	Т	Р	С	CA	SE	TM		
IT224	Web T	echnology Laboratory	-	-	3	2	40	60	100		
Prerequisite											
	CO1	Learn about HTML file forr	natting	and lir	nking						
Course		Able to know about Scripti	ing lang	uages							
Outcome	<u> </u>	Know Configuration of wel	b servei	ſS							
Outcome	02	Link and embed with diffe	rent do	cumen	its						
	CO3	Apply JSP for data accessir	ng and s	ession	trackir	ng					

	CO4	Learn	about Server Side Sc	ripting		
	CO5	Devel	op Web Applications			
1. Creation of	HTML Fil	es with C	SS			
2. Working wi	th Client	Side Scrip	oting			CO1
2.1 VBS	Script					
2.2 Java	aScript					
3. Configurati	on of web	o servers				
3.1 Apa	iche Web	Server				CO 2
3.2 Inte	ernet Info	rmation S	Server (IIS)			002
4. Working wi	th Active	X Control	s in web documents			
5. Experiment	s in Java S	Server Pa	ges			
5.1 Dat	a Access I	Programn	ning (using ADO)			CO3
5.2 Se	ssion and	Applicati	on objects			
6. Working w	ith other :	Server Sic	de Scripting			
6.1 Ac	tive Serve	er Pages				CO4
6.2 Ja	va Servlet	S				
6.3 PF	IP	_				
7. Experiment	ts in Ajax	Program	ning			CO5
8. Developing	Web Ser	vices				
9. Developing	any E-co	mmerce a	application (Mini Pro	ject)		
Lecture Perio	ds: -		Tutorial Periods: -	Practical Periods: 45	Total Periods: 45	
Reference Bo	oks		- <i>"</i>			-
1. N.P. Gopal	an and J.	Akilande	swari, "Web Techno	logy: A Developer's Perspec	ctive", Second Edition, Pre	entice-
Hall of Indi	a, 2014.		<i>//.</i>			
2. Deitel and	Deitel, (Goldberg,	, "Internet and Wor	'ld Wide Web – How to Pi	rogram", Fifth Edition, Pe	earson
Education	Asia, 201	1. 			A delta e 14/4 de 12007	
3. Eric Newco	mer, "Un	derstandi	ng web Services: XIV	IL, WSDL, SUAP, and UDDI", A	Addison-Wesley, 2007.	
4. nttps://boo	KS.google		oks/about/webitec	HINOLOGY.NTMI		
5. nttps://ww	w.w3scho	Jois.com				

Department : Info	ormatio	n Technology	Program	ne: B. 1	「ech. (IT)				
Semester : Six	αth		Course Ca	ategory	Code	PCC	Seme	ster E	xam Type	: TY
Course Code	Caura	Nama	Period	s / We	ek	Crec	lit	Ma	ximum N	arks
Course Code	Course	endrie	L	Т	Р	С		CA	SE	TM
IT225	Softwa Labora	are Engineering atory	-	-	3	1.5	5	40	60	100
Prerequisite										
Course	CO1	Can be able to produc	e SRS with [DFD/ER	/Use c	ase to t	he end	l user.		
Outcome	CO2	Obtain practical know	ledge for Sl	DS with	decor	nposed	desigr	ning		
Outcome	CO3	Can practice real time	test genera	tion fo	r the n	nini pro	ject			
Cycle-I	Softwa	are Requirement Specif	ication Rep	ort		Period	ls: 9			
Architecture dia DFD/ER/Use Case Note: 2 students IEEE format.	igram, e, Activit s per ba	Functional and Non-F cy chart oriented cost es tch. Every batch should	unctional i timation an I do unique	require d time Mini p	ment, sched project	identi uling. and co	ficatior	n of e SRS	activities Report ir	, , CO1
Cycle -II	Softwa	are Design Specification	Report			Period	ls: 9			
Decomposition of Implementation App are to be use activity to Modul Note: Every Mini	of Modu to be do ed to exp e level. project	ules. Detail diagram of one by adopting softwar plore to latest updated t should consists minimu	of every de are enginee cechnologie m of 3 mod	ecompo ring me s. Verif ules wi	osed n ethodo ication th SDS	nodule blogy. R i Testin report	with o eal tim g shoul in IEEE	docum ne too d be c forma	nentation Is/Mobile Ione from at.	
Cycle -III	Softwa	are Testing				Period	ls: 9			
Prepare test plan, perform validation testing, Coverage analysis, Design the Test Strategy, Define the Test Objectives, Define Test Criteria, Plan Test Environment, Test case Schedule & Estimations, Unit testing, integrated testing, Determine Test Deliverables Complete Software Test report with output results in IEEE format										
Lecture Periods:	45	Tutorial Perio	ods: - Pra	actical	Period	s: -	Tota	al Peri	ods: 45	

Department : Information Technology Programme: B. Tech. (IT)											
Semester :	Sevent	h	Subje	ct Cate	egory: PCC	Semest	er Exam	Туре: ТҮ			
Course Code	Cours	o Namo	Pe	eriods	/ Week	Credit	Max	kimum Ma	rks		
Course Coue	Course	ename	L	Т	Р	С	CA	SE	ΤM		
IT226	Artific	cial Intelligence	3	1	-	4	40	60	100		
Prerequisite											
	CO1	Apply heuristic concepts to	design eff	icient	algorithms	that help	o to atta	ain the go	oals in		
	.01	satisfactory manner									
Course	CO2	Able to design different Know	ledge Rep	resent	ation scheme	es for typ	ical Al p	roblems.			
Outcome	CO3	Understand the concept of Fu	ızzy logic								
outcome	CO4	Able to design and implement	t a typical <i>i</i>	Al prol	plem to be so	olved Usir	ng Mach	ine Learni	ng		
		Techniques.									
	CO5	Capability to develop intellige	nt systems	5							
UNIT-I	Intro	duction				Periods	: 12				
Overview of A	Overview of AI, Problems, Problem space and searching techniques, Definition production system, Control										
strategies, He	uristic s	earch techniques. Game Playing	g: Minmax	search	procedure-	Adding al	pha-beta	a cutoff	CO1		
Intelligent age	ents: Ag	ents and environment – structu	ire of agen	ts and	its functions	s- simple	reflex ag	gent- goal			
based agent –	utility k	based agent – learning agents, K	nowledge	- Based	d Agent.						
UNIT-II	Know	ledge representation	- •-			Periods	: 12				
Approaches a	nd issue	es in knowledge representation,	Predicate	logic,	propositiona	l logic, Fo	rward a	nd	CO2		
backward rea	soning -	Unification- Resolution- Weak	slot-filler s	tructu	re – Strong sl	ot-filler s	tructure				
UNIT-III	Reaso	oning under uncertainty				Periods	: 12				
Logics of nor	n-monot	tonic reasoning-Implementation	n- Basic p	robabi	lity notation	- Bayes	rule –	Certainty	CO3		
factors and ru	le based	d systems-Bayesian networks – I	Dempster	- Shafe	er Theory - Fu	uzzy Logio	2.				
UNIT-IV	Plann	ing and Learning				Periods	: 12				
Planning with	state	space search-partial order plan	nning-plan	ning g	raphs-condit	ional pla	anning-co	ontinuous			
planning-Mult	i-Agent	planning. Forms of learning- Le	earning fro	m obs	ervation - In	ductive le	earning -	- Decision	CO4		
trees – Explan	ation b	ased learning – Statistical Lea	rning met	hods	- Reinforcem	nent Leai	rning -N	eural Net			
learning and C	Senetic	learning									
	Applic	cations and Al Languages			• •.•	Periods	: 12				
Expert System	: Repre	sentation-Expert System shells-	Knowledge	e Acqu	isition.						
AI Languages	Intro	duction to LISP, expressions, fu	unctions, H	Recurs	ion. Introduc	ction to	Prolog-K	nowledge	CO5		
representatio	n and re	easoning using Prolog.		_				-			
Lecture Perio	ds: 45	Tutorial Periods: 15	6 Practi	cal Pe	riods: -	Tot	al Perio	ds: 60			
Reference Bo	oks:										
1. Elaine Rio 2009.	ch and K	Kevin Knight and Shivashankar B	. Nair, Arti	ficial Ir	ntelligence, 3	rd editio	n, Tata N	ЛсGraw Hi	11,		
2. Ben Copp	oin, "Art	ificial Intelligence Illuminated",	Jones and	Bartle	tt Publishers	, 1st editi	ion, 2004	4.			
3. Stuart J.	Russell a	and Peter Norvig, Artificial Intell	igence: A l	Noder	n Approach,	Pearson	Educatio	n Asia,			
II edition	, 2003.	-									
4. N.P. Padł	ny, Artifi	icial Intelligence and Intelligent	Systems, C)xford	University P	ress, 2nd	edition,	2005.			
5. I. Bratko	, —Pro	olog: Programming for Artificia	al Intellige	nce,	Fourth editi	on, Addi	son-Wes	sley Educa	ational		
Publisher	s Inc., 2	2011.									
6 Deensly	ا مر ممر م ما	: ((Autificial lustalline and " Tata NA	- C		1: 2012						

6. Deepak Khemani "Artificial Intelligence", Tata McGraw Hill Education 2013.

Department : I	lumaniti	es & Social Sciences	Prog	amme: I	B. Tech	. (IT)			
Semester : S	Seventh		Cours	se Catego	ory Coc	le: HSM	Semeste	er Exam Ty	ype: TY
Course Code	Course	Namo	Pei	riods / W	/eek	Credit	Max	kimum Ma	arks
Course Coue	Course	name	L	Т	Р	С	CA	SE	TM
HS202	Indust	rial Economics and Management	3	-	-	3	40	60	100
Prerequisite:	-								
	The co	urse will enable the students:							
	CO1	Assess the knowledge o economics/macroeconomics.	f ma	themati	cs to	under	stand ir	ndustrial	micro
Course	CO2	Implement various managemen	t techn	iques ba	sed on	the need	s.		
Outcome	CO3	Implement various investment e	valuat	ion base	d on th	e needs	-		
	CO4	Apply formula and workout prol	olem						
	CO5	Case studies on General. Produc	tion ar	nd Financ	cial mai	nagement	•		
UNIT-I	MICRO	AND MACRO FCONOMICS AND IT	S APPL	ICATION	S	Periods	: 09		
Nature and S	cone of	Fronomic science: Micro – Mac	ro Fro	nomics	Fcono	mic decis	sions and	Technica	4
decisions. Dem	hand and	Supply concepts: Types of Deman	d. Dete	rminant	s of De	mand and	d Supply	concept o	of .
Fauilibrium, Fl	asticity o	of Demand, cost components, Conc	ents o	f ISO-Ou	iant – I	Break Eve	n Analysis	s – Marke	.t
structure – Pri	ce of Pro	duct Nature of pricing in different t	vnes o	f compet	tition S	mall Scale	Industrie	s – Role c	of
SSI in Indian Ec	conomy.		, , , , , , , , , , , , , , , , , , , ,	, compe					. CO1
Macro Econor	nics: Nat	ure and functions of Money – Na	tional	Income	– GNP	and Sav	ings – Inf	lation an	d
Deflation conc	ept – Bus	siness Cycle – Foreign Trade and Bal	ance o	f paymei	nt.				4
UNIT-II	MANA	GEMENT TECHNIQUES		. paje		Periods	: 09		l
Types and Prir	nciples of	Management – Elements of Mana	igemei	nt – Plan	ning. ()rganising	. Staffing.	Directing	7.
Coordinating (Controllir	g - Scope of Management – Type	es of C	rganizat	ion Me	rits and	Demerits ·	– Types c	,, of CO2
(Ownership) of	f a firm N	Arits and Demerits.		0				.,	
UNIT-III	INDUS	TRIAL FINANCE				Periods	: 09		I
Need for Finar	nce – Tvn	es of finance – Sources of finance -	– Type	s of Inve	stment	– Evalua	tion of Inv	estment	_
Preparation of	Trading	Profit and loss Account and Balar	ice She	et – tvp	es of a	ccounting	and sign	ificance c	of CO3
each types.	1144116			ee cyp					
						Dorioda	• •		
Theory of Bro	duction I	Function Types of Broduction M	orite or	nd Domo	vrite		lanning	Pouting	
Scheduling -	Matorial	Control Concents of Productivity			nt of D	roductivi	tv – Inché	action an	4 CO 1
Dispatches	viateriai	control concepts of Froductivity		sureniei		TOUUCTIVI	ty – inspe		J C04
	MVBK					Pariods	• 00		
Core Concents		veting _0 Needs _ Wants _ Deman	d Ma	koting \	/c Solli	renous	ucts and	Markots	
Pricing and r	olotod fa	ectors - Channels of Distribution	– Dro	motion	Advort	icing – N	Narkot Pe	soarch V	- COE
Marketing Pos	earch		- 10	motion	Auvent				3 000
Locture Period		Tutorial Pariods:	Dract	ical Pari	oder -	Т	atal Paria	dc. 15	
Poforonco Bool	5. 4 . 76		FIAC		uus	11		43. 4 3	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
1 Varshnov Ma	hoswari	"Managerial Economics" S Chand P		ow Dolhi	2011				
2 Dutt & Sund	aram "In	dian Economy" S Chand & Co Now I	CU, N Dolhi 1		2011				
2. Duri & Juliu 3. Pandov I M	"Flomont	s of Financial Management" Wiley	Eastorr		v Delhi	2015			
Δ H Abuis "	Macro Fo	onomics for Business and Managem	-ascell	Chand P	Comp	2013 2011 to 20	711		
T. TIL. Alluja, 1 5 OPKhanna	"Inductri	al Engineering and Management	hannot	Raiand	Sone 7				
6 Philin R Kotla	r "Mark	eting Management Mac Millan Ne	w York	2011	50113, 2				
	., ייומות	cing management, mat miniall, Ne	VV IUIN	2011.					

Department :	Informa	ition Technology	Prog	amme	e: B. Te	ch. (IT)			
Semester :	Seventh	1	Subje	ect Cat	egory:	РСС	Semester	Exam Typ	oe: LB
Course Code	Caura	o Nomo	Но	urs / W	/eek	Credi	t Ma	ximum N	1arks
Course Code	Cours	ename	L	Т	Р	С	CA	SE	TM
IT227	Artific	ial Intelligence Laboratory	-	-	3	1.5	40	60	100
Prerequisite									
	CO1	Apply heuristic concepts to design	gn efficier	it algo	rithms	using Pyt	hon		
Course	CO2	Able to implement game playing	g algorithr	ns in P	ython.				
Outcome	CO3	Able to develop Expert system u	ising Pythe	on					
Outcome	CO4	Able to develop AI problems usi	ng LISP						
	CO5	Able to design and implement K	nowledge	repre	sentati	on using	Prolog		
To develop fol	lowing	programs in Python							
1.	Imple	ment Breadth First Search (for 8 p	uzzle prot	olem)					
2.	Imple	ment Depth First Search (for Wate	er Jug prok	olem)					CO1
3.	Imple	ment A* algorithm							01
4.	To im	plement AO* Algorithms							
5.	Imple	ment Single Player Game (Using H	euristic Fι	unctior	า)				
6.	Imple	ment Two Player Game (Using He	uristic Fun	ction)					CO2
7.	To im	plement constraint satisfaction tee	chnique						002
8.	Imple	ment Certainty Factor problem							
9.	Imple	ment Syntax Checking of English s	entences-	Englisł	n Gram	mar			
10.	Devel	op an Expert system for Medical d	iagnosis.						CO3
11.	Devel	op any Rule based system for an a	pplication	of yo	ur choi	ce.			
To design and	develop	programs in Lisp							
12.	Knigh	t's tour problem							CO4
13.	Cros	sword puzzle							
Problems in Pi	rolog								ĺ
14.	Resol	ution in Propositional Logic							CO5
15.	Resol	ution in Predicate Logic		- •					
Lecture Period	ds: -	Tutorial Periods: -	Pr	actica	Period	ls: 45	Total Pe	riods: 45	

Department :	Inform	nation Technology	Progr	amme:	B. Tech	n. (IT)			
Semester :	Sevent	'n	Subje	ct Cate	gory: P /	AC	Semester Ex	am Type	:-
Course	Cours	o Namo	Но	urs / W	eek	Credit	: Max	imum N	larks
Code	Cours	ename	L	Т	Р	С	CA	SE	ТМ
IT228	Semin	ar	3	-	-	1	100	-	100
Prerequisite	-								
Course Outcome	CO1	The students able to work i	ndepend	ently ar	nd get e	xposure i	n latest techr	nologies.	
 The S guide Each The s 	Seminar student tudent	topic shall be chosen in con has to make a critical review has to present a seminar.	of literat	with a ure and	faculty	y membe re a repor	r who would t.	be the	CO1
Lecture Perio	ds: 45	Tutorial Periods: -	Pra	actical I	Periods	: -	Total Perio	ods: 45	. <u>.</u>

Department :	Inform	ation Technology	Progr	amme:	B. Tech	n. (IT)			
Semester :	Sevent	h	Subje	ct Cate	gory: PC	CC	Semester Ex	am Type	e: PR
Course	Course	Nama	Но	urs / W	eek	Credi	t Max	kimum N	1arks
Code	Course	endine	L	Т	Р	С	CA	SE	TM
IT229	Mini P	roject	-	-	3	1.5	40	60	100
Prerequisite									
Course Outcome	CO1	Students able to work i	in groups and	develo	p proje	cts for rea	al time proble	ems.	
 Preparin A report A preser A A consolid 	g a proj Probl Deve A sta Diagr List o Time highligh ntation i Imple Testin Learr	ect – brief proposal inclu em Identification loping a model for solvin tement of system / proce ram) f possible solutions inclu line activities nting the design finalizati ncluding the following ementation phase (Hardw ng & Validation of the de ning in the project port preparation	ding g the problen ess specificati ding alternati on [based on vare / Softwa veloped syste	n ons pro ves and functio re / bot em	oposed t d constr onal requ ch)	to be deve aints uirement	eloped (Data s & standards	Flow	C01
Lecture Perio	ds: -	Tutorial Periods: -	· Pr	actical	Periods	: 45	Total Peri	ods: 45	

Department :	Inform	nation Technology	Progra	amme:	B. Tech	n. (IT)			
Semester :	Sevent	h	Subjec	t Cate	gory: M	ICC	Semester Ex	am Type	:-
Course	Carro		Ηοι	ırs / W	eek	Credi	t Max	kimum M	arks
Code	Course	ename	L	Т	Р	С	CA	SE	TM
IT230	Profes	ssional Ethics	2 0						-
Prerequisite	-								
Course	CO1	The students will have a clea nature.	r vision a	about t	he rela	tionship a	among self, so	ociety an	d
Outcome	CO1	The students will realize thei professional)	r import	ance ir	the so	ciety (in p	particular in t	neir	
The course sh	iould co Hum Life, Ethic Ethic Engir Resp Glob	over the following topics by way an Values and Attitudes, Ethica Body and Mind, Philosophy of cal Theories, Profession and Pro cal theories and their uses neering as Experimentation – C onsibilities and rights al issues of engineering ethics a	y of Sem al Living a Life, Ana ofessiona code of E and Wor	inars, E and Du Ilysis of Ilism, E thics, E Id Pead	Expert L ty Cons f Thoug Inginee Enginee ce.	ectures a ciousnes ht and No ring Ethic r's respon	ind Assignme s eutralization o s – Moral issu nsibility for sa	nts: of Anger les, fety and	C01
Lecture Perio	ds: 30	Tutorial Periods: -	Pra	ctical I	Periods	: -	Total Peri	ods: 30	

Department :	Inform	ation Technology	Progra	amme:	B. Tech	n. (IT)			
Semester :	Eighth		Subje	ct Cate	gory: P	AC	Semester Ex	am Type	<u>:</u> -
Course Code	Cours	o Nomo	Ηοι	urs / W	eek	Credit	Credit Maxim		larks
Course Code	Cours	endme	L	Т	Р	С	CA	SE	TM
IT231	Comp	rehensive Test	3 1				100	-	100
Prerequisite:									
Course	CO1	To refresh all the IT relate	d subjects	studied	1				
Outcome	CO1	To face the placement tes	ts conduct	ed for t	the cam	pus recru	itment		
 The st subject A com A com 	tudents ts they prehen prehen	are provided with tutorial se have studied from the 3rd t sive test, preferably with ob sive viva voce examination (essions to u o 7th seme jective type (external) w	ipdate ester. e quest vill be c	their kr tions, w	nowledge ill be conc ed.	in all the IT re lucted.	elated	CO1

Lecture Periods: -	Tutorial Periods: -	Practical Periods: 45	Total Periods: 45

Department :	Inform	ation Technology	Progra	amme:	B. Tecł	n. (IT)			
Semester :	Eighth		Subje	ct Cate	gory: N	ICC	Semester Ex	am Type	: PR
Course	Course	Nama	Ηοι	urs / W	eek	Credi	t Max	kimum N	larks
Code	Course	ename	L	Т	Р	С	CA	SE	TM
IT233	Projec	t Work	2	-	-	0	60	40	100
Prerequisite									
	CO1	The students will have a clea	ar vision	about t	he rela	tionship a	mong self, so	ociety an	d
Course		nature.							
Outcome	CO1	The students will realize the	ir import	ance ir	the so	ciety (in p	oarticular in t	neir	
		professional)							·····
The project g	roup is r	equired to do the following							
1. Li	iterature	e Survey,							
2. P	roblem	formulation							
3. F	orming	a methodology of arriving at t	he soluti	on of th	ne prob	olem.			
4. E	Docume	ntation of each step							
5. №	laster a	programming language or sof	tware to	ol used	for im	plementa	tion		CO1
6. T	est the _l	project and compare it with be	enchmar	k stand	ards				
7. P	repare F	Project Report							
8. D	evelop	Presentation skills							
9. D	evelop	ability to work in a Group							
10. P	ublish a	paper in a reputed Conference	e or Jour	nal.					
Lecture Perio	ds: -	Tutorial Periods: -	Pra	actical I	Periods	: 45	Total Peri	ods: 45	

Program Elective Courses

Department :	Informa	tion Technology	Programme: B. Tech. (IT)							
Semester :	Fifth		Subje	ct Cate	gory: I	PEC Sem	nester Exa	am Type:	: TY	
Course Code	Course	Namo	Perio	ods / W	/eek	Credit	Max	imum M	arks	
	Course		L	Т	Р	С	CA	SE	TM	
ITY01	Compi	iler Design	3	-	-	3	40	60	100	
Prereguisite	CS201	 Programming for Problem 	Solving							
	IT203 ·	 Object Oriented Programmi 	ing							
	CO1	Able to learn the various ph	ases of	comp	iler.					
Course	CO2	Design a lexical analyzer for	a samı	ole lan	guage.					
Outcome	CO3	Apply different parsing algo	rithms	to dev	elop tł	ne parsers for	a given §	grammar	•	
outcome	CO4	Understand syntax-directed	l transla	ation a	nd run	-time enviror	nment			
	CO5	Learn to implement code or	otimiza	tion te	chniqu	ies and a simp	ole code	generato	or.	
UNIT-I	Introd	luction to Compilers				Periods: 9				
Translators-Co	ompilatio	on and Interpretation – The p	ohases	of Con	npiler-	Errors encour	ntered in	differen	t	
phases-The gr	ouping	of phases – cousins of the co	mpiler-	Compi	ler cor	struction too	ls – A sin	nple one	- CO1	
pass compiler-	- Contex	xt Free Grammars-Derivation-	– Redu	ction a	nd Am	biguity				
UNIT-II	Lexica	l Analysis				Periods: 9				
Need and role	of lexic	al analyzer – Lexical errors-Ex	pressir	ng toke	ns by I	Regular Expre	ssion –			
Converting reg	gular exp	pression to DFA – Minimizatio	on of D	FA – La	nguag	e for specifyii	ng lexical		CO2	
analyzers – LE	X-Desigr	n of lexical analyzer for a sam	ple lan	guage.						
UNIT-III	Syntax	<pre>c Analysis</pre>				Periods: 9				
Need and role	e of the	e parser – Context Free Grar	nmars	– Тор	Down	parsing –Ge	neral str	ategies -	-	
Recursive Des	cent Pai	rser – Predictive Parser – LL(1	1) Parse	er – Sh	ift Red	luce Parser –	LR Parse	r – LR (0) co3	
item – Constru	uction o	f SLR Parsing table – Introdu	ction to	D LALR	Parser	– Error hand	lling and	recovery	/ 000	
in syntax analy	yzer – YA	ACC – Design of a syntax anal	yzer foi	r a sam	ple lar	nguage.				
UNIT-IV	Syntax	Constructed Translation and Ty	vpe Che	ecking		Periods: 9				
Definitions –	Constru	ction of syntax trees –Bottc	om-up	evalua	tion of	f S-attributed	l and L-a	ittributed	2	
definitions – T	op dow	n translation –Bottom up eva	luation	– Forr	ns of i	ntermediate o	code – Tr	anslatior	¹ CO4	
of Assignmen	it, Bool	ean Expression and Contro	ol state	ements	5 — Ва	ack patching	type sy	/stems -	-	
Specification c	of a simp	ole type checker –equivalence	e of typ	e expr	essions	s – Type conv	ersions.			
	Code	Optimization and Code Gene	ration	<u>.</u>		Periods: 9				
Principal sour	ces of C	optimization – DAG –Optimiz	ation o	t basic	block	s – Global da	ta flow a	analysis -	-	
Efficient data	riow alg	gorithms –Source language l	issues	– Stor	age oi	rganization –	Symbol	tables -	CO5	
Dynamic stor	age and	ocation —issues in design o	гасо	de ger	ierato	r – A simple	e code g	generato	ſ	
	1c. 1E	Tutorial Dariada	Dract	ical Da	riada	То	tal Daria	day 15		
Poforonce Perilo	15. 45 okc:	Tutorial Perious: -	riact	ical Pe	ious:	- 10		us. 45		
1 Alfred	V Abo	Ravi Sathi Jaffray D. Lillman	"Comni	lorc- D	rincipl	os Tochnique	s and To	ols" Por	arson	
I. AIII Educat	v. AIIU, ion Asia	2007	comp	nei s- P	meipi	es, rechnique	s, anu TC	, 190	31 5011	
2 David	Galles "	n, 2007. "Modern Compiler Design" Da	arson	Educat	ion Δ¢	ia 2007				
2. Daviu (hnick "Advanced Compiler I	Design	& Imn	lemen	tation" More	an Kauf	mann Pu	lishers	
2000	. J. WIUC		CSIGIT	a inp	icitien				insite(3)	
2000										

4. C. N. Fisher and R. J. LeBlanc "Crafting a Compiler with C", Pearson Education, 2000.

Department :	Informa	ation Technology	Programme: B. Tech.(IT)							
Semester :	Fifth		Subject	Catego	ory Coo	de: PEC	Semester	Exam Type	e: TY	
Course Code	Cours	o Namo	Peric	ods / We	eek	Credit	Maxi	mum Mark	S	
Course Coue	Course	e Name	L	Т	Р	С	CA	SE	ΤM	
ITY02	Objec Desigr	t Oriented Analysis and า	3	-	-	3	40	60	100	
Prerequisite	CS201 IT203	 Programming for Problem 9 Object Oriented Programmi 	Solving ing							
	CO1	To familiarize the students t developing object oriented	co carry ou software p	it object projects	t orien	ted analy	sis and desi	gn for		
Course	CO2	Design a lexical analyzer for	a sample	languag	ge.					
Outcome	CO3	Apply different parsing algo	rithms to	develop	the p	arsers for	a given gra	mmar.		
	CO 4	Understand syntax-directed	translatic	on and r	un-tim	ne enviror	iment			
	CO5	Learn to implement code op	otimizatio	n techni	ques a	ind a simp	ole code gei	nerator.		
UNIT-I	OOAI	D Basics				Period	s: 9			
Introduction -	- Overvi	iew of object oriented system	n develop	ment –	Objec	t basics-T	he Unified	Process –		
Modeling con	cepts –	Modeling as a design techni	ique – An	alysis ar	nd mo	deling –	UML diagra	ms – Use	CO1	
case Modeling	g – Class	modeling – State modeling –	Interactio	n Mode	eling.					
UNIT-II	Requi	rements and Modelling				Period	s: 9			
Object Const Sequence Diag	raint La grams –	anguage - Inception – Evolu Operation Contracts.	utionary	Require	ments	– Domai	n Models	– System	CO2	
UNIT-III	Desigr	n and Principles of Design				Period	s: 9			
Requirements Model, View, diagram with	to Desi Contro Visibility	ign –Design Patterns – Logica I pattern – Detailed design – /.	l Architec - Object c	ture – P lesign w	Packag vith G	e diagran RASP pat	n – Design I tern – Deta	oatterns – ailed class	CO3	
UNIT-IV	Mapp	ing to code				Period	s: 9			
Mapping desig	gns to co	ode – Test Driven developmer	nt and refa	octoring	– UM	L Tools ar	d UML as b	lueprint	CO4	
UNIT-V	Patter	'ns				Period	s: 9		.L	
More Pattern Architectural	ns – Ai Analysis	nalysis update – Objects v – Logical Architecture Refine	vith respo ement – P	onsibilit ackage	ies – Design	Applying Persiste	design p ence frame	atterns – work with	CO5	
Lecture Perior	ds: 45	Tutorial Periods: -	Practic	al Perio	ds: -		Total Perio	ds: 45	<u>.</u>	
Reference Bo	oks:		114000		45.			45. 45		
				dmada		بمططمة من		Dranting		
1. Micha	iel Blaha	and James Rumbaugh, "Ohie	ect-oriente	eu mone	elling a	nd desier		. Prennice-	пан	
 Micha of Ind 	iel Blaha ia. 2005	a and James Rumbaugh, "Obje	ect-oriente	a mode	elling a	na aesigr		, Prentice-	ndli	
 Micha of Ind Craig and It 	iel Blaha ia, 2005 Larman. erative l	a and James Rumbaugh, "Obje . "Applying UML and Patterns Development", 3rd ed, Pearso	– An intro on Educati	duction	to Ob 5.	iject-Oriei	nted Analys	is and Desi	gn	
 Micha of Ind Craig and It Ali Ba 	el Blaha ia, 2005 Larman. erative l hrami, "	a and James Rumbaugh, "Obje . "Applying UML and Patterns Development", 3rd ed, Pearso 'Object Oriented Systems Deve	– An intro on Educati elopment	duction on, 200! ", McGra	to Ob 5. aw-Hil	iject-Oriei I, 1999.	nted Analys	is and Desi	gn	
 Micha of Ind Craig and It Ali Ba Booch 	iel Blaha ia, 2005 Larman. erative l hrami, " n, Grady	a and James Rumbaugh, "Obje "Applying UML and Patterns Development", 3rd ed, Pearso Object Oriented Systems Deve . Object Oriented Analysis and	– An intro – An intro on Educati elopment d Design. 2	duction on, 2005 , McGra	to Ob 5. aw-Hil Pearso	iject-Oriei I, 1999. In Educati	nted Analys on 2000.	is and Desi	gn	
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70

Department: I	nformatio	on Technology	Progra	mme: E	3. Tech	. (IT)			
Semester : F	ifth		Course	Catego	ory Coc	le: PEC	Semester	Exam Ty	ype: TY
	<u></u>		Perio	ods / W	eek	Credit	Maxin	num Ma	rks
Course Code	Course r	vame	L	Т	Р	С	CA	SE	TM
ITY03	Introduc	tion to Business Intelligence	3	-	-	3	40	60	100
Prerequisite:	-								
	CO1	Understand Basics of BI							
Course	CO2	Know about BI Delivery Issue	es.						
Outcomo	CO3	Analyze Efficiency Measures							
Outcome	CO4	Learn about BI Applications							
	CO5	Get a feel of Future of BI							
UNIT-I	Introduc	tion to Business Intelligence				Periods	: 9		
Understanding	g Basics	of BI-Efficient Data Storage	e: key t	o Busi	iness	ntelligend	ce– Busine	ss	
Intelligence O	ueries –	Types of BI Users - Advant	ages of	Busine	ess Int	elligence	- BI Syste	m CO 1	L
Disadvantages	– Exampl	e of Business Intelligence.							
UNIT-II	Trends i	n Business Intelligence Delive	ry			Periods	: 9		
Data Quality	Managem	nent- Data Discovery- Artifici	al Intell	igence-	Predi	ctive and	Prescriptiv	/e	
Analytics Too	ls- Conne	cted Clouds- Data Governand	ce and [·]	Trust- S	Securit	y – Digita	al Ethics ar	nd CO2	2
Privacy- Collat	orative B	usiness Intelligence				•			
UNIT-III	Efficien	cy				Periods	: 9		
Efficiency Mea	asures –C	CR Model: Definition of Target	t Object	ives- Pe	er Gro	ups – Ide	ntification	of	
Good Operati	ing Practi	ces; Cross Efficiency Analysi	is – Vir	tual In	puts a	ind Outp	uts –Patte	rn CO 3	3
Matching – Clu	uster Anal	ysis-Outlier Analysis							
UNIT-IV	Busines	Intelligence Applications				Periods	: 9		
Marketing Mo	dels – Log	istic and Production Models –	Real-tin	ne Case	Studie	s in Differ	ent Domair	าร	
								CO4	ŧ
UNIT-V	Future o	f Business Intelligence				Periods	: 9		
Future of B	l – Eme	rging Technologies-Machine	Learni	ng- Pr	edictin	g Future	– Advance	ed	
Visualization -	Beyond T	echnology.						COS	5
Lecture Period	ls: 45	Tutorial Periods: -	Practio	al Perio	ods: -		Total Peri	ods: 45	
Reference Boo	oks:	-							
1. Gerard	dus Blokdy	yk, "Business Intelligence Deve	lopmen	t", 5sta	rcooks	, Third Edi	tion, 2019		
2. Grossr	mann, Wil	fried, Rinderle-Ma, Stefanie, "	Fundam	entals c	of Busir	ness Intell	igence", 20	15	
3. Rick S	herman, '	'Business Intelligence Guidebo	ok: Fron	n Data I	Integra	tion to Ar	alytics", 20	14.	
4. Jerem	y Kolb, "E	Business Intelligence in Plain L	anguage	e: A pra	actical	guide to I	Data Mining	g and B	usiness
Analyt	ics", 2013	8.							

Department : I	nforma	tion Technology	Prog	ramme	e: B. Te	ch. (IT)			
Semester :	Fifth		Cour	se Cat	egory C	Code: PEC	Semes	ter Exam T	ype: TY
Course Code	C	Neme	Perio	ds / ۱	Neek	Credit	M	aximum M	arks
Course Code	Course	e Name	L	Т	Р	С	CA	SE	ТМ
ITY04	Comp Troub	uter Hardware and leshooting	3	-	-	3	40	60	100
Prerequisite	IT201 IT208	- Digital System Design - Computer Architecture							
	CO1	To familiarise with the	e vario	us typ	es and	parts of th	e compu	uter	
	CO2	To learn the various b	ous sta	ndard	s and n	etwork cor	nponent	s of a com	puter
Course Outcome	urse CO3 To learn the working mechanism of various peripheral devices connected computer.							ted to a	
	CO4	To study the various r	nount	ed and	d portal	ble mass st	orage de	evices	
	CO5	To study the basic ha	rdware	e diagr	nostic to	ools and tr	oublesho	ooting	
UNIT-I	PC Ha	rdware Overview			Per	riods: 9			
Introduction –	- Basic P	arts of PC – Functional b	lock di	agram	– syste	em board -	- Microp	rocessor –	
Interrupts – D	MA – S	SMPS – BIOS – POST seq	uence	- Syst	tem co	nfiguration	- Memo	ory – Mass	CO1
storage – I/O i	nterface	e standards							
UNIT-II	Bus St	andards and Networking			Dor	riada: 0			
					Pei	10us. 9	• -		
ISA – PCI – SC – Cables and c	SI – IDE onnecto	– USB – comparative stu prs - MODEM – AT comma	dy and and set	chara t	icteristi	ics – Netwo	ork Inter	face Cards	CO2
ISA – PCI – SC – Cables and c UNIT-III	SI – IDE onnecto Periph	– USB – comparative stu prs - MODEM – AT comma neral Devices & Display A	dy and and set dapte r	chara t 's	eteristi Per	ics – Netwo	ork Inter	face Cards	CO2
ISA – PCI – SC – Cables and c UNIT-III Functional des	SI – IDE onnecto Periph scriptior	– USB – comparative stur ors - MODEM – AT comma neral Devices & Display A as of keyboard – mouse –	dy and and set dapter printe	chara t 's rs – jo	Per octeristi Per ystick –	ics – Netwo iods: 9	ork Inter – CGA –	face Cards SVGA.	CO2
ISA – PCI – SC – Cables and c UNIT-III Functional des UNIT-IV	SI – IDE onnecto Periph scription Mass	– USB – comparative stur ors - MODEM – AT comma neral Devices & Display A ns of keyboard – mouse – Storage Devices	dy and and set dapter printe	chara t s rs – jo	Per octeristi Per ystick – Per	ics – Netwo iods: 9 - scanners - iods: 9	ork Inter – CGA –	face Cards SVGA.	CO2 CO3
ISA – PCI – SC – Cables and c UNIT-III Functional des UNIT-IV Floppy disk a	SI – IDE onnecto Periph scription Mass S nd driv	– USB – comparative stur ors - MODEM – AT comma neral Devices & Display A as of keyboard – mouse – Storage Devices re – Hard disk and driv	dy and and set dapter printe re – N	chara t s rs – jo 1FM a	ystick – Per Per	ics – Netwo ics – Netwo iods: 9 - scanners - iods: 9 L recordin	ork Inter – CGA – g standa	face Cards SVGA. ards – CD	CO2
ISA – PCI – SC – Cables and c UNIT-III Functional des UNIT-IV Floppy disk a technology – I	SI – IDE onnecto Periph scriptior Mass nd driv DVD tec	– USB – comparative stur ors - MODEM – AT comma neral Devices & Display A as of keyboard – mouse – Storage Devices re – Hard disk and driv hnology – pen drives – ta	dy and and set dapter printe re – N pe driv	chara t r s rs – jo 1FM a res	Per ystick – Per Per	ics – Netwo iods: 9 - scanners - iods: 9 L recordin	ork Inter – CGA – g standa	face Cards SVGA. ards – CD	CO2 CO3 CO4
ISA – PCI – SC – Cables and c UNIT-III Functional des UNIT-IV Floppy disk a technology – I UNIT-V	SI – IDE onnecto Periph scriptior Mass S nd driv DVD tec Troub	 USB – comparative sturbers - MODEM – AT commander of the second se	dy and and set dapter printe re – N pe driv	chara t rs – jo 1FM a es	Per ystick – And RL	iods: 9 iods: 9 - scanners - iods: 9 L recordin	ork Inter – CGA – g standa	face Cards SVGA. ards – CD	CO2 CO3 CO4
ISA – PCI – SC – Cables and C UNIT-III Functional des UNIT-IV Floppy disk a technology – I UNIT-V In-Circuit Emu Analyzers – Tr	SI – IDE onnecto Periph scriptior Mass Mass nd driv DVD tec Troub Ilators – oublesh	 USB – comparative sturbers MODEM – AT commander of keyboard – mouse – Storage Devices Marce – Hard disk and driver hnology – pen drives – tage Logic State/Timing Analogoting problems of system 	dy and and set dapter printe re – N pe driv lyzers m boar	chara t rs – jo 1FM a res – Digi rds, ad	Per ystick – and RL Per and RL Per tal Mul	ics – Netwo ics – Netwo iods: 9 - scanners iods: 9 L recordin iods: 9 ltimeters – ards and pe	ork Inter – CGA – g standa • CROs – eripheral	face Cards SVGA. ards – CD Signature s.	CO2 CO3 CO4 CO5
ISA – PCI – SC – Cables and c UNIT-III Functional des UNIT-IV Floppy disk a technology – I UNIT-V In-Circuit Emu Analyzers – Tr Lecture Period	SI – IDE onnecto Periph scriptior Mass S nd driv OVD tec Troub ilators – oublesh	 USB – comparative sturbers - MODEM – AT commander and Pevices & Display A as of keyboard – mouse – Storage Devices e – Hard disk and drive hnology – pen drives – taleshooting tools Logic State/Timing Analooting problems of system Tutorial Periods: - 	dy and and set dapter printe re – N pe driv lyzers - m boar	chara t rs – jo 1FM a res – Digi rds, ad	Per ystick – Per and RL Per tal Mul Id on ca eriods:	riods: 9 - scanners - riods: 9 L recordin riods: 9 Itimeters – ards and pe	ork Inter – CGA – – g standa • CROs – eripheral Total F	face Cards SVGA. ards – CD Signature s. Periods: 45	CO2 CO3 CO4 CO5
ISA – PCI – SC – Cables and c UNIT-III Functional des UNIT-IV Floppy disk a technology – I UNIT-V In-Circuit Emu Analyzers – Tr Lecture Period Reference Bod	SI – IDE onnecto Periph scriptior Mass s nd driv DVD tec Troub ilators – oublesh ds: 45 oks:	 USB – comparative sturbers - MODEM – AT commander of keyboard – AT commander of keyboard – mouse – Storage Devices e – Hard disk and driver hnology – pen drives – tage leshooting tools Logic State/Timing Analooting problems of system Tutorial Periods: - 	dy and and set dapter printe re – M pe driv lyzers – m boar	chara t rs – jo 4FM a res – Digi rds, ad	Per ystick – and RL Per and RL don ca eriods:	iods: 9 iods: 9 - scanners - iods: 9 L recordin - iods: 9 ltimeters – ards and pe	- CGA – g standa · CROs – eripheral Total F	face Cards SVGA. ards – CD Signature s. Periods: 45	CO2 CO3 CO4 CO5
ISA – PCI – SC – Cables and c UNIT-III Functional des UNIT-IV Floppy disk a technology – I UNIT-V In-Circuit Emu Analyzers – Tr Lecture Period Reference Bod 1. Dr. Aj Publis	SI – IDE onnecto Periph scription Mass S nd driv DVD tec Troub Ilators – oublesh ds: 45 oks: ay Rana hers	 USB – comparative sturbers - MODEM – AT commander and Devices & Display A as of keyboard – mouse – Storage Devices Be – Hard disk and driver hnology – pen drives – tage leshooting tools Logic State/Timing Analooting problems of system Tutorial Periods: - and Dr. Ajit Mittal, Mast 	dy and and set dapter printe re – M pe driv lyzers – m boar Pract	chara t rs – jo AFM a res – Digi rds, ad tical Po	Per ystick – And RLI Per and RLI Per tal Mul Id on ca eriods:	iods: 9 iods: 9 - scanners - iods: 9 L recordin - iods: 9 timeters - ards and pe - & Network	- CGA – g standa · CROs – eripheral Total F king, late	face Cards SVGA. ards – CD Signature s. Periods: 45 est edition,	CO2 CO3 CO4 CO5
ISA – PCI – SC – Cables and c UNIT-III Functional des UNIT-IV Floppy disk a technology – I UNIT-V In-Circuit Emu Analyzers – Tr Lecture Period Reference Boo 1. Dr. Aj Publis 2. Balasu 2010	SI – IDE onnecto Periph scription Mass S nd driv OVD tec Troub Ilators – oublesh ds: 45 oks: ay Rana hers Ibramar	 USB – comparative sturbers - MODEM – AT commander and Devices & Display A as of keyboard – mouse – Storage Devices e – Hard disk and drives – talleshooting tools Logic State/Timing Anallooting problems of system Tutorial Periods: - and Dr. Ajit Mittal, Mastinian D, Computer Installat 	dy and and set dapter printe re – N pe driv lyzers – m boar Pract tering I	chara t rs – jo 1FM a res – Digi rds, ad tical Po FC Har d Serv	Per ystick – Per and RL Per tal Mul Id on ca eriods: rdware	riods: 9 - scanners - riods: 9 - scanners - riods: 9 L recordin - riods: 9 Itimeters - ards and pe - & Network nd Edition	ork Inter – CGA – – g standa • CROs – eripheral Total F king, late , McGra	face Cards SVGA. ards – CD Signature s. Periods: 45 <i>est edition,</i> w hill Publ	CO2 CO3 CO4 CO5 Khanna ications,

4. Scott Muller, Upgrading and Repairing PCs, 15th edition, 2002.
| Department : Ir | nent : Information Technology Programme : B. Tech. (IT) | | | | | | | | |
|---|---|--------------------|------------------|------------------|-----------------|-------------|-----------------|----------|--|
| Semester : S | ixth | Subje | ct Cate | gory: P l | E C Seme | ster Exam | Туре: ТҮ | | |
| Course Code | Course Norse | Peri | ods / W | /eek | Credit | Max | kimum Ma | ırks | |
| Course Code | Course Name | L | Т | Р | С | CA | SE | ТМ | |
| ITY05 | C# and .Net Programming | 3 | - | - | 3 | 40 | 60 | 100 | |
| Proroquisito | IT203 – Object Oriented Programming | g | | | | | | | |
| Trerequisite | IT216 – Computer Networks | | | | | | | | |
| | CO1 Debug, compile, and run a sin | nple ap | plicatio | n. | | | | | |
| Course | CO2 Analyze the basic OBJECT ORI | ENTED | ASPECT | S OF C | Ħ | | | | |
| Outcome | CO3 Develop programs using C# of | n .NET. | | | | | | | |
| Outcome | CO4 Design and develop Web base | ed appli | cations | on .NE | Т | | | | |
| | CO5 Analyze the CLR and its securi | ity issue | S | | | | | | |
| UNIT-I | Introduction to C# | | | | Periods: 9 | | | | |
| Introducing C#, | Understanding .NET, overview of C#, L | iterals, | Variabl | es, Dat | a Types, Ope | erators, ch | ecked and | | |
| unchecked operators, Expressions, Branching, Looping, Methods, implicit and explicit casting, Constant, CO1 | | | | | | | | | |
| Arrays, Array Class, Array List, String, String Builder, Structure, Enumerations, boxing and unboxing. | | | | | | | | | |
| UNIT-II Analyze the basic object oriented aspects of C# Periods: 9 | | | | | | | | | |
| Class, Objects, Constructors and its types, inheritance, properties, indexers, index overloading, | | | | | | | | | |
| polymorphism, | sealed class and methods, interfac | e, abst | ract cl | ass, ab | ostract and | interface, | operator | CO2 | |
| overloading, de | elegates, events, errors and exception, | Threadi | ng. | | | | | | |
| UNIT-III | Application development on .NET | | | | Periods: 9 | | | . | |
| Building windo | ws application, Creating our own wind | dow for | ms wit | h even | ts and cont | rols, menu | creation, | | |
| inheriting wind | low forms, SDI and MDI application, D | ialog B | ox(Mod | lal and | Modeless), | accessing | data with | 603 | |
| ADO.NET, Data | Set, typed dataset, Data Adapter, up | dating o | databas | e using | g stored pro | cedures, S | QL Server | | |
| with ADO.NET, | handling exceptions, validating control | s, wind | ows ap | plicatio | n configurat | ion. | | | |
| UNIT-IV | Web based application development | on .NE | T | | Periods: 9 | | | | |
| Programming v | veb application with web forms, ASP.N | ET intro | ductio | n, work | ing with XM | L and .NET | , Creating | | |
| Virtual Director | ry and Web Application, session manage | gement | technic | ques, w | eb.config, w | eb service | es, passing | CO4 | |
| datasets, retur | ming datasets from web services, h | andling | transa | iction, | handling ex | ceptions, | returning | | |
| exceptions from | n SQL Server. | | | | | | | | |
| UNIT-V | CLR and .NET framework | | | | Periods: 9 | <i>a</i> | | | |
| Assemblies, Versioning, Attributes, reflection, viewing meta data, type discovery, reflection on type, CO5 | | | | | | | | | |
| marshalling, rei | moting, security in .NET | | D | | | | A F | | |
| I OTAI CONTACT H | Iours: 45 I Otal I utorials: - | Iotal | Practic | al class | ses:- T | otal Hours | 5: 45 | | |
| | | 4 0″ T | | | 1 2012 | | | | |
| 1. 1. Herbert | Schlidt, "The Complete Reference: C# 4 | 4.0°, la
1. NET | | raw Hil | 1, 2012. | | | | |
| 2. 2. Christian | n Nagel et al. "Professional C# 2012 wit | n.NEľ4 | 4.5 <i>° ,</i> W | iley Ind | lia, 2012. | <u> </u> | | | |
| 3. Andrew Tr | oelsen, "Pro C# 2010 and the .NET 4 Pla | atform, | Fifth e | dition, <i>i</i> | A Press, 201 | J. | | | |
| 4. Ian Griffiths, Matthew Adams, Jesse Liberty, "Programming C# 4.0", Sixth Edition, O"Reilly, 2010. | | | | | | | | | |

Department : I	Department : Information Technology Programme: B. Tech. (IT)								
Semester : S	ixth		Cou	rse Ca	ategory (Code: PEC	Semeste	er Exam Type: T	Y
Course Code	Cours	Nama	Pei	iods /	' Week	Credit		Maximum Mark	S
Course Coue	Course	e Name	L	Т	Р	С	CA	SE	ТМ
ITY06	Real-t	ime Systems	3	-	0	3	40	60	100
Proroquisito	IT207	 Operating Systems 							
Fielequisite	IT216	– Computer Networks							
	CO1	Understand the concept	t of r	eal-tir	ne syste	m and able	to differe	entiate betweer	n general
		purpose and real-time sy	ysten	าร					
	CO2	Understand real-time so	chedu	uling v	vith resc	ource and o	lata depe	ndency in unip	rocessor,
Course		multi-processor and dist	ribut	ed sys	stems				
Outcome	CO3	Understand the role of r	eal-t	ime oj	perating	system		-	-
	CO4	Understand need for	rea	l-time	comm	unication	and able	e to design	real-time
		communication protoco	ls	-		-	-		
	CO5	Understands the need for	or rea	al-time	e databa	ses and its	design co	ncepts	
UNIT-I	Introd	luction			-	Periods: 9	9		1
Introduction to	roduction to Real-Time system – Characteristics – Types of Real-Time tasks – Timing constraints –								
Real-Time Sch	Real-Time Scheduling:- Basic concepts and classification of Algorithms–Clock-Driven Scheduling– CO1								
Event-Driven S	vent-Driven Scheduling– Hybrid schedulers–EDF Scheduling–RM Scheduling and its Issues								
UNIT-II Real-time Scheduling Periods: 12									
Resource Shari	ng and I	Dependencies among Rea	I-Tim	e task	s: Resou	irce sharing	g in Real T	ime tasks,	
Priority Inversion	on, Prio	rity Inheritance Protocol,	Highe	est Lo	cker Prot	tocol, Prior	ity Ceiling	Protocol,	CO2
Handling Task (depend	encies	-l D:-						
	I-time t	asks in iviuitiprocessor an		tribut	ed Syste	ms Devieder	-		
	Real-t	Ime Operating System (R	105)			Perioas: (T
Time Services -	- Featur	res of Real-time Operating	g Sysi	tem –		US – UNIX	based RI	US – Windows	CO3
as RIUS – PUSI	x – Surv	/ey of Contemporary RTO	S — В	ench i	viarking	real-time S	ystems		
UNIT-IV	Real-t	ime Communication				Periods: 1	L2		
Examples of Re	eal-time	e Communication in Appli	catio	ns – 9	Soft and	Hard Real	-time Con	nmunication in	
LAN – Bounded	Access	Protocol –Real-time Com	imun	icatio	n over In	iternet – Ro	outing and	Multicasting -	CO4
Real-Time Com	munica	tions over Packet Switche	d Ne	twork	s – QoS I	Models			
UNIT-V	Real-t	ime Databases				Periods: (5		
Applications –	Design	issues – Characteristics o	f Ten	npora	l Data –	Concurren	cy control	– Commercial	COE
Real-time Data	bases								005
Lecture Period	s: 45	Tutorial Periods: -	Pra	ctical	Periods:	-	Total Pe	riods: 45	
Reference Boo	ks:						<u>.</u>		
1. Rajib N	1all, Rea	al-Time Systems Theory ar	nd Pra	actice	, Pearsor	n Educatior	, India, 20)12.	
2. C. Siva	Ram M	urthy and G. Manimaran,	Reso	urce N	Managen	nent in Rea	I-Time Sy	stems and Netw	vorks,
Prentic	e-Hall c	of India, 2005.							
3. Jane W	'.S.Liu, F	Real-Time Systems, Pearso	on Ed	ucatic	on, 2006.				
4. Stuart Bennelt, Real-time computer control and introduction, Pearson Education, 2003.									

5. C.M.Krishna and Kang G Shin, Real-time systems, McGraw-Hill, 1997.

Department : I	nformat	tion Technology	Progra	amme	: B. Te	ch. (IT)			
Semester : S	ixth		Cours	e Cate	gory (Code: PEC	Semes	ster Exan	n Type: TY
Course Code	Course	Nama	Perio	ds / W	/eek	Credit		Maxin	num Marks
Course Coue	Course	endrie	L	Т	Р	С	CA	SE	ТМ
ITY07	Mobil	e Computing	3	-	-	3	40	60	100
Prerequisite	IT216	 Computer Networks 							
	CO1	To know the basics of	mobile	teleco	ommu	nication sys	stem		
Course	CO2	Determine the function	nality o	of MA	C, netv	vork layer			
Outcome	CO3	Identify a routing prot	ocol fo	r a giv	en Ad	hoc netwo	rk		
outcome	CO4	To know the function	ality of	Transp	oort ar	nd Applicati	on layer	S	
	CO5	Develop a mobile app	lication	using	Andro	oid/Blackbe	rry/ios/	Windows	s SDK
UNIT-I	INTRO	DUCTION					Period	ls: 9	
Introduction to	o Mobil	e Computing – Applic	ations	of Mo	bile C	omputing-	Genera	tions of	
Mobile Comm	unicatio	n Technologies- Multip	olexing	– Spr	ead sp	pectrum -N	IAC Pro	tocols –	CO1
SDMA- TDMA-	FDMA-	CDMA							
UNIT-II	MOBI	LE TELECOMMUNICATI	ON SYS	TEM		-	Period	ls: 9	
Introduction to	ntroduction to Cellular Systems – GSM – Mobile services - System architecture - Radio								
interface -Prot	ocols -	Localization and calling	g - Han	dover	- Seci	urity - New	data se	ervices -	CO2
GPRS-DECT - I							Davia	J 0	
UNIT-III MOBILE NETWORK LAYER Periods: 9									
	HCP – A	AdHoc- Proactive proto	COI-DSI	DV, KE		e Routing P		5 – DSR,	~~~
VANET) – MANI	ET Vs VA	NET – Security.	iting- t	ואוטנ	r, vei	liculai Au		WOIKS (03
UNIT-IV	MOBI	LE TRANSPORT AND AP	PLICAT	ION L	AYER		Period	ls: 9	
Mobile TCP– W WML	/AP — Aı	rchitecture – WDP – W	TLS – W	/TP –V	VSP –	WAE – WT	A Archite	ecture –	CO4
UNIT-V	MOBI	LE PLATFORMS AND AF	PLICAT	IONS		Periods: 9			
Mobile Device	Operat	ting Systems – Specia	Const	raints	& Re	quirements	6 – Con	mercial	
Mobile Operat	ing Syst	ems – Software Develo	pment	Kit: iO	S, And	lroid, Black	Berry, W	/indows	CO5
Phone – MCom	merce -	– Structure – Pros & Co	ns – Mo	obile P	ayme	nt System –	Securit	y Issues	
Lecture Period	s: 45	Tutorial Periods: -	Practi	cal Pe	riods:	-	Total	Periods:	45
Reference Boo	ks:								
1. Jochen	Schiller	r, —Mobile Communica	tions, F	PHI, Se	cond I	Edition, 200	3.		
2. Prasan	t Kumar	⁻ Pattnaik, Rajib Mall, —	-Fundai	menta	ls of N	1obile Com	puting, I	PHI Learr	ning Pvt. Ltd, New
Delhi –	2012		_	<i></i> .					
3. Dharm	a Prakas	sh Agarval, Qing and An	Zeng,	Intro	ductio	n to Wirele	ss and N	lobile sy	stems", Thomson
	't Ltd, 20	JU5.	C Niel		a d Tha	waaa Ctaba		-:	Mahila
4. Uwe H	ansman iting So	ringer 2002	5. INICK	ions a			r, —Prin	cipies of	BIIDDIE
5 Androi	d Devel	nners · http://develope	r andro	nid cor	n/				
6. Annle I)evelon	er : https://developer	annle co	-m/					
7. Windo	ws Phor	e Dev Center : http://d	levelon	er.win	Idowsi	phone.com			
8. BlackB	8. BlackBerry Developer : http://developer.blackberry.com								

Department : I	nforma	tion Technology	hology Programme: B. Tech. (IT)							
Semester :	Sixth		Course	e Catego	ory Code:	PEC	Seme	ster Exar	n Type: TY	
Course Code	Cours	a Nama	Pe	riods / V	Veek	Credit	M	laximum	Marks	
course coue	Cours		L	Т	Р	С	CA	SE	TM	
ITY08	Image	Processing	3	-	-	3	40	60	100	
Prerequisite:	-	•								
	CO1	To have fundamentals Ir	nage Pro	cessing	steps					
	CO2	To understand the spati	al and fre	equency	/ domain	filters				
Course	CO3	To have various image r	estoratio	on and n	nulti-reso	lution app	roaches	5.		
Outcome	CO4	To have basics of colorimages.	our imag	ge and	various i	morpholo	gical op	erators	applied in	
	CO5	To know about various i	mage seg	gmentat	ion, repre	esentation	and de	scription	methods.	
UNIT-I						Periods	9			
Digital Image	Fundam	entals: Digital image rep	resentati	on –fur	ndamenta	l steps in	volved i	n digital		
image process	ing – c	omponents of image pro	cessing s	ystem -	- image s	sensing ar	nd acqu	isition –	CO1	
image samplin	g and q	uantization – basic relatio	nships be	etween	pixels –e	xamples o	of fields	that use		
digital image p	digital image processing.									
						Periods	9			
Histogram processing – Eurodamentals of spatial filtering – Smoothing spatial filters – Sharpening										
Histogram processing – Fundamentals of spatial filtering – Smoothing spatial filters – Sharpening								CO 2		
spatial filters -	hing using Frequency Domain Filters – Image Sharpening using Frequency Domain								COZ	
Filters - Select	tive Filtering									
INIT-III Periode: 9										
Image Restor	ation.	model of the image de	aradation	/restor	ation pro	10003	noise m			
restoration in	the pre	sence of noise only-spatia	al filtering	g – neri	odic nois	e reductio	on by fr	equency		
domain filterir	ng – line	ear. position-invariant deg	radation	s – esti	mating th	e degrada	ation fu	nction –		
inverse, wier	ier, co	nstrained least square	and g	eometri	ic mean	filtering	— ge	eometric	CO3	
transformation	is.		0			0				
Multi-resoluti	on proc	essing: background – Mu	ılti-resolu	ution ex	pansions	– wavele	et trans	forms in		
one dimensior	and tw	o dimensions – fast wavel	et transfo	orm – w	avelet pa	ckets.				
UNIT-IV						Periods	: 9			
Colour Image	Processi	ng: fundamentals – coloui	r models	– pseud	lo colour	image pro	cessing	– colour		
transformation	ns – colo	our image smoothing and s	sharpenii	ng – col	our segm	entation -	- noise i	n colour		
images.									CO4	
Morphologica	Image	Processing: preliminaries	– dilatio	n and e	rosion – o	opening a	nd closi	ng – hit-		
or-miss transfo	orm – so	me basic morphological a	gorithms	5.			_			
UNIT-V						Periods	: 9	-		
Image Segme	ntation	detection of discontinu	uties –	edge li	nking an	d bounda	ry dete	ection –		
thresholding –	region l	based segmentation.					ما ام		CO5	
rolational doce	n and L	representation: representatio	n – nou	idary d	escriptors	s – region	al uesci	iptors –		
		Tutorial Dariada	Dractic	al Daria	de.		Total	Dorioda	15	
Reference Bec	13. 43 	Tutonal Perious: -	Fractio		Jus: -		TULAI	renous:	43	
1. Rafael C	. Gonza	lez and Richard E. Woods	s, "Digita	l Image	Processi	ng", 3 rd Ed	dition, F	Pearson	Education	
2014.			, ,	- 0-		J /	, -		· · · · ,	
2. Anil K. Ja	ain, Fund	damentals of Digital Image	Processi	ing, Prei	ntice Hall	of India, 2	2011.			

Department : Ir	nformati	on Technology	Programi	me: B. Tec l	n. (IT)							
Semester : S	Sixth		Course C	ategory Co	de: PEC		Semeste	r Exam Ty	be: TY			
Course Code	Courso	Namo	Pe	riods / We	ek	Credit	Max	kimum Ma	rks			
Course Coue	Course	INAITIE	L	Т	Р	С	CA	SE	TM			
ITY09	Cloud	Computing	3	-	-	3	40	60	100			
	IT207 -	• Operating systems										
Prerequisite	IT208 -	Computer Architect	ure									
	IT216 -	Computer Networks										
	CO1	To impart the princi Model with reference	ples and p e to Clouc	aradigm o I Computin	f Cloud Cc g	omputing	and under	rstand the	Service			
	CO2	To comprehend the	Cloud Con	nputing arc	hitecture	and imple	ementatio	n				
Course	CO3	To realize the role	of Virtua	alization T	echnologi	es and a	icquire kn	owledge	of how			
Outcome	COS	hypervisors are used	l in Virtual	Machines.								
	<u> </u>	To secure and perfo	orm identi	ty manage	ment in t	he Cloud	and to a	ccess and	use the			
	04	services in the Cloud	۱.									
	CO5 To familiarise with the popular Cloud Service Providers											
UNIT-I	Introdu	uction to Cloud Com	outing			Periods	: 9					
Overview, Roots of Cloud Computing, Layers and Types of Cloud, Desired Features of a Cloud, Benefits												
and Disadvantages of Cloud Computing, Cloud Infrastructure Management, Infrastructure as a Service CO1												
Providers, Platform as a Service Providers, Challenges and Risks, Assessing the role of Open Standards.												
UNIT-II	Cloud /	Architecture, Service	s and App	lications		Periods	: 9					
Exploring the C	Cloud Co	mputing Stack, Conn	ecting to t	he Cloud,	Infrastruct	ture as a	Service, Pl	atform as				
a Service, Saa	S Vs. Pa	aS, Using PaaS App	lication Fr	ameworks	Software	e as a Se	rvice, Ide	ntity as a	CO2			
Service, Compl	iance as	a Service.										
UNIT-III	Abstra	ction and Virtualizat	ion			Periods	: 9					
Introduction to	o Virtual	lization Technologies	, Load Ba	lancing an	d Virtualiz	zation, Ur	nderstand	ing Hyper				
visors, Unders	tanding	Machine Imaging,	Porting A	pplications	s, Virtual	Machine	s Provisio	oning and	CO3			
Manageability	Virtual	Machine Migration	Services,	Virtual Ma	achine Pr	ovisioning	g and Mi	gration in				
Action, Provisio	oning in t	the Cloud Context					_					
UNIT-IV	Manag	ging & Securing the C	loud		-	Periods	: 9					
Administrating	the Clo	buds, Cloud Manage	ment Pro	ducts, Eme	erging Clo	ud Mana	igement S	standards,	CO4			
Securing the Cl	oud, Sec	curing Data, Establish	ing Identit	y and Pres	ence		-					
UNIT-V	Case S	Studies				Periods	: 9					
Using Google V	Veb Serv	vices, Using Amazon V	Neb Servic	es, Using N	/licrosoft (Cloud Serv	vices.	• • •	CO5			
Lecture Period	s: 45	Tutorial Periods: -	Practic	al Periods	-		Total Pe	riods: 45				
Keterence Boo	KS:											
1. Buyya R., E Sons. 2011	Broberg J	J., Goscinski A., "Clou	id Comput	ing: Princip	ples and P	aradigm"	, First Edit	ion, John V	Niley &			
2. Sosinsky B.	, "Cloud	Computing Bible", Fi	rst Edition	, Wiley Edi	tion, 2011							
3. Miller Mic	chael, "(Cloud Computing: V	Veb Base	d Applicat	ions that	Change	the Way	/ You Wo	rk and			
Collaborate	e Online'	", Pearson Education	India			0-	- /	-				
4 Smooth S	Conductate Online, Pedison Education India A Smooth S Tap N "Private Cloud Computing" Morgan Kauffman First Edition 2011											

- 4. Smooth S., Tan N., "Private Cloud Computing", Morgan Kauffman, First Edition, 2011.
- 5. Linthicium D., "Cloud Computing and SOA Convergence in Enterprise", Pearson Education India.

Department : In	formation	Technology	Progra	mme: B .	Tech.	(IT)			
Semester : S	Sixth		Course	Catego	ry Code	e: PEC	Semest	ter Exam ⁻	Гуре: ТҮ
Course Code	Course	lamo	Peri	ods / We	eek	Credit	Ma	aximum N	1arks
Course Coue	Course i	Name	L	Т	Р	С	CA	SE	TM
ITY10	Internet	of Things	3	-	-	4	40	60	100
	IT207 - C	Operating systems							
Prerequisite	IT208 - C	Computer Architecture							
	IT216 - C	Computer Networks							
	CO1	To understand the bas	sics of li	nternet	of Thi	ngs and get	t an ide	a of som	e of the
		application areas where	Internet	t of Thin	gs can	be applied			
C	CO2	To understand the need	l for Prot	ocol sta	ndardiz	zation and IC	OT proto	cols	
Course	CO3	To understand the conc	ept of Cl	oud of T	hings v	vith emphas	is on we	b of thing	ζS
Outcome	CO4	To Identify and design	the nev	<i>w</i> mode	ls for l	atest strate	egic inte	raction I	Design
		To Design a middlewa	are for I	oT and	analyz	e various p	rotocols	for IoT t	o design
	CO5	different models for net	work dy	namics					_
UNIT-I	Introduo	ction to IoT	· · · ·			Periods: 9			
Definitions and	Functiona	al Requirements – Motivati	ion – Arc	hitectur	e - We	b 3.0 View o	of IoT– U	biquitous	
IoT Application	s – Four Pil	lars of IoT – DNA of IoT - T	he Toolk	kit Appro	bach fo	r End-user P	articipat	ion in the	
Internet of Thir	ngs. Middle	ware for IoT: Overview –	Commur	nication	middle	ware for IoT	–IoT Inf	ormation	CO1
Security.	0								
UNIT-II	IoT Prot	ocols and Applications				Periods: 9			
Protocol Stand	ardization	for IoT – Efforts – M2M	and WS	N Proto	cols –	SCADA and	RFID Pr	otocols –	
Issues with IoT	Standardiz	ation – Unified Data Stand	lards – P	rotocols	– IEEE	802.15.4 - 6	BACNet F	rotocol –	CO2
Modbus – KNX	– Zigbee A	rchitecture – Network laye	er – APS l	ayer – S	ecurity	,			
UNIT-III	Web of	things				Periods: 9			
Web of Things	versus Int	ernet of Things – Two Pi	llars of	the Web	o – Arc	chitecture St	andardiz	ation for	
WoT– Platform	Middlewa	re for WoT – Unified Mu	ltitier W	oT Archi	tecture	e – WoT Poi	rtals and	Business	CO3
Intelligence. Clo	oud of Thir	ngs: Grid/SOA and Cloud (Computii	ng – Clo	ud Mic	ddleware – (Cloud Sta	andards –	.05
Cloud Providers	and Syste	ms – Mobile Cloud Compu	iting – Th	ne Cloud	of Thir	ngs Architec	ture		
UNIT-IV	Integrat	ed Internet of Things				Periods: 9			
Integrated Bill	ing Solutio	ons in the Internet of Th	nings Bus	siness N	1odels	for the Inte	ernet of	Things -	
Network Dynar	nics: Popu	lation Models – Informati	on Casca	ades - N	etwork	Effects - N	etwork D	Oynamics:	CO4
Structural Mod	els - Casca	ding Behavior in Networks	- The Sm	nall-Wor	ld Pher	nomenon			
UNIT-V	Applicat	ions				Periods: 9			
The Role of th	e Internet	of Things for Increased	Autono	my and	Agility	/ in Collabo	rative Pr	roduction	
Environments	- Resource	e Management in the Ir	nternet	of Thing	gs: Clu	stering, Syn	chronisa	ition and	CO5
Software Agent	s. Applicat	ions - Smart Grid – Electric	al Vehic	le Charg	ing				
Lecture Periods	5:45	Tutorial Periods: -	Practic	al Perio	ds: -		Total P	eriods: 4	5
Reference Bool	ks:								
1. Honbo Zho	ou <i>, "</i> The Ir	nternet of Things in the (Cloud: A	Middle	eware	Perspective	e" <i>,</i> CRC F	ress 201	2
2. Dieter Ucke – 2011	elmann, Ma	ark Harrison, " Architecting	g the Int	ernet of	Things	s", Florian M	ichahelle	es (Eds.) –	Springer
3. David Easle World", Car	ey and Jor mbridge Ui	n Kleinberg, "Networks, C niversity Press - 2010	Crowds,	and Ma	rkets:	Reasoning A	About a	Highly C	onnected
4. Kenneth A.	Lambert, -	–Fundamentals of Python	: First Pr	ograms∥	, CENG	AGE Learnin	ig, 2012.		
5. Charles Die	rbach, —In	troduction to Computer S	cience u	sing Pyt	hon: A	Computatio	nal Prob	lem Solvi	ng Focus,
Wiley India	Edition, 20	13		- •		-			
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Department : Information Technology Programme: B. Tech. (IT)										
Semester : Seven	th		Course	Category	Code: I	PEC	Semeste	er Exam Ty	/pe: TY	
Course Code	C	Nomo	Per	riods / We	eek	Credit	M	aximum N	larks	
Course Code	Course	Name	L	Т	Р	С	CA	SE	ТМ	
ITY11	Big Da	ta Analytics	3	-	-	3	40	60	100	
Prerequisite	-					-				
	CO1	Acquire knowledge i	n the insi	ght conce	pt of Big	g Data Ana	lytics			
	CO2	Able to store, create	, extract ,	transfer	and con	nect Big Da	ata			
Course Outcome	CO3	Obtain adequate kno	owledge o	n Hadoo)					
	CO4	Apply advance analy	tical platf	orm						
	CO5	Could know the lates	st tools in	stallation	and dep	oloyment	process of	Big data		
UNIT-I	Introd	uction To Big Data and I	lts Techno	ologies		Periods:	9			
Big Data and its Imp	ortance -	– Four V's of Big Data –	Drivers fo	or Big Dat	a –Intro	duction to	Big Data	Analytics		
– Big Data Analytics	Applicat	ions-Hadoop's Parallel V	Norld – D	ata disco	very Op	en Source	Technolog	gy for Big	CO1	
Data Analytics – Clo	ud and Bi	g Data							01	
UNIT-II	Proces	sing Big Data				Periods:	9			
Integrating Disparat	e Data S	tores - Mapping Data to	o Progran	nming Fra	mewor	k- Connect	ing and E	xtracting		
Data From Storage - Transforming Data for Processing - Subdividing Data in Preparation for Hadoop Map CO2										
Reduce										
UNIT-III	Hadoo	p Map Reduce				Periods:	9			
Employing Hadoop	Map Rec	luce - Creating Compor	nents Of I	Hadoop N	/ap Rec	luce Jobs	- Distribut	ing Data		
Processing Across S	erver Far	ms – Executing Hadoop	Map Red	uce Jobs	- Monit	oring Prog	ress of Jo	b Flows -	CO3	
The Building Blocks	s Of Had	loop Map Reduce - Di	istinguishi	ng Hado	op Daei	mons -Inv	estigating	Hadoop	05	
Distributed File Syst	em					·				
UNIT-IV	Advan	ced Analytics Platform				Periods:	9			
Real-Time Architect	ure – Orc	hestration and Synthesi	is Using A	nalytics E	ngines–	Discovery	using Dat	a at Rest		
– Implementation o	f Big Data	a Analytics – Big Data Co	nvergenc	e – Analy	tics Busi	ness Matu	rity Mode	l.	CO4	
	Pia Do	ta latast Taals				Dariada	0			
UNIT-V Installing and Pupp	ing Dig	Comparison with Dat	tabacac	Dia Lati		Perious.	Function	c Data		
Processing Operato	rs — Inst	- Companson with Dat alling and Running Hive	anases - an Hiva () _ Tabl	r = 0se	i Denneu	ta — Llear	- Dala	COE	
Functions – Oracle F	lis — Ilist Riσ Data				es – Qi			-Denneu	LOS	
		Tutovial Daviada.	Dre	ation Dow	:- d	-	stal Davia		[
Lecture Periods: 45		Tutorial Periods: -	- Pra	cucal Per	100S: -		Stal Perio	us: 45		
1 Michael M	inalli M	ichobo Chambors Dig	Data Dia	Apolytic	· Emor	aina Pucin	occ Intolli	aonco on	d Applytic	
I. WICHAELIN	Today's F	Rusiness 1st Edition Am	biga Dhir	anarytic: ai Wiely	CIO Sori	gilig Dusili oc 2012	ess inten	gence an	u Analytic	
2 Arvind Sath	ni Big Dat	ta Analytics: Disruntive	Technolog	aj, wiely zies for Ch	anging	the Game	1st Editio	n IBM Co	rnoration	
2. 2012	., Dig Da				ion Bing	the durie,				
3. Bill Franks	Taming	the Big Data Tidal Wa	ave: Findi	ng Onnor	tunities	in Huge	Data Strea	ams with	Advanced	
Analytics. 1	st Editio	n, Wiley and SAS Busines	ss Series	2012.						
4. Tom White, Hadoop: The Definitive Guide, 3rd Edition, O'reilly 2012.										

5. Wolfgang karl Hardle, Henry Horng-Shing Lu, Xiaotong Shen, Handbook of Big Data Analytics , Springer 2018

Department :	artment : Information Technology Programme: B. Tech. (IT)													
Semester :	Sevent	n	Cours	e Categ	gory Co	de: PEC Se	emester E	xam Type	: TY					
Course	Course	Name	Perio	ods / W	/eek	Credit	Ma	ximum M	arks					
Code	Course		L	Т	Р	С	CA	SE	ТМ					
ITY12	Softwa	are Project Management	3	-	-	3	40	60	100					
Prerequisite	IT221 ·	Software Engineering												
	CO1	Understand the Software Proj	ect Plar	nning a	nd Mar	nagement prin	ciples wh	ile develo	ping					
		software.												
Course	CO2	Obtain adequate knowledge a	bout so	oftware	proces	s models and	estimatio	on techniq	ues.					
Outcome	CO3	Able to mitigate project risk.												
	CO4	Could manage, track and cont	rol proj	ect.										
	CO5	Could know the staff selection	n proced	dures a	nd mar	age the staff i	n work e	nvironme	nt .					
UNIT-I	Projec	t evaluation and planning				Periods: 9								
Importance of	of Softw	are Project Management – I	Product	: Proce	ss and	project—Def	inition—	product li	fe					
Cycle—proje	e—project Life cycle models—Process Models- Activities— Methodologies — Overview of Project													
Planning – St	ing – Stepwise Project Planning-Cost-benefit evaluation technology –Strategic program Management – CO													
Stepwise Pro	vise Project Planning.													
UNIT-II	NIT-II Life Cycle and Estimation Periods: 9													
Software pro	cess and	Process Models – Choice of P	rocess I	models	– wate	erfall-incremn	tal-Rapid	Applicatio	on					
development	-proto	type–UML- Agile methods –	Dynan	nic Sys	stem L	evelopment	Method	– Extren	ne CO2					
Programming	g– iviana	ging interactive processes.												
UNIT-III	Activit	y planning and Risk Manageme	ent		-	Periods: 9		• • •						
Objectives of	Activity	/ planning – Project schedules	- Acti	vities -	- Seque	encing and sc	heduling	– Netwo	rk					
Planning mod	dels – Fo	rmulating Network Model – Fo	orward	Pass &	Backwa	ard Pass techr	niques – (critical pa	th					
(CRIVI) metho	00 — KISK	Identification – Assessment –	RISK PIE	anning	–KISK IN	lanagement -	- – PERT	tecnnique	- 03					
tochniquos	COSMIC	Dn = Resource Allocation = Ba		sonwa	re estin	hation – Effort	and Cost	estimatio	חכ					
	Manag	rement and Control) II – CO	St Sche	uules.	Poriods: 9								
Eramework f	or Mana	gement and control - Collecti	on of a	lata _	Vicualia	ving progress	- Cost m	onitoring						
Farned Value		= Prioritizing Monitoring = Pro	iect tra	cking –	Chang	e control – So	ftware Co	nfiguratio	- 					
Management	– Mana	ging contracts – Contract Mana	gemen	t	Chang			mgulati						
UNIT-V	Staffin		Schiell			Periods: 9			I					
Managing ne	ople – Ω	e rganizational behaviour – Rest	methor	s of st	aff sele	ction – Motiva	tion – Th	e Oldham	1 —					
Hackman job		teristic model – Stress – Hea	Ith and	l Safet	v – Ftł	nical and Prof	essional	concerns	- 005					
Hackman job characteristic model – Stress – Health and Safety – Ethical and Professional concerns – CO5														
Working in te	eams – D	ecision making – Organizationa	Estructi	ures –L	eadersl	Vorking in teams – Decision making – Organizational structures –Leadersmp.								
Working in te	ams – D	ecision making – Organizationa	l structi Practi	ures –L	eaders	Tot	al Perior	lc· 15						
Working in te	eams – D ods: 45	ecision making – Organizationa Tutorial Periods: -	l structi Practi	ures –L cal Per	eadersi iods: -	Tot	t al Perioc	ls: 45	Δ					
Working in te Lecture Perio	ams – D ods: 45 aJalote,	ecision making – Organizationa Tutorial Periods: - Software Project Management i Jian and Anil Misra, Working Ca	l structi Practi in Pract	ures –L cal Per ice, Pe	eadersi iods: - arson E	ducation, New	t al Perioc / Delhi, Ed	ls: 45 dition 201 010	4.					
Working in te Lecture Perio 1. Pank 2. Krish 3. Watt	ams – D ods: 45 aJalote, Rangara	ecision making – Organizationa Tutorial Periods: - Software Project Management i Jian and Anil Misra, Working Ca Drey, Managing the Software Pro-	l structi Practi in Pract pital Ma	ures –L cal Per ice, Pe anagen Publish	eadersi iods: - arson E hent, Ex	ducation, New ccel Book, Nev	t al Perioc / Delhi, Eu / Delhi, 2	ls: 45 dition 201 010. Delbi 20	.4.					
Working in te Lecture Perio 1. Panka 2. Krish 3. Watt 4. Roge	ams – D ods: 45 aJalote, Rangara s Humph r S Press	ecision making – Organizationa Tutorial Periods: - Software Project Management i njan and Anil Misra, Working Ca prey, Managing the Software Pro- man, Software Engineering – A	l structi Practi in Pract pital Ma ocess, F Practiti	ures –L cal Per ice, Pe anagen Publishe oner's	eadersi iods: - arson E nent, Ex ed by P	ducation, New cel Book, New earson Educat	t al Perioc / Delhi, Ed v Delhi, 2 ion, New Iill Intern	ls: 45 dition 201 010. Delhi, 20 ational Ed	4. 10 ition					
Working in te Lecture Perio 1. Panka 2. Krish 3. Watt 4. Roge	aJalote, Rangara s Humph r S Press	ecision making – Organizationa Tutorial Periods: - Software Project Management i Jian and Anil Misra, Working Ca Drey, Managing the Software Pro- man, Software Engineering – A Venth Edition, 2009	l structi Practi in Pract pital Ma ocess, F Practiti	ures –L cal Per ice, Pe anagen Publishe oner's	eadersi iods: - arson E nent, Ex ed by P Approa	ducation, New ccel Book, Nev earson Educat ch, McGraw H	t al Perioc v Delhi, E v Delhi, 2 ion, New lill Intern	ls: 45 dition 201 010. Delhi, 20 ational Ed	4. 10 ition,					
Working in te Lecture Perio 1. Panka 2. Krish 3. Watt 4. Roge Singa 5. Hugh	aJalote, Rangara s Humpl r S Press pore, Se	ecision making – Organizationa Tutorial Periods: - Software Project Management i Jan and Anil Misra, Working Ca Darey, Managing the Software Pro- man, Software Engineering – A venth Edition, 2009. Ware Project Management Tata	l structi Practi in Pract pital Ma ocess, F Practiti McGra	ures –L cal Per ice, Pe anagen Publish oner's aw-Hill	eadersi iods: - arson E nent, Ex ed by P Approa 2017.	ducation, New cel Book, New earson Educat ch, McGraw H	t al Perioc / Delhi, Ed v Delhi, 2 ion, New lill Intern	ls: 45 dition 201 010. Delhi, 20 ational Ed	4. 10 ition,					

Walker Royce "Software Project Management A Unified Framework", Pearson Education, 2017

Department : I	Information Technology Programme: B. Tech. (IT)								
Semester :	Seventh		Cours	e Cate	egory C	ode: PEC	Semeste	er Exam Ty	oe: TY
Course Code	C	Nomo	Perio	ods / V	Veek	Credit	Ma	ximum Ma	rks
Course Code	Course	endme	L	Т	Р	С	CA	SE	TM
ITY13	Data N Wareh	Mining and Data nousing	3	-	-	3	40	60	100
Prerequisite	IT214	- Data Base Management S	ystems			-			
	CO1	Understand the insight c	oncept	s of da	ata mir	ning.			
Course	CO2	Understand multidimens	sional c	lata ar	nd data	a warehous	е		
Outcome	CO3	Able to Clean and pre-pr	ocess o	data ar	nd Que	ry with mu	ltidimensi	onal data.	
Outcome	CO4	Apply various data minin	ng tech	niques	for pr	ojects.			
	CO5	Apply Web mining for re	eal-tim	e proje	ects				
UNIT-I	Introd	uction to Data Mining				Periods: 9)		
Definition of c	lata mir	ning - data mining vs query t	tools –	machi	ne lear	rning –taxo	nomy of d	ata mining	
tasks – steps ir	n data m	nining process – overview o	f data ı	mining	techn	iques			CO1
UNIT-II	Data V	Narehousing				Periods: 9)		
Definition – M	ultidime	ensional Data Model – Data	Cube -	– Dime	ension	Modelling-	OLAP Op	erations –	
Warehouse Sc	hema –	Data Warehouse Architect	ure – D	ata M	art– M	eta Data – [·]	Types of N	leta Data	CO2
– Data Wareho	puse Bao	ckend Process – Developme	nt Life	Cycle.		1			
UNIT-III	Data c	leaning and Pre-Processin	g			Periods: 9)		
Data Cleaning	– Pre-Pr	rocessing techniques, Data	Integra	tion a	nd Trai	nsformatio	n –Data Re	eduction –	
Discretization	and Cor	cept Hierarchy Generation	–Quer	y Lang	uage –	Generaliza	ition –		CO3
Summarization	<u>ן</u>	_				·			
UNIT-IV	Associ	ation Rule and Classification	on		-	Periods: 9)		T
Association Rule – Mining Multi-Dimensional data from Transactional Database and Relational									
Database.	_			· c·					CO4
Classification -	- Decisio	on Tree Induction – Bayesia	n Class	ificatio	on – Pro	ediction –B	ack Propa	gation	
UNII-V	Cluste	r analysis				Periods: 5) - - D	. Daaad	
Cluster Analys	IS – Type	es of Clustering-Hierarchica	Invietn	00 – P	artitior	ning metho	us- Densit	у ваѕео	
Advanced toni	cs: Woh	Mining-Difference betwee	n data	minin	a and V	Nob Mining	r – Woh Co	ontont	
Mining – Struc	ture and	d Usage Mining - Snatial M	ining _		g anu v nce Mi	ning	g – web ci	Jileni	CO5
Applications :	Case stu	idies in Data Mining and we	h mini	ng anr	olicatio	ns			
, approacione i					meacle				
Lecture Period	ls: 45	Tutorial Periods: -	Pract	ical Pe	riods:		Total Perio	ods: 45	
Reference Boo	oks		1			i			
1. Paulraj Po	nnaiah,	Data Warehousing Fundam	entals,	Wiley	Publis	hers, 2001.			
2. Jiawei Han	, Miche	lineKamber, Data Mining: C	Concep	ts and	Techni	iques, Mor	gan Kaufm	an Publish	ers,
2011.									
3. UsamaM.F	ayyad, (Gregory Piatetsky Shapiro, I	Padhra	i Smyt	h, Ram	nasamyUthu	urusamy, A	Advances in	ı
4. Ralph Kim	ball. Ma	rgy Ross. The Data Wareho	use To	olkit I	ohn W	iley and So	ns Inc. 3 rd	edition 20	19.
5. Alex Berso	n. Stepł	nen Smith. Kurt Thearling. B	Building	n Data	Mining	Applicatio	ns for CRN	A. Tata Mc	Graw
Hill, 2009.	n) ocepi			, Data	c	Supplicatio		i) i ata inte	oran
6. Daniel T. L	arose Jo	ohn Wiley & Sons, Hoboken	, Disco	vering	Knowl	edge in Dat	a: An Intro	oduction to) Data
7 Hand Mar	w Jerse	y, 2003. d Smuth Drinciples of Data	Mining	Dron	tica Un	ll of India I	Now Dolhi	2000	
2. Hallu, Ivial	nnid dill Data Mir	a Singui, Finicipies of Data ning-Introductory and Adv		, rien		nn Ur Muld, I an Educatio		, 2009. alhi Third	
impression	סנמ ועווו ה 2002	ming- mitrouuctory and Auvo	anceul	opics,	redis(n, new D	enn, rinnu	
9 Sean Kelly	. Data w	arehousing in action John	wilev &	l sons	renrin	t 2008			
10. Sam Anal	orv. D	ennis Murrary. Data war	ehousi	ng in	the r	eal world	Addition	Wesley	Fourth
In the real world, Addition wesley, Fourth Impression 2009.									

Department :	partment : Information Technology Programme: B. Tech. (IT)									
Semester :	Sevent	h	Cours	se Catego	ory Coc	de: PEC	Semes	ter Exam	Туре: ТҮ	
Course Code	Cours	se Name	Per	iods / W	eek	Credit	М	aximum I	Marks	
Course coue	Cours		L	Т	Р	С	CA	SE	TM	
ITY14	Distri	buted Computing	3	-	-	3	40	60	100	
Prerequisite	IT207	' - Operating System								
	IT216	- Computer Networks								
	CO1	Able to understand the imp	portanc	e of com	munic	ation in dis	tributed	environm	ent.	
Course	CO2	Apply the distributed object	t conce	epts in re	al-time	9.				
Outcome	CO3	Ability to manage thedistril	buted f	ile syster	n.					
	CO4	Attain the knowledge of tra	ansactio	ons conc	urrenc	y control.				
	CO5	Know the details of distribut	uted mu	ultimedia	web s	ervices.				
UNIT-I	Intro	duction				Periods: 9	9			
Characteristics	s, Exam	ples, Trends, Resource sharii	ng Appl	lications,	Challe	nges – Sys	tem mod	els:		
Architectural r	nodels	and Fundamental models – I	Networ	rk princip	les and	d Internet p	protocols	– Inter-		
process comm	unicati	on: API, Marshalling, Client-s	server c	communi	cation	, Multicast	commun	ication –	CO1	
Case study: M	PI.	uted objects and Remote Invocation Periods: 9								
	Distri	buted objects and Remote I	note Invocation Periods: 9							
Introduction to	Call Events and Natification BML Case Study: COBBA - Operating System Support: Introduction OS									
Call, Events an		rication, RIVII, Case Study: CC)KBA —	Operatin	g Syste	em Suppor	t: Introdu	iction, US	CO2	
Layer, Protecti	on, Pro	Desses and Threads synchro	nizatior	n, Operat	ing sys		ecture.			
UNIT-III	Distri	buted File System				Periods: 9	9			
File service arc	hitectu	ure, Sun network and Andrev	v File sy	/stem, Er	hance	ments – Na	ame Serv	ices: Dom	iain	
Name System,	Globa	Name Service, Directory ser	vices w	ith a Cas	e stud	y – Time ar	nd Global	States:	CO3	
Clocks, events	and pr	ocesses, Clock synchronization	on, Log	ical clock	s, Glob	oal states –	Election	algorithm	ns.	
UNIT-IV	Trans	actions and Concurrency Co	ntrol			Periods: 9	9			
Transactions a	nd nes	ted transactions, Locks, Opti	mistic c	concurre	ncy cor	ntrol, Time	stamp or	dering,		
Comparison of	metho	ods for concurrency control –	- Distrik	outed Tra	insacti	ons: Distrik	outed dea	dlocks,	CO4	
Transaction re	covery	 Replication: Transactions v 	with rep	olicated	lata –	Distributed	Shared I	Memory:		
Design and im	plemer	ntation issues, Consistency m	odels.							
UNIT-V	Distri	buted Multimedia Systems	<u> </u>		•	Periods: 9	9			
Characteristics	ot Dis	tributed Multimedia Systems	s, Quali	ty of serv	vice ma	anagement	, Resourc	e . Di i		
management,	Stream	n adaptation – Web Services:	Introd	luction, S	ervice	description	ns and ID	L, Directo	ry CO5	
Service, XIVIL S		Tutorial Dariada	es – cas	se study:)LE.	stal Dani-		<u> </u>	
Lecture Period	15:45	i utorial Periods: -	Pract		Jus: -	10	Juai Perio	us: 45		
Reference Boo	oks									
1. George Co	oulouri	s, Jean Dollimore, Tim Kindl	berg ar	nd Gordo	on Blai	r, "Distribu	uted Syst	ems: Con	cepts and	
Design", 5	th Edit	ion, Pearson Education, 2012	.							
2. Andrew S	Tanei	nbaum and Maarten Van St	teen, "	Distribut	ed Sys	tems: Prin	ciples an	d Paradi	gms", 2nd	
Edition, Pr	entice-	Hall, 2016.							.	
3. Ajay D. Ks	hemka	Iyani and Mukesh Singhal, "I	Distribu	ited Com	puting	: Principle:	s, Algoritl	nms, and	Systems",	
1st Edition, Cambridge University Press, 2011.										

Department :	Informa	tion Tec	hnology	Programme: B. Tech. (IT)								
Semester :	Seventh)		C	our	se Ca	ategory	Code: F	PEC	Semeste	er Exam	n Type: TY
_				P	eric	ods/	Week	Cred	it	Max	kimum	Marks
Course Code			Course Name	L		Т	Р	С		CA	SE	TM
ITY15	Inform	ation S	ecurity	3	5	-	-	3		40	60	100
Prerequisite	MA206	5 - Math	ematics for Computing									
	IT202 -	· Data S	tructures									
	On su	ccessful	completion of this course	e, the stu	ide	nts v	vill be a	ble to:				
	CO1	Under	rstand OSI security archite	ecture ar	nd I	egal,	, ethica	l and pr	ofessio	onal issu	es in se	ecurity
Course	CO2	Identi	fy risks and design securi	ty model								
Outcome	CO3	Under	rstand security technolog	y								
	CO4	Familiarize cryptographic techniques										
	CO5 Apply biometric security											
UNIT – I	INTRO	DUCTIO	N	Periods: 9								
Security Trenc	ls, OSI se	curity a	rchitecture, Security atta	cks, secu	rity	/ ser	vices, se	ecurity r	necha	nisms, -		CO1
Security Syste	m Devel	opment	Life cycle – Legal, Ethical	and Pro	fess	siona	al issues					
UNIT – II	SECUR	ITY ANA	LYSIS AND DESIGN							Perio	ods: 9	
Risk Managem	nent - Ide	entifyin	g and Assessing Risk - Ass	sessing a	nd	Cont	rolling	Risk. Blu	ueprin	t for Sec	urity	CO2
Information S	ecurity	Policy -	Standards and Practice	es – ISO	17	7799	/BS 77	99 – N	IST M	odels -	VISA	
International S	Buyer	Model-L	Design of Security Archite	cture.						D ¹ -	-l 0	
	PHYSIC			[C				Perio	as: 9	<u> </u>
filters.	nology -	- mtrua	ers, Malicious soltware,	FILEWAI	5, .	Scan	ning ar	iù Anar	ysis to	ois, coi	itent	03
UNIT – IV	CRYPT	OGRAPH	HY							Perio	ds: 9	*****
Advanced En	cryption	standa	rd, Principles of public-	-key cry	pto	syste	em, Ke	y mana	igeme	nt, Mes	sage	CO4
authenticatior	and Ha	sh funct	ions, Digital signatures.									
UNIT – V	BIOME	TRIC SE	CURITY							Perio	ds: 9	
Biometrics: De	efinition	– Types	of Biometrics – Multi bio	metrics -	- Fι	usion	metho	ds - app	olicatio	ons.	CO5	
Lecture Peri	ods: 45	5	Tutorial Periods: -	Practi	cal	l Pei	riods: ·	•	Tota	l Perio	ds: 45	
Reference Boo	oks:	•				-						
1. Michael E	Whitmar	and He	rbert J Mattord, Principles	s ot Infor	ma	tion	Security	y, Vikas	Publisł	ning Hou	se, Nev	w Delhi,
2010.	llings C	auntoarr	nhu and Naturali againt	Dringia	امد	and	Dractics		.+b ㄷ네:	tion Dec		ducation
2. William Stallings, Cryptography and Network security, Principles and Practices, Seventh Edition, Pearson Education, 2017.												

3. John D. Wood Ward, Jr. Nicholas M. Orlans and Peter T. Higgm, Biometrics, Dream tech press, 2010.

Department : I	nformation Technology	ation Technology Programme: B. Tech. (IT)									
Semester :	Seventh	Cours	se Categ	gory Co	de: PEC	Semest	er Exam ⁻	Гуре: ТҮ			
	Course Norma	Per	iods / V	Veek	Credit	Ma	ximum N	larks			
Course Code	Course Name	L	Т	Р	С	CA	SE	TM			
ITY16	Introduction to Machine Learning	3	-	-	3	40	60	100			
Prerequisite	MA206 – Mathematics for Computir	ng									
	CO1 Able to explore basics of sup	oervise	d learnir	ng							
Courco	CO2 Able to understand various	unsupe	rvised le	earning	algorithm	S					
Outcome	CO3 Able to understand various s	scalable	e learnir	ng algor	ithms						
Outcome	CO4 Able to understand different	reinfo	rcement	t learnir	ng algorith	ıms					
	CO5 Able to apply various machin	e learn	ing algo	orithms	to real-tir	ne applic	ations.				
UNIT-I					Periods:	9					
Supervised Le	arning: Regression/Classifications – Di	stance	-based I	Vethod	ls – Neare	st-Neighl	oours –				
Decision Trees	cO1										
 Support Vec 	ctor Machines – Non-linearity and Kernel Methods –Multi-class/Structured outputs –										
Ranking.											
UNIT-II Periods: 9											
Un Supervised	Learning: Clustering: K-means/ Kerne	el; Dime	ensiona	lity Red	uction: PC	:A – Kern	el PCA;	CO2			
	ation and Matrix Completion; Genera	tive M	odels			•					
		D' ! .		· · · · · ·	Periods:	9					
Scalable Iviac	Nine Learning: Unline Learning -	Distrid	oon lo	earning	; Sparse	Nodelli	ig and	<u> </u>			
Learning: Semi	would be sequence time-series Dat	.d – D a	eep Lea	arning	-reature	Represe	ntation	COS			
		g.			Periods	9					
Reinforcemen	t Learning: O-learning – Non dete	orminis	tic Rew	vards a	nd Actio	ns – Te	mnoral				
Difference lea	ming: Bayesian Learning and Inference	د. د					inportar	CO4			
UNIT-V					Periods	9					
Applications:	Bobotic Control – Data Mining – Auto	nomo	us Navia	vation -	- Bioinforr	natics –	Speech				
Recognition –	Face Recognition – Text and Web Data	a Proce	ssing –	ααΑ ΤοΙ	lications.	inactios -	opecon	CO5			
Lecture Period	ls: 45 Tutorial Periods: -	Pract	ical Per	iods: -		Total P	eriods: 4	5			
Reference Boo	oks:	.1				.1					
1. Tom M. M	itchell, "Machine Learning", McGraw I	Hill, 19	97.								
2. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, 2010.											
3. Christophe	er Bishop, "Patter Recognition and Ma	chine L	earning	", Sprin	ger, 2006						
4. Kevin Mur	phy," Machine Learning: A Probabilist	ic Persp	pective"	, MIT P	ress, 2012	•					
5. Richard Du	ida, Peter Hart and David Stork, "Patte	ern Clas	ssificatio	on", 2 nd	Edition, Jo	ohn Wiley	/ & Sons,	2001.			
6. Richard Su	atton and Andrew Barto, "Reinforcer	ment L	earning	: An In	troductio	n", 2 nd E	dition, M	IT Press,			
2018.											

Honours Core Courses

Department :	Information Technology	Progra	amme:	B. Tech.	(IT)-Hor	nours			
Semester :	Third	Course	e Categ	gory Cod	e: PCC	Semest	er Exa	ım Type	: TY
Course Coolo	Course Name	Peri	ods / V	Veek	Crec	lit	Maxi	imum N	larks
Course Code	Course Name	L	Т	Р	С		CA	SE	TM
ITH01	Programming Paradigms	3	1	-	4		40	60	100
Prerequisite									
	CO1 Understand and Explain the syntax	of a prog	grammi	ing langu	iage usir	ıg Gramı	mars		
	CO2 Learn Imperative programming lang	guage co	nstruct	S					
Course	CO3 Learn object oriented programming	g languag	e cons	tructs					
Outcome	CO4 Learn functional and logic program	iming lan	guage	construc	cts				
	CO5 Understand, Identify and apply suit	able prog	gramm	ing para	digm for	a given	applic	ation	
UNIT – I	Language description						Hour	rs: 12	•
Introduction to	p programming languages - Expression Nota	ations, Al	ostract	Syntax T	rees Lex	ical Synt	tax, Co	ontext -	
Free Grammar	s, Grammars for Expression						I		CO1
UNIT – II	Imperative Programming						Hour	rs: 12	
Syntax - Direct Arrays & Reco	ed Control Flow, Programming with Invaria rds. Unions & Sets. Pointers. Procedure Act	nts, Proc ivations.	of rules	for Part	ial Corre ogrammi	ctness, E ng Langi	Basic T Juages	ypes,	CO2, CO5
UNIT – III	Object - Oriented Programming	,			0	00	Hour	rs: 12	
Constructs for	Program Structuring, Object Model, param	eter pass	sing, Dy	/namic A	llocation	n, Object	t - Orie	ented	CO3,
Programming	Languages						· · · · · · · · · · · · · · · · · · ·		CO5
UNIT – IV	Functional Programming						Hour	rs: 12	r
A Little Langua	ge of Expressions, Types and Expression Ev	aluation,	Functi	onal Pro	grammi	ng with I	Lists		C04, CO5
UNIT – V	Other Paradigms						Hour	rs: 12	
Introduction to ADA. Haskell, I	o Logic Programming, Basics of Prolog, Intro Ruby	duction	to Con	current l	Program	ming, Co	oncurr	ency in	CO4, CO5
Lecture Period	ls: 45 Tutorial Periods: 15	Practi	cal Per	iods: -			Tota	l Period	s: 60
References	A	£					.		
1. Ravi Sethi,	"Programming Languages: Concepts and C	onstructs	5", AT&	T Bell La	boratori	ies, 2nd	editio	n, Addis	on
2. Allen B. Tu	icker, Robert E. Noonan, "Programming Lar	nguages I	Princip	les and F	Paradigm	ıs" 2nd I	Editior	n, Tata N	/lcGraw
Hill, 2007.			D .	.					
3. Turbak F A	, Gifford D K and Sheldon M A, —Design co	ncepts in	Progra	amming	Languag	es, The	MIFPr	ress,	
4. Sebesta R.W. —Concepts of Programming Languages, Addison-Wesley, 2012.									
5. Friedman	D P and Wand M, —Essentials of Programm	ning Lang	uages -	Third e	dition, Tl	he MIT F	Press, 2	2008.	

- 6. Harper R, —Practical Foundations for Programming Languages, Cambridge University Press, 2012.
- 7. Scott M L, Programming Language Pragmatics, Morgan Kaufmann, 2009.

Department : In	formati	on Techno	logy	Progra	Programme: B. Tech. (IT)-Honours						
Semester : F	ourth			Course	e Categ	ory Cod	e: PCC Seme	ester Exa	im Type	:: TY	
	_			Perio	ods / V	Veek	Credit	Max	imum N	1arks	
Course Code	Course	e Name		L	Т	Р	С	CA	SE	ТМ	
ITH02	Advan	ced Data S	tructures	3	1	-	4	40	60	100	
Prerequisite											
	CO1	Learning	about various heap struc	tures an	d their	applicat	tions				
~	CO2	Learning	about various Tree struc	tures and	d their	applicat	ions				
Course	CO3	Learning	various applications of g	raph stru	ctures						
Outcome	CO4	Understa	nding the string matchin	g technic	ques ar	nd using	them in advan	ced cou	rses		
	CO5	Learning	and practicing various ge	ometric	structu	ires					
UNIT – I	Heap S	Structures						Perio	ods: 12		
Single and doub Symmetric Min-	le ende Max He	d priority c aps – Inte	jueue – Liftist Trees – Bin rval Heaps	omial He	eaps – I	Fibonaco	ci Heaps –Pairiı	ng Heap	s —	CO1	
UNIT – II	Tree St	tructures						Perio	ods: 12		
Binary Search trees – Optimal binary search trees - AVL Trees – Red Black Trees – Splay Trees CO2 m-way search trees - B Trees – B ⁺ trees								CO2			
UNIT – III	Graphs	5						Perio	ods: 12		
Topological sort Hamiltonian cyc	, Applica les, Isor	ations of d norphism,	epth first search, Undired Directed graphs, Finding	ted grap strong c	hs, Bic ompon	onnectiv ents	vity, Euler circu	lits,		СОЗ	
UNIT – IV	String	matching T	echniques	Ŭ	•			Perio	ods: 12	.1	
Naïve string mat Pratt algorithm.	tching a	lgorithm, F	Rabin Karp algorithm, Stri	ng matcl	hing wi	th finite	automata, Kni	uth Mor	ris	CO4	
UNIT – V	Multi-I	Dimension	al Structures					Perio	ods: 12		
K-D Trees - Poin	t Quad ⁻	Trees - MX	-Quad Trees - R-Trees - T	V Trees						CO5	
Lecture Periods	: 45		Tutorial Periods: 15	Practio	cal Peri	ods: -		Tota	l Period	ls: 60	
References											
 E.Horowitz, S.Sahni and Dinesh Mehta, Fundamentals of Data Structures in C++, Universities Press, 2nd Edition, 2007. S.Sahni, Data Structures, Algorithms and Applications in C++, 2nd Edition, Universities Press, 2005. Adam Drozdek, —Data Structures and Algorithms in C++, Cengage Learning, USA, 2013. 											
4. Thomas H C Press, New	 Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, —Introduction to Algorithms∥, MIT Press, New Delhi, 2014. 										

5. Peter Brass, —Advanced Data Structures, Cambridge University Press, USA, 2008.

6. Venkatesan R and Lovelyn Rose S, —Data Structures, Wiley India Pvt. Ltd., New Delhi, 2015.

Department : Information Technology Programme: B. Tech. (IT)-Honours										
Semester : I	Fifth		Course	Catego	ry Code:	PEC	Semes	ter Exam	n Type: TY	
	C	1	Per	riods / V	Veek	Credit	М	aximum	Marks	
Course Code	Course r	vame	L	Т	Р	С	CA	SE	TM	
ITH03	Biometr	ics	3	1	-	4	40	60	100	
Prerequisite	-									
	CO1	To get an introduction to Bio	metric t	raits, its	processi	ng and ap	plicatior	าร		
Course	CO2	To know the importance of p	physiolog	gical bio	ometric tr	aits and it	s opera	tions		
Outcome	CO3	To know more about behavio	oral and	soft bio	metric tr	aits and it	s operat	ions		
Outcome	CO4	To acquire knowledge in mu	lti-biom	etrics ar	nd levels (of fusion				
	CO5	To apply the multi-biometric	c traits ir	n real tin	ne applic	ations				
UNIT-I	Introduc	tion				Periods:	12			
Introduction	to Biome	trics: Operation of a Biom	etric Sy	vstem –	• verifica	tion vs.	identific	ation –		
performance	of a bion	netric system – biometrics o	characte	ristics –	biometri	cs traits ·	- applica	ation of	CO1	
biometrics.										
UNIT-II	Physiolo	gical traits				Periods:	12			
Fingerprint – F	ace – Iris	– Hand geometry – Ear – paln	n print –	knuckle	print – F	land vascu	ular – DN	IA traits		
- sensor models of every trait - feature extraction techniques - matching - performance evaluation - CO										
test databases	– applica	tions				•				
UNIT-III	Behavio	ural and Soft traits				Periods:	12			
Key stroke – Si	gnature –	- Voice – Gait – Driving Style –	ECG – E	EG - ser	isor mod	els of ever	ry trait –	feature	CO3	
extraction tech	nniques –	matching – performance eval	uation –	test da	tabases –	applicatio	ons			
UNIT-IV	Multi-bi	ometrics				Periods:	12			
Limitations of	Biometri	c System - Multi-biometrics	System	Design	- Level o	of Fusion:	Sensor	Level -	CO4	
Feature Level	- Rank Lev	vel - Decision Level.								
UNIT-V	Applicat	ions				Periods:	12			
National ID Ca	ard (UID),	Voter Registration, Welfare	Disburs	ement,	Border C	rossing. F	orensic:	Corpse		
Identification,	Criminal	Investigation, Parenthood D	etermina	ation. C	ommerci	al: ATM,	Access	Control,	CO5	
Mobile Phone,	Banking,	E-Commerce, Smart Card.								
Lecture Period	ls: 45	Tutorial Periods: 15	Practic	al Perio	ds: -		Total I	Periods:	60	
Reference Boo	oks:		1							
1. Anil K. Jair	, Patrick F	-lynn and Arun A. Ross, Handb	book of E	Biometri	cs, Spring	ger, 2008.				
2. Arun A. Ro	oss, Karthi	k Nandakumar and Anil K. Jair	n, Handb	ook of N	Nultibion	netrics, Sp	ringer, 2	2008		
3. Davide Ma	altoni, Da	rio Maio, Anil K. Jain, SalilPr	abhakar	, Handb	ook of F	ingerprint	Recogr	ition, 2r	d Edition,	
Springer, 2	2009.						_			
4. M.J. Burge	and K.W.	. Bowyer, Handbook of Iris Red	cognitio	n, Spring	ger, 2013					
5. Stan Z. Li a	5. Stan Z. Li and Anil K. Jain, Encyclopedia of Biometrics, Springer, 2009.									

6. Ruud M. Bolle, Sharath Pankanti, Nalini K. Ratha, Andrew W. Senior and Jonathan H. Connell, Guide to Biometrics, Springer, 2009.

Department: Information Technology Programme: B. Tech. (IT)-Honours									
Semester :	Sixth		Cours	e Cate	gory Co	ode: PCC	Semest	er Exam ⁻	Type: TY
			Perio	ods / W	/eek	Credit	Ma	ximum M	larks
Course Code	Course Nan	16	L	Т	Р	С	CA	SE	ТМ
ITH04	Advanced	Java Programming	3	1	-	4	40	60	100
Prerequisite									
	On complet	ion of the course, students ab	le to						
	CO1	Understand Java Classes							
Course	CO2	Implement GUI Programmin	g						
Outcome	СО3	Understand Event Handling							
	CO4	Understand and do Data Bas	se Progr	ammir	ıg				
	CO5	Understand and apply Java T	echnol	ogies					
UNIT – I	A Collection	n of Useful Classes					Pe	riods: 12	
Utility Method Expression, In Understandin Object, File I/0 Operations wi	ds for Arrays, put/Output C g Streams, Th O Basics, Rea th File Chann	Observable and Observer Obj Operation in Java (java.io Packa ne Classes for Input and Outpu ding and Writing to Files, Buffe nel, Serializing Objects.	ects, Da age), Str t, The S er and B	ite & T reams a tandar suffer N	imes, L and the d Strea Aanage	Jsing Scan e new I/O ams, Work ement, Re	iner Regi Capabili king with ad/Write	ılar ties, File e	CO1
UNIT – II	GUI Progra	mming					Pe	riods: 12	
Designing Gra Containers, La Using Swing C Objects, Colle	phical User Ir yout Manage omponents, s ction Types, S	nterfaces in Java, Components ers, AWT Components, Adding Java Utilities (java.util Package Sets, Sequence, Map, Understa	and Co a Menu) The Co anding H	ntaine u to Wi ollectic Hashing	rs, Basi ndow, on Fran g, Use (ics of Com Extending nework: C of Array L	ponents g GUI Fea collection ist & Vec	, Using atures s of tor.	CO2
UNIT – III	Event Hand	lling					Pe	riods: 12	
Event-Driven Delegation Me Helper Classes	Programming odel of Event s in Event Hai	; in Java, Event- Handling Proce Handling, Event Classes, Even ndling.	ess, Eve t Source	nt-Har es, Eve	ndling N nt Liste	Mechanisr eners, Ada	n, The apter Cla	sses as	СО3
UNIT – IV	Database P	rogramming using JDBC					Pe	riods: 12	
Introduction t conventional	o JDBC, JDBC Databases.	Drivers & Architecture, CURD	operati	on Usi	ng JDB	C, Connec	cting to n	on-	CO4
UNIT – V	Java Server	Technologies Servlet					Pe	riods: 12	
Web Applicati Servlet life cyc Handling Requ	ion Basics, Ar cle, Developir Jest and Resp	chitecture and challenges of W ng and Deploying Servlets, Exp ponse.	Veb App Ioring D	olicatio eployr	n, Intro nent, E	oduction t Descriptor	o servlet (web.xn	;, 11),	CO5
Lecture Perio	ds: 45	Tutorial Periods: 15	Practi	cal Per	iods:	-	To	al Period	ls: 60
References									
 Herb Schil Deitel & D Gay Horst 	dt, JAVA the Deitel, "Java H mann, BIG JA	Complete Reference, 8th Edit low to program", Prentice Hall VA, 4th edition, 2010.	ion, July I, 9th Ed	y 2017. lition, 2	2016.				

Department : In	formatio	n Technology	Progran	nme: B. 1	Tech. (IT)-Honoi	urs		
Semester : Se	eventh		Course	Category	Code	: PEC	Semester E	xam Ty	pe: TA
Course Code	Cauraa	Nama	Perio	ods / Wee	ek	Credit	Maxin	num Ma	rks
Course Code	Course	Name	L	Т	Р	С	CA	SE	TM
ITH05	Introdu	ction to Data Science	3	1	-	4	40	60	100
Prerequisite	-								
	CO1	Able to know the benefits of I	earning o	lata scier	nce an	d its phas	es		
Cauraa	CO2	Able to learn the various mac	hine lear	ning algo	rithms	5			
Course	CO3	Able to learn the various text	mining a	nd analyt	tics teo	chniques			
Outcome	CO4	Able to read and write simple	Python p	programs					
	CO5	Able to represent compound	data usin	g Python	lists,	tuples, die	ctionaries.		
UNIT-I	Data so	ience in a big data world				Periods	: 12		
Benefits and u	ses of da	ata science and big data-Facet	s of dat	a-The da	ata sci	ence pro	cess-The big	g data	co1
ecosystem and	data scie	nce-The data science process							01
UNIT-II	Machin	e learning Algorithm Fundame	ntals			Periods	: 12		
What is maching	ne learni	ng and why should you care a	bout it?-	The mo	delling	g process-	Types of ma	achine	
learning- Naive	Bayes-	Decision Tree Classifiers- Bo	osting a	nd Ense	mble	Learning	- Support \	/ector	CO2
Machines-Limit	ations of	Machine learning							
UNIT-III	Text m	ining and text analytics				Periods	: 12		
Text mining in the real world -Text mining techniques-Getting Data- Working with data- Data visualization							CO3		
to the end user	Sample p	programs with Python							03
UNIT-IV	Introdu	uction to Python				Periods	: 12		
Data types- var	iables, ex	pressions, statements, tuple as	signment	, precede	ence o	f operato	rs-		
Conditionals: Bo	olean va	lues and operators, conditional	(if), alter	native (if	else),	chained	conditional (if-elif-	
else); Iteration:	state, w	hile, for, break, continue, pass;	Fruitful f	unctions	: retu	rn values,	parameters	, local	CO4
and global scop	e, functic	on composition, recursion;							
Strings: string sl	ices, imm	nutability, string functions and n	nethods,	string mo	odule;	Lists as a	rrays.		
UNIT-V	Advand	ced constructs				Periods	: 12	······	
Lists: list opera	tions, list	t slices, list methods, list loop,	mutabil	ity, aliasi	ng, cl	oning list	s, list param	eters;	
Tuples: tuple a	ssignmer	nt, tuple as return value; Dict	ionaries:	operatio	ons ai	nd metho	ods; advance	ed list	
processing - list	compreh	iension;							CO5
Files and excep	tion: text	files, reading and writing files,	format c	perator;	comn	hand line	arguments,	errors	
and exceptions,	handling	exceptions, modules, packages	;						
Lecture Periods	: 45	Tutorial Periods: 15	Practica	al Periods	5: -		Total Perio	ods: 60	
Keterence Book	(S:		"I	ina Data	C		ata Mashi		
1. Davy Clelen, Arno D. B. Meysman, Monamed All, "Introducing Data Science Big Data, Machine Learning, and More Using Buthon Tools, Manning Bublications Co., 2016									
2 Stoven S SL	ryunon	Dota Science Design Manual S	, 2010. pringer 7	017					
2. JUNE D	ata Scien	co from Scratch O'Poilly Modia	2015 2015	.017					
Δ Kenneth A	ala suen I amhart	-Fundamentals of Python: First	, 2013. st Program	ns CENG	AGEL	earning	2012		
	Lunibert,	i unuamentais or rythom. This				.carning, .	2012.		_

5. Charles Dierbach, —Introduction to Computer Science using Python: A Computational Problem Solving Focus, Wiley India Edition, 2013

Minor Core Courses

Department :	Informatio	n Technology	Progra	mme:	B. Tech. (I	T)-Min	or			
Semester :	Third		Subjec	t Cate	gory: PCC		Semes	ter Exa	m Type	e: TY
	_		Perio	ods / V	Veek	Credi	t	Maxii	num M	arks
Course Code	Course Na	me	L	Т	Р	С		CA	SE	ТМ
ITM01	Data Struc	tures and Algorithms	3	1	-	4		40	60	100
Prerequisite			i							
	CO1	Study of sorting and searc	hing algori	thms a	nd applyir	ng them	n in app	licatio	ns	
_	CO2	To design and implement	linear data	struct	ures using	C				
Course	CO3	To design and implement	non - linea	r data	structures	using (2			
Outcome	CO4	Learn about the algorithm	analysis m	nethod	S					
	CO5	Learn algorithm design me	ethods							
UNIT – I	Sorting An	d Searching Techniques					Perio	ds: 12	2	
Sorting algorit	hms – Inser	tion sort- selection sort – sł	nell sort – k	oubble	sort – qui	ck sort ·	– heap	sort-		
merge sort – r	adix sort – s	earching – linear search – b	pinary sear	ch.					C	01
UNIT – II	Stacks and	l Queues					Perio	ds: 12	2	
Stack ADT – o	perations - i	mplementation – applicatio	on: express	ion eva	aluation				C	02
Queue ADT –	operations –	- implementation – applicat	tion – prior	ity que	eue					
UNIT – III	Trees and	Graphs					Perio	ds: 12	2	
Binary tree – t	raversal me	thods – application – binary	y search tre	ee					C	03
		s – Dijkstra s algoritini - ap	plication				Daria	da. 11	<u> </u>	
	Algorithm	analysis					Perio	as: 14	2	~^
order of – asy	- Algorithm mototic not	- enciency of algorithms – i ations –solving recurrences	– homoge	i and a neous	verage cas	se analy es – inh	/SIS — tr	neous	L	04
recurrences			nomoge	neous	recurrent	c5 mm	10111050		'	
UNIT – V	Algorithm	design					Perio	ds: 12	2	
Strassen's Ma	trix multiplic	cation – Greedy Knapsack pr	roblem solu	ution –	N queen'	s proble	em – al	l pairs	C	05
shortest path	algorithm				-	-		-		
Lecture Period	ds: 45	Tutorial Periods: 15	Practio	al Per	iods: -		Total	Period	ls: 60	
References										
1. Ellis Horo	witz, Sartaj	Sahni, Susan Anderson-Free	ed, —Fund	ament	als of Data	a Struct	ures in	C, Sec	ond Edi	ition,
Universit	y Press, 200	8.	c					o" c		
2. Richard G	ulberg, Behr ndia Edition	ouz and A.Forouzan, "Data	Structures	: A Pse	eudocode	Approa	ch with	i C″, S€	econd	
3. Mark Alle	en Weiss. —I	, 2005 Data Structures and Algorit	hm Analvsi	s in C.	Second Ec	lition. P	earson	Educa	ation. 20	010.
4. Venkates	an R and Lo	velyn Rose S, —Data Struct	ures, Wiley	/ India	Pvt Ltd, N	ew Dell	ni, 2015	5.		
5. Salaria R	S, —Data St	ructures and Algorithms usi	ing C, Fifth	Editio	n, Khanna	Book P	ublishi	ng, Ne	w Delhi	,
2012.										
6. Vijayalak Hill, 2009	shmipai G.A	A, —Data Structures and Alg	gorithms: C	oncep	ts Techniq	ues and	a Applio	cations	s, McGr	aw

Department : In	formation	n Technology	Progra	mme:	B. Tech. (IT)-Min	or			
Semester : Fo	ourth		Subjec	t Cate	gory: PCC		Semeste	r Exai	m Type	e: TY
			Ηοι	ırs / W	eek	Credi	t ľ	Лахіп	าum M	arks
Course Code	Course N	lame	L	Т	Р	С	(CA	SE	ТМ
ITM02	Java and	Internet Programming	3	1	-	4	4	10	60	100
Prerequisite										
	CO1	Study of Java Fundamentals	5							
	CO2	Study and Implementation	of Applet	S						
Course	CO3	Study of HTML Programmin	g							
Outcome	CO4	Study of DHTM, XML and Ad	ctive-X C	ontrols	5					
	CO5	Study of Servlets								
UNIT – I		-					Period	5: 12		
Introduction to	Object Or	iented Programming – Java o	n the Inte	ernet –	Multithre	eading a	nd			
Persistence – Ja	va keywor	rds and flow control – Garbag	ge collect	ion – p	ackages- I	Final de	claration	-	C	01
Interfaces and in	nner class	es – Java I/O classes – Run tir	ne type io	dentifio	cation.		I			
UNIT – II							Period	5: 12	1	
Introduction to	Applets –	How it differs from application	on –buildi	ng app	let code a	and			C	02
Execution – Life	cycle – Ap	oplet Tag – Adding Applet to I	HTML file	– Pass	Sing Paran	neters to ~	0			
		incal values – Getting input n		Jser –	Depuggin	g.	Pariod	. 17		
		N	C 1	D			Period	5. 12		<u></u>
HTML – forms –	frames –	rogramming: An overview o tables – web nage design - Ia	r internet	introdi	amming - iction – co	vv vv vv · ntrol st	- tructures	-	Ľ	03
functions – arra	vs – objec	ts – simple web applications.	wasenpt	muout		51111013	liucture			
UNIT – IV	· · · · · ·						Period	5: 12		
Dynamic HTML	– introduc	tion – cascading style sheets	– object	model	and colle	ctions –			С	04
event model – f	ilters and	transition – data binding – da	ata contro	ol – Act	iveX cont	rol – ha	ndling of	:		
multimedia data	a - XML.									
UNIT – V							Period	5: 12		
Servlets commu	nication –	- Interactive Java Servlets – D	eployme	nt of si	mple serv	lets – w	'eb		C	05
server (Java web	o server /	Tomcat / Web logic) – HTTP (GET and F	POST re	equests –	session	tracking	-		
COOKIES - JDBC -	- simple w	Ped applications – multi-tier a		ns.	·		T -+-1 D	! I		
Lecture Periods	: 45	Tutorial Periods: 15	Practic	al Peri	10 as: -		I otal P	erioa	s: 60	
Keterences						D				
I. Deitel, Deite	ei and Niei Jublisbers	to, internet and World Wide '	vveb – Ho	ow to p	program,	rearsor	1			
2. E. Balagurus	amv. Prog	gramming with Java – A Prime	er – 3 Edi	tion. Ta	ata McGra	aw Hill.				
3. R. Krishnamoorthy & S. Prabhu, Internet and Java Programming , New Age International										
Publishers, 2	2004.		-		-					
4. Thomno A.	Powell, Th	e Complete Reference HTML	and XHT	ML, fo	urth editio	on, Tata				
McGraw Hil	I, 2003. The Comm	lata Dafaranza Jawa? Tata M	Accrow	⊔; ⊃ <i>⊪</i>	d adition	1000				
5. Naughton, I	ne comp	iele Reference – Javaz, Tata I	vicuraw-	⊓III, 3ľ(u eaition,	TAAA.				

Department : In	formation Technol	ogy	Programme: B. Tech. (IT)-Minor							
Semester : Fif	th		Course	Catego	ry Cod	e: PCC	Semester	Exam Typ	e: TY	
	Course Norse		Perio	ods / We	eek	Credit	Maxi	mum Ma	rks	
Course Code	Course Name		L	Т	Р	С	CA	SE	TM	
ITM03	Data Communica Networks	tion and Computer	3	1	-	4	40	60	100	
Prerequisite										
	CO1 Understar	nd the basic layers and	d its fund	ctions in	comp	uter netwo	orks			
Course	CO2 Understar	nd the basics of how d	lata flow	s from	one no	de to anot	her			
Course	CO3 Analyze a	nd design routing algo	orithms a	and eval	uate th	ne perform	ance of a n	etwork		
Outcome	CO4 Understar	nd the Internet protoc	ols							
	CO5 Understar	nd the working of vari	ous app	lication	layer p	rotocols				
UNIT-I	Introduction and	Physical Layer			, in the second s	Periods: 1	L 2			
Networks – Net	work Types – Pro	tocol Layering – TCP/	IP Prot	ocol sui	te – 0	SI Model -	– Physical			
Layer: Performa	iyer: Performance – Transmission media – Switching – Circuit-switched Networks – Packet CO1									
Switching										
UNIT-II	DATA LINK LAYER	AND MEDIA ACCESS				Periods:	12			
Introduction – L	ink-Layer Addressi	ng – DLC Services – I	Data-Lin	k Layer	Proto	cols – HDL	С — РРР —			
Media Access C	Control – Wired LA	ANs: Ethernet – Wire	eless LA	Ns – In	troduc	tion – IEE	E 802.11,	CO2		
Bluetooth – Con	necting Devices									
UNIT-III	NETWORK LAYER					Periods: 1	L 2			
Network Layer	Services – Packet	switching – Performa	nce – II	PV4 Add	dresses	– Forwar	ding of IP			
Packets – Netw	ork Layer Protoco	ols: IP, ICMP v4 – U	nicast I	Routing	Algori	thms – Pr	otocols –	CO3		
Multicasting Bas	ics – IPV6 Addressi	ng – IPV6 Protocol.								
UNIT-IV	TRANSPORT LAYE	R				Periods:	12			
Introduction – T	ransport Layer Pro	otocols – Services – P	ort Nun	nbers –	User [Datagram I	Protocol –	CO4		
Transmission Co	ntrol Protocol – SC	TP								
UNIT-V	APPLICATION LAY	(ER				Periods:	12			
WWW and HITP		net –SSH – DNS – SNN	/IP.		• •			CO5		
Lecture Periods:	45	Tutorial Periods: 15	Prac	tical Pe	rioas:	-	I otal Peri	oas: 60		
1 Debrouz A	s: Carouzon Data Car	munications and Nat	working	Litte L	dition -					
1. Benrouz A. F	rson Bruco S. Davi	a Computer Network		, FIITU E	nroach	LIVIN, 2013	ion Morgan	. Kaufma	20	
2. Larry L. Pele	13011, DIUCE 3. DAVI	e, computer network	5. A 3951	еніз Ар	proacti	, intheult	ion, worgal	rikauiiild		
3 William Stall	ings Data and Com	nuter Communicatio	ns Tent	h Editio	n Pear	son Educat	ion 2013			
A Nader F Mir Computer and Communication Networks Second Edition, Prentice Hall 2014										

5. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach, McGraw Hill Publisher, 2011.

6. James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Sixth Edition, Pearson Education, 2013.

Department: In	formatio	n Technology	Programme: B. Tech. (IT)-Minor								
Semester : Six	ĸth		Cours	e Categ	ory Co	de: PCC	Semeste	r Exam	Type: TY		
Course Code	Courso	Nama	Peri	ods / W	'eek	Credit	Max	imum l	Marks		
Course Coue	Course	Name	L	Т	Ρ	С	CA	SE	TM		
ITM04	Informa	ation Systems and Organization	3	1	-	4	40	60	100		
Prerequisite	-										
	CO1	Know the Concepts of Information	Syster	ns and (Organi	zation					
Course	CO2	Study the Importance of Decision	Making	5							
Outcome	CO3	Understand the Fundamental Con	cepts N	/IS.							
Outcome	CO4	Impart the knowledge of MIS									
	CO5	Know the security issues of MIS									
UNIT-I	CONCE	PTUAL FOUNDATIONS				Periods:	12				
Introduction to	Basic S	Systems Concepts-Elements of S	ystem-	Chara	cterist	cs of Sy	stem-Type	es of			
Systems- Syster	n Appro	ach to Problem Solving - Informat	ion Sys	stems:	Definit	ion and (Characteri	stics-	CO1:		
Types of Inform	ation Ro	e of Information in Decision Makin	g.								
UNIT-II	DECISIO	DN MAKING				Periods:	12				
Simon's Model of Decision Making- Concepts of Management Organization and Hierarchy of CO2:											
Management A	ctivity- S	structured Vs Unstructured Decision	ons- Fo	ormal V	s Info	rmal Syst	ems- Leve	els of			
Management - I	Kinds of I	nformation Systems.									
UNIT-III	MANAG	GEMENT INFORMATION SYSTEM				Periods:	12				
Definition and C	Characte	istics- History of MIS Components	of MIS	6-Frame	Work	for Unde	rstanding	MIS-			
Hardware Suppo	ort for M	IS- Structure of Management Infor	mation	System	.				CO3:		
UNIT-IV	DEVELO	PING INFORMATION SYSTEMS				Periods:	12				
Analysis and De	sign of Ir	nformation Systems: Evaluation- Pi	tfalls in	MIS De	evelop	ment. Fui	nctional N	1IS: A			
Study of Market	ting- Pers	onnel- Financial and Production M	IS.						CO4:		
UNIT-V	SECURI	TY AND ETHICAL ISSUES				Periods:	12				
Introduction- C	ontrol Is	sues in Management Information	Syste	ms- Seo	curity	Hazards-	Ethical Is	sues-	CO5:		
Technical Soluti	ons for P	rivacy Protection									
Lecture Periods	: 45	Tutorial Periods: 15	Pract	ical Peri	iods: ·	•	Total Pe	riods:	60		
Reference Book	ks:										
1. C. Laudon K	enneth, l	P. Laudon Jane, "Management Info	rmatio	n Syster	n", Pe	arson Edu	cation; 5 th	' editio	n, 2018.		
2. James A. C)'Brien, (George M. Marakas, Ramesh Beł	nl, "Ma	anagem	ent In	formation	n Systems	s", Mc	Graw Hill		
Education, 1	10 th editic	on, 2017.									
3. Parminder	Kaur See	ema Gupta, "Principles of Manag	ement	Inform	ation	System",	Mewar L	Inivers	ity Press;		
1 st edition, 2	015.										

Semester : Seventh Course Category Code: PCC Semester Exam Type: TY Course Code Course Name I T P Code Course Maximum Marks ITM05 IoT and Python Programming 3 1 - 4 40 60 100 Prerequisite application areas where Internet of Things can be applied CO1 Able to understand the basics of Internet of Things and get an idea of some of the application areas where Internet of Things can be applied CO2 Able to understand the concept of Cloud of Things with emphasis on web of things Course CO3 Able to read and write simple Python programs. CO5 Able to read and write simple Python programs. CO5 Able to regresent compound data using Python Internet of Things with emphasis on web of things Definitions and Functional Requirements -Motivation - Architecture - Web 3.0 View of IoT- Ubiquitous IoT Applications - Four Pillars of IoT - DNA of IoT -								
Course Code Course Name Periods / Week Credit Maximum Marks ITM05 IoT and Python Programming 3 1 - 4 40 5E TM Prerequisite Able to understand the basics of Internet of Things and get an idea of some of the application areas where Internet of Things can be applied CO1 Able to understand the need for Protocol standardization and IOT protocols Outcome CO2 Able to understand the concept of Cloud of Things with emphasis on web of things CO3 Able to read and write simple Python programs. CO3 Able to read and write simple Python programs. CO3 Able to read and write simple Python programs. CO3 Able to read and write simple Python programs. CO3 Able to read and write simple Python programs. CO3 Able to read and write simple Python programs. CO3 Able to read and write simple Python programs. CO3 Able to read and write simple Python programs. CO3 Able to read and write simple Python programs. CO3 Able to read and write simple Python programs. CO3 Able to Python								
Course Code Cold and Python Programming I T P C CA SE TM ITM05 IoT and Python Programming 3 1 - 4 40 60 100 Prerequisite - Able to understand the basics of Internet of Things can be applied - Course CO2 Able to understand the concept of Cloud of Things with emphasis on web of things C04 Able to read and write simple Python program. CO3 Able to represent compound data using Python lists, tuples, dictionaries. UNIT-1 Definitions and Functional Requirements -Motivation - Architecture - Web 3.0 View of IoT- Ubiquitous IoT Applications - Four Pillars of IoT - DNA of IoT - The Toolkit Approach for End-user CO1 Optionation in the Internet of Things. Middleware for IoT: Overview - Communication middleware CO1 CO1 Protocol Standardization for IoT - Efforts - M2M and WSN Protocols - SCADA and RFID Protocols - Issues with IoT Standardization - Unified Data Standards - Protocols - SCADA and RFID Protocols - Issues with IoT Standardization - Unified Multitier WoT Architecture - WoT Portals and Business CO2 VNIT-II Web of things Periods: 12 Verodod - Wood - Unified Multitier WoT Architecture - WoT Portals and Business CO2 UNIT-III Web of things Required								
ITM05 IoT and Python Programming 3 1 - 4 40 60 100 Prerequisite C01 Able to understand the basics of Internet of Things and get an idea of some of the application areas where Internet of Things and redization and IOT protocols Outcome C02 Able to understand the concept of Cloud of Things with emphasis on web of things C03 Able to understand the concept of Cloud of Things with emphasis on web of things CO3 Able to read and write simple Python programs. CO3 Able to regresent compound data using Python lists, tuples, dictionaries. Velocitian and some of things UNIT-I Introduction to IOT Periods: 12 Definitions and Functional Requirements -Motivation – Architecture - Web 3.0 View of IOT– Velocitian and Papications Periods: 12 Participation in the Internet of Things. Middleware for IoT Overview – Communication for Edducer and and redization for IoT = Efforts – M2M and WSN Protocols – SCADA and RPID Protocols – IEEE 802.15.4 – BACNet Protocol = Modbus – KNX – Zigbee Architecture Periods: 12 CO2 VINT-II Web of Things: Grid/SOA and Cloud Computing – Cloud Middleware – Cloud Standards – C								
Prerequisite Co1 Able to understand the basics of Internet of Things and get an idea of some of the application areas where Internet of Things can be applied Course CO2 Able to understand the need for Protocol standardization and IOT protocols Outcome CO3 Able to understand the concept of Cloud of Things with emphasis on web of things CO4 Able to read and write simple Python programs. CO5 Able to represent compound data using Python lists, tuples, dictionaries. CO1 UNIT-I Introduction to IoT Periods: 12 CO1 CO1 Definitions and Functional Requirements -Motivation – Architecture - Web 3.0 View of IOT-Ubiquitous IOT Applications - Four Pillars of IOT – DNA of IOT - The Toolkit Approach for End-user for IoT-IoT Information Security. CO1 UNIT-II IoT Protocols and Applications Periods: 12 CO2 Protocol Standardization for IoT - Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – IEEE 802.15.4 – BACNEt CO2 Protocol -Modbus – KNX – Zigbee Architecture Periods: 12 CO2 VINT-III Web of things Periods: 12 CO2 UNIT-III Web of things Periods: 12 CO2 Voticol = Modbus – KNX – Zigbee Architecture Periods: 12 CO3								
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Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Files and exception: text files, reading and writing files, format operator; command line arguments,								
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Files and exception: text files, reading and writing files, format operator; command line arguments,								
Files and exception: text files, reading and writing files, format operator; command line arguments,								
annens and averaging the adding averaging and dealer and a second								
errors and exceptions, nandling exceptions, modules, packages;								
Lecture Periods: 45 Tutorial Periods: 15 Practical Periods: - Total Periods: 60								
Reference Books:								
Hondo Zhou, The Internet of Things in the Cloud: A Middleware Perspective, CRC Press, 2012 Distor, Uskalmann, Mark, Harrison, "Architecting the Internet of Things", Elerian Mishahalles, (Eds.)								
2. Dieter Uckeimann, Mark Harrison, " Architecting the Internet of Things", Florian Michahelles- (Eds.) –								
3 David Fasley and Ion Kleinherg Networks Crowds and Markets: Reasoning About a Highly Connected								
World" Cambridge University Press 2010								
Violia, Califoliage Oniversity Fress, 2010 A Kenneth & Lambert — Eurodamentals of Dython: First Programs!! CENGAGE Learning, 2012								
5. Charles Dierhach — Introduction to Computer Science using Python: A Computational ProblemSolving								
Focus. Wilev India Edition. 2013								

Open Elective Courses

Department : Ir	nformati	on Technology	Progra	amme:	B. Te	ch. (IT)			
Semester : T	hird		Course	e Categ	gory C	Code: OEC	Semester	Exam Type:	ТҮ
Course Code	Course	Nama	Perio	ds / W	eek	Credit	Μ	laximum Ma	rks
Course Coue	Course		L	Т	Р	С	CA	SE	TM
ITO01	Busine	ess Process	3	-	-	3	40	60	100
Prerequisite	-								
	CO1	Know about Business Pr	rocess Ba	sics					
Course	CO2	Learn about Business Pr	ocess Pla	atform	S				
Outcome	CO3	Analyse about Process N	Modellin	3					
outcome	CO4	Know about Business Pr	rocess To	ols					
	CO5	Know about Life Cycle o	of Busines	ss Proc	ess				
UNIT-I	INTRO	DUCTION				Periods: 9			•
Introduction –	Definitio	on of Business Process- N	eed and	Impor	tance	e of Business	Process – E	Examples of	CO1
Business Proces	ss - Busir	ness Process Excellence.							
UNIT-II	BUSIN	ESS PROCESS PLATFORM	S			Periods: 9			·
Business Proce	ss Platfo	rms – Specification and	Modelin	g of Bu	isines	s Process –	Integration	of Business	CO2
and Production	Process	 Integration of Business 	Process	and Bu	sines	s Intelligence	2.		
UNIT-III	PROCI			_		Periods: 9			T
Global View of	Business	s Process – Local View of	Business	Proce	ss – I	Business Pro	cess Modelli	ng – Events	CO3
In Business Pro		deling – Semantics of Ever	nts.						
	BUSIN	ESS PROCESS TOOLS	D		- D	Periods: 9	D C		I
Decomposing E	Susiness	Process – Motivation – Se	amiess B	usines	s Pro	cess – Busine	ss Process S	pecification	CO4
		VCLE OF BUSINESS DROCE	:cc			Pariods: 9			<u> </u>
Life cycle of Bi	ISINESS P	rocess — Classification of	of Busine	ss Prod	- 20C	Workflow N	/anagement	– Rusiness	
Process Manag	ement –	Definition – Application- L	ife Cycle	of Bus	iness	Process Mar	nagement.	Business	CO5
Lecture Period	s: 45	Tutorial Periods: -	Practi	cal Per	iods:	-	Total Per	iods: 45	
Reference Boo	ks:								
1. Dumas, M.,	. La Rosa	, M., Mendling, J., Reijers,	, "Fundai	menta	ls of I	Business Pro	cess", 2018		
2. Stiehl, Voll	ker, "Pro	cess-Driven Applications	s with BF	PMN",	2014	•			
3. Brocke and	Rosema	inn, Handbook on Busine	ss Proces	ss man	agem	ent 2 Strate	gic Alignmer	nt, Governan	ce, People
and Culture	e, Springe	er, 2012.							

Department : Information Technology Programme: B. Tech. (IT)										
Semester :	Fourth		Cour	se Cat	egory C	ode: OEC	Semester Ex	am Type: 1	ſY	
	~		Peri	ods /	Week	Credit	Max	imum Mar	ks	
Course Code	Course	e Name	L	Т	Р	С	CA	SE	TM	
ITO02	Object Engine	t Oriented Software eering	3	-	-	3	40	60	100	
Prerequisite	-									
	CO1	To learn about Object orien	ted life	e cycle	e manag	ement				
Course	CO2	To compare various object	oriente	ed sof	tware er	ngineering	approaches			
Outcome	CO3	To learn how to use UML to	repre	sent s	tatic and	d dynamic	aspects of a sy	rstem		
Outcome	CO4	To learn the various approa	ches f	or Obj	ect orie	nted analys	sis			
	CO5	To learn the various approa	ches f	or obj	ect orier	nted desigr)			
UNIT-I	-					Periods:	9			
Design Obje associations, a systems devel a use-case driv	ects, nggregat opment ven appl	Class Hierarchy, inheritand ions and object containment, life cycle, Software developme roach.	ce, p objec ent pr	oolym t per ocess	orphism sistence object	, object , meta -cl oriented	relationshi asses, Object systems deve	os and -oriented lopment:	CO1	
UNIT-II Periods: 9										
Object modeling techniques as software engineering methodology, Rumbaugh methodology, Jacobson								<u> </u>		
methodology,	Booch r	methodology, patterns, framewo	orks, tl	ne uni	fied mo	deling lang	uage (UML).		COZ	
UNIT-III	Unifie	d Modelling Language				Periods: 9	9			
Class Diagram Diagrams- Act	ns- Sequ ivity Dia	ence Diagrams- Object Diagrar grams-Component Diagrams	ns- De	ployn	nent dia	grams- Use	e Case Diagrar	ns- State	CO3	
UNIT-IV	Objec	t oriented Analysis				Periods: 9	9			
Analysis Proce Different App Relationships, Class Responsi	ess, Use roaches attribut ibilities,	-Case Driven Object Oriented Ar for identifying classes, classes, tes and Methods, super-sub Cla , Object Responsibilities.	nalysis respo iss Rela	, Use- nsibili ations	Case Mc ties and hips, ap	odel, Objec l Collaborat art of Rela	t Classification tors, identifyir tionships-Aggr	, Theory, ng Object regation ,	CO4	
UNIT-V	Objec	t Oriented Design				Periods:	9			
Object Orier design philoso Visibility, Refir Designing inte	Object Oriented design process, corollaries, design axioms, design patterns, object oriented design philosophy, UML Object Constraint Language, Designing Classes : The Process, Class Visibility, Refining Attributes, Designing Methods and Protocols, Packages and Managing classes, Designing interface objects, View layer interface design, Macro and Micro level interface design process.									
Lecture Period	Lecture Periods: 45 Tutorial Periods: - Practical Periods: - Total Periods: 45									
Reference Boo	oks:									
 Bernd Bru Hall, Third Ali Bahran Seidl, M 	egge& A Edition ni , Obje Scholz.	Allen H. Dutoit , Object-Oriented ,2008. ct Oriented System Developmer M., Huemer, C., Kappel. G. UN	d Softv nt,Tata 1L @ (vare E McG Classro	ingineer raw-Hill oom An	ing Using U Education Introducti	JML, Patterns, Pvt. Ltd.2008. on to Object-	and Java [*] Oriented	Prentice Modeling.	

Springer Publications, 2012.

Department : Information Technology			Programme: B. Tech. (IT)									
Semester : Fifth			Course Category Code: OEC Semester Exam Type: T									
Course Code	Course	Peri	Periods / Week		Credit	Maximum N		Marks				
	course	Name	L	Т	Р	С	CA	SE	TM			
ITO03	Introdu	Jaction to Operating Systems 3 - 3 40 60							100			
Prerequisite	-											
	CO1Able to grasp fundamentals of operating systems and to understand fundamental operating system abstractions such as processes, threads and IPCCO2Understand the concept of process scheduling, synchronization and system deadlock handling											
Course												
Outcome	CO3	Understand the role of OS as resource manager to support virtual memory concept and functions										
	CO4	CO4 Understand basic file and I/O management techniques.										
	CO5	Understand mass storage m	anageme	ent and	l system	n security	issues					
UNIT-I	Introdu	iction				Periods	: 8					
Introduction t	o operat	ing systems – review of compu	iter orga	nizatio	n – ope	rating sys	tem stru	ctures –				
system calls-s	ystem pr	ograms-system structure-virte	ual mach	ines					CO1			
Processes: Pro	ocess cor	ncept –Process scheduling– Op	perations	on pr	ocesses	-Coopera	ating pro	ocesses–				
Inter-process communication–Communication in client-server systems – Concept of threads												
UNIT-II	Process	sor Management				Periods	: 10					
CPU Schedulir	ig: Sched	uling criteria – Scheduling algo	rithms									
Process Synch	ronizatio	on: The critical-section probler	m – Syn	chronia	zation h	ardware ·	– Semap	hores –				
Classic proble	ms of syr	chronization							CO2			
Deadlock: System model – Deadlock characterization – Methods for handling deadlocks – Deadlock												
prevention – Deadlock avoidance–Deadlock detection–Recovery from deadlock												
UNIT-III	Memoi	y Management	- ··			Periods	: 10	•				
Memory Mar	nagemen	t: Background – Swapping -	- Contig	guous	memor	y allocat	ion – P	aging –				
Segmentation	– Segme	Intation with paging		- 4 !	Deee				CO3			
Virtual Memo	ry: Backg	ground – Demand paging – Pro	ocess cre	ation -	- Page i	eplaceme	ent–Alloc	ation of				
frames—Inras						Dowloado	. 0					
	File and	I/O Management	D:+	+		Periods	:9					
Protoction	terrace:	rile concept – Access methods	s – Direc	lory st	ructure	– File sys	nem mo	unting –				
	mnloma	atation: Directory implement	tation	٨١١٨	ocation	mothoda	. E~/	0 00000				
File-System Implementation: Directory implementation – Allocation methods – Free-space CO4									CO4			
management – Enciency and performance–Recovery–Log-structured file systems												
i/O systems – i/O Hardware – Application i/O interface – Kernel i/O subsystem – Streams–												
LINIT_V Storage Management and Security Deriods 9												
MassStorageStructure·Diskscheduling_Diskmanagement_Swan_snacemanagement_RAID_												
Diskattachme	nt– Stabl	e storage–Tertiary storage - Sys	stem Pro	tectio	n and Se	curity			CO5			
Lecture Periods: 45 Tutorial Periods: - Practical Periods: - Total Periods: 45								45				
Reference Books:												
1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concents, Ninth Edition, John												
Wiley & Sons(ASIA) Pvt. Ltd, 2012.												
2. D. M. Dhamdhere, "Operating Systems: A concepts based approach", Second Edition, Tata McGraw-Hill									v-Hill			
Publishing Company Ltd., 2006.												
3. Harvey M. Deital, "Operating Systems". Third Edition, Pearson Education, 2004												

Harvey M. Deltal, Operating Systems , Third Edition, Pearson Education, 2004
 Andrew S. Tannenbaum and Herbert Bos, Modern Operating Systems, Fourth Edition, Prentice Hall, 2014.

Department: Info	ormatio	n Techn	ology	Progra	amme:	B. Tec	h. (IT)					
Semester : Sixth			Cours	e Cate	gory Co	de: OEC	Semester Exam Type: TY					
Course Code	Course Name			Perio	Periods / Week			Maximum Marks				
Course Coue						Р	С	CA	SE	TM		
ITO04	Introduction to Database 3 3 40 60								100			
Prerequisite	-											
	CO1 Know the Concepts of Database Management System											
Course	CO2	Design ER Model for Real Time projects										
Outcome	CO3	CO3 Specify Query with Constraints										
Outcome	CO4 Specify Nested Queries											
CO5 Know about Transactions Concepts												
UNIT-I Introduction to Databases and Transactions Periods: 9												
Introduction to Database Systems: Overview – Data Models- Database System Architecture- Storage												
Management- Transaction Management- History of Database Systems. Introduction to Relational Model												
UNIT-II	Entity- Relationship Model Periods: 9											
Basic Concepts – Constraints – Keys – Design Issues – Entity Relationship Diagram –Entity Sets – Design of CO2												
E-RDatabase Sch	ema. Ca	se study	r: ER Modelling									
UNIT-III	SQL Periods: 9											
Introduction to	SQL - SO	QL Data	-Definition language	– Basic Qu	ery Str	ucture	-Create Ta	ble Comm	nand –	<u> </u>		
Integrity Constraints- Set Operations.									03			
UNIT-IV	SQL						Periods: 9					
Aggregate Funct	ions – I	Null Val	ues – Nested Sub-Q	ueries – Vi	ews –N	Лodific	ation of D	atabase –	Joined	CO4		
Relations - Data-	Definitio	on Langu	lage.									
UNIT-V	Trans	action N	Nanagement and Cor	ncurrency			Periods:	9				
Transaction Ma	nageme	ent: AC	ID Properties- Seri	alizability a	nd Co	oncurre	ency Cont	rol: Lock	-Based	CO5		
Protocols. Recovery System: Failure Classification – Storage Structure – Recovery and Atomicity.												
Lecture Periods: 45 Tutorial Periods: - Practical Periods: - Total Periods: 4							5					
Reference Books												
1. Avi Silberschatz, Henry F. Korth, S. Sudarshan "Database System Concepts", 7 th Edition, March 5, 2019.												
2. C.J. Date, "An Introduction to Database Systems", 8 th Edition, Jun 24, 2019												
3. Hugh Darwen, "Introduction to Relational Database Theory", 3 rd edition, 2012.												

Department : Information Technology		Programme: B. Tech. (IT)								
Semester : Seventh			Course Category			Code: OEC	Semester Exan	e: TY		
Course Code				iods /	Week	Credit	Maximum Ma		arks	
Course Code	Course Name		L	Т	Р	С	CA	SE	TM	
ITO05	Web Engineering			-	-	3	40	60	100	
Prerequisite	-						-			
	CO1 Able to apply the characteristics of web applications and acquire the knowledge of requirements engineering									
Course	CO2 Inviouel architectures for web applications CO2 Apply appropriate web design for applications									
Outcome	Apply appropriate web design for applications									
CO4 Understand the concept of testing web applications										
· · · · · · ·	CO5 Develop and manage web-based projects									
UNIT-I	Introduction Periods: 9									
Introduction to	Introduction to Web Engineering and Requirements Engineering, Motivation, Categories of Web									
Applications, C	Applications, Characteristics of Web Applications, Evolution of web engineering - Requirements									
Engineering Act	ivities, l	RE Specifics in Web Engine	ering,	Princ	iples fo	or RE of Web App	olications, Adap	ting		
RE Methods to Web Application Development, Requirement Types										
UNIT-II	Web Application Architectures Periods:9									
Categorization	of Archi	tectures, Specifics of Web	Appl	icatio	n Archi	tectures, Compo	nents of a Gen	eric	CO2	
Web Applicatio	n Archi	tecture, Layered Architectu	ires,	Archit	ectures	for Web Docur	nent Managem	ent,		
Architectures for	or Multi	imedia Data Modelling Spe	ecifics	s in W	/eb Enរូ	gineering, Model	lling Requireme	nts,	002	
Hypertext Modelling, Relation to Hypertext Modelling, Customization Modelling										
UNIT-III	Web Application Design Periods: 9									
Web Design, In	formatio	on Design, Software Design	: A Pr	ogran	nming A	Activity, Merging	Information De	sign		
and Software	Design,	Problems and Restrictions	s in I	Integr	ated W	/eb Design, A P	roposed Struct	ural	CO3	
Approach, Pres	sentatio	n Design, Inter action D	esign,	, Nav	igation	Design, Design	ing Link Interr	nals,	05	
Navigation and	Orientat	tion, Functional Design								
UNIT-IV	Testin	Testing Web Applications Periods:9								
Test Objectives	, Test L	evels, Role of the Tester,	Test	Specif	fics in \	Neb Engineering	, Test Approac	hes,		
Conventional Approaches, Agile Approaches, Test Scheme, Applying the Scheme to Web Applications,								ons,	CO 4	
Test Methods a	nd Tech	niques, Testing Security, Te	st-dri	ven D	evelopr	nent, Test Autom	nation, Benefits	and	CO4	
Drawbacks of A	Drawbacks of Automated Test, Test Tools									
UNIT-V	Web P	roject Management				Periods:9				
Understanding Scope, Refining Framework Activities, Building a Web Team. Managing Risks. Developing a										
Schedule, Managing Quality, Managing Change, Tracking the Project. Introduction to node JavaScript –									CO5	
web sockets										
Lecture Periods: 45 Tutorial Periods: - Practical Periods: - Total Periods: 45										
Reference Books:										
1. GertiKappel, Birgit Proll, "Web Engineering", John Wiley and Sons Ltd. 2006.										
2. Roger S. Pressman, David Lowe, "Web Engineering: A Practitioner's Approach", McGraw-Hill. 2009.										
3. Guy W. Lecky-Thompson, "Web Programming", Cengage Learning, 2008.										
4. Chris Bates, "Web Programming: Building Internet Applications", Third Edition, Wiley India Edition, 2007.										

5. http://www.csun.edu