

Scheme – 2020

Department of Emerging Technologies in Computer Science

G. Pulla Reddy Engineering College (Autonomous): Kurnool

Accredited by NBA of AICTE and NAAC of UGC

Affiliated to JNTUA, Anantapuramu

Scheme and Syllabus for II, III & IV Year of FOUR YEAR B.Tech. Degree Course in

Computer Science and Business Systems

(With Effect from the Batch Admitted in 2020-21)

COMPUTER SCIENCE AND BUSINESS SYSTEMS (CSBS) FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination

III SEM CSBS

Scheme-2020

				l pe	Scheme nstruct eriods/w	of ion veek	Scheme of Examination Maximum Marks			
S. No	Category	Course Title	Credits	L	Т	Р	End Exam Marks	CIA Marks	Total Marks	
Ι		Theory								
1	PCC	Formal Language and Automata Theory	3	2	1	-	60	40	100	
2	PCC	Computer Organization & Architecture	3	3	-	-	60	40	100	
3	PCC	Object Oriented Programming	3	2	1	-	60	40	100	
4	BSC	Computational Statistics	3	3	-	-	60	40	100	
5	HSBS	Financial Management	3	3	-		60	40	100	
	SC	Software Engineering	2	1		2	60	40	100	
	MC	Constitution of India		2				100	100	
II		Practical								
6	PCL	Object Oriented Programming Lab	1.5	-	-	3	60	40	100	
7	BSL	Computational Statistics Lab	1.5	-	-	3	60	40	100	
8	PCL	Computer Organization & Architecture Lab	1.5		-	3	60	40	100	
		Total	21.5							

IV SEM CSBS

Scheme-2020

S No	Catagory		Cradits	l pe	Scheme Instructi eriods/w	of ion /eek	Scheme of Examination Maximum Marks			
5.110	Category	Course Title	Creuits	L	Т	Р	End Exam Marks	CIA Marks	Total Marks	
Ι		<u>Theory</u>								
1	PCC	Operating Systems	3	3	-	-	60	40	100	
2	PCC	Database Management Systems	3	2	1	-	60	40	100	
3	ESC	Introduction to Innovation, IP Management & Entrepreneurship	3	3		-	60	40	100	
4	ESC	Operations Research	3	2		2	60	40	100	
5	HSS	Marketing Research & Marketing Management	3	3	-		60	40	100	
	SC	Software Design with UML	2	1		2	60	40	100	
II		Practical								
6	PCL	Operating Systems Lab	1.5	-	-	3	60	40	100	
7	PCL	Database Management Systems Lab	1.5	-	-	3	60	40	100	
8	HSL	Business Communication & Value Science – III Lab	1.5	-	-	3	60	40	100	
		Total	21.5							

FORMAL LANGUAGE AND AUTOMATA THEORY (FLAT)

III Semeste	III Semester : CSBS Scheme : 2020										
Course Code	Category	Ho	ours/W	eek	Credits	Max	imum Mar	ks			
CB201	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		2	1	-	3	40	60	100			
Sessional E	xam Duration :	1½ H	rs			En	d Exam Du	ration: 3 Hrs			
Course Out	tcomes : At the e	nd of th	ne cour	se the st	udent will	be able to					
CO1: Design the finite automata for a given regular language.											
CO2: Understand the regular expressions and pumping lemma of regular languages.											
CO3: Design push down automata and context free grammar for a given context free language.											
CO4: Understand Context-sensitive languages, linear bounded automata and Turing machine.											
CO5: Understand the undecidability and complexity theory of problems.											
UNIT – I											
Introduction: Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of											
languages.											
Finite Automata: Deterministic finite automata (DFA), Non deterministic finite automata (NFA) and											
equivalence with DFA, Myhill-Nerode theorem and its uses, minimization of finite automata.											
UNIT – II											
Regular lar	nguages and fini	te auto	mata:	Regular	r expression	ns and languages,	equivalence	e of DFA with			
regular exp	ressions, regular	gramı	nars a	ind equi	ivalence w	ith finite automa	ita, properti	es of regular			
languages, I	Kleene's theorem	, pump	ing len	nma for	regular lang	guages.					
				UN	IT – III						
Context-fre (CFL), pars nondetermin free languag	e languages ar e trees, ambiguit nistic pushdown ges, deterministic	id pus ty in C automa pushdo	hdowr FG, Si ta (PD own au	auton implifica (A) and tomata,	nata: Cont ation of CF equivalenc closure pro	ext-free grammar FG, Chomsky and e with CFG, pum perties of CFLs.	rs (CFG) a l Greibach 1 nping lemm	nd languages normal forms, a for context-			
				UN	IT – IV						
Context-sensitive languages: Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG. Turing machines: The basic model for Turing machines (TM), Turing recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, nondeterministic TMs and equivalence with deterministic TMs, unrestricted grammars and equivalence with Turing machines, TM's as enumerators.											
				UN	IT – V						
Undecidability: Church-Turing thesis, universal Turing machine, the universal and diagonalization languages, reduction between languages and Rice s theorem, undecidable problems about languages. Basic Introduction to Complexity: Introductory ideas on Time complexity of deterministic and											

nondeterministic Turing machines, P and NP, NP- completeness, Cook's Theorem, other NP - Complete problems.

Text Books:

1. John E. Hop croft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, 3/e, Pearson Education India, 2008.

Reference Books:

- 1. Elements of the Theory of Computation, Harry R. Lewis and Christos H. Papadimitriou.
- 2. Automata and Computability, Dexter C. Kozen.
- 3. Introduction to the Theory of Computation, Michael Sipser.
- 4. Introduction to Languages and the Theory of Computation, John Martin.
- 5. Computers and Intractability: A Guide to the Theory of NP Completeness, M. R. Garey and D.S.Johnson

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

COMPUTER ORGANIZATION & ARCHITECTURE (COA)

III Semeste	r : CSBS						S	cheme : 2020				
Course Code	Category	Ho	ours/W	eek	Credits	Max	imum Mar	ks				
CB202	РСС	L	Τ	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	-	-	3	40	60	100				
Sessional E	xam Duration :	1 ½ H	rs			En	d Exam Du	ration: 3 Hrs				
Course Out	tcomes : At the e	nd of th	ne cour	se the st	tudent will	be able to						
CO1: Unde	rstand the registe	r transf	èr lang	guage, th	e instructio	n set and instruction	on execution	n cycle				
CO2: Demo	onstrate the arithr	netic al	gorithr	ns and t	he design o	f logic circuits for	performing	arithmetic				
operations												
CO3: Understand the design approaches of hardwired Control unit, micro-programmed control unit and												
summarizes	summarizes the semiconductor memory technologies											
CO4: Classify the types of peripheral devices and analyze the Pipelining concepts												
CO5: Analy	ze the design iss	ues of r	nemor	y organi	ization in te	rms of speed, cost	and perform	nance				
UNIT – I												
Revision of basics in Boolean logic and Combinational/Sequential Circuits.												
Functional blocks of a computer: CPU, memory, input-output subsystems, control unit.												
Instruction set architecture of a CPU: Registers, instruction execution cycle, RTL interpretation of												
instructions, addressing modes, instruction set. Outlining instruction sets of some common CPUs.												
				UN	II – II							
Data repres	sentation: Signe	d numb	er rep	resentat	ion, fixed a	nd floating point	representati	ons, character				
Computer	arithmetic. Integ	ver addi	ition a	nd subtr	action rinn	le carry adder ca	rry look-ahe	ad adder etc				
multiplicati	an - shift and ad	d Root	th mul	tiplior	corry save 1	multiplier etc. Di	vision resta	ring and non				
restoring tec	shniques floating	u, Doo	ur mur arithme	tic IFF	E 754 form	at		ing and non-				
	milques, noating	; point a	1111111	, 1151		lat.						
				UN	IT – III							
Introduction CPU control hypothetical	on to x86 archite ol unit design: CPU.	cture: Hardwi	red an	d micro	o-programm	ed design approa	ches, desig	n of a simple				
Memory sy	stem design: Sei	nicond	uctor n	nemory	technologie	es, memory organi	zation.					
UNIT – IV												
Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCII, USB Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards. Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency.												

UNIT – V

Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies.

Text Books:

- 1. M. M. Mano, Computer System Architecture, 3/e, Prentice Hall of India, New Delhi, 1993.
- 2. David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, 4/e, Morgan Kaufmann, 13 October 2011.
- 3. Carl Hamacher, Computer Organization and Embedded Systems, 6/e, McGraw-Hill Education, 2017.

Reference Books:

1. John P. Hayes, Computer Architecture and Organization, 3/e, McGraw Hill Education, 1 July 2017.

2. William Stallings, Computer Organization and Architecture: Designing for Performance, 10/e, Pearson Education India,29 September 2016.

3. Vincent P. Heuring and Harry F. Jordan, Computer System Design and Architecture, 2/e, Prentice Hall, 23 March 2006.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

III Semester : CSBS Scheme : 2020 Course Category Hours/Week Credits **Maximum Marks** Code **Continuous** End Т Р C Internal TOTAL L **CB203** Exam PCC Assessment 2 3 **40** 60 1 100 _ **Sessional Exam Duration : 1**¹/₂ Hrs **End Exam Duration: 3 Hrs Course Outcomes :** At the end of the course the student will be able to **CO1:** Recall the concepts of C programming **CO2:** Understand the object oriented programming concepts **CO3:** Demonstrate inheritance, polymorphism and error handling concepts **CO4:** Comprehend templates, input-output library functions **CO5:** Design UML diagrams for real life applications UNIT – I Procedural programming, An Overview of C: Types Operator and Expressions, Scope and Lifetime, Constants, Pointers, Arrays, and References, Control Flow, Functions and Program Structure, Namespaces, error handling, Input and Output (C-way), Library Functions (string, math, stdlib), Command line arguments, Pre-processor directive. UNIT – II The Fundamentals of Object Oriented Programming: Necessity for OOP, Data Hiding, Data Abstraction, Encapsulation, Procedural Abstraction, Class and Object. More extensions to C in C++ to provide OOP Facilities: Scope of Class and Scope Resolution Operator, Member Function of a Class, private, protected and public Access Specifier, this Keyword, Constructors and Destructors, friend class. Some difference between C and C++: Single line comments, Local variable declaration within function scope, function declaration, function overloading, stronger type checking, Reference variable, parameter passing - value vs reference, passing pointer by value or reference, Operator new and delete, the typecasting operator, Inline Functions in contrast to macro, default arguments. UNIT – III Essentials of Object Oriented Programming: Operator overloading, Inheritance – Single and Multiple, Class Hierarchy, Pointers to Objects, Assignment of an Object to another Object, Polymorphism through dynamic binding, Virtual Functions, overriding and hiding, Error Handling (exception). UNIT - IVGeneric Programming: Template concept, class template, function template, template specialization. Input and Output: Streams, Files, Library functions, formatted output. UNIT – V Object Oriented Design and Modelling: UML concept, Use case for requirement capturing, Class diagram, Activity diagram and Sequence Diagram for design, Corresponding C++ code from design.

OBJECT ORIENTED PROGRAMMING (OOP)

Text Books:

1. Bjarne Stroustrup, The C++ Programming Language, Addison Wesley, 4th Edition, 2013.

2. Debasish Jana, C++ and Object-Oriented Programming Paradigm, PHI Learning Pvt. Ltd.

Reference Books:

1. Bjarne Stroustrup, Programming – Principles and Practice Using C++, Addison Wesley.

2. Bjarne Stroustrup, The Design and Evolution of C++, Addison Wesley.

3. Herbert Schildt, C++: The Complete Reference, 4th Edition.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

COMPUTATIONAL STATISTICS (CS)

III Semeste	er : CSBS						S	cheme : 2020					
Course Code	Category	Ho	ours/W	'eek	Credits	Max	imum Mar	ks					
BS203	BSC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL					
		3	-	-	3 40 60 100								
Sessional E	xam Duration :1	$\frac{1}{2}$ Hr	'S	.1 .	1 . 111	En	d Exam Du	ration: 3 Hrs					
Course Out	tcomes : At the e	nd of th	ne cour	se the st $\frac{1}{1}$ Distant	udent will t	be able to							
CO1: Unde	erstand the Multiv	incor d	isorimi	Distrib	ution								
CO_2 . Estim	lon an Algorithm	for co	nductir	nant Iui	nle compoi	nent analysis							
CO4: To transform the solutions of factor analysis													
CO5: Gain the knowledge on different types of Clustering.													
UNIT _ I													
UNII – I Maltinguista Namual Distributing Maltinguist N = 1 Distributing C = 111 - 1													
Multivaria	te Normal Dis	tributi	on: N	Aultivari	ate Norm	al Distribution	Functions,	Conditional					
Distribution	and its relation to	o regres	ssion m	iodel, Es	stimation of	parameters.							
UNIT – II Discriminant Analysis Statistical background linear discriminant function analysis. Estimating linear													
Discriminant Analysis: Statistical background, linear discriminant function analysis, Estimating linear discriminant functions and their properties.													
UNIT – III													
Principal Component Analysis: Principal components, Algorithm for conducting principal													
component	analysis, deciding	g on how	<i>v</i> many	y princip	al compone	ents to retain, H-pl	lot.						
				UN	IT – IV								
Factor Ana	alysis: Factor and	alysis r	nodel,	Extracti	ing commo	n factors, determ	ining numb	er of					
factors, Trai	nsformation of fac	ctor ana	lysis s	olutions	, Factor sco	res.							
				UN	IT – V								
Clustering:	Introduction, T	ypes of	f cluste	ering, C	orrelations	and distances, c	lustering by	partitioning					
methods, hi	erarchical cluster	ing, ov	erlappi	ng clust	ering, K-M	eans Clustering- I	Profiling and	l Interpreting					
Clusters.													
Text Books	:												
1. An Intro	duction to Multiv	variate S	Statisti	cal Anal	ysis, T.W.	Anderson.							
2. Applied Multivariate Data Analysis, Vol I & II, J.D. Jobson.													
3. Statistical Tests for Multivariate Analysis, H. Kris.													
Reference Books:													
1. Regressio	on Diagnostics,	Identif	ying Ir	nfluentia	l Data and	l Sources of Col	linearety, D).A.					
Belsey, H	E. Kuh and R.E. V	Velsch											
2. Applied	Linear Regressior	n Mode	ls, J. N	eter, W.	Wasserman	n and M.H. Kutne	r.						
3. The Four	ndations of Factor	Analy	sis, A.S	S. Mulai	k.								
4. Introduct	4. Introduction to Linear Regression Analysis, D.C. Montgomery and E.A. Peck.												
					-								

5. Cluster Analysis for Applications, M.R. Anderberg.

6. Multivariate Statistical Analysis, D.F. Morrison.

7. Applied Multivariate Statstical Analysis, Richards A.Johnson Dean W Wichern, Pearson Education

Question Paper Pattern:

Sessional Examination :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

FINANCIAL MANAGEMENT (FM)

III Semeste	r : CSBS						S	cheme : 2020			
Course Code	Category	Ho	ours/W	'eek	Credits	Max	imum Mar	ks			
HU202	HSBS	L	Т	Р	С	Continuous Internal Assessment	Continuous Internal Assessment				
		3	-	-	3	40	60	100			
Sessional E	xam Duration :	1 ½ H	rs			En	d Exam Du	ration: 3 Hrs			
Course Out	tcomes : At the e	nd of th	ne cour	se the st	tudent will b	be able to	6				
COI: Under	rstand the fundan	nental c	oncept	ts of fina	ancial mana	gement, time valu	le of money				
CO2: Appreciate basic concepts such as, risk and return											
CO3: Appre	ate the project us	ing wo	rking c	ost of ca	pital	conital budgeting	techniques	, ,			
CO5: Under	rstand the concer	ts of liv	uid ca	sh mana	agement and	, capital budgeting	managemer	nt in a firm			
	istand the concep	15 01 11	<u>1uiu ca</u>	SII IIIdile			managemer				
				U	$\Gamma - \Gamma$						
Introduction: Introduction to Financial Management - Goals of the firm - Financial Environments.											
Time Value of Money: Simple and Compound Interest Rates, Amortization, Computing more that once											
a year, Annuity Factor.											
UNIT – II											
Valuation	of Securities: H	Bond V	/aluati	on, Pre	ferred Stoc	k Valuation, Co	mmon Sto	ck Valuation,			
Concept of	Yield and YIM.	ialr and	Data		a Duchahilit	y Distributions to	Maaguma D	iale Attitudas			
Toward Risk	k Risk and Retu	isk and	Portfo	n, Using	g Probabilit	y Distributions to	o Measure R	Pricing Model			
(CAPM)	k, Misk and Ketu	111 111 a	1 01110		icat, Divers	incation, The Ca		Theme widder			
				LINI	ит пп						
				UN	11 – 111						
Operating Indifference	& Financial Analysis in leve	Levera rage sti	. ge: C 1dy	perating	g Leverage	e, Financial Lev	verage, Tot	tal Leverage,			
Cost of Ca Weighted A	pital : Concept , verage Cost of C	, Comp apital –	utation Factor	of Spe rs affect	cific Cost of ing Cost of	of Capital for Eq Capital 4L	uity - Prefe	rence – Debt,			
UNIT – IV											
Capital Bu	dgeting: The	Capital	Budg	eting (Concept &	Process - An	Overview,	Generating			
Investment Project Proposals, Estimating Project, After Tax Incremental Operating Cash Flows,											
Capital Bud	geting Technique	es, Proje	ect Eva	luation	and Selection	on - Alternative M	lethods				
Working C	apital Managen	nent: (Jvervie	w, Wo	King Capita	al Issues, Financi	ng Current	Assets (Short			
Working Co	ong 1 erm- Mix),	Comb	ining L	Jaoiiity	Structures a	and Current Asset	Decisions,	Esumation of			
	pital.										
				UN	$\Gamma \Gamma - V$						
Cash Man	Cash Management: Motives for Holding cash, Speeding Up Cash Receipts, Slowing Down Cash										

Payouts, Electronic Commerce, Outsourcing, Cash Balances to maintain, Factoring. Accounts Receivable Management: Credit & Collection Policies, Analyzing the Credit Applicant, Credit References, Selecting optimum Credit period. 4L

Text Books:

1. Financial Management - Theory & Practice Chandra, Prasanna, Tata McGraw Hill

Reference Books:

- 1. Financial Management, Srivastava, Misra, OUP.
- 2. Fundamentals of Financial Management, Van Horne and Wachowicz, Prentice Hall/ Pearson Education.

3. Financial Management, M. Pandey , Vikas Publishing House Pvt. Ltd., 10th edition, 2012

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

III Semester	r : CSBS	K					Sch	eme : 2020				
Course Code	Category	Ног	ırs/W	eek	Credits	Maximu	ım Marks					
SCCB01	SC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
<u> </u>		1	-	2	2	40	60	100				
Sessional Ex	kam Duration	1:2	Irs			End Ex	am Durat	ion: 3 Hrs				
Course Out	comes : At the	e end	of the	course	e the studen	t will be able to						
CO1: Under	stand the role	of So:	ftware	engir	neering in so	oftware projects.						
CO2: Demo	nstrate the est	imatic	n tech	nique	s of schedul	le, effort, size and cos	st.					
CO3: Identify the key activities of Lifecycle models, risk and configuration management.												
CO4: Under	CO4: Understand quality and reliability models that suit the software project.											
CO5: Identi	ty the requirer	nents	tor a s	oftwa	re project.	domain knowladge	Fromouvorle					
COT: Design	n the test case	s using	black	c hox	and white h	ox testing techniques						
Unite test cases using black box and white box testing techniques.												
UNIT – I												
Introduction: Programming in the small vs. programming in the large, Software project												
failures and	Importance of	of Sof	tware	qualit	ty and Time	ely availability, Eng	ineering aj	pproach to				
Software de	velopment, R	ole of	f Soft	ware	engineering	towards successful	execution	of large				
software pro	jects, Emerger	nce of	Softw	are er	ngineering a	s a discipline.						
					UNIT – II							
Software Pi	roject Manag	gemen	t: Bas	ic Co	ncepts of L	ife cycle models – I	Different N	Iodels and				
Milestones,	Software proj	ect pla	anning	g - Ide	entification	of Activities and Re	sources, C	oncepts of				
Feasibility s	tudy, Techniq	jues to	or Esti	matic	on of Sched	ule and Effort, Softwork \cdot	vare Cost	estimation				
control and	reporting. Int	roduc	ware of the total	o Mea	asurement o	omics, Techniques	of Softwa	to the				
Concepts of	Risk and its N	litigat	ion, C	onfigu	uration mana	agement.						
Agile Softw	are Engineer	ring: (Concep	ots of	Agile Meth	ods, Extreme Progra	amming, A	gile Process				
Model – Scr	um, Feature, S	Scenar	ios an	d Stor	ies.							
				l	UNIT – III							
Software Quality and Reliability: Software quality, Garvin's quality dimensions, McCall's,												
quality factor, ISO – 9126 quality factor, Software Quality Dilemma, Introduction to Capability												
Maturity Mo	odels (CMM	and C	CMMI), Inti	roduction to	o software reliability	, Reliabili	ity models				
and estimation	on.											
~ •			. .									
Software F	Requirements	Ana	lysis,	Desi	gn and C	Construction: Introc	luction to	Software				
Requirement	s Specification	sons (۲	SKS)	and i	requirement	elicitation techniq	ues, Tech	niques for				
requirement modelling – decision tables, event tables, state transition tables, Petrinets, Requirements documentation through use cases. Introduction to UML, Introduction to software												

SOFTWARE ENGINEERING (SE)

metrics and metrics based control methods, Measures of code and design quality.

Object Oriented Analysis, Design and Construction: Concepts -- the principles of abstraction, modularity, specification, encapsulation and information hiding; concepts of abstract data type; Class Responsibility Collaborator (CRC) model; quality of design; design measurements; concepts of design patterns; Refactoring; object oriented construction principles; object oriented metrics.

UNIT – V

Software Testing: Introduction to faults and failures; basic testing concepts; concepts of verification and validation; black box and white box tests; white box test coverage – code coverage, condition coverage, branch coverage; basic concepts of black-box tests – equivalence classes, boundary value tests, usage of state tables; testing use cases; transaction based testing; testing for non-functional requirements – volume, performance and efficiency; concepts of inspection.

Text Books:

- 1. Software Engineering, Ian Sommerville, 9/e, Pearson, 2016
- 2. Software Engineering, Pankaj Jalote's, Wiley Textbook series
- 3. Software Engineering, A Practitioner's Approach.Roger S. Pressman,7e

Reference Books:

- 1. Fundamentals of Software Engineering, Carlo Ghezzi, Jazayeri Mehdi, Mandrioli Dino
- 2. Software Requirements and Specification: A Lexicon of Practice, Principles and Prejudices, Michael Jackson
- 3. The Unified Development Process, Ivar Jacobson, Grady Booch, James Rumbaugh
- 4. Design Patterns: Elements of Object-Oriented Reusable Software, Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides
- 5. Software Metrics: A Rigorous and Practical Approach, Norman E Fenton, Shari Lawrence Pfleeger
- 6. Software Engineering: Theory and Practice, Shari Lawrence Pfleeger and Joanne M. Atlee
- 7. Object-Oriented Software Construction, Bertrand Meyer
- 8. Object-Oriented Software Construction, Bertrand Meyer Object Oriented Software Engineering: A Use Case Driven Approach
- 9. Touch of Class: Learning to Program Well with Objects and Contracts
- 10. UML Distilled: A Brief Guide to the Standard Object Modeling Language

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

Laboratory:

- 1. Identify the role of the software in today's world across a few significant domains related to day to day life.
- 2. Identify requirements using different Elicitation techniques and classify the requirements as Functional and Non functional Requirements for given scenario.
- 3. Identify and design the test cases for given scenarios.
- 4. Understand the use of appropriate Case tools for different phases of Software Development Lifecycle.
- 5. Understand the Configuration Management Tools and Program analysis tools in software lifecycle.

CONSTITUTION OF INDIA (CI)

III Semester :	Common for all	Brar	ıches				Sche	me: 2020				
Course Code	Category	Hou	rs/We	ek	Credits	Μ	aximu m Mark	S				
		_		_		Continuous						
MC103	МС	L	Т	Р	С	Internal	End Exam	TOTAL				
		2						100				
Course Oute	omes. At the end	∠ lofth		-	- student will	ha abla ta	-	100				
CO1: Unders	tand the formation	on and	l princi	$\frac{1}{\text{ples of}}$	f Indian Cor	istitution.						
CO2: Unders	tand structure and	d fund	ctions of	of Uni	on governm	ent and State e	xecutive. Dutie	s of				
President, Vice president, Prime Minister, Governor, Chief Minister cabinet and State												
Legislature.												
CO3: Unders	tand constitution	al am	endme	nts of	42, 44,74,70	6,86 and 91. Ce	entral-State rela	tions,				
Preside	CO4: Understand Indian social structure and languages in India Rights of women SC ST and then											
weaker section.												
CO5: Understand the structure of Judiciary, Role and functions of Supreme Court, High court and												
Subordinate courts, Judicial review.												
UNIT - I												
Historical back ground, Significance of Constitution, Making of the constitution, Role of the												
constituent Assembly, Salient features, the Preamble, Citizenship, procedure for amendment of												
Constitution Fundamental rights-Derivative principles of state policy-Elections in India.												
UNIT - II												
Union Execu	tive: Structures o	of Un	ion Go	vernm	nent & Fun	ctions, Preside	nt, Vice Presid	ent, Prime				
Minister, Cab	inet, Parliament-	- State	e Exect	utive:S	structures an	nd Functions, (Jovernor, Chief	t Minister,				
Cabinet, State				TIN	гт ш							
Central State	Palations Presi	ident'		Cons	titutional A	mandmants [/	2 11 71 76	86 & 011				
Constitutiona	l functionaries, W	Vorkii	ng of P	, cons arliam	entary syste	em in India	2, 44, 74, 70, 8	00 & 91]-				
			-	UN	IT - IV							
Indian Social	Structure, Langua	ages	in Ind	ia-Poli	tical Parties	& Pressure gr	oups, Rights o	f Women-				
S.C"s, S.T"s &	z other weaker see	ctions	•									
				UN	IT - V							
Judiciary: Str Supreme Cou	ucture, Organisat rt, High Courts &	tion o 2 Sub	f Judic ordina	iary, i te cou	ndependenc rts, Judicial	e of the Judici Review.	ary, role and fu	nctions of				
Text Books :												
1. Durga D	as Basu, "Introd	luction	n to the	e Cons	titution of I	ndia", Wedwe	& Company					
2. Macivel	, Page, "An Intro	duction	on Ana	lysis",	Society							
3. M.V. Py	3. M.V. Pylee, <i>"Indian Constitution"</i> , S. Chand Publications											
4. Subhash C Kashyao : " <i>Our Constitution</i> ", NationalBank, Trust, India.												
5. Constitu	5. Constitutional Law of India by Dr.S.M.Rajan											
Reference Boo	KS:	- Drif	h a MCu		florend	Instiga The C	and of Ladia					
1. The Con	tional Law of Indi	a. Dyl	he Mif	nsury (DI Law and	justice, The G	ovi. of mula.					
2. Constitut	Institution I any h	па 0 у у М Г	Nasii ya Dain	ipsuon	asall							
4 Constitut	ional I aw of Indi	y 1v1.r a hy l	Jam HMS4	ervai								
Web Reference		aUyl	1.111 30									
1. https://w	ww.india.gov.in/	mv-9	overnm	nent/co	onstitution-i	ndia						

OBJECT ORIENTED PROGRAMMING LAB (OOP (P))

Course CodeCategoryHours/WeekCreditsMaximum MarksCB204PCLLTPCContinuous Internal AssessmentEnd ExamTOTALRessional Exam Duration: 2 Hrs31.54060100Sessional Exam Duration: 2 HrsEnd Exam Duration: 3 HrsCourse Outcomes : At the end of the course students will be able toCO2: Construct the applications using class, object, constructors and destructorCO3: Develop programs using inheritance and templates.I. Parameter passing: passing parameter by value vs by reference, passing array as constant pointer.2. Function overloading: writing string operations like streat and struct, strepy and strnepy as overloaded functions.3. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer.4. Define class complex with all possible operations: constructor, destructor, copy constructor, adsignment operators.6. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators.7. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections.9. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators.7. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections.9. Define class stack	III Semester : CSBS Scheme : 2020												
CB204PCLLTPCContinuous Internal AssessmentEnd ExamTOTALSessional Exam Duration: 2 Hrs31.54060100Sessional Exam Duration: 2 HrsEnd Exam Duration: 3 HrsCourse Outcomes : At the end of the course students will be able toCO1: Implement the concepts of functions, overloadingC02: Construct the applications using class, object, constructors and destructorC03: Develop programs using inheritance and templates.I. Parameter passing: passing parameter by value vs by reference, passing array as constant pointer.2. Function overloading: writing string operations like streat and struct, strepy and strnepy as overloaded functions.3. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer.4. Define class complex with all possible operations: like constructor, destructor, copy constructor and assignment operators.6. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators.7. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor, copy constructor and assignment operators.8. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections.9. Define class matrix of integers with all possible operations: like constructor, destructor, copy constructor, assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (),10. D	Course Code	Category	Hou	rs/We	ek	Credits	Maxi	imum Marks					
Image: construct of the second se	CB204	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
Sessional Exam Duration: 2 Hrs End Exam Duration: 3 Hrs Course Outcomes : At the end of the course students will be able to CO1: Implement the concepts of functions, overloading CO2: Construct the applications using class, object, constructors and destructor CO3: Develop programs using inheritance and templates. I. Parameter passing: passing parameter by value vs by reference, passing array as constant pointer. 2. Function overloading: writing string operations like streat and strneat, strepy and strnepy as overloaded functions. 3. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer. 4. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operators. 5. Define class weetror of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 6. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 7. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor, assignment operators. 8. Define class complex with all possible operations: constructor, copy constructor, copy constructor, and assignment operators. 9. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. 9. Define class complex w			-	-	3	1.5	40	60	100				
Course Outcomes : At the end of the course students will be able to CO1: Implement the concepts of functions, overloading CO2: Construct the applications using class, object, constructors and destructor CO3: Develop programs using inheritance and templates. Image: Complex class of the construction of the construction of the construction overloading: writing string operations like streat and struct, strepy and strnepy as overloaded functions. 3. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer. 4. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operators with the data members stored as pointer to integers. 5. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 6. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 8. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. 9. Define class complex with all possible operations like constructor, destructor, copy constructor, assignment operator and operators >, <, >=, <=, =, ++ (pre and post), +, +=, ().	Sessional Exam	Duration: 2	2 Hrs				End I	Exam Dur	ration: 3 Hrs				
Course Outcomes : At the end of the course students will be able to CO1: Implement the concepts of functions, overloading CO2: Construct the applications using class, object, constructors and destructor CO3: Develop programs using inheritance and templates. I. Parameter passing: passing parameter by value vs by reference, passing array as constant pointer. 2. Function overloading: writing string operations like streat and struct, strepy and strnepy as overloaded functions. 3. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer. 4. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operators. 5. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 6. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 8. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor, and sasignment operators. 9. Define class complex with all possible operators: 9. Define class complex with all possible operators. 10. Define class stored as pointer to integers. 11. Define class complex with all possible operators. 12. Define class complex with all possible operators. 13. Define class complex													
 CO1: Implement the concepts of functions, overloading CO2: Construct the applications using class, object, constructors and destructor CO3: Develop programs using inheritance and templates. List of Experiments 1. Parameter passing: passing parameter by value vs by reference, passing array as constant pointer. 2. Function overloading: writing string operations like streat and strneat, strepy and strnepy as overloaded functions. 3. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer. 4. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operators with all possible operations like constructor, destructor, copy constructor and assignment operators. 5. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 6. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators. 7. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. 9. Define class complex with all possible operations like constructor, copy constructor, assignment operators >, <>=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators >, <>=, <=, ==, ++ (pre and post), +, +=, (). 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators >, <>=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all pos	Course Outcon	nes : At the en	nd of t	the cou	arse st	udents wil	l be able to						
 CO2: Construct the applications using class, object, constructors and destructor CO3: Develop programs using inheritance and templates. List of Experiments 1. Parameter passing: passing parameter by value vs by reference, passing array as constant pointer. 2. Function overloading: writing string operations like streat and strneat, strepy and strnepy as overloaded functions. 3. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer. 4. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operator with the data members stored as pointer to integers. 5. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 6. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 7. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators >, <>=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <>=, <=, ==, ++ (pre and post), +, +=, (). 11. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators>, <>=, <=, ==, ++ (pre and post), +, +=, ().	CO1: Implement the concepts of functions, overloading												
 CO3: Develop programs using inheritance and templates. List of Experiments 1. Parameter passing: passing parameter by value vs by reference, passing array as constant pointer. 2. Function overloading: writing string operations like streat and strneat, strepy and strnepy as overloaded functions. 3. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer. 4. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operator with the data members stored as pointer to integers. 5. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 6. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 8. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators both protected and public sections. 9. Define class complex with all possible operations like constructor, destructor, copy constructor, assignment operators?, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators?, <, >=, <=, =+, ++ (pre and post), +, +=, (). 11. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and ass	CO2: Construct the applications using class, object, constructors and destructor												
List of Experiments 1. Parameter passing: passing parameter by value vs by reference, passing array as constant pointer. 2. Function overloading: writing string operations like streat and strneat, strepy and strnepy as overloaded functions. 3. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer. 4. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operator with the data members stored as pointer to integers. 5. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 6. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 7. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, destructor, destructor, destructor, assignment operators. 8. Define class complex with all possible operators: constructor, destructor, copy constructor, assignment operator and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers.	CO3: Develop programs using inheritance and templates.												
List of Experiments 1. Parameter passing: passing parameter by value vs by reference, passing array as constant pointer. 2. Function overloading: writing string operations like streat and strneat, strepy and strnepy as overloaded functions. 3. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer. 4. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operator with the data members stored as pointer to integers. 5. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 6. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 7. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, destructor, destructor, destructor, copy constructor and assignment operators. 8. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. 9. Define class complex with all possible operations like constructor, destructor, copy constructor, assignment operators >, <>=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers.													
 Parameter passing: passing parameter by value vs by reference, passing array as constant pointer. Function overloading: writing string operations like streat and strneat, strepy and strnepy as overloaded functions. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operator with the data members stored as pointer to integers. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators line operators: Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. Define class complex with all possible operations like constructor, destructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (). Define class matrix of i	List of Experiments												
 pointer. 2. Function overloading: writing string operations like streat and strneat, strepy and strnepy as overloaded functions. 3. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer. 4. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operator with the data members stored as pointer to integers. 5. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 6. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 7. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators. 8. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. 9. Define class complex with all possible operations like constructor, destructor, copy constructor, assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 11. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matri	1. Parameter passing: passing parameter by value vs by reference, passing array as constant												
 Function overloading: writing string operations like streat and strncat, strepy and strnepy as overloaded functions. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operator with the data members stored as pointer to integers. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, destructor, destructor, destructor, destructor, destructor, destructor, destructor, assignment operators. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. Define class vector of integers with all possible operations like constructor, copy constructor, assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (). Define class matrix of integers with all possible operations like constructor, copy constructor and assignment operators, <, >=, <=, =+, ++ (pre and post), +, +=, (). Define class matrix of integers with all possible operations like constructor, copy constructor, copy constructor and assignment operators, <, >=, <=, =+, ++ (pre and post), +, +=, (). Define class matrix of integers usi	pointer.												
 overloaded functions. 3. Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer. 4. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operator with the data members stored as pointer to integers. 5. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 6. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 7. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, copy constructor and assignment operators. 8. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. 9. Define class complex with all possible operations like constructor, copy constructor, assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class matrix of integers with all possible operations like constructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, =	2. Function overloading: writing string operations like streat and strncat, strepy and strncpy as												
 Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operator with the data members stored as pointer to integers. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, copy constructor and assignment operators. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. Define class complex with all possible operations like constructor, copy constructor, assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. Define class matrix of integers with all possible operations like constructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (). Define class matrix of integers with all possible operations like constructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (). Define class matrix of integers with all possible operations like constructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (). Define class matrix of integers using vector, with all possible operations like constructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (). Define class matrix of integers using vector, with all possible opera	overloaded functions.												
 depending on different inputs and finally de-allocating the pointer. 4. Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operator with the data members stored as pointer to integers. 5. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 6. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 7. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, destructor, copy constructor and assignment operators. 8. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. 9. Define class complex with all possible operations like constructor, copy constructor, assignment operator and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class matrix of integers with all possible operations like constructor, copy constructor and assignment operators, <, >=, <=, ==, ++ (pre and post), +, +=, (). 11. Define class matrix of integers with all possible operations like constructor, copy constructor and assignment operators, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, destructor, copy constructor and assignment operators, <, >=, <=, ==, ++ (pre and post), +, +=, (). 	3. Dynamically	allocating sp	ace fo	r a po	inter c	lepending	on input and doi	ng this rep	eatedly,				
 Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operator with the data members stored as pointer to integers. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, destructor, copy constructor and assignment operators. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, copy constructor and assignment operators. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. Define class complex with all possible operators: constructor, destructor, copy constructor, assignment operator and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. Define class weetor of integers with all possible operations like constructor, destructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (). Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (). Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (). Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (). 	depending on di	iterent inputs	$\frac{1}{1}$ and $\frac{1}{1}$	inally	de-all	ocating the	e pointer.						
 assignment operator with the data members stored as pointer to integers. 5. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 6. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, copy constructor and assignment operators. 7. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, copy constructor and assignment operators. 8. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. 9. Define class complex with all possible operators: constructor, destructor, copy constructor, assignment operators and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destruc	4. Define class	complex with	n all p data r	OSSIDI	e opei	rations: co	nstructor, destru	ctor, copy	constructor,				
 Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, copy constructor and assignment operators. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. Define class complex with all possible operators: constructor, destructor, copy constructor, assignment operators and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, () Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, () Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, () Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators >, <, >=, <=, ==, ++ (pre and post), +, +=, () 	5 Define class	vector of inte	uala I	with al	$\frac{11}{1000}$	vible operation	tions like constru	ictor dest	ructor conv				
 6. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators. 7. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators. 8. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. 9. Define class complex with all possible operators: constructor, destructor, copy constructor, assignment operator and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, () 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 	constructor and	assignment of	nerato	ors.	n pos	siole opera	tions like constru	actor, acsu	rucior, copy				
 constructor and assignment operators. 7. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators. 8. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. 9. Define class complex with all possible operators: constructor, destructor, copy constructor, assignment operator and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, () 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 	6. Define class	matrix of int	egers	with a	ll pos	sible opera	tions like constr	uctor. dest	ructor. copy				
 7. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators. 8. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. 9. Define class complex with all possible operators: constructor, destructor, copy constructor, assignment operator and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, () 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, () 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destr	constructor and	assignment o	perato	rs.	- r			;	, <u>-</u>				
 destructor, copy constructor and assignment operators. 8. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. 9. Define class complex with all possible operators: constructor, destructor, copy constructor, assignment operator and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, () 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 	7. Define class	matrix of int	egers	using	vector	, with all p	ossible operatio	ns like cor	nstructor,				
 8. Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections. 9. Define class complex with all possible operators: constructor, destructor, copy constructor, assignment operator and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, () 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 	destructor, copy	constructor a	and as	signm	ent op	erators.							
 members kept as private and functions kept in both protected and public sections. 9. Define class complex with all possible operators: constructor, destructor, copy constructor, assignment operator and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, () 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, destructor, destructor, destructor, destructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 	8. Define class	stack, queue,	, linke	d-list,	array	, set using	some data-type ((int) with c	lata				
 9. Define class complex with all possible operators: constructor, destructor, copy constructor, assignment operator and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, () 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 	members kept as	s private and	functi	ons ke	pt in [both protec	cted and public s	ections.					
 constructor, assignment operator and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers. 10. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, () 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 	9. Define clas	ss complex	with	all p	ossib	le operato	ors: constructor,	, destruct	or, copy				
 with the data members stored as pointer to integers. 10. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, () 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, destructor, end post), +, +=, (). 	constructor, assignment operator and operators $>$, $<$, $>=$, $<=$, $==$, $++$ (pre and post), $+$, $+=$, (),												
 10. Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, () 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, destructor, expression operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 	with the data members stored as pointer to integers.												
 constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, () 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=. 	10. Define class	s vector of int	egers	with a	ill pos	sible opera	ations like constr	uctor, dest	tructor, copy				
 11. Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=. 	constructor and	assignment o	perato	rs>, <	<u>, >=,</u> ∙	<=, ==, ++	(pre and post), -	+, +=, ()					
 constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, (). 12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=. 	11. Define class	s matrix of in	tegers	with a	all pos	ssible opera	ations like consti	ructor, des	tructor, copy				
12. Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators>, $<$, >=, $<=$, ==, ++ (pre and post), +, +=.	constructor and	assignment o	perato	$\frac{\text{rs}}{.}$, >=, ·	<=, ==, ++	(pre and post), -	+, +=, ().					
uestructor, copy constructor and assignment operators $>$, $<$, $>=$, $<=$, $==$, $++$ (pre and post), $+$, $+=$.	12. Define class	s matrix of in	tegers	using	vecto	r, with all	possible operatio	ons like co	nstructor,				
	destructor, copy	constructor a	ina as	signm	ent op	erators>, <	~, >=, <=, ==, ++	- (pre and	post), +, +=,				

().

13. Define stack and queue inherited from array class, with standard functions and operators.

14. Define a class called 'array' with data type passed as template type with constructor, destructor, copy constructor and assignment operators and index operator.

15. Define template functions for compare and use it in the algorithms like bubble sort, insertion sort, merge sort.

16. Formatted input-output examples.

17. Input manipulators.

18. Overriding operators <<, >>

19. Define class model for complex number, student class, book class and show it using UML diagram as well as concrete class.

20. Show behavioural modelling through sequence diagram and activity diagram for workflow in a typical log-in, log-out situation.

COMPUTATIONAL STATISTICS LAB (CS(P))

III Semester :	CSBS						Sc	heme : 2020					
Course Code	Category	Hour	s/Wee	k	Credits	Max	imum Ma	arks					
BS205	BSL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL					
		-	-	3	1.5	40	60	100					
Sessional Exam	m Duration:	2 Hrs				End I	E <mark>xam Du</mark> r	ration: 3 Hrs					
Course Outco	Course Outcomes : At the end of the course students will be able to												
CO1: Implement Classes, Functions in Python.													
CO2: Implement Data Wrangling functions in Python.													
CO3: Implement Data Aggregation, pivot tables and time series data in Python.													
CO4: Imple	ment Data vis	sualizat	ion tec	hnique	s in Pythor	n.							
		List of	f Expe	riment	s(Using P)	YTHON)							
1. Implement	nt functions.												
2. Implement	nt Classes and	d const	ructors	5.									
3. Implement	nt Read and v	vrite op	eration	ns on fi	le.								
4. Implement	nt Merge and	Join op	peratio	ns on d	lata sets.								
5. Implement	nt Regular Ex	pressic	ons.										
6. Implement	nt String man	ipulatio	on fune	ctions.									
7. Implement Data Aggregation operations.													
8. Implement	nt Pivot table	s.											
9. Implement	nt Time series	s data.											
10. Implement	nt Histograms	s and L	ine plo	ots.									
11. Implement	nt Boxplot ch	art and	Pie C	hart.									
12. Implement	12. Implement Scatter plots.												

COMPUTER ORGANIZATION & ARCHITECTURE LAB (COA (P))

III Semester :	CSBS						\$	Scheme : 2020			
Course Code	Category	Но	urs/V	Veek	Credits	N	/laximum Ma	arks			
CB205	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		-	-	3	1.5	40	60	100			
Sessional Exan	n Duration: 2	2 Hrs	5				End Exam	Duration: 3 Hrs			
Course Outcom	nos • At the e	nd of	fthac	011750	students v	vill be able to					
COIl: Impleme	nt Boolean ci	ircuit	$\frac{1}{s}$ Cor	nhina	tional circu	uits and Sequent	tial circuits				
CO2: Demonst	rate data form	nats i	using	$\frac{10000}{C/C+1}$	+.	and Bequein	tial encarts.				
CO3: Demons	trate machine	e leve	el pros	zramn	ning using	simulator.					
			1 6	2	8 8						
				List	of Experin	ments					
 List of Experiments Circuits on breadboard or simulators: Implementation of Boolean Circuits: Operations of Logic Gates - OR, AND, NOT, NAND and NOR gates. Implementation of Combinational Circuits: Adder, Subtractor, Multiplication Module, Division Module Implementation of Multiplexer, De-multiplexer, Encoder, Decoder Implementation of Sequential Circuits: Counters, Linear Feedback Shift Registers (LFSR) C/C++ programming to understand the formats of char, int, float, double, long etc. Machine language programming on x86 or higher version kits or simulators: Add/subtract/multiplication/division/GCD/LCM. Accessing some specific memory locations/ports. Counting odd and even integers from a series of memory locations. Printing values of selected registers. Handing interrupts. 											
References: https://in.mathw https://matlab.m http://www.egr. https://www.usr	/orks.com/pro nathworks.con unlv.edu/~ed na.edu/Users/	oduct m/ /asse cs/lm	s/sim mbly(ncdow	ulink- 64.pdf rel/cou	online.htm [urses/ic220	<u>1</u>)/S20/labs/logic/	/logic.html				

OPERATING SYSTEMS (OS)

IV Semeste	er : Common for	r CSE,	CST &	& CSBS	Scheme : 2020							
Course Code	Category	H	lours/	Week	Credits	Max	imum Mar	ks				
CS208	РСС	L	L T P		С	Continuous Internal Assessment	End Exam	TOTAL				
		3	-	-	3	40	60	100				
Sessional E	xam Duration :	$\frac{11}{2}$ H		(1)	1 4 111	End	Exam Du	ration: 3 Hrs				
Course Ou	tcomes : At the e	end of t	the cou	rse the stud	tom and the	e able to	1#00					
CO1: Acqu	prehend the proc	ess mai	nageme	ent policies	CPU Sch	eduling and Proc	ess synchro	nization				
techniques												
CO3: Understand Deadlocks and their handling mechanisms, file management system.												
CO4: Anal	yze memory mar	nageme	nt sche	mes and al	location p	olicies.	•					
CO5: Demonstrate Input / Output related Software/Hardware and Disk scheduling strategies.												
UNIT – I												
Introduction: Concept of Operating Systems (OS), Generations of OS, Types of OS, OS Services, Interrupt handling and System Calls, Basic architectural concepts of an OS, Concept of Virtual Machine, Resource Manager view, process view and hierarchical view of an OS. Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching. Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads. UNIT – II Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time. Scheduling algorithms: Pre-emptive and non-pre-emptive, FCFS, SJF, RR; Multi processor scheduling: Real Time scheduling: RM and EDF. Inter-process Communication: Concurrent processes, precedence graphs, Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Semaphores, Strict Alternation, Peterson's Solution, The Producer / Consumer Problem Event Counters Monitors Message Passing Classical IPC												
				UNIT	`–Ш							
 Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery. Concurrent Programming: Critical region, conditional critical region, monitors, concurrent languages, communicating sequential process (CSP); Deadlocks - prevention, avoidance, detection and recovery. File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation(linear list, hash table), efficiency and performance. 												

UNIT – IV

Memory Management: Basic concept, Logical and Physical address maps, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction.

Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page allocation, Partitioning, Paging, Page fault, Working Set, Segmentation, Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

$\mathbf{UNIT} - \mathbf{V}$

I/O Hardware: I/O devices, Device controllers, Direct Memory Access, Principles of I/O. **Disk Management**: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks.

Case study: UNIX OS file system, shell, filters, shell programming, programming with the standard I/O, UNIX system calls.

Text Books:

1. Operating System Concepts Essentials. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne.

Reference Books:

1. Operating Systems: Internals and Design Principles. William Stallings.

2. Operating System: A Design-oriented Approach. Charles Patrick Crowley.

3. Operating Systems: A Modern Perspective. Gary J. Nutt..

4. Design of the Unix Operating Systems. Maurice J. Bach.

5. Understanding the Linux Kernel, Daniel Pierre Bovet, Marco Cesati.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER / OR Type) in each section. The student shall answer one question from each section.

End Examination:

IV Semester : CSBS Scheme : 2020 Course Hours/Week Credits **Maximum Marks** Category Code **Continuous** End Т Р C Internal TOTAL L PCC **CB206** Exam Assessment 3 **40** 60 2 1 100 _ **Sessional Exam Duration : 1**¹/₂ Hrs **End Exam Duration: 3 Hrs Course Outcomes :** At the end of the course the student will be able to **CO1:** Understand the Database system architecture and Data Models. **CO2:** Comprehend the Relational query languages and Normalization techniques. **CO3**: Understand the concepts of Query processing, Query optimization and Storage strategies. **CO4:** Understand the properties of Transactions in a database system. **CO5:** Understand the significance of Database security and Advanced Databases. UNIT – I **Introduction:** Introduction to Database. Hierarchical, Network and Relational Models. Database system architecture: Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML). Data models: Entity-relationship model, network model, relational and object oriented data models, integrity constraints, data manipulation operations. UNIT – II Relational query languages: Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server. Relational database design: Domain and data dependency, Armstrong's axioms, Functional Dependencies, Normal forms, Dependency preservation, Lossless design. UNIT – III Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms. Storage strategies: Indices, B-trees, Hashing. UNIT – IV Transaction processing: Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery. UNIT - VDatabase Security: Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection. Advanced topics: Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining.

DATABASE MANAGEMENT SYSTEMS (DBMS)

Text Books:

1. Database System Concepts, Abraham Silberschatz, Henry F. Korth and S. Sudarshan, McGraw Hill, 7th Edition, 2019.

Reference Books:

1. Principles of Database and Knowledge - Base Systems, J. D. Ullman, Vol. 1, 2016.

2. Fundamentals of Database Systems. R. Elmasri and S. Navathe, 7th Edition, 2017.

3. Foundations of Databases. Serge Abiteboul, Richard Hull, Victor Vianu.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

INTRODUCTION TO INNOVATION, IP MANAGEMENT & ENTREPRENEURSHIP (IIIE)

IV Semeste	r : CSBS						S	cheme : 2020		
Course Code	Category	Но	ours/W	/eek	Credits	Maximum Marks				
ME213	ESC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional Exam Duration : 1 ¹ / ₂ Hrs End Exam Duration: 3 H										
Course Outcomes : At the end of the course the student will be able to										
CO1: Practi	ice creative and in	nnovati	ve thir	iking sty	les.					
CO2: Under	rstand the basics	and us	e of II	PR in do	mestic and	international arena	a			
CO3: Unde	rstand various ty	pes of I	PR to j	protect c	ompetitive	advantage.				
CO4: Invest	tigate, understand	d and in	iternali	ze the p	rocess of fo	ounding a startup.				
CO5: Unde	rstand financial p	lanning	g for a	enterpris	se					
				UN	I – TIV					
Introduction Incremental Need pull in Building and Substitute, (Reverse)); innovation a	 Introduction to Innovation: Concept of innovation; Creativity vs. innovation; Kinds of innovation – Incremental, Break-through and Disruptive; Innovation as a core business process; Knowledge push vs. Need pull innovations. Building an Innovative Organization: Creating new products and services {using SCAMPER (S – Substitute, C – Combine, A – Adapt, M – Modify, P - Put to another use, E – Eliminate, R – Rearrange / Reverse)); Use of innovation for starting a new venture (using 180 degrees thinking); Exploiting open innovation and collaboration. 									
				UN	IT – II	• • • •	1 1 1			
Business Pe	erspective; IPR in	n India	K): In – Ger	troduction troduction troduction to the troduction trout to the trout to the troduction to the troduct	on and the d Developr	nent; Internationa	nd developi 1 Context; (Concept of IPR:		
Managemen	it, Use in marketi	ng; Use	e of IP	R to prot	tect Innova	tion				
				UN	IT – III					
Types of Intellectual Property: Patent- Procedure, Licensing and Assignment, Infringement and Penalty Trademark- Use in marketing, example of trademarks- Domain name Geographical Indications- Meaning of GI; protection of GI Copyright- Meaning of copyright Industrial Designs- Meaning of Designs: protection of Industrial Designs										
	UNIT – IV									
Entreprene managemen	Entrepreneurship: Opportunity recognition and entry strategies; Entrepreneurship as a style of management; Maintaining competitive advantage									
				UN	IT – V					
Entreprene Debt, Ventu	eurship - Finan are Capital and ot	cial Pl a her fori	anning ns of I	g: Finan Financin	cial Projec g	tions and Valuation	ion; Stages	of financing;		

Text Books:

- 1. Joe Tidd, John Bessant. Managing Innovation: Integrating Technological, Market and Organizational Change.
- 2. Dr.Lee Swanson, Entreprenuership and innovation tool kit, 3rd edition
- 3. Neeraj pandey, Kushdep Dharni: Intellectual Property rights.

Reference Books:

- 1. Sangeeta sarma :Entrepreneurship Development, Prentice hall India
- 2. JP Mishra : An Introduction to Intellectual property rights, Central Law publications.
- 3. Ramakrishna B and Anil kumar HS: Fundamentals of Intellectual property rights.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

OPERATIONS RESEARCH (OR)

IV Semeste	r : CSBS						S	cheme : 2020		
Course Code	Category	Но	ours/W	eek	Credits	Maximum Marks				
ME214	ESC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		2	-	2	3	40	60	100		
Sessional E	Sessional Exam Duration : 1 ½ HrsEnd Exam Duration: 3 Hrs									
Course Outcomes : At the end of the course the student will be able to										
CO1: Under	rstand Basics of o	operatio	ons rese	earch an	d solve line	ear programming p	problems			
CO2: Solve Transportation and assignment problems										
CO4: Solve	PERI/CPM Pro	l probl	on proje	ect mana	igement					
CO ₄ . Solve	rstand and solve	<u>Oueuin</u>	a proh	lems and	1 Simulatio	n problems				
Cool of defibilitied and softee Queening problems and of induction problems										
UNIT – I										
Introduction to OR:Origin of OR and its definition. Concept of optimizing performance measure, Types of OR problems, Deterministic vs. Stochastic optimization, Phases of OR problem approach – problem formulation, building mathematical model, deriving solutions, validating model, controlling and implementing solution.Linear Programming: Linear programming – Examples from industrial cases, formulation & definitions, Matrix form. Implicit assumptions of LPP. Some basic concepts and results of linear algebra – Vectors, Matrices, Linear Independence/Dependence of vectors, Rank, Basis, System of linear eqns., Hyper plane, Convex set, Convex polyhedron, Extreme points, Basic feasible solutions. Geometric method: 2-variable case, Special cases – infeasibility, unboundedness , redundancy °eneracy, Sensitivity analysis.Simplex Algorithm – slack, surplus & artificial variables, computational details, big-M method, identification and resolution of special cases through simplex iterations.Duality – formulation, results, fundamental theorem of duality, dual-simplex and primal- dual algorithms.										
				UN	IT – II					
Transporta TP - Exam Balanced & optimality (I AP - Exa &unbalance	tion and Assign ples, Definitions unbalanced situ MODI method), o mples, Definition d situations, Solu	ment p – deci lations, legener ons – ltion m	roblen sion v Solut acy an decis tethod	ns: ariables ion met d its rese ion van – Hunga UN	, supply & hods – NV olution. riables, co urian test for IT – III	demand constrai WCR, minimum of nstraints, formul r optimality & its	nts, formula cost and V ation, Bala resolution.	ation, AM, test for anced		

PERT – CPM:

Project definition, Project scheduling techniques – Gantt chart, PERT & CPM, Determination Of critical paths, Estimation of Project time and its variance in PERT using statistical principles, Concept of project crashing/time-cost trade-off.

UNIT – IV

Inventory Control:

Functions of inventory and its disadvantages, ABC analysis, Concept of inventory costs, Basics Of inventory policy (order, lead time, types), Fixed order-quantity models – EOQ, POQ & Quantity discount models. EOQ models for discrete units, sensitivity analysis and Robustness, Special cases of EOQ models for safety stock with known/unknown stock out situations, models under prescribed policy, Probabilistic situations.

UNIT – V

Queuing Theory:

Definitions – queue (waiting line), waiting costs, characteristics (arrival, queue, service discipline) of queuing system, queue types (channel vs. phase).Kendall's notation, Little's law, steady state behaviour, Poisson's Process & queue, Models with examples - M/M/1 and its performance measures; M/M/m and its performance measures; brief description about some special models.

Simulation Methodology:

Definition and steps of simulation, random number, random number generator, Discrete Event System Simulation – clock, event list, Application in Scheduling, Queuing systems and Inventory systems.

Text Books:

1. Operations Research: An Introduction. H.A. Taha.

2. Quantitative Techniques in Management, TMH Publishers, New Delhi, N.D. Vohra

Reference Books:

1. Linear Programming. K.G. Murthy.

2. Linear Programming. G. Hadley.

3. Principles of OR with Application to Managerial Decisions. H.M. Wagner.

4. Introduction to Operations Research. F.S. Hiller and G.J. Lieberman.

5. Elements of Queuing Theory. Thomas L. Saaty.

6. Operations Research and Management Science, Hand Book: Edited By A. Ravi Ravindran.

7. Management Guide to PERT/CPM. Wiest & Levy.

8. Modern Inventory Management. J.W. Prichard and R.H. Eagle.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	List of Experiments
1.	To solve Linear Programming Problem using Graphical Method with
	I. Unbounded solution
	II. Infeasible solution
	III. Alternative or multiple solutions.
2.	Solution of LPP with simplex methods.
3.	Solving transportation problems.
4.	Solving assignment problems.
5.	Solve inventory related problems
6.	Solve ABC analysis problems
7.	Simulation: Random number generation, Monte carlo method
8.	Performance measures for M/M/1 queuing model

MARKETING RESEARCH & MARKETING MANAGEMENT (MR&MM)

IV Semeste	r : CSBS						S	cheme : 2020		
Course Code	Category	Но	ours/W	eek	Credits	redits Maximum Marks				
HU203	HSS L T P C Continuous Internal Assessment End Exam				TOTAL					
		3	-	-	3	40	60	100		
Sessional E	xam Duration :	1 ½ Hi	*S			En	d Exam Du	ration: 3 Hrs		
Course Out	tcomes : At the e	nd of tl	ne cour	se the st	udent will	be able to				
CO1: Unde	rstand the basic c	oncept	s of ma	arketing	and consu	mer behaviour				
CO2: Understand the evolution of New Product, and its sustainability in its life time										
CO3: Identify the potential source of pricing and its distribution strategies										
CO4: Identify the market trends using statistical and data visualization tools										
CO5: Understand the basic concepts of B-To-B marketing using Internet as a medium.										
UNIT – I										
Marketing	g Concepts a	nd A	pplicat	tions:	Introductio	n to Marketing	g & Core	e Concepts,		
Marketing	of Services, Imp	ortance	e of ma	rketing	in service s	ector.		1		
Marketing	g Planning &	Envir	onmer	nt: El	ements of	Marketing Mix	k, Analyzir	ng needs &		
trends in I	Environment - Ma	acro, Eo	conomi	ic, Politi	cal, Techni	cal & Social.	•	-		
Understan	ding the cons	umer:	De	etermina	ints of co	nsumer behaviou	ur, Factors	influencing		
consumer l	pehaviour.							-		
Market S	Segmentation: 1	Meanin	g &	Concept	t, Basis o	f segmentation,	selection of	of segments,		
Market Seg	gmentation strate	gies, Ta	arget M	larketing	g, Product F	ositioning.				
				UN	IT – II					
Product N	Janagement: Pro	oduct I	ife cvo	cle conc	ent. New P	Product developme	ent & strate	gy. Stages in		
New Produ	ict development.	Produc	t decisi	ion and s	strategies, E	Branding & packag	ging.	by, stuges in		
	1 /			TIN						
Duising D	warmation and	Diataih	4:	UN.	II – III	P. Durations D	uising Math	ada 6 Duine		
determinet	ion Policica Ma	Distrib rkoting	uuon Comn	Siraleg	y: Policies	α Practices – Pr	luortiging &	Dublicity 5		
M's of	Ion Foncies. Ma Avertising Mar	ageme	nt M	arketing	Channels	Retailing Mar	keting Cor	munication		
Advertisin	o	lageme	111. 1916	arketing	Channels	, Retaining, Mai	Ketting COI	innumeation,		
	D.			TINT						
Maulzatina	Deseauch. Int	un das ati			$\frac{11 - 1V}{1 - 1V}$	and Come O	laiantirra P	T :		
Marketing	Research Tool	roductio	on, Ty Sum	$r_{\rm pe}$ of 1	viarket Kes	dosign & draft	ting Drigir	Descereb		
Media Res	earch Qualitativ	niiques • Resea	, Suiv	ey Qu	estionnane	uesign & uran	ing, rhen	ig Research,		
Data Ama	Jusis Usa of		ototict	ical to		mintizzo la Informa	noo Statisti	Statistical		
Hypothesis	Testing Multiv	ariota	Statist Analys	ical loc	oriminant A	nalveis Cluster	Analysis Se	amenting and		
Positioning	5 Factor Analysi		marys	12 - D180			mary 515, 5t	ginenting and		
1 OSHOIIII	5, 1 actor 7 mary 51									
				UN	$ \Gamma \Gamma - V $					
Business t	o Business Mar	keting	: Fund	amental	of busines	s markets. Organi	zational bu	ying process.		

Business buyer needs. Market and sales potential. Product in business markets. Price in business markets. Place in business markets. Promotion in business markets. Relationship, networks and customer relationship management. Business to Business marketing strategy.

Internet Marketing: Introduction to Internet Marketing, Mapping fundamental concepts of Marketing (7Ps, STP); Strategy and planning for Internet Marketing

Text Books:

Marketing Management (Analysis, Planning, Implementation & Control) – Philip Kotler

Fundamentals of Marketing – William J. Stanton & Others

Marketing Management – V.S. Ramaswamy and S. Namakumari

Marketing Research - Rajendra Nargundkar

Market Research – G.C. Beri

Market Research, Concepts, & Cases - Cooper Schindler

Reference Books:

1. Marketing Management – Rajan Saxena

2. Marketing Management – S.A. Sherlekar

3. Service Marketing – S.M. Zha

4. Journals – The IUP Journal of Marketing Management, Harvard Business Review

5. Research for Marketing Decisions by Paul Green, Donald, Tull

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

SOFTWARE DESIGN WITH UML (SDU)

IV Semester :CSBS							S	cheme : 2020		
Course Code	Category	Но	ours/W	eek	Credits	Maximum Marks				
SCCB02	SC	L	Τ	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
			-	2	2	40	60	100		
Sessional Exam Duration : 1 ½ HrsEnd Exam Duration: 3 Hr										
Course Outcomes :At the end of the course the student will be able to										
COI: Understand the basics of an object-oriented approach to software development, the basic										
building blocks of UML										
find the obje	Ze the system re	quireine	ents thi	ougn us	e case drive	en approach, the h	meraction d	lagram to		
CO3: Mode	l Package diagra	m to sh	ow the	structur	e and dene	ndencies between	different m	odules		
CO4: Desig	CO4: Design State/Activity diagrams for a given software intensive system.									
CO5: Model Component and Deployment model for a given software intensive system.										
UNIT – I										
Intro du atio	n to Object Ori	onted 7	Taahna	laging a	nd the UM	I Mathada				
Software development process: The Waterfall Model vs. The Spiral Model, The Software Crisis, description of the real world using the Objects Model, Classes, inheritance and multipleconfigurations, Quality software characteristics, Description of the Object Oriented Analysis process vs. the Structure Analysis Model. Introduction to the UML Language: Standards, Elements of the language, General description of various models, The process of Object Oriented software development, Description of Design Patterns, Technological Description of Distributed Systems.										
				UN	IT – II					
 Requirements Analysis Using Case Modeling: Analysis of system requirements, Actordefinitions, writing a case goal, Use Case Diagrams, Use Case Relationships. Transfer from Analysis to Design in the Characterization Stage: Interaction Diagrams:Description of goal, Defining UML Method, Operation, Object Interface, Class, Sequence Diagram, finding objects from Flow of Events, Describing the process of finding objects using a Sequence Diagram, Describing the process of finding objects using a Collaboration Diagram. 										
UNIT – III										
The Logica descriptions Generalizati Package D packages, Ir	The Logical View Design Stage: The Static Structure Diagrams: The Class Diagram Model, Attributes descriptions, Operations descriptions, Connectionsdescriptions in the Static Model, Association, Generalization, Aggregation, Dependency, Interfacing, Multiplicity. Package Diagram Model: Description of the model, White box, black box, Connections between packages, Interfaces, Create Package Diagram, Drill Down.									

Dynamic Model: State Diagram / Activity Diagram: Description of the State Diagram, EventsHandling, Description of the Activity Diagram, Exercise in State Machines.

UNIT – V

Component Diagram Model: Physical Aspect, Logical Aspect, Connections and Dependencies,User face, Initial DB design in a UML environment.

Deployment Model: Processors, Connections, Components, Tasks, Thread, Signals and Events.

Text Books:

- 1. The Unified Modeling LanguageUser Guide,Grady Booch, James Rumbaugh, IvarJacobson,2/e, Pearson Education, 2008.
- 2. Object-Oriented Software Engineering:using UML, Patterns, and Java.Bernd Bruegge and Allen H. Dutoit. 3/e, Pearson Education India, 2013.

Reference Books:

- 1. Design Patterns: Elements of Reusable Object-Oriented Software. Erich Gamma, Richard Helm, Ralph Johnson, and John M. Vlissides. 2015.
- 2. Object-oriented analysis and design using UML. Mahesh P. Matha, PHI, 2008.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

List of Experiments:	
1. ATM System	
2. Stock Maintenance System	
3. Remote Procedure Call Implementation	

OPERATING SYSTEMS LAB (OS(P))

IV Semester : Common for CSE,CST & CSBS					Scheme : 2020				
Course	Category		Hours/	Week	Credits	Maximum Marks			
Code							-		
CS213	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		-	-	3	1.5	40	60	100	
Sessional	Exam Durat	tion: 2	Hrs		End Exa	m Durat	ion: 3 Hrs		
Course Outcomes : At the end of the course students will be able to									
CO1: Un	derstand the	Unix co	mmand	s and vi edito	or.				
CO2: Im	plement threa	ds and	schedul	ing concepts.					
CO3: Imp	lement inter-	process	commu	unication, dea	dlock avoi	idance and dea	dlock det	ection.	
CO4: Imp	lement the sh	ared m	emory o	concepts.					
CO5: Imp	element the m	emory	manage	ment techniq	ues.				
			List o	f Experimen	ts (Using (C)			
1. Basi	ic UNIX com	mands.							
2. Shel	ll programmir	ng using	g vi edit	or.					
3. Prog	gram for impl	ementa	tion of t	hread and mu	ılti threads	•			
4. Prog	gram for impl	ementa	tion of S	Scheduling A	lgorithms.				
5. Prog	gram for impl	ementa	tion of l	nter Process	Communio	cation			
6. Prog	gram for impl	ementa	tion of l	Deadlock Ave	oidance an	d Deadlock De	tection.		
7. Prog	gram for impl	ementa	tion of S	Shared memo	ry.				
8. Prog	gram for impl	ementa	tion of	Semaphores.					
9. Prog	gram for impl	ementa	tion of	Memory Man	agement.				
10. Prog	gram for imple	ementat	ion of Ir	dexing and H	Iashing.				

DATABASE MANAGEMENT SYSTEMS LAB (DBMS (P))

IV Semester : C	CSBS				Sche	eme : 2020			
Course Code	Category	Ho	urs/W	eek	Credits Maximum Marks				
CB207	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		-	-	3	1.5	40	60	100	
Sessional Exam	n Duration: 2	Hrs			End Ex	am Dura	tion: 3 Hrs		
Course Outcomes : At the end of the course students will be able to									
CO1: Design of Entity Relationship diagrams and Schema diagrams for real life systems.									
CO2: Implement	nt SQL querie	s on t	he real	l-life s	systems.				
CO3: Write PL/SQL programs for given problems.									
CO4: Implement	nt Procedures,	Func	tions,	Trigg	ers and Curs	sors in PL/SQL.			
			Lis	t of E.	xperiments				
1. Perform D	DL, DML an	d DC	L com	mand	s.				
2. Design an	d create a Uni	iversi	ty Libı	rary D	atabase usir	ng ER diagram a	nd Schem	a diagram.	
3. Design and	d create a Uni	iversi	ty data	base o	consisting of	f the following ta	ables Depa	artment,	
Course, In	structor and S	Studer	nt usin	g ER	Modeling ar	nd Schema Diag	ram.		
4. Create var	ious tables li	ke Bra	anch, A	Accou	int, Deposito	or, Customer, Lo	an and Bo	orrower for	
5 Porform y	system with	vorios	ants t	using a	a Schema di	agrani.	matching	Order by	
and Grour	5. Perform various SQL queries on Select clause, where clause, Pattern matching, Order by,								
6. SOL Ouer	6 SOL Oueries on Set operations. Aggregate functions and Join operations								
7. PL/SQL p	rogram using	Cont	rol Str	ucture	es.	*			
8. Program to	o implement l	Proce	dures a	and Fu	inctions.				
9. Program to	o implement (Curso	rs.						
10. Program to	o implement 7	Trigge	ers.						
BUSINESS COMMUNICATION & VALUE SCIENCE – III Lab (BCVS-III(P))

IV Sem	ester : C	SBS						5	Scheme : 2020			
Cours	e Code	Category	Hou	rs/W	eek	Credits	Μ	aximum M	arks			
HU	205	HSL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
			-	-	3	1.5	40	60	100			
Sessi	onal Exa	m Duration:	1 1/2]	Hrs			End	Exam Dura	tion: 3 Hrs			
			Lead	ership	o Orie	nted Lear	ning (LOL)					
Nature	of Cours	e: Behavioral										
Pre-Rec	quisites:											
Basic K	nowledge	e of English (v	verbal	and w	vritten), Complet	ion of all units	from Seme	ster I and II.			
~	-											
Course	Course Outcomes: At the end of the course students will be able to											
CO1: A	CO1: Apply the basic principles of SWOT & life positions.											
CO2: R	CO2: Recognize pluralism in cultural spaces, rhythms of India and the roles & relations of different											
genders.	genders.											
CO3: Apply the science of Nation building.												
04:0	CO4. Onderstand Artificial intelligence & recognize its impact in dairy me.											
CO5: A	nalyze th	e best practic	es of t	echnie	cal wr	iting and a	pply the tools o	f technical	writing.			
UNIT – I												
Basic n	Pasia principles of SWOT and Life Desitions											
Dasic p	SWOT a	and Life Posit	tions									
2.	Apply S	WOT in real	life sc	enario	os. Cre	eate SWOT	-					
3.	SWOT	Vs. TOWS-T	he Bal	ancin	g Act							
4.	Importa	nce of Motiva	tion i	n real	life							
5.	Leverag	e motivation	in real	l-life s	cenari	ios.						
					UN	II – TI						
Pluralis	m in cult	tural spaces										
1.	Awaren	ess and respec	et for	plurali	ism in	cultural sp	baces					
2.	Rhythm	s of India (Cu	ltures	in Inc	lia)							
3.	Define a	and Differenti	ate -G	lobal,	Gloca	al, Translo	cational					
4.	Cross-cu	ultural commu	inicat	ion- C	ulture	shock						
5.	Gender	awareness										
					UN	IT – III						
Role of	science in	n nation buil	ding		•							
l. 1.	Role of	scientists and	math	ematic	cians f	rom ancier	it India.					
<i>2</i> .	2. Role of science post- independence											
3. 4	Inventio	ns – Inventors	-insti	tutes-1	niorm	iation tech	nology					
4.	Decie m	los of toohnio	ol wri	ting								
	Dasic Iu		ai wii	ung	UN							
Antifici	alintallia	onco Voico	of the	. f	ro	11 - IV						
	Artificio	l intelligence	in Ev	ervda	v Life							
2	Commu	nicating with	mach	ines	y Life							
3	Applvin	g technical w	ritino	in nro	fessio	n						
4.	Scenario	based techn	ical w	riting								

5. Best practices of Technical writing

UNIT – V

Technical Writing

- 1. Summarizing &Synthesizing
- 2. Abstract Writing
- 3. Report Writing
- 4. Product Description
- 5. Description of a mechanism

Project-

Visit rural area/ underprivileged parts of city to address some of the local issues; if relevant, suggest a practical technology solution to the issues.

Text Books:

There are no prescribed texts for Semester IV – there will be handouts and reference links.

Web References:

- 1. Examples of Technical Writing for Students https://freelance-writing.lovetoknow.com/kinds-technical-writing
- 2. Skills of a Good Technical Writer https://clickhelp.com/clickhelp-technical-writing-blog/11-skills-of-a- good-technical-writer/
- 3. Benefits and challenges of cultural diversity in the workplace. https://www.hult.edu/blog/benefits-challenges-cultural-diversity-workplace/

Online Resources:

1. https://youtu.be/CsaTslhSDI

2. <u>https://m.youtube.com/watch?feature=youtu.be&v=IIKvV8_T95M</u>

3. <u>https://m.youtube.com/watch?feature=youtu.be&v=e80BbX05D7Y</u>

4. <u>https://m.youtube.com/watch?v=dT_D68RJ5T8&feature=youtu.be</u>

5. <u>https://m.youtube.com/watch?v=7sLLEdBgYYY&feature=youtu.be</u>

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING FOUR YEAR B.TECH DEGREE COURSE Scheme of Instruction and Examination (Effective from 2020-2021)

V Semester CSBS

		JG						(Benefic	-2020j
S No	Catagory	Course Title	Cradita	Sch Inst peri	eme o tructic iods/w	of on veek	Scheme of Examination Maximum Marks		
5.110	No Category Course Thie			L	Т	Р	End Exam Marks	Internal Assessment Marks	Total Marks
Ι	Theory								
1.	PCC	Design and Analysis of Algorithms	3	3	0	0	60	40	100
2.	PCC	Compiler Design	3	3	0	0	60	40	100
3.	PCC	Fundamentals of Management	3	3	0	0	60	40	100
4.	PCC	Business Strategy	3	3	0	0	60	40	100
5.	PEC	Professional Elective-I	3	3	0	0	60	40	100
6.	OEC	Open Elective-I	3	3	0	0	60	40	100
7.	MC	Professional Ethics	0	2	0	0	0	100	100
Π	Practical								
8.	PCL	Design and Analysis of Algorithms Lab	1.5	0	0	3	60	40	100
9.	PCL	Compiler Design Lab	1.5	0	0	3	60	40	100
10.	SC	Multimedia and Applications Lab	2	0	0	4	60	40	100
11.	INT	Summer Internship - I	1.5	0	0	0	0	100	100
			24.5						

VI Semester CSBS

(Scheme-2020)

(Schomo_2020)

S No.	Catagory	Course Title	Cradita	Sc. Ins per	heme o structio riods/w	of n reek	Scheme of Examination Maximum Marks		
5.110	Category		Cleans	L	T/D	Р	End Exam Marks	Internal Assessment Marks	Total Marks
Ι	Theory								
1.	PCC	Introduction to Machine Learning	3	3	0	0	60	40	100
2.	PCC	Information Security	3	3	0	0	60	40	100
3.	PCC	Computer Networks	3	3	0	0	60	40	100
4.	PEC	Professional Elective-II	3	3	0	0	60	40	100
5.	OEC	Open Elective-II	3	3	0	0	60	40	100
6.	MC	Essence of Indian Traditional Knowledge	0	2	0	0	0	100	100
Π	Practical								
7.	PCL	Machine Learning Lab	1.5	0	0	3	60	40	100
8.	PCL	Computer Networks and Information Security Lab	1.5	0	0	3	60	40	100
9.	PCL	Business Communication & Value Science – IV Lab	1.5	0	0	3	60	40	100
10.	SC	Android App development Lab	2	0	0	4	60	40	100
			21.5						

DESIGN AND ANALYSIS OF ALGORITHMS (DAA)

V Semester	: CSBS							Scheme:2020
Course Code	Category	Н	ours/W	eek	Credits	Max	ximum Mar	·ks
CB301	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional E	xam Duration :	1½Hrs				E	nd Exam D	uration: 3 Hrs
Course Out	tcomes: At the en	nd of th	e cours	se the st	udent will b	be able to		
CO1: Analy CO2: Apply	v Greedv progran	nming 1	technia	ues to s	olve proble	ms.		
CO3 Apply	Dynamic progra	mming	techni	ques to	solve proble	ems.		
And Backtra	acking methods t	o solve	proble	ms.	mal tashnig	was and Dealstread	rin a maathad	a to golygo
problems.	prenend Tree trav	ersar a	lu Gra	pn trave	rsar techniq	lues and Backtraci	king method	is to solve
CO5:Under	stand Branch and	l Bound	d and t	actable	and intracta	able Problems		
				U	NIT–I			
Complexity Algorithm, Relations: M Divide and Quick sort, F Fundamenta Knapsack Pro	Bounds – Bes Time and Spac Aasters' Theorem Conquer: Gene Strassens Matrix	t, Ave te Trad a. ral met <u>Multip</u> Strateg	ies: Br	inary sea n. U ute-Fore eadlines	rst-Case be sis of Rec arch, Findir NIT–II ce, Heuristi , Minimum	thavior; Performation pursive Algorithm ng Maximum and cs, Greedy Meth -Cost Spanning T	Minimum, 1 nod : The Crees, Single	Tements of Recurrence Merge sort, General Method, Source Shortest
r alli.								
				UI	III–III			
Dynamic Pr Travelling Sa	ogramming: Th alesperson Proble	e Gene m.	ral Me	thod, A	ll Pairs Sho	ortest Paths, 0/1-F	Knapsack, B	in packing, The
				UI	NIT-IV			
Graph and (BFS); Short	Tree Algorithm est path algorithm	s: Trav ns, Trav	versal a nsitive	algorithr closure,	ns: Depth I Minimum	First Search (DFS Spanning Tree,	5) and Bread	dth First Search
Backtrackin	g: The General N	Aethod,	The 8	-Queens	Problem, O	Graph Coloring, a	nd Hamiltor	nian cycles.
				U	NIT–V			
Branch and	Bound: The Met	thod, 1:	5 Puzzl	e proble	em, Travelli	ng Salesperson		
Tractable a	nd Intractable F	Probler	ns: Co	mputabi	lity of Alg	orithms, Computa	ability classe	es – P, NP, NP-

complete and NP-hard.

Text Books:

- 1. FundamentalsofComputerAlgorithmsbyEllisHorowitz,SartazSahni&SanguthevarRajasekaran, Galgotia Publications Second Edition
- 2. The Design and Analysis of Computer Algorithms, A. Aho, J. Hopcroft and J. Ullman.

Reference Books:

- 1. Introduction to Algorithms, T. H. Cormen, C. E. Leiserson and R. L. Rivest.
- 2. Computer Algorithms: Introduction to Design and Analysis, S. Baase.
- 3. The Art of Computer Programming, Vol. 1, Vol. 2 and Vol. 3, .D. E. Knuth.
- 4. Quantum Computation and Quantum Information, Michael A. Nielsen and Isaac L. Chuang.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer anyone question from each unit. Each Question carries 12marks.

COMPILER DESIGN (CD)

V Semester	: CSBS						,	Scheme : 2020			
Course Code	Category	Но	ours/W	eek	Credits	Max	ximum Mar	'ks			
CB302	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	-	-	3	40	60	100			
Sessional E	xam Duration 1	1 ¹ / ₂ Hrs				Er	ld Exam Di	uration: 3 Hrs			
Course Out	tcomes : At the e	nd of th	ne cour	se the st	udent will l	be able to					
CO1: Unde	rstand the phases	of com	piler a	nd lexic	al analyzer.						
CO2: Const	truct the parse tre	es usin	g Top	down an	d bottom u	p parsing methods	5.				
CO3: Build	a type system, sy	yntax d	irected	translat	ion and syn	nbol table.					
CO4: Deve	lop intermediate	code ge	eneratio	on and c	ode optimiz	zation techniques.					
CO5: Unde	rstand target code	e genera	ation u	sing flov	w graph and	1 DAG representa	tion Three a	address code.			
				U	I – TIN						
Introductio	on: Basic function	on of l	Langua	ige tran	slator, diffe	erences between	compiler a	nd interpreter,			
bootstrappir	ng, logical phases	of a co	ompile	r, differe	ences betwe	en pass and phase	e, grouping	the phases into			
passes, com	piler constructior	n tools.									
Lexical Ana	Lexical Analysis : Role of lexical analyzer, Input buffering, Specification of tokens, Recognition of										
tokens, A la	nguage for specif	fying L	exical	analyzei	, Lex Tools	5.					
				UN	II – TI						
Syntax An	alysis: Role of	parser,	Deriva	ations, l	Parse Trees	s, Writing a Grar	nmar, Elim	ination of left			
recursion ar	nd left factor a gr	ammar	, Top I	Down P	arsing, Rec	ursive decent pars	ser, Predicti	ve parser, Non			
Recursive p	predictive parsing	g, Cons	tructio	n of par	rsing Table	, Bottom up pars	ing, Shift r	educe parsing,			
Operator pro	ecedence parsing	, LR pa	rser, L	R(0) ite	ms, Constru	acting LR parsing	Table, CLR	parser, LALR			
Parser, parse	er generator (yac	c)									
				UN	IT – III						
Semantic A expressions s-attributed of symbol ta	Analysis: Type (, Syntax directed definition, Top d able, Symbol attri	Checkir translat own tra ibutes a	ng, Tyj tion, D anslatio nd mar	pe conv efinitior on, Botto nagemen	ersions, A n, Construct om up evalu nt.	simple type check tion of syntax tree ation of inherited	cker, Equiva s, Bottom u attributes, 2	alence of type p evaluation of Basic structure			
				UN	IT – IV						
Intermedia	te Code Genera	tion: I	nterme	ediate la	nguages, T	hrees address coo	le, Translat	ion into Three			
Address Co	Address Code, Implementation of three address code, Boolean expressions, back patching.										
Code Imp	rovement: Crit	eria fo	or cod	le impr	oving tran	nsformations, Pri	ncipal sou	rces of code			
optimization	n, Peephole optim	nization	, Optir	nization	of basic bl	ocks.					
				UN	$\mathbf{VIT} - \mathbf{V}$						
Code Gene	ration: Issues in	the des	ign of	code ge	nerator, Ta	rget machine, Bas	ic blocks an	d flow graphs,			
Next use in	formation, A sin	nple co	de ger	nerator,	DAG repre	esentation of basic	e blocks, G	enerating code			
from DAG.	from DAG.										

Text Books:

1. Compilers: Principles, Techniques and Tools, V. Aho, R. Sethi and J. Ullman.

Reference Books:

1. Lex &Yacc, Levine R. John, Tony Mason and Doug Brown

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

FUNDAMENTALS OF MANAGEMENT (FOM)

V Semester	Semester: CSBS						Sche	eme: 2020		
Course Code	Category	Но	ours/W	'eek	Credits	Maxin	num Marks	5		
CB303	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional E	xam Duration1	∕₂ Hrs				End Ex	xam Durati	on: 3 Hrs		
Course Ou	tcomes :At the en	nd of th	e cour	se the st	tudent will l	be able to				
CO1:Under	stand manageme	nt theo	ries, ev	olution	of manager	ment over the yea	rs and few b	pasic		
concepts										
CO2:Understand the functions of management										
CO3: Understand the Organizing and Controlling function of management										
CO4:Under	stand the individ	ual and	l organ	ization	behavior					
CO5:Under	stand the organiz	zation c	ulture							
				UNI	T – I					
Nature, Pur Classical m Classical Th Principles of classical M Neoclassica Systems, A Managemer Linking Pro	Management Theories: Concept and Foundations of Management-Definition, Meaning, Concepts, Nature, Purpose, Scope, Significance, functions, levels, approaches, process of Management; Classical management Era (1880-1930) -The Classical Management Theory, Assumptions of the Classical Theory, Two Streams of the Classical Theory, Key Characteristics of the Classical Theory, Principles of Organizations under the Classical Theory , Criticisms of the Classical Theory; Neo- classical Management Era (1930-1950) - Neoclassical Management Theory, Appraisal of Neoclassical Theory Contribution, Criticisms, Facts Discovered through Hawthorne Experiments Systems, Approach to an Organization ; Modern Management era (1950-on word) - Modern Management Theory, The Various Parts of the System, Nature of their Mutual Interdependency,									
				UNI	Γ–II					
Functions of Planning: Planning, St	of Management- Introduction - teps in the Planni	Meani Meanin ng,	ngs of ng, def	Plannin finition,	g, Organizi nature of	ng, Staffing, Dire planning; Types	cting and C of Plans,	ontrolling Levels of		
Manageme	nt by Objective	s - Coi	e Con	cepts, S	etting Obje	ctives, Character	istics of Ma	inagement		
by Objectives, Process of Management by Objectives, Benefits of Management by Objectives, Limitations of Management by Objectives; Decision-making - Components of Decision-making, Decision-making Process, Styles of Decision-making, Kinds of Decisions - Different Types of Decisions, Types of Decision-making; Barriers in Decision-making;										
				UNI	Γ – ΙΙΙ					
Organizing of Organizi theory; Typ	UNIT – III Organizing: Introduction - Meaning, Definition, Characteristics, Principles, Importance, Process of Organizing, Theories of Organization - Classical, Neoclassical, Contingency organization theory; Types of Organizations; Forms of organization- Formal and Informal; Organizational									

Levels; Organizational Design & Structure – Features, Importance, Role, Determinants of

Organizational Structure; Line Organization; Line and Staff Organization; Matrix Organization, Functional Organization; Directions in Organization Structure – Team Structure, Network Structure, Free form Structure; Elements of Organization Structure – Work specialization, Departmentalization, Chain of command, Unity of Command, Span of Control, Centralization and Decentralization, Formalization.

Controlling: Introduction - Meaning, Definition, Characteristics of Control, Relationship between Planning and Control, Steps in Control Process - Establishing Standards, Measuring and Comparing Actual Results against Standards, Taking Corrective Action; Types of Control;

UNIT – IV

Organization Behavior: Introduction - Definition of Organizational Behavior, Nature of Organizational Behavior, Determinants of Organizational Behavior - Organizations as Systems, The Formal and Informal Organization, Need for Organizational Behavior, Contributing Disciplines, Modeling for OB - Freudian Psychoanalytic Model, Humanistic Psychology Framework,

Individual Behavior : Meaning of Individual Behavior - Determinants of Individual Behavior Biographical Characteristics; **Personality**- Definition of Personality, Major Determinants of Personality, Theories of Personality – Intra psychic Theory, Type Theories, Trait Theories, and Self-Theory **Perception** – Meaning, Factors Influencing Perception, Frequently used Shortcuts in Judging Others, Perceptions and its Application in Organization, **Learning and Reinforcement**-Meaning of Learning, Types of Learners, The Learning Process; Reinforcement - Stages in Reinforcement, Principles of Reinforcement, **Motivation** - Meaning , Early Approach to Motivation - 'Hierarchy of Needs' Theory, Theory X and Theory Y; Contemporary Theory of Motivation -McClelland's Theory of Need, Expectancy Theory

Behavior in Organization : Group Dynamics- Meaning, types, meetings, team, **Power & Influence -** Sources of Power in Organizations, Consequence of using Power, Maccoby's Four Political Types; **Work Stress and Stress Management –** Meaning, types, causes, forms and implications of stress

UNIT – V

Leadership: Introduction – Meaning, Definition, Components of Leadership; Leadership traits; Leadership Behavior and traits – Classic leadership styles, styles based on task Vs people emphasis, styles based on Assumptions about people, Likert's four styles, Entrepreneurship Leadership style; Theories/Approches of Leadership – Managerial Grid.

Organizational Culture: Types of Organizational Culture, Effects of Organizational Culture, Functions of Organizational Culture, Importance of Culture to the Organization, Changing Organizational Culture, Forces for Change in Organizations, Forms of Change, Resistance to Change - Sources of Resistance, Managing Resistance to Change, Approaches/Models to Managing Organizational Change (Change Process) - Lewin's Change Model, Nadler's Organizational Model, A Contingency Model of Analyzing Change;

Text Books:

1. Richard L. Daft, Understanding the Theory and Design of Organizations

Reference Books:

1. Stephen P. Robbins, Timothy A. Judge, Neharika Vohra, Organizational Behavior

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

BUSINESS STRATEGY (BS)

V Semester:	CSBS						Sch	eme : 2020				
Course Code	Category	Но	ours/W	eek	Credits	Maxir	num Mark	S				
CB304	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	-	-	3	40	60	100				
Sessional Exa	am Duration: 1 ¹ ⁄	2 Hrs				End E	xam Durat	tion: 3 Hrs				
Course Outc	omes :At the end	of the	course	the stud	lent will be	able to						
CO1: Unders	tand the basic con	ncepts o	of Strat	egic Ma	nagement a	and process.						
CO2:Underst	and the approach	es of St	rategic	e formul	ation							
CO3:Analyse the environments of the firm and apply the strategy												
CO4:Understand the long term strategies of a firm												
CO5: Evaluat	CO5: Evaluate the objectives through implementation and control											
	UNIT – I											
Introduction to Strategic Management: Strategy- Meaning and definition of strategy, elements of strategy, levels of strategy; Strategic Management- Meaning and definition, nature, scope, approaches, importance, limitations, Strategic Management process; Schools of thought in Strategic Management; Fit Concept and Configuration Perspective in Strategic Management UNIT – II Strategy Formulation: Approaches to Strategic formulation, process of Strategic formulation; Developing Strategic vision & mission- Meaning, definition features, elements, process; Setting Objectives- Characteristics, Classification, Significance and role, Strategic and financial Objectives- the												
				UNIT	– III							
Environments of Firm and Competitive Strategy External Environments of Firm- Industry Analysis- framework, factors, use, dominant economic features, industry competitive forces(porter's 5 forces),competitive environment analysis, Concept of key success factors. Internal Environment of Firm Recognizing a Firm's Intellectual Assets: Introduction to Internal Analysis, VRIO Analysis, SWOT Analysis, Value Chain Analysis; Strategy and Competitive Advantage-Generic Strategies- Cost Leadership strategy and Differentiation strategy; Complimentary Strategies-Mergers, Acquisitions, Joint Ventures. UNIT – IV Long-term and Grand Strategies: Long-term Objectives: Qualities, Principal grand strategies, Concentrated Growth, Diversification, Retrenchment, Strategic Alliances.												
Selection of C	brand strategy: B	CG Ma	trıx, Gl	E model	[
maustry me c	sycle: Unaracteris	ucs, str	alegies		Г_V							
Stuatory In-	UNII – V											
Strategy Imp	plementation and	i Conti	101									

Strategy Implementation: Meaning, elements, process, challenges, MC.Kinsey's 7-S Framework; Strategic Control: Evaluation- Meaning, Importance, levels, techniques, establishing strategic controls

Text Books:

- 1. Robert M. Grant (2012). Contemporary Strategic Management, Blackwell, 7th Edition.
- 2. Bartlett, C.A., Ghoshal, S. and P. Beamish, Transnational Management: Text, Cases, and Readings in Cross-Border Management, McGraw Hill.
- 3. Bhattachary, S.K. and N.Venkataramin: Managing Business Enterprise: Strategies, Structures and Systems, Vikas Publishing House, New Delhi.1st edition 1983

Reference Books:

- 1. Porter, Michael E., The Competitive Advantage of Nations, Macmillan, London, 1990.
- 2. Sharma, R.A Strategic Management in Indian Companies, Deep and Publications, New Delhi.
- 3. Srivastava, R.M. Management Policy and Strategic Management, Himalaya Publishing.
- 4. Subba Rao, V., Strategic Management, Himalaya Publishing

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

PROFESSIONAL ETHICS (PE)												
V Semeste	er: Commo	n to al	ll Br	anche	S		Sche	eme: 2020				
Course Code	Category	Но	ours/N	Veek	Credit s	N	faximum 1	Marks				
MC104	МС	L 2	T	P	C	Continuou s Internal AssessmentEnd ExamTOTA100100100						
Course O	utcomes: A	t the e	nd of	the co	ourse stud	lents will be able	to	100				
CO1: Und	derstand the	impoi	tance	of Et	hics & H	uman Values and	d become I	Humane.				
CO2: Know the moral autonomy and uses of Ethical theories.												
CO 3: Kn	CO 3: Know the responsibilities of the Engineer towards the society.											
CO 4: As	sess environ	menta	l issu	es to t	ake Prote	ective measures to	evade risl	ks.				
CO 5: De	termine varie	ous ro	les of	Engir	neer and l	help them make th	ne world a	better place.				
					UNIT-	I						
Human Values Morals – Values - Ethics – Morals vs Laws - Integrity - Work Ethics - Respect for Others - Peaceful Life - Honesty - Courage - Valuing Time- Empathy - Character - Spirituality UNIT-II												
Inquiry – I Profession	Kohlberg's T al Roles - C	Theory	V - Gil	lligan' Relig	s Theory gion - Use UNIT-I	- Consensus & C es of Ethical The	controversy ories	 Types of Models of 				
Engineeri - Engineer The Challe	ng As Socia rs as respons enger case st	l Exp ible e tudy	erim xperii	entati menter	on: Engi rs - Code	neering as Social s of Ethics - A ba	l Experime alanced Ou	entation itlook on Law -				
					UNII-I	V						
Safety, Ro Risk - Coll - Professio	esponsibiliti egiality and onal Rights -	i es & Loyal ^ı Emple	Righ ty - R oyee]	ts: Sa: espect Rights	fety and l for Auth - Intellec UNIT-	Risk - Risk Benet ority - Confidentia ctual Property Rig V	fit Analysi ality - Occu ghts (IPR)	s and Reducing pationalCrime				
Global Is	sues											
Global Issues Multinational Corporations - Environmental Ethics - Computer Ethics -Engineers as Managers - Consulting Engineers - Moral Leadership - Sample Code of Ethics like ASME, ASCE, IEEE, Institute of Engineers, Indian Institute of Materials Management, IETE etc.,												
Text Books:												
1. Jayashı Chand F	1. Jayashree Suresh, B.S.Raghavan, "Human Values and Professional Ethics", S. ChandPublications											
Reference	Books:											
1. Mike M 1996	artin and Ro	land S	chinz	inger"	Ethics in	Engineering",Mc	Graw Hill,	New York.,				
2. Charles D.Fleddermann, "Engineering Ethics", prentice Hall, New Mexico., 1999.												
3. S. Dine	sh Babu, "P	rofess	ional	Ethic	s & Hun	an Values", Lax	mi publica	ations.				

DESIGN AND ANALYSIS OF ALGORITHMS LAB (DAA(P))

V Semester: CSBS	5						Sche	me: 2020				
Course Code	Category	Hou	rs/W	eek	Credits	Maxi	mum Mai	rks				
CB305	PCL	L	Т	Р	С	ContinuousEndInternalExamTOTAlAssessment						
		-	-	3	3 1.5 40 60 100							
Sessional Exam D	uration: 2 Hrs					End Ex	am Durat	ion: 3 Hrs				
Course Outcomes	: At the end of	the co	ourse	stude	ents will be	able to						
CO1: Apply Greedy and Dynamic Programming methods for problem solving.												
CO2: Apply Backtracking and Branch and Bound Techniques for problem solving.												
CO3: Apply BFS and DFS algorithms for Graph Traversal.												
List of Experiments												
1. Implement so	olution for Frac	tional	Knap	sack	problem us	ing Greedy Tec	hnique.					
2. Implement Jo	b Sequencing	with E	Deadlin	nes p	roblem usin	ng Greedy Tech	nique.					
3. Implement Tr	ravelling Sales	Perso	n prot	olem	using Dyna	mic Programm	ing Techni	ique.				
4. Implement so	lution for 0/1 I	Knaps	ack pr	oble	m using Dy	namic Program	ming Tech	nnique.				
5. Implement Tr	ravelling Sales	Perso	n prot	olem	using Brand	ch and Bound T	echnique.					
6. Implement N	Queens' probl	em us	ing Ba	acktr	acking tech	nique.						
7. Implement D	epth First Searc	ch Alg	gorith	n foi	Graph Tra	versal.						
8. Implement B	readth First Sea	arch A	lgorit	hm f	or Graph Ti	raversal.						
9. Implement P	rim's algorithn	n for	findin	g mi	nimum cos	t spanning tree	•					
10. Implement K	ruskal's algori	thm f	or fin	ding	minimum	cost spanning t	ree.					

COMPILER DESIGN LAB (CD (P))

V Semester : C	SBS				Ì		Sche	me: 2020			
Course Code	Category	Hou	rs/Wee	ek	Credits	Maximum Marks					
CB306	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		-	-	3	1.5	40	60	100			
Sessional Exam	n Duration: 2	2 Hrs				End E	xam Dura	ation: 3 Hrs			
Course Outcon	nes: At the e	nd of	the cou	rse stu	dents will be	able to					
CO1: Impleme	nt DFA and I	Lexica	l Analy	zer.							
CO2: Construc	t parse trees	using	Top do	wn and	l Bottom up	parsing methods					
CO3: Impleme	nt Intermedia	te coc	le gene	ration.							
			Li	st of E.	xperiments						
1. Implementati	ion of Determ	inistic	finite a	utomat	a (DFAs).						
2. Implementat	tion of Lexica	al Ana	lyzer.								
3. Implement H	Elimination of	f Left	Recurs	ion.							
4. Implementat	tion of Findin	ig a Le	eft Fact	oring.							
6. Implementat	tion of Non-R	lecurs	ive Prec	dictive	Parser.						
7. Implementat	tion of Shift I	Reduc	e parsir	ng usin	g stack.						
8. Implementat	8. Implementation of Operator Precedence Parsing.										
10. Implementat	tion of Intern	nediate	e Code	Genera	ation.						
11. Construction of Directed Acyclic Graphs (DAGs).											

MULTIMEDIA AND APPLICATIONS LAB (MAA (P))

V Semeste CSE(AIM	V Semester : Common for CSE,CST, CSE(AIML), CSE(DS) & CSBS				Scheme : 2020							
Course Code	Category	Hour	s/We	ek	Credits	Ma	iximum Ma	rks				
SCCS02	SC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		-	-	4	2	40	60	100				
Sessional	Exam durat	tion: 2	Hrs			End	d Exam Du	ration: 3 Hrs				
Course Ou	tcomes : At	the en	d of tl	he cour	se students	s will be able to						
CO1: Des	sign the web	based	multi	media c	component	S						
CO2: Crea	ate time-base	ed and	intera	ctive m	ultimedia	components.						
CO3: Crea	ate Animatio	n Proie	ects fr	om its	Conceptua	1 Stage to the fi	nal Product.					
CO4. Ann	CO4: Apply Audio and Video Production Techniques to an Animation Project.											
	CO4: Apply Audio and Video Production Techniques to an Animation Project.											
				List o	of Experim	ents						
1. Des	ign a web pa	age to a	lispla	y stude	nt educatio	on details in a ta	ıbular forma	t.				
2. Wri	te an HTML	code 1	to disp	play the	e CV on a	web page.						
3. Des	ign a Regist n. the user sl	tration 10uld r	Form aviga	te to H	includes ome page.	a multimedia c	ontent. On	submitting the				
4. Wri	te an HTML	code	to crea	ate a H	ome page l	having three lin	ks: About U	s, Our				
5. Des	ign a web p	age wl	nich i	eate seg ncludes	s text, grap	pages for the the bhics, sound, vi	deo, and an	imation create				
you	r Institute w	ebsite,	Depa	rtment	Website a	nd Tutorial web	site for spec	ific subject.				
6. Pro	tedure to cre	eate an	anima	$\frac{1}{100}$	change a	Circle into a Sq	uare using f	lash.				
7. Pro	tedure to cre	eate an	anima	ation io	$\frac{1}{1}$	aying with a Fo	otball.					
8. Proc 9 Proc	cedure to cre	eate an $\frac{1}{2}$	anima	ation to	show the	ripple effect.	sing multipl	e lavers and				
motion tweening)												
10. Pro orig	cedure to Cr	eate ar the car	n anin r winr	nation f	for bus, ca e race.	r race in which	both starts	from the same				
11. Pro	cedure for cr	reating	a Bar	ner usi	ng Photosl	hop.						
12. Pro	cedure for cr	reating	a Auc	dio file	using free	open source too	ols.					
13. Pro	cedure for cr	reating	a vide	eo: Edit	ting, Mixir	ng, Adding Sour	nd to a video).				
14. Pro	cedure for E	diting a	an Im	age usi	ng Photosh	nop/free open so	ource tool.					

15. Procedure for working with text using Microsoft powerpoint.

Additional Experiments

16. Procedure to create an Animation to indicate a ball bouncing on the steps.

17. Procedure to create a simulation Animation of Moving Clouds.

18. Procedure to draw the fan blades and to give proper Animation.

19. Procedure to create an Animation with the following features:

*Letters should Appear one by one *The fill color of the text should change to a different color after the display of full

word

20. Procedure to simulate a ball hitting another ball.

INTRODUCTION TO MACHINE LEARNING (IML)

VI Seme	ster : CSBS						Sche	me: 2020				
Course Code	Category	Но	ours/W	eek	Credits	Maxin	num Marks	5				
CB307	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	-	-	3	40	60	100				
Sessiona	ll Exam Duratio	$n: 1\frac{1}{2}$	Hrs	-		End Ex	xam Durati	on: 3 Hrs				
Course	Outcomes :At th	e end c	of the c	ourse th	<u>e student w</u>	vill be able to	· ·					
$\frac{\text{COI: Di}}{\text{CO2: }M}$	stinguish betwee	en, supe	ervised	, unsupe	ervised and	semi-supervised	learning.					
CO2: M	uld a basic neuro	achine al netwo	ork for	real_tin	unnis to nnj ne data	prove classification	on efficiency	y				
CO3 : Us	CO4: Use of temporal models for classification											
CO5: Us	CO5: Use unsupervised models for clustering data and design a system that uses the information											
mining n	mining models of machine learning.											
			<u> </u>	IIN	JIT I							
Learning of how r problem validatio	Learning (ML), Relationship between ML and human learning; A quick survey of major models of how machines learn; Example applications of ML, Classification: Supervised Learning; The problem of classification; Feature engineering; Training and testing classifier models; Cross- validation; Model evaluation (precision, recall, F1-mesure, accuracy, area under curve) UNIT – II											
Statistics including networks Machine backprop boosting	g discriminant fr ; Decision Tree s, Introduction pagation; Applica	and Ra to ations o	and C s and ndom neura of class	decision Forests; l netwo ification	n surfaces; k-Nearest vorks; Art ns; Ensemb	Naive Bayes cla neighbor classific tificial neural les of classifiers i	ation; Supp networks ncluding ba	Bayesian ort Vector including gging and				
				UN	IT – III							
Regressi squares r algorithm	on Techniques regression; Reguns including apri	s: Reg larizati ori.	ressior on; LA	n: Mult ASSO; A	i-variable pplications	regression; Mod s of regression. As	el evaluation ru	on; Least 1le mining				
				UN	IT – IV							
Clusteri neighbor Expectat	Clustering: average linkage; Ward's algorithm; Minimum spanning tree clustering; K-nearest neighbors clustering; BIRCH; CURE; DBSCAN Anomaly and outlier detection methods. Expectation-Maximization (EM) algorithm for unsupervised learning.											
	UNIT – V											
Hidden Markov Model(HMM): Hidden Markov Models (HMM) with forward-backward and Viterbi algorithms; Sequence classification using HMM; Conditional random fields; Applications of sequence classification such as part-of-speech tagging.												
Text Bo	oks:											

- 1. E. Alpaydin, "Introduction to Machine Learning", Third Edition, Prentice-Hall, 2014
- 2. V.K. Jain, Machine Learning, Khanna Publishing House
- 3. A. Rostamizadeh, A. Talwalkar, M. Mohri, "Foundations of Machine Learning", MIT Press.
- 4. Andriy Burkov, The Hundred-Page Machine Learning Book, first edition

Reference Books:

- 1. R.O. Duda, P.E. Hart, D.G. Stork, "Pattern Classification", Second Edition, Wiley,
- 2. Advanced Data Mining Techniques Authors: David L. Olson (Author), Dursun Delen.
- 2. C. Bishop,"Pattern Recognition and Machine Learning", Springer, 2007.
- 3. Webb, "Statistical Pattern Recognition", Third Edition, Wiley, 2011

Web References:

- 1. <u>https://www.javatpoint.com/machine-learning</u>
- 2. https://www.geeksforgeeks.org/machine-learning/
- 3. https://www.kaggle.com/learn/intro-to-machine-learning
- 4. https://machinelearningmastery.com/start-here/
- 5. https://intellipaat.com/blog/tutorial/machine-learning-tutorial/
- 6. https://nptel.ac.in/courses/106/106/106106139/

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

INFORMATION SECURITY (IS)

VI Seme	ester : CSBS						Sc	heme : 2020					
Course Code	Category	Ho	urs/W	'eek	Credits	its Maximum Marks							
CB308	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL					
		3	-	-	3	40	60	100					
Sessiona	l Exam Durati	ion: 1½	² Hrs			End	Exam Dur	ation: 3 Hrs					
Course	Outcomes :At t	the end	of the	course	the studen	t will be able to							
CO1: To	understand the	e overv	iew of	compu	ter security	<i>.</i>							
CO2: To	o understand the	e inform	nation	securit	y policy.								
CO3: To	o understand tec	chnique	s of sy	stem s	ecurity and	system design.							
CO4: To	CO4: To learn about various applications of system security.												
CO5: To learn about operating system and database security.													
UNIT – I													
Overview of Security Parameters: Confidentiality, integrity and availability; Security violation and threats; Security policy and procedure; Assumptions and Trust; Security Assurance, Implementation and Operational Issues; Security Life Cycle.													
	UNIT – II												
Access (Discretic algebra, Security	Access Control Models: Discretionary, mandatory, roll-based and task-based models, unified models, access control algebra, temporal and spatio-temporal models.												
Confider	tiality policies	s, integ nal stan	grity p dards.	olicies	, hybrid p	olicies, non-inte	rference a	nd policy					
1	,			U	NIT – III								
Systems Design confinen evaluatir	Design: principles, rep nent problem. ng systems.	present Assura	ing io ance:	dentity, Buildir	control ng system	of access and s with assuranc	informat e, formal	ion flow, methods,					
				U	NIT - IV								
Logic-based System: Malicious logic, vulnerability analysis, auditing, intrusion detection. Applications: Network security, operating system security, user security, program security. UNIT – V													
Operating System And Database Security Operating System Security: Security Architecture, Analysis of Security in Linux/Windows Database Security: Security Architecture, Enterprise security, Database auditing.													
1 ext Bo	DKS:	•, •	- ·	•		D '11' D	111	'1 / 1					
1. Ross Syste	Anderson, "Sea ms", Third Edi	$\frac{\text{curity I}}{\frac{\text{tion, W}}{2}}$	iley, 2	ering: 1 2021.	A Guide to	Building Depend	able Distr	ibuted					
2. M.	Bishop, "Comp	uter Se	curity	Art an	d Science"	, 2nd Edition, Pe	arson Educ	ation, 2019.					

3 M. Stamp, "Information Security: Principles and Practice", 2nd Edition, Wiley, 2011.

Reference Books:

1. C.P. Pfleeger, S.L. Pfleeger, J. Margulies, "Security in Computing", 5th Edition, Prentice Hall, 2015.

2. David Wheeler, "Secure Programming HOW TO", v3.010 Edition, 2003

3. Michael Zalewski, "Browser Security Handbook", Google Inc., 2009.

4. M. Gertz, S. Jajodia, "Handbook of Database Security", Springer, 2008.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

COMPUTER NETWORKS (CN)

VI Seme	ester :CSBS						Se	cheme : 2020				
Course Code	Category	Ho	ours/W	eek	Credits	its Maximum Marks						
CB309	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	-	-	3	40	60	100				
Sessiona	l Exam Duration	<mark>on1½</mark> H	Irs			End	Exam Du	ration: 3 Hrs				
Course	Outcomes :At th	he end	of the o	course t	he student	will be able to						
CO1: Cl	noose the require	ed func	tionali	ty at eac	ch layer for	given application	1.					
CO2: Tr	ace the flow of i	informa	<u>tion fr</u>	rom one	node to an	other node in the	network.					
CO3: Aj	communication to select optimal path.											
communication to select optimal path.												
CO4: M	onitor the traine	applier	tions	of notwo	orke using	ule transfer of pa	ing					
UNIT – I												
Introduction: Computer networks and distributed systems, Classifications of computer networks, Preliminaries of layered network structures. Data communication components: Representation of data and its flow, Various connection topology, Protocols and standards, OSI model, Transmission Media. LAN: Wired LAN, Wireless LAN, Virtual LAN. Performance – Bandwidth, Throughput, Latency, Jitter. UNIT – II Data Link Layer and Medium Access Sub Layer: Fundamentals of Error Detection and Error Correction, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait.												
				Ul	NIT – III							
Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP,RARP. Routing Algorithms: The optimality principle, shortest path routing, Flooding, Distance vector and Link state, Hierarchical, Broadcast and Multicast Routings.												
UNIT – IV												
Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service (QoS).												
UNIT – V												
Applica	tion Layer: DN	S, TEL	NET, I	EMAIL	, FTP, WW	W, HTTP, Bluet	ooth, Firew	alls.				

Text Books:

- 1. Andrew S. Tanenbaum and David J. Wetherall, "Computer Networks", 5th edition, Pearson education, 2016.
- 2. William Stallings, "Data and Computer Communication", 10th edition, Pearson education, 2017.

Reference Books:

1. Kaufman, R. Perlman and M. Speciner, "Network Security", Pearson education, 2017.

2. W. Richard Stevens, "UNIX Network Programming, Vol. 1,2 & 3", Prentice-Hall of India, 2004.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

]	ESSENCE OF	IND	IAN 7	FRAD	TIONAL	KNOWLEDGE (F	EITK)		
VI Semester: Co	ommon to all E	Branc	hes				Scheme:2	2020	
Course Code	Category	Hou	urs/W	eek	Credits	Maximu	ım Marks		
MC105	МС	L 2	T	P	C	Continuous Internal Assessment 100	End Exam	TOTAL	
Course Outcom	es: At the end of	of the	cours	se stude	ents will b	e able to		100	
CO1: Understand	the concept of	Trad	itional	l know	ledge and	its importance.			
CO2: Explain the	need and impo	rtanc	e of p	rotectir	ng traditio	nal knowledge.			
CO 3: Illustrate the various enactments related to the protection of traditional knowledge.									
CO 4: Interpret the concepts of Intellectual property to protect the traditional knowledge.									
CO 5: Understand the traditional knowledge in different sectors.									
				UN	I-TIN				
Protection Of T Protection of tra TK Protection, v	Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge UNIT-II Protection Of Traditional Knowledge Protection of traditional knowledge: The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.								
Legal Frame	Work And Tk			:4: 1	Easter Dr		of Forest D	alata) A at	
A. The Schedu 2006, The F	Protection of Pla	ant V	arietie	s and F	Forest DV Farmers' R	ights Act, 2001 (PP)	VFR Act).	gnis) Aci,	
B. The Biolog 2016. Geog	ical Diversity A raphical indicat	Act 20 cors a	002 ar ct 200	nd Rule 13.	es 2004, th	e protection of tradi	tional know	ledge bill,	
UNIT-IV Traditional Vnawladas And Intellectual Duan arty									
Traditional Knowledge And Intellectual Property Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge. UNIT-V Traditional Knowledge In Different Sectors									

Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in

agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK. 139.

TextBooks:

1. 'Traditional Knowledge System in India' by Amit Jha, 2009.

ReferenceBooks:

1. 'Traditional Knowledge System and Technology in India' by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.

2. 'Traditional Knowledge System in India' by Amit Jha Atlantic publishers, 2002.

3. 'Knowledge Traditions and Practices of India' by Kapil Kapoor and Michel.

Web References:

1. www.youtube.com/watch?v=LZP1StpYEPM

2. https://nptel.ac.in/courses/121106003

MACHINE LEARNING LAB (ML (P))

VI Semester : C	CSBS						Sch	eme : 2020				
Course Code	Category	Hou	rs/Wee	k	Credits	Maximum Marks						
CB310	PCL	L	Т	Р	С	Continuous Internal Assessment						
3 1.5 40 60 100												
Sessional Exam Duration: 2 Hrs End Exam Duration: 3 Hrs												
Course Outcomes : At the end of the course students will be able to												
CO1:Demonstra	ate Numpy ar	nd Pan	das on	Data F	iles							
CO2:Use Descr	iptive and D	ata Vi	sualizat	tion tec	chniques							
CO3:Implement	t Simple and	Multip	ole line	ar Reg	ression Mod	els						
CO4:Apply Cla	ssification an	d Clus	stering	technic	lues							
			Lis	st of Ex	xperiments							
1. Introduction	on to WEKA	and R										
2. Classificat	tion of some	public	domaiı	n datas	ets in UCI M	IL repository						
3. Implement	tation of one	cluster	ring alg	orithm	l							
4. Implementation of one association rule mining algorithm												
5. Implementation of one anomaly detection algorithms												
6. Implemen	tation of EM	algori	thm for	some	specific pro	blem						

COMPUTER NETWORKS AND INFORMATION SECURITY LAB (CNIS(P))

VI Semester :C	CSBS				Scheme :	2020					
Course Code	Category	Hou	rs/Wee	ek	Credits	Maximum Marks					
CB311	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam TOTA				
		-	-	3	1.5	40	60	100			
Sessional Exam	n Duration:2	Hrs				End Ex	xam Dura	tion: 3 Hrs			
CO1:Understan	d the network	c envir	onmen	t using	commands.						
CO2:Implemen	t Local Area	Netwo	ork usin	g swite	ches and ser	vices provided by	/ transport	layer.			
CO3: Implement	ntinformation	securi	ty issue	es.							
CO4:Implemen	t real time mo	odels f	or info	rmation	n security.						
			Lis	st of E.	xperiments						
1.Learn to use ba	asic command	s.									
2. Configuration	n of Network	in Lin	ux Env	ironme	ent.						
3. Implementati	on of setup of	f a Loo	al Area	a Netw	ork (using S	Switches) – Minir	num 3 noc	les and			
4. Study of sock	tet programm	ing an	d client	t servei	model usin	g TCP and UDP.					
5 Simulation of	f sliding wind	ow pro	ntocol								
		/T ·									
6. Analysis of se	ecurity in Uni	x/Lint	IX								
7. Administratio	on of users, pa	sswor	d polici	ies, pri	vileges and 1	roles.					
8. Implementati	on of mobile	audit	and ger	nerate 1	the report of	the existing artif	facts.				
9. Perform mob forensics tool lil	ile analysis in ke SAFT.	the fo	orm of 1	retrievi	ng call logs	, SMS log, all cor	ntacts list u	using the			
10. Implementat	tion to identif	y web	vulner	abilitie	es, using OW	ASP project.					

BUSINESS COMMUNICATION AND VALUE SCIENCE – IV(LAB)

VI Semester : CSBS Scheme : 2020														
Course Code	Category	Ηοι	irs/W	eek	Credits	lits Maximum Marks								
CB312	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL						
		-	-	3	1.5	40	60	100						
Sessional Exam	n Duration:	2 Hr	s.			End Ex	kam Durati	on: 3 Hrs.						
		L	eader	ship	Oriented I	earning (LOL)								
Nature of Cou	rse: Behavio	ral												
Pre-Requisites	: Basic Knov	vledg	e of I	Englis	h (verbal a	nd written)								
Course Outcon	nes: At the e	nd of	the c	ourse	students w	ill be able to		11						
CO 1: Use tool	s of structure	d wri	tten c	comm	unication a	nd hone public s	peaking ski	lls.						
CO 2: Apply er	CO 2: Apply emotional intelligence and knowledge of multiple intelligences and learning													
styles in	styles in real life scenarios.													
CO 3: Understa	ind the impor	rtance	$\frac{1}{1}$	iversi	ty in workp	lace and corpora	ite social re	sponsibility.						
CO 4 : Identify	and practice	best t	ime n	nanag	gement, stre	ss management	practices.							
CO5: Recogniz	e and cultiva	te the	e attri	butes	needed to f	unction and grov	w in a corpo	orate environment.						
UNIT – I														
Communicative Writing Principles of Communicative Writing Formal and Business letters Writing proposals Using charts and graphs in communicative writing Applying communicative writing in real life scenarios UNIT – II Public Speaking Need for public speaking Public speaking – best practices Applying public speaking in real life scenarios Selling your start-up ideas (activity) Business Storytelling and Doodling methods 														
Emotional Inte	elligence													
 Emotional intelligence Manifestations of Emotional intelligence Importance of emotional intelligence in personal and professional lives Ways to Build Emotional intelligence Applying emotional intelligence in real life scenarios- Activity 														
		1 •1• -	(000)		UNII – I	V								
Corporate Soc1. <td< td=""><td colspan="10"> Importance of corporate social responsibility (CSR) The Need to conduct CSR activities Stories of corporate social responsibility </td></td<>	 Importance of corporate social responsibility (CSR) The Need to conduct CSR activities Stories of corporate social responsibility 													
Diversity, Mul 1. Multiple 2. Learnin	tiple Intellig e intelligence g styles	ences s	s & L	earn	er styles									

2. Learning styles

3. Applying multiple intelligences and Learning styles in communication
UNIT – V
Employability Skills
1. Attributes required for work and life
2. Strategic thinking and planning
3. Decision making
4. Best practices to share and receive feedback
5. Attributes needed to function and grow in a corporate environment- Image Management
UNIT-VI
Life Skills
2 Time Management
3. Corporate etiquette
4 Business idioms and Cornorate Terms
5. Conflict Resolution and Conflict Management
Project-
Each group to create a POC (Proof of Concept) for their start-up applying their learning from the
CSBS course (core subjects + BCVS).
Text Books:
There are no prescribed texts for Semester VI – there will be handouts and reference links.
Reference Books:
1. Emotional Intelligence: Why it Can Matter More Than IQ by Daniel Goleman
2. Putting Emotional Intelligence To Work by Ryback David
3. How to Develop Self Confidence and Improve Public Speaking - Time - Tested Methods of
Persuasion by Dale Carnegie
4. TED Talks: The official TED guide to public speaking: Tips and tricks for giving unforgettable
speeches and presentations
Web References:
1. <u>https://www.tata.com/about-us/tata-group-our-heritage</u>
2. <u>https://economictimes.indiatimes.com/tata-success-story-is-based-on-humanity-philanthropy-</u>
and-ethics/articleshow/41766592.cms
Online Resources:
1. <u>https://youtu.be/reu8rzD6ZAE</u>
2. <u>https://youtu.be/Wx9v_J34Fyo</u>
3. <u>https://youtu.be/F2hc2FLOdhI</u>
4. https://youtu.be/wHGqp8lz36c
5. https://youtu.be/hxS5He3KVEM
6. https://youtu.be/nMPasjuXDmE

ANDROID APP DEVELOPMENT LAB (AAD(P))

VI Semester :	Common for	r CSE	,CSBS	,			Scl	neme : 2020	
CST, CSE(AIN	1L) & CSE(I	DS)							
Course Code	Category	Hou	rs/Wee	k	Credits	Maximum Ma	arks		
SCCS03	SC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		-	-	4	2	40	60	100	
Sessional Exam	Duration: 2	Hrs				End Exam Dur	ation: 3 H	lrs	
Course Outcom	nes: At the en	nd of t	he cour	se the	student will	be able to			
CO1: Install and	d configure A	ndroi	1 applic	ation o	levelopment	tools.			
CO2: Design an	nd develop us	er Inte	erfaces	for the	Android pla	tform.			
CO3:. Save stat	e information	acros	s impo	rtant op	perating syst	em events.			
CO4: Apply Java programming concepts to Android application development.									
List of Experiments									
1. Installati	on of Androi	d stud	io.						
2. Develop	ment of Hello	Wor	ld Appl	ication					
3. Create an	n application	that ta	kes the	name	from a text l	pox and shows he	ello messa	ige along	
with the	name entered	in tex	kt box, y	when t	he user click	s the OK button			
4. Create a	screen that ha	as inp	ut boxe	s for U	ser Name, P	assword, Addres	s, Gender	(radio	
buttons f	for male and f	emale), Age	(numer	ric), Date of	Birth (Date Pick	et), State	(Spinner)	
and a Su	bmit button.	Un cli	cking th	ne subr	nit button, p	rint all the data b	below the s	Submit	
5 Design a	use ally layou	i) Micati	on to cr	eate no	age using Int	ent and one Butt	on and na	ss the	
Values fr	from one Activ	vitv to	second	l Activ	itv	ent and one Dut	on and pa	55 the	
6. Design a	n android app	olicati	on Send	1 SMS	using Intent				
7. Create an android application using Fragments									
8. Design a	an android ap	plicat	ion Usi	ng Rad	io buttons				
9. Design an android application for menu.									
10. Create a	user registrat	ion ap	plicatio	on that	stores the us	er details in a da	tabase tab	le.	

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING FOUR YEAR B.TECH DEGREE COURSE Scheme of Instruction and Examination (Effective from 2020-2021)

VII Se	emester CS	BS						(Scheme-	2020)
				S Ir pei	cheme istructi riods/w	of on reek	Scheme of Examination Maximum Marks		
S.No	Category	Course Title	Credits	L	T/D	Р	End Exam Marks	Internal Assessment Marks	Total Marks
Ι	Theory								
1.	PEC	Professional Elective-III	3	3	0	0	60	40	100
2.	PEC	Professional Elective-IV	3	3	0	0	60	40	100
3.	PEC	Professional Elective-V	3	3	0	0	60	40	100
4.	OEC	Open Elective-III	3	3	0	0	60	40	100
5.	OEC	Open Elective-IV	3	3	0	0	60	40	100
6.	HSSEC	Universal Human Values-2	3	3	0	0	60	40	100
Π	Practical								
7.	SC	IT Workshop Skylab/ Matlab	2	0	0	4	60	40	100
8.	INT	Summer Internship - II	3	0	0	0	0	100	100
			23						

VIII Semester CSBS (Scheme-2020)

				Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
S.No	Category	Course Title	Credits	L	T/D	Р	End Exam Marks	Internal Assessment Marks	Total Marks
Ι	INT	Internship	6	0	0	0	0	100	100
II	PROJ	Project Work	6	0	0	0	60	40	100
			12						

UNIVERSAL HUMAN VALUES-2 (UHV-2)

VII Semester :	Common for	all bra	ches				Sc	heme : 2020			
Course Code	Category	Ho	urs/We	eek	K Credits Maximum Marks						
HSSEC 701	HSSEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		3	0	0	3	40	60	100			
Sessional Exar	n Duration : 1	1/2 Hrs				End	Exam Dur	ation: 3 Hrs			
Course Outcon	mes: At the end	d of the	course	e the st	tudent will be	e able to					
CO1: Develop	a holistic persp	ective	based o	on self	-exploration	about themselves	s (human be	ing), family,			
society and nat	ure/existence.		_								
CO2: Understand the harmony in the human being, family, society and nature/existence											
CO3: Strengthen of self-reflection.											
CO4: Develop	a commitment	and cou	irage to	owards	s implementi	ng Human values					
UNIT – I											
Course Introduction - Need, Basic Guidelines, Content and Process for Value Education Purpose and motivation for the course, recapitulation from Universal Human Values, Self-Exploration-											
Purpose and motivation for the course, recapitulation from Universal Human Values. Self-Exploration– what is it? - Its content and process: 'Natural Acceptance' and Experiential Validation- as the process											
for self-explora	tion. Continuo	us Hap	piness	and P	rosperity- A	look at basic Hu	iman Aspira	ations. Right			
understanding,	Relationship a	nd Phys	sical Fa	acility	- the basic re	equirements for f	ulfillment o	of aspirations			
of every human	n being with the	eir corr	ect pri	ority.	Understandir	ng Happiness and	Prosperity	correctly- A			
critical apprais	al of the curren	t scena	rio. M	ethod	to fulfill the	above human as	pirations: u	nderstanding			
and living in ha	rmony at vario	us level	s. Incl	ude pr	actice session	ns to discuss natu	ral acceptar	ice in human			
existence) rathe	er than as arbitra	ariness	in choi	ice bas	sponsionity ed on liking.	disliking	lisilip, naili	iony and co-			
				UN	IT - II						
Understanding	g Harmony in t	the Hu	man B	eing -	Harmony in	n Myself					
Understanding	human being as	s a co-e	xistend	ce of the	he sentient 'I	' and the material	l 'Body'. U	nderstanding			
the needs of S	elf ('I') and 'H	Body'-	happi	ness a	and physical	facility. Underst	anding the	Body as an			
instrument of "	I' (I being the d	loer, se	er and	enjoy	er). Understa	inding the charact	eristics and	activities of			
'I' and harmon	y in 'I'. Under	rstandiı	ng the	harmo	ony of I with	n the Body: Sany	am and He	ealth; correct			
appraisal of Ph	ysical needs, m	neaning	of Pro	osperit	y in detail.	Programs to ensu	ure Sanyam	and Health.			
Include practic	e sessions to di	iscuss t	he role	e other	s have playe	ed in making mat	erial goods	available to			
me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss											
program for en	suring health vs	dealin	g with	diseas	e						
				UN	III – III						
Understanding	g Harmony in t	the Far	nily ar	nd Soc	iety- Harmo	ony in Human- H	luman Rela	ationship			
Understanding	values in hun	nan-hui	nan re	elation	ship; meanii	ng of Justice (ni	ine univers	al values in			
relationships) a	and program fo	or its f	ulfilme	ent to	ensure mutu	al happiness; Tr	ust and Re	spect as the			
foundational va	alues of relation	nship. U	Jnderst	tanding	g the meanin	ng of Trust; Diffe	rence betwe	een intention			

and competence. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive

Human Goals. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family. Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives

UNIT - IV

Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

Understanding the harmony in the Nature. Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence of mutually interacting units in all- pervasive space. Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

UNIT - V

Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics. **a**. Ability to utilize the professional competence for augmenting universal human order. **b**. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems. **c**. Ability to identify and develop appropriate technologies and management patterns for above production systems. Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order: **a**. At the level of individual: as socially and ecologically responsible engineers, technologists and managers **b**. At the level of society: as mutually enriching institutions and organizations. Sum up. Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

Text Books

R R Gaur, R Asthana, G P Bagaria, "A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

R R Gaur, R Asthana, G P Bagaria, "Teachers' Manual for A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantak, 1999.

2. A. N. Tripathi, "Human Values", New Age Intl. Publishers, New Delhi, 2004.

3. The Story of Stuff (Book).

4. Mohandas Karamchand Gandhi "The Story of My Experiments with Truth"

5. E. FSchumacher. "Small is Beautiful"

6. Slow is Beautiful –Cecile Andrews

7. J C Kumarappa "Economy of Permanence"

8. Pandit Sunderlal "Bharat Mein Angreji Raj"

9. Dharampal, "Rediscovering India"

10. Mohandas K. Gandhi, "Hind Swaraj or Indian Home Rule"

11. India Wins Freedom - Maulana Abdul Kalam Azad

12. Vivekananda - Romain Rolland(English)

13. Gandhi - Romain Rolland (English)

Web References:

- 1. https://nptel.ac.in/courses/109/104/109104068/
- 2. https://aktu.ac.in/hvpe/ResourceVideo.aspx

Question Paper Pattern:

Internal Assessment: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions and the student should answer any one question from each unit. Each Question carries 12 marks.

IT WORKSHOP SKYLAB / MATLAB (ITWM)

Course Code Category Hours/Week Credits Maximum Marks SCCB01 SC L T P C Continuous Internal Assessment End Exam TOTAL SccB01 SC L T P C Continuous Internal Assessment End Exam TOTAL SccB01 SC L T P C Continuous Internal Assessment End Exam TOTAL SccB01 SC L T P C Continuous Internal Assessment End Exam TOTAL SccB01 SC L T P C Continuous Internal Assessment End Exam TOTAL SccB01 Understand the Building and managing workspace End Exam Duration: 3 Hrs CO1: Understand the Building and managing workspace CO2: Define and compose matrices and sub matrices to solve linear equations CO3: Display axis labels and annotations, and testing programming functions CO4: Examine relations between I/O arguments CO5: Calculate and validating the arguments	VII Semest	er :CSBS						S	cheme : 2020		
SCCB01 SC L T P C Continuous Internal Assessment End Exam TOTAL Sessional Exam Duration : 2 Hrs - - 4 2 40 60 100 Sessional Exam Duration : 2 Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs Course Outcomes : At the end of the course the student will be able to CO1: Understand the Building and managing workspace CO2:Define and compose matrices and sub matrices to solve linear equations C03: Display axis labels and annotations, and testing programming functions CO4: Examine relations between I/O arguments CO5: Calculate and validating the arguments C05: Calculate and validating the arguments Ist of Experiments Ist of Experiments 1. Programs using mathematical, relational expressions and the operators. 2 2. Vectors and Matrices: Programs using array operations and matrix operations (such as matrix multiplication).Programs on input and output of values. 3. Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops 4. Programs based on scripts and user-defined functions 5. Programs based on stripts and user-defined functions 6. 5. </th <th>Course Code</th> <th>Category</th> <th>Но</th> <th>ours/W</th> <th>'eek</th> <th>Credits</th> <th>Max</th> <th>timum Mar</th> <th>ks</th>	Course Code	Category	Но	ours/W	'eek	Credits	Max	timum Mar	ks		
- - 4 2 40 60 100 Sessional Exam Duration : 2 Hrs End Exam Duration: 3 Hrs Course Outcomes : At the end of the course the student will be able to CO1: Understand the Building and managing workspace CO2:Define and compose matrices and sub matrices to solve linear equations CO3: Display axis labels and annotations, and testing programming functions CO4: Examine relations between I/O arguments CO5: Calculate and validating the arguments I. Programs using mathematical, relational expressions and the operators. 2. Vectors and Matrices: Programs using array operations and matrix operations (such as matrix multiplication).Programs on input and output of values. 3. Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops 4. Programs based on scripts and user-defined functions 5. Programs on Built-in text manipulation functions and conversion between string and number types. 6. Programs based on Advanced Plotting Techniques. 8. Programs based on Advanced Plotting Techniques. 8. Programs based on sound files and image processing	SCCB01	SC	L	Τ	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
Sessional Exam Duration : 2 Hrs End Exam Duration: 3 Hrs Course Outcomes : At the end of the course the student will be able to CO1: Understand the Building and managing workspace CO2:Define and compose matrices and sub matrices to solve linear equations CO3: Display axis labels and annotations, and testing programming functions CO4: Examine relations between I/O arguments CO5: Calculate and validating the arguments CO5: Calculate and validating the arguments Ist of Experiments 1. Programs using mathematical, relational expressions and the operators. 2. 2. Vectors and Matrices: Programs using array operations and matrix operations (such as matrix multiplication).Programs on input and output of values. 3. 3. Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops 4. Programs based on scripts and user-defined functions 5. 5. Programs based on work and elseif claures. Programs based on Data Transfer 7. Programs based on Advanced Plotting Techniques. 8. 8. Programs based on sound files and image processing			-	-	4	2	40	60	100		
Course Outcomes :At the end of the course the student will be able to CO1: Understand the Building and managing workspace CO2:Define and compose matrices and sub matrices to solve linear equations CO3: Display axis labels and annotations, and testing programming functions CO4: Examine relations between I/O arguments CO5: Calculate and validating the arguments I. Programs using mathematical, relational expressions and the operators. 2. Vectors and Matrices: Programs using array operations and matrix operations (such as matrix multiplication).Programs on input and output of values. 3. Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops 4. Programs based on scripts and user-defined functions 5. Programs on Built-in text manipulation functions and conversion between string and number types. 6. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer 7. Programs based on Advanced Plotting Techniques. 8. Proorrams based on sound files and image processing	Sessional E	xam Duration :	2 Hrs				En	d Exam Du	ration: 3 Hrs		
 CO1: Understand the Building and managing workspace CO2:Define and compose matrices and sub matrices to solve linear equations CO3: Display axis labels and annotations, and testing programming functions CO4: Examine relations between I/O arguments CO5: Calculate and validating the arguments 1. Programs using mathematical, relational expressions and the operators. 2. Vectors and Matrices: Programs using array operations and matrix operations (such as matrix multiplication).Programs on input and output of values. 3. Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops 4. Programs on Suilt-in text manipulation functions and conversion between string and number types. 6. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer 7. Programs based on Advanced Plotting Techniques. 8. Programs based on sound files and image processing 	Course Out	tcomes :At the er	nd of th	e cours	se the stu	udent will b	e able to				
 CO2:Define and compose matrices and sub matrices to solve linear equations CO3: Display axis labels and annotations, and testing programming functions CO4: Examine relations between I/O arguments CO5: Calculate and validating the arguments I. Programs using mathematical, relational expressions and the operators. 2. Vectors and Matrices: Programs using array operations and matrix operations (such as matrix multiplication).Programs on input and output of values. 3. Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops 4. Programs based on scripts and user-defined functions 5. Programs on Built-in text manipulation functions and conversion between string and number types. 6. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer 7. Programs based on Advanced Plotting Techniques. 8. Programs based on sound files and image processing 	CO1: Unde	rstand the Buildin	ng and	managi	ing worl	space					
 CO3: Display axis labels and annotations, and testing programming functions CO4: Examine relations between I/O arguments CO5: Calculate and validating the arguments List of Experiments Programs using mathematical, relational expressions and the operators. Vectors and Matrices: Programs using array operations and matrix operations (such as matrix multiplication).Programs on input and output of values. Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops Programs on Built-in text manipulation functions and conversion between string and number types. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer Programs based on Advanced Plotting Techniques. Programs based on sound files and image processing 	CO2:Define	e and compose m	atrices	and su	b matric	es to solve	linear equations				
 CO4: Examine relations between I/O arguments CO5: Calculate and validating the arguments List of Experiments Programs using mathematical, relational expressions and the operators. Vectors and Matrices: Programs using array operations and matrix operations (such as matrix multiplication).Programs on input and output of values. Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops Programs on Built-in text manipulation functions and conversion between string and number types. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer Programs based on Advanced Plotting Techniques. Programs based on sound files and image processing 	CO3: Display axis labels and annotations, and testing programming functions										
List of Experiments 1. Programs using mathematical, relational expressions and the operators. 2. Vectors and Matrices: Programs using array operations and matrix operations (such as matrix multiplication).Programs on input and output of values. 3. Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops 4. Programs based on scripts and user-defined functions 5. Programs on Built-in text manipulation functions and conversion between string and number types. 6. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer 7. Programs based on Advanced Plotting Techniques. 8. Programs based on sound files and image processing	CO4: Examine relations between I/O arguments										
List of Experiments 1. Programs using mathematical, relational expressions and the operators. 2. Vectors and Matrices: Programs using array operations and matrix operations (such as matrix multiplication).Programs on input and output of values. 3. Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops 4. Programs based on scripts and user-defined functions 5. Programs on Built-in text manipulation functions and conversion between string and number types. 6. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer 7. Programs based on Advanced Plotting Techniques. 8. Programs based on sound files and image processing	CO5: Calcu	late and validating	ng the a	rgume	nts						
 Programs using mathematical, relational expressions and the operators. Vectors and Matrices: Programs using array operations and matrix operations (such as matrix multiplication).Programs on input and output of values. Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops Programs based on scripts and user-defined functions Programs on Built-in text manipulation functions and conversion between string and number types. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer Programs based on Advanced Plotting Techniques. Programs based on sound files and image processing 					List of E	Experiment	5				
 Vectors and Matrices: Programs using array operations and matrix operations (such as matrix multiplication).Programs on input and output of values. Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops Programs based on scripts and user-defined functions Programs on Built-in text manipulation functions and conversion between string and number types. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer Programs based on Advanced Plotting Techniques. Programs based on sound files and image processing 	1. Progra	ams using mather	natical.	relatio	onal exp	ressions and	the operators.				
 multiplication).Programs on input and output of values. 3. Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops 4. Programs based on scripts and user-defined functions 5. Programs on Built-in text manipulation functions and conversion between string and number types. 6. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer 7. Programs based on Advanced Plotting Techniques. 8. Programs based on sound files and image processing 	2. Vecto	rs and Matrices: 1	Program	ns usin	g array	operations a	and matrix operat	ions (such a	s matrix		
 Selection Statements: Experiments on if statements, with else and elseif clauses and switch statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops Programs based on scripts and user-defined functions Programs on Built-in text manipulation functions and conversion between string and number types. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer Programs based on Advanced Plotting Techniques. Programs based on sound files and image processing 	multipli	cation).Programs	on inp	ut and	output c	of values.					
 statements. Loop Statements and Vectorizing Code: Programs based on the concepts of counted (for) and conditional (while) loops 4. Programs based on scripts and user-defined functions 5. Programs on Built-in text manipulation functions and conversion between string and number types. 6. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer 7. Programs based on Advanced Plotting Techniques. 8. Programs based on sound files and image processing 	3. Select	ion Statements: E	Experin	nents of	n if state	ements, with	n else and elseif c	lauses and s	witch		
 and conditional (while) loops 4. Programs based on scripts and user-defined functions 5. Programs on Built-in text manipulation functions and conversion between string and number types. 6. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer 7. Programs based on Advanced Plotting Techniques. 8. Programs based on sound files and image processing 	stateme	nts. Loop Stateme	ents and	d Vecto	orizing (Code: Progr	ams based on the	concepts of	counted (for)		
 Programs based on scripts and user-defined functions Programs on Built-in text manipulation functions and conversion between string and number types. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer Programs based on Advanced Plotting Techniques. Programs based on sound files and image processing 	and con	ditional (while) le	oops								
 Programs on Built-in text manipulation functions and conversion between string and number types. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer Programs based on Advanced Plotting Techniques. Programs based on sound files and image processing 	4. Progra	ams based on scri	pts and	user-d	lefined f	unctions					
 6. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer 7. Programs based on Advanced Plotting Techniques. 8. Programs based on sound files and image processing 	5. Programs on Built-in text manipulation functions and conversion between string and number types.										
 Programs based on Advanced Plotting Techniques. Programs based on sound files and image processing 	6. Programs based on two main data structures: cell arrays and structures. Programs based on Data Transfer										
8. Programs based on sound files and image processing	7. Progra	ams based on Adv	vanced	Plottin	g Techn	iques.					
or regrams cases on sound most and mage processing	8. Progra	ams based on sou	nd files	and ir	nage pro	ocessing					

List of Open Electives - OEC-I & OEC-II

Open Elective Courses (OEC-I)		
S.No	Course Title	
1.	Optimization Techniques	
2.	Remote Sensing & GIS	
3.	Introduction to JAVA	
4.	Internet of Things	
5.	Scientific Programming with Python	
6.	Introduction to Database Systems	
7.	Ethical Hacking	
8.	Entrepreneurship Development	
9.	Introduction to Information Systems	
10.	Neural Networks & Fuzzy Logic	

Open Elective Courses (OEC-II)											
S.No	Course Title										
1.	Renewable Energy Sources										
2.	Industrial Safety										
3.	Web Technologies										
4.	Introduction to Cyber Security										
5.	Nano Technology										
6.	Disaster management										
7.	Project management										
8.	Advanced Information Systems										
9.	Product Lifecycle Management										
10.	Industry 4.0										
OPTIMIZATIONTECHNIQUES (OT)											
---	--	------------	---	------------	-----------------	--	--------------------------	-----------------	--	--	--
V Semest	er : B.Tech						Se	cheme : 2020			
Course Code	Category	Hou	rs/V	leek	Credi ts	Ma	ximum Ma	rks			
OEC301	OEC - I	L	T	Р	C	Continuous Internal AssessmentEnd ExamTotal					
Sessional	Evam Duratio	 ວກ • 1	U 5 H#	-	3		d Exam Du	100			
Sessional Exam Duration: 1.5 mrs End Exam Duration: 3 Hrs											
Course Outcomes. At the end of the course the student will be able to											
Course Outcomes: At the end of the course the student will be able to											
CO1: Understand the concepts of Optimization and solve linear programming problems											
CO3: Solv	ve the enginee	ring pi	proh	leme	using K	uhn tucker co	nditions an	d Lagrangean			
multiplier	method	iiig	probl		using K		nuntions an	u Lagrangcan			
CO4: Solv	re the engineer	ing n	roble	ms 11	sing dyn	amic program	ning techniq	านค			
CO5: App	ly non-tradition	nal or	ntimi	zatior	technio	ues to solve en	gineering p	roblems			
	iy non tradition		, , , , , , , , , , , , , , , , , , , ,	Zatioi	UNIT - 1		<u></u>				
Ontimiza	UNIT - 1										
Optimization: Introduction, Historical Development, Engineering Applications of											
Optimization, Classification of Optimization problems.											
Linear Programming Problems:											
Simplex r	Simpley method Big-M method Sensitivity Analysis Duality Dual simpley method										
Interpreta	tion.		,	001101		aijoio, Duairej	, <i>Dua</i> <u>biii</u>	pion method,			
L					UNIT-2						
Integer P	rogramming T	echn	iane	•							
Simple an	nlications of ir	nteger	nro	• orami	ming so	lution methods	of integer	nrogramming_			
Branch ar	nd Bound Algor	rithm	Cut	ting I	Plane Alo	orithm	, or integer	programming			
Dianon a	ia Doulla riigoi		, ou		UNIT-3						
Classical	Ontimization	Tech	niau	les:							
Single var	riable optimizat	ion w	vith a	and w	vithout c	onstraints mu	lti – variable	e optimization			
with and	without constra	aints	met	hods	of Lagra	nge multipliers	Kuhn-Tucl	ker conditions			
with and		,	11100.	nouo	UNIT-4	inge maniphero	, 1141111 1401				
Dynamic	Programming	Tech	niai	1e:							
Elements	of dynamic pr	ogran	nmin	g mo	del Bac	k ward recursi	ve equation	Applications			
of Dynam	ic	ogran		.5	uei, Due	i wara recursi	ve equation	, inpplications			
Programm	ning to Linear r	progra	mmi	ing ar	nd Capita	al budgeting.					
	<u> </u>	- 8 -	-	8	UNIT-5						
Genetic A	lgorithm:										
Introducti	on. Difference	betw	veen	Gene	tic Algor	rithm and Tra	ditional Me	thods. Simple			
Genetic Algorithms, Similarity Templates (Schemata), Genetic algorithm operators –											
selection, crossover and mutation. Simple applications of GA.											
Evolutionary Algorithms:											
Evolutionary Algorithums: Ant colony algorithm, Tabu search algorithm and Particle											
swam opt	imization algor	ithm.		5	C	-	U				
TextBook	(S:										
1.Rao S.S	1.Rao S.S, -Optimization, Wiley Eastern, New Delhi, 1995										
L	•		~			·					

2. S.D. Sarma, -Operations Research, Kedarnath Ramnath & Co

3. David E.Goldberg,-Genetic Algorithms, Pearson Education

ReferenceBooks:

1. HamdyA.Taha, -Operations Research, Prentice Hall of India.

2. Kalyanmoy Deb,-Optimization for Engineering Design, Prentice Hall, New Delhi, 2000

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain subquestions. The student shall answer one question from each unit.

REMOTE SENSING & GIS (RSGIS)									
V Semester: I	B.Tech.						Schem	ne: 2020	
Course	Category	Ног	irs/W	'eek	Credits	Maxi	mum Mark	S	
OEC302	OEC-I	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		3	I	-	3	40	60	100	
Sessional Exa	m Duration:1	.5 Hrs	5			End Ex	am Duratio	n: 3 Hrs	
Course Outco	mes • At the er	nd of t		urse the	e student w	vill be able to			
CO1: Underst	and the Photos	gramm	etry,	EDM a	and Total s	station surveyir	g principles	to solve	
surveying problems using appropriate tools and techniques.									
CO2: Understand the concepts of remote sensing and interpretation methods.									
CO3: Unders	tand the impor	tance of	$\frac{\text{of mag}}{\text{GIS}}$	$\frac{\text{ps, con}}{\text{and it}}$	cept of ma	ip projections.	data model	spotial	
analysis.	tand the conco	ept of	015	and n	s applicati	ons, unierent	uata models	s, spatiai	
CO5: Under	rstand the prin	nciples	s used	d in C	SNSS and	Drone survey	ving, data c	ollection	
methods, error	in observation	ns and	correc	ctions.					
				UNI	Γ-Ι				
<i>Aerial Photogrammetry:</i> Stereoscopy– 3-D Model – Height determination using Parallax Bar– Digital Elevation Model (DEM) – Slope.									
<i>Land Surveying:</i> Various Levels – Levelling methods–Total Station– EDM– Working principle – Parts of Total Station – Capabilities and applications of Total Station– Traversing – Triangulation and Trilateration.									
				UNIT	Г - II				
<i>Remote Sens</i> Resolutions – S Sensing Data I and digital inte	Sing: Basic Spectral. Spatia Products – PA erpretation met	concep al, Ten N – M thods.	ot– E nporal lultisp	Electron and R bectral,	magnetic adiometric Microway	spectrum– Sp c – Platforms ar ve, Thermal, Hy	bectral sign nd Sensors – yper spectral	ature – - Remote – Visual	
				UNIT	– III				
<i>Maps:</i> Import Plotting accu geographical,	tance of maps tracy – Map map projection	s to en sheet is,map	ginee nun datun	ering p nbering n–MS	projects – ' g – Coor L,Geoid, S	Types of maps dinate system Spheroid,WGS	s– Scales an s – Cartes -84.	nd uses– sian and	
				UNIT	– IV				
<i>GIS:</i> Introdu DBMS – C Interpolation	ction– Data reation of D –Buffer, Over	Source Databas lay – T	es – ses (Ferrai	Data spatia n Moo	Models and no delling and	nd Data Struc n-spatial) – l Network ana	ctures– Alg Spatial ana lysis.	orithms, alysis –	
<i>Remote Sensing and GIS Applications:</i> Land use / Land cover classification – Rainfall- runoff studies – Flood and drought impact assessment and monitoring – Regional and urban planning and management – GIS based highway alignment.									
UNIT - V									
<i>GNSS:</i> Principle used – Components of GNSS– Data collection methods – DGPS – Errors in observations and corrections.									

Drone Surveying: Working principle – Benefits of drones in surveying – Applications – Interior and exterior drone surveying – Calculation of length, area and stockpile volume.

Text Books:

1. M. Anji Reddy, *Text Book of Remote Sensing and Geographic Information System*, BSPublication.

2. Lo C.P. &Yeung A.K.W., *Concepts and Techniques of GIS*, Prentice-Hall of India, New Delhi.

3. Thomas Lillesand, Ralph W Kiefer and Jonathan Chipman, *Remote Sensing and Image Interpretation*, John Wiley & Sons, India.

4. Hofmann-Wellenhof, Lichtennegger and Wasle, *GNSS: Global Navigation Satellite Systems*, Springer -Verlag Wein, New York.

Reference Books:

1. B.Bhatta, *Remote sensing and Geographic Information System*, Oxford Publications.

2. Siddiqui M.A., Introduction to Geographical Information System, ShardaPustakBhavan, Allahabad.

3. Curran, Paul J, Principles of Remote Sensing, Longman, London.

4. Floyd F Sabins Jr., *Remote Sensing Principles and Interpretation*, Freeman and Co., San Francisco.

Web References:

1. <u>https://nptel.ac.in/courses/105/101/105101206/</u>

2. https://nptel.ac.in/courses/105107155

3. <u>https://nptel.ac.in/courses/105/107/105107194/</u>

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

	INTRODUCTION TO JAVA (ITJ)									
V Semester : B.Te	ch						S	cheme : 2020		
Course Code	Category	Ho	urs/V	Veek	Credits	Maxi	imum Ma	rks		
OEC303	OEC- I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional Exam D	uration 1½ Hrs					End	Exam Du	ration: 3 Hrs		
Course Outcomes	: At the end of the	e cou	rse th	e stude	nt will be a	ble to				
CO1: Understand f	undamentals of oc	ops co	ncept	s, inpu	t and outpu	t				
CO2: Understand the classes and objects.										
CO3: Understand the Inheritance and interfaces										
CO5: Understand the exception handling										
UNII – I Object oriented concepts: Fundamentals, Overview of Java, Data types, variables, Operators, control										
statements, Reading console input, writing console output, arrays.										
UNIT – II										
Introducing Classes: Class fundamentals, declaring objects, introducing methods, Constructors, this										
keyword, finalize										
			1	<u>UNIT -</u>	- III	<u> </u>	~	<u> </u>		
Inheritance: Inherit	tance basics, using	g supe	r, met	thod ov	erriding, ab	stract class, using	g final with	i inheritance,		
Interfaces: Defining	g interface, implei	nenti	ng mu		_ IV					
String Handling: S	String constructor	s. Spe	ecial s	string o	perations.	character extracti	on, string	comparison.		
searching strings, n	nodifying strings.	String	gBuff	er class	s and its me	thods.	ion, sung	eomparison,		
			2	UNIT	$-\mathbf{V}$					
Exception Handli exceptions, creating	ng: Fundamental g your own except	s, exo tion su	ceptic ubclas	on type sses.	es, try, catc	h, throw, throw	s, finally.	Java built-in		
Text Books :										
1. Herbert Schildt	[2008], [9th Editi	ion], [Гhe С	Comple	te Referenc	e Java2, TATA	McGraw-l	Hill.		
2. E Balaguruswam	y [2007], [3 rd Edi	ition],	Prog	rammin	ng with Java	, A Primer, TAT	A McGraw	7- Hil.		
Reference Books	•									
1. Bruce Eckel [20	08], [2nd Edition], Thi	nking	<u>g in Jav</u>	va, Pearson	Education.	1			
2. H.M Dietel and	2. H.M Dietel and P.J Dietel [2008], [6th Edition], Java How to Program, Pearson Ed.									
Question Paper Pa	attern:									
The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.										
The question paper for End examination shall be for 60 marks. The Question paper shall contain Five										

V - Semester : B. Tech Scheme : 2020 Course Code Course Category Credits Maximum Marks OEC304 OEC-1 L T P C Continuous Internal End Exam TOTAL Exam OEC304 OEC-1 L T P C Continuous Internal End Exam TOTAL Exam OEC304 OEC-1 L T P C Continuous Internal End Exam TOTAL Exam Ourse Outcomes :At the end of the course the student will be able to Course Outcomes :At the end of the course the student will be able to OCO: Understand the purpose of sensors and Actuators in IoT Cog: Analyze Various IoT Protocols CO2: Understand Raspherry-Pi Processor and Rasphian Operating Systems OC9: Understand Raspberry-Pi Processor and Rasphian Operating Systems UNIT – I Introduction to IoT: Our Sensor, and Logical Design, IoT Enabling Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoT Levels and Deployment Templates, IoT Vs M2M Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – II Wireless Technologies and Data Transmission for IoT: WINT – II Wireless Technologies and Data Transmission for IoT: UNIT – I			П	NTERN	ЕТ С	OF THINGS	(IoT)					
Course Code Course Category Hours/Week Credits Maximum Marks OEC304 OEC-1 L T P C Internal Assessment End TOTAL Sessional Exam Duration : 1 ½ Hrs F C Assessment End Exam TOTAL Sessional Exam Duration : 1 ½ Hrs Hrs F Assessment End Exam TOTAL Course Outcomes : At the end of the course the student will be able to Go 100 Exam Course Course of the course the student will be able to Go 100 CO3: Understand the basic knowledge of Internet of things and its design CO2: Understand Raspberry-Pi Processor and Actuators in IoT CO3: Analyze Various IoT Protocols CO4: Understand Raspberry-Pi Processor and Raspbian Operating Systems CO4: UNIT - I Introduction to IoT: UNIT - I Internet of the course in Aduators in IoT CO4: UNIT - I Sensing and Actuators UNIT - II UNIT - II Internet of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT - II Wireless Technologies and Data Transmission for IoT: UNIT - I	V - Semest	er: B.Tech					х <i>с</i>	Schen	ne: 2020			
Code Category Image: Continuous in the probability of the probability	Course	Course	Hou	rs/We	ek	Credits	Maxim	um Marl	KS			
OEC304 OEC-I L T P C Continuous Internal Assessment End Exam TOTAL 3 3 - 3 40 60 100 Sessional Exam Duration : 1 ½ Hrs Fr End Exam Duration: 3 Hrs End Exam 100 Course Outcomes : At the end of the course the student will be able to CO1: Understand the basic knowledge of Internet of things and its design 000 CO2: Understand the basic knowledge of Internet of things and its design 000 000 CO2: Understand the purpose of sensors and Actuators in IoT 005 000 CO3: Understand the purpose of sensors and Actuators in IoT 005 000 CO4: Design IoT Projects Using Arduino UNIT - I 1 Introduction to IoT: UNIT - I 1 Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoTLevels and Deployment Templates, IoT Vs M2M 100 UNIT - II 1 100 100 Sensing and Actuation: UNIT - II 100 UNIT - II 100 100 100 Wireless Technologies and Data Transmission for IoT:	Code	Category										
OEC304 OEC-I L T P C Internal Assessment End TOTAL Exam 0 Sessional Exam Duration : 1 ½ Hrs End Exam Duration : 3 Hrs End Exam Duration : 3 Hrs Course Outcomes : At the end of the course the student will be able to CO:: Understand the basic knowledge of Internet of things and its design CO:: Understand the purpose of sensors and Actuators in IoT CO3: Analyze Various IoT Projects Using Arduino CO5: Understand The purpose of sensors and Actuators in IoT CO3: Analyze Various IoT Projects Using Arduino CO3: Understand the purpose of sensors and Raspbian Operating Systems CO4: Design IoT Projects Using Arduino CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems CO5: Understand Content of IoT Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoTLevels and Deployment Templates, IoT Vs M2M UNIT - II Sensing and Actuators: purpose of Sensors and Actuators in IoT UNIT - II Wireless Technologies and Data Transmission for IoT: Wirelas, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT - V Building IoT with Arduino: Arduino IDE, Programming of Arduino, Interfaci			_			_	Continuous					
Assessment Lxam 3 - - 3 40 60 100 Sessional Exam Duration : 1 ½ Hrs End Exam Duration : 3 Hrs Course Outcomes : At the end of the course the student will be able to CO1: Understand the basic knowledge of Internet of things and its design CO2: Understand the purpose of sensors and Actuators in IoT CO2: Understand the purpose of sensors and Actuators in IoT CO3: Understand the purpose of sensors and Actuators in IoT CO4: Design IoT Projects Using Arduino CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems UNIT - I Introduction to IoT: Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoTLevels and Deployment Templates, IoT Vs M2M UNIT - II Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT - II Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC, Serial Transmission, RS-232, RS-485, I.2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT - V	OEC304	OEC-I	L	Т	Р	С	Internal	End	TOTAL			
csessional Exam Duration : 1 / 4 Hrs Hrs End Exam Duration : 3 Hrs Course Outcomes : At the end of the course the student will be able to CO: Understand the basic knowledge of Internet of things and its design CO2: Understand the purpose of sensors and Actuators in IoT CO3: Analyze Various IoT Protocols CO3: Understand the purpose of sensors and Actuators in IoT CO3: Analyze Various IoT Protocols CO4: Understand the purpose of sensors and Actuators in IoT CO3: Understand the purpose of sensors and Actuators in IoT CO5: Understand the purpose of sensors and Raspbian Operating Systems CO4: Design IoT Projects Using Arduino CO5: Understand the purpose of sensors and Actuators in IoT UNIT – I Introduction to IoT: Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoTLevels and Deployment Templates, IoT Vs M2M UNIT – II Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – II WieNeax, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC, Serial Transmission RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:							Assessment	Exam				
Sessional Exam Duration : 1 1/2 Hrs Hrs End Exam Duration: 3 Hrs Course Outcomes: At the end of the course the student will be able to CO: Understand the purpose of sensors and Actuators in IoT CO2: Understand the purpose of sensors and Actuators in IoT CO: CO2: Understand the purpose of sensors and Actuators in IoT CO3: Analyze Various IOT Protocols CO6: Understand Raspberry-Pi Processor and Raspbian Operating Systems CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems CO5: Understand Raspberry Pi Processor and Raspbian Operating Systems CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems CO5: Understand Raspberry Pi Pi Processor S, Actuator, Different types of Sensors, Actuator, Different types of Actuators, purpose of Sensors and Actuators in IoT UNIT - II UNIT - II Wireless Technologies and Data Transmission for IoT: Wireless Technologies and Data Transmission for IoT Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Int				-	-	3		60	100			
Coli: Understand the basic knowledge of Internet of things and its design CO2: Understand the purpose of sensors and Actuators in IoT CO3: Understand the purpose of sensors and Actuators in IoT CO4: Design IoT Projects Using Arduino CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems CO5: Understand the Junt - I Introduction to IoT: Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoTLevels and Deployment Templates, IoT Vs M2M UNIT - II Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT - III Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, R8-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT - IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT -V Raspberry PI : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions, Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga, Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the In	Sessional	Exam Duration	:1 4/2	Hrs H	rs	the studen	End Exam I	Juration	: 3 Hrs			
CO2: Understand the basic knowledge of Interfiet of utings and its design CO2: Understand the purpose of sensors and Actuators in IoT CO3: Analyze Various IoT Protocols CO4: Design IoT Projects Using Arduino CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems UNIT – I Introduction to IoT: Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoTLevels and Deployment Templates, IoT Vs M2M UNIT – II Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – II Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions, Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet of Things,Apress,2016.	Course	tand the basis kn	end of	the co	urse	the studen	t will be able to					
CO3: Analyze Various IGT Protocols CO3: Analyze Various IGT Protocols CO4: Design IGT Protocols CO4: Design IGT Protocols CO4: Design IGT Protocols CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems CO5: Understand Concessor and Concessor Systems UNIT – II Sensing and Actuations: UNIT – III Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall,	CO2: Understand the purpose of sensors and Actuators in IoT											
CO3: Maryae various information of the system of the sy	CO3: Analyze Various IoT Protocols											
CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems UNIT – I Introduction to IoT: Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoTLevels and Deployment Templates, IoT Vs M2M UNIT – II Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – II Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch, potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi: Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions, Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga, Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.	CO4: Design IoT Projects Using Arduino											
UNIT – I Introduction to IoT: Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoTLevels and Deployment Templates, IoT Vs M2M UNIT – II Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – II Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, GPS, RFID with Arduino UNIT –V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.	COE: Under	stand Rasnherry-	Pi Proc	ACCOT 3	nd R	asphian Or	perating Systems					
UNIT – I Introduction to IoT: Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoTLevels and Deployment Templates, IoT Vs M2M UNIT – II Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – II Wieless Technologies and Data Transmission for IoT: Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT – V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1 ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,20	CO 5. Onder	stand Raspberry-		c5501 a	nu r		Scrating Systems					
Introduction to IoT: Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoTLevels and Deployment Templates, IoT Vs M2M UNIT – II Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – III Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.					UN	IT – I						
Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoTLevels and Deployment Templates, IoT Vs M2M UNIT – II Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – III Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permission s, Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.	Introducti	on to IoT:			01							
Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoTLevels and Deployment Templates, IoT Vs M2M UNIT – II Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – III Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT – V Raspberry Pi: Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permission 9, Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.			a									
Technologies, IoTLevels and Deployment Templates, IoT Vs M2M UNIT – II Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – III Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.	Definition a	Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling										
UNIT – II Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – III Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.	Technologies, IoTLevels and Deployment Templates, IoT Vs M2M											
Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – III Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch, potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi: Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions, Processes, Linux Graphic user Interface, Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books: ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016. 	UNIT – II											
Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – III Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT – V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.	Sensing an	nd Actuation:										
Differenttypes of Actuators, purpose of Sensors and Actuators in IoT UNIT – III Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.	Definition o	f Sensor Sensor f	eatures	Resol	utio	n Classes I	Different types of ser	sors Acti	iator			
UNIT – III Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT – V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.	Differenttyn	es of Actuators n	urnose	of Sen	sors	and Actuat	ors in IoT	15015, ACU	iator,			
 Wireless Technologies and Data Transmission for IoT: Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT – V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016. 	Difference	cs of Actuators, p	urpose	UI DUI		$\frac{110 \text{ Actual}}{11 \text{ T} - 111}$						
Wieless Feelmologies and Data Humanisation for for: SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino : Arduino, Interfacing LED, switch, potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.	Wireless T	echnologies an	d Data	Tran	smi	ssion for	ΙоТ·					
Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart,Zigbee/Zigbee smart, Cellular, NFC,Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT – V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.		cennologies an	u Duu	. II ull	51111	551011101	1011					
Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch,potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.	Wi-Max, Wi	-Fi (802.11), Blue	tooth/l	Bluetoc	oth s	mart,Zigbe	e/Zigbee smart, Cellı	ılar, NFC,	Serial			
SerialATA, Parallel Transmission UNIT – IV Building IoT with Arduino:Arduino IDE, Programming of Arduino, Interfacing LED, switch, potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016. 3.	Transmissio	on, RS-232, RS-48	5, I2C	Inter-I	nteg	rated Circu	it, Ethernet, CAN bu	s, USB, Fi	rewall,			
UNIT – IV Building IoT with Arduino: Arduino IDE, Programming of Arduino, Interfacing LED, switch, potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.	SerialATA, I	Parallel Transmiss	sion									
 Building IoT with Arduino: Arduino IDE, Programming of Arduino, Interfacing LED, switch, potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi: Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions, Processes, Linux Graphic user Interface, Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : ArsheepBahga, Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. Adeel Javed , Building Arduino Projects for the Internet of Things,Apress,2016. 					UN	IT – IV						
LED, switch, potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, ,GPS, RFID with Arduino UNIT –V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet of Things,Apress,2016.	Building I	oT with Arduin	o:Ardu	ino IDI	E, Pr	ogramming	g of Arduino, Interfac	cing				
UNIT –V Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet ofThings,Apress,2016.	LED, switch	,potentiometer, S	ensors,	LCD, I	Blue	tooth, Wi-F	Fi, ,GPS, RFID with A	rduino				
 Raspberry Pi : Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. Adeel Javed , Building Arduino Projects for the Internet of Things,Apress,2016. 					UN	IT –V						
 Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions, Processes, Linux Graphic user Interface, Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : ArsheepBahga, Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. Adeel Javed , Building Arduino Projects for the Internet of Things,Apress,2016. 	Raspherry	Pi:			01	II V						
 Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions, Processes, Linux Graphic user Interface, Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : ArsheepBahga, Vijay Madisetti, Internet of Things: A Hands-On Approach Paperback, 2015 Rajkumar Bhuyya, Internet of Things : Principles and Paradigms, 2016. Adeel Javed, Building Arduino Projects for the Internet of Things, Apress, 2016. 	maspherry											
 Permissions , Processes, Linux Graphic user Interface , Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. Adeel Javed , Building Arduino Projects for the Internet of Things,Apress,2016. 	Linux basic	s, Linux File sy	stem, 2	Naviga	ting	the File s	system, Text Editor	s, Access	ing Files,			
 Arduino, Operating system benefits, Raspberry Pi Set up, Configuration, Text Books : ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. Adeel Javed , Building Arduino Projects for the Internet of Things,Apress,2016. 	Permissions	, Processes, Linu	ıx Grap	ohic us	er Ir	iterface, R	aspberry Pi Processo	or, Raspbe	erry Pi Vs			
Text Books : 1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. 3. Adeel Javed , Building Arduino Projects for the Internet of Things,Apress,2016.	Arduino, Operating system benefits, Raspberry Pi Set up, Configuration,											
 ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015 Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. Adeel Javed , Building Arduino Projects for the Internet of Things,Apress,2016. 	Text Books :											
 Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016. Adeel Javed , Building Arduino Projects for the Internet of Things, Apress,2016. 	1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback,2015											
3. Adeel Javed , Building Arduino Projects for the Internet of Things, Apress, 2016.	2. Rajkumar Bhuyya ,Internet of Things : Principles and Paradigms,2016.											
	3. Adee	l Javed , Building	Arduin	o Proje	ects f	for the Inte	rnet ofThings,Apress	s,2016.				
	L											

4. Wolfram Donat, Learn Raspberry-Pi with Python, Apress, 2016

Web References:

- 1. https://nptel.ac.in/courses/106105166/
- 2. <u>https://onlinecourses.nptel.ac.in/noc17_cs22/course</u>
- 3. https://nptel.ac.in/courses/108108098/4
- 4. https://onlinecourses.nptel.ac.in/noc19_ee28

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam:

SCIENTIFIC PROGRAMMING WITH PYTHON (SPY)										
V Semester:	B.Tech						Schen	ne: 2020		
Course Code	Category	Hou	rs/We	ek	Credits	Ma	ximum Marks			
OEC305	OEC - I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional E	xam Duratio	n: 1½	² Hrs			End E	xam Duration:	3 Hrs		
	1		0.1			11 11				
Course Out	comes: At the	e end	of the of	course	student Will	be able to				
CO2: Apply the concents of Leans lists Experience and Dromeking										
CO2: Apply the concepts of Loops, lists, Functions and Branching.										
CO4: Learn	to visualize m	athem	atical f	ig and	is and mathe	matical calculat	ions			
CO5: Work	on Dictionar	ies an	d Strin	gs.						
CO6: Apply the concepts of Object Oriented Programming.										
UNIT–I										
UNIT-1Getting Started with Python: The First Example: Hello, World!, Different Ways to Use Python.Computing with Formulas: Programming Simple Mathematics, Variables and Variable Types, Formatting Text Output, Importing Modules, Pitfalls When Programming Mathematics.UNIT-IILoops and Lists: Loops for Automating Repetitive Tasks, Boolean Expressions, Using Lists to Store Sequences of Data, Iterating Over a List with a for Loop, Nested Lists and List Slicing, Tuples.Functions and Branching: Programming with Functions, Function Arguments and Local Variables, Default Arguments and Doc Strings, If-Tests for Branching the Program Flow, Functions as Arguments to Functions, Solving Equations with Python Functions, Writing Test										
				UN	IT–III					
User Input an exec, Readin Modules.	d Error Ha g Data from	ndlin Files	g: Rea , Writi	ding U ng Da	User Input D ta to Files,	Data, Flexible U Handling Erro	Jser Input with rs in Programs,	eval and Making		
				UN	IT–IV					
 Arrays and Plotting: NumPy and Array Computing, Plotting Curves with Matplotlib, Plotting Discontinuous and Piecewise-Defined Functions, Making a Movie of a Plot, More Useful Array Operations. Dictionaries and Strings: Dictionaries, Example: A Dictionary for Polynomials, Example: Reading File Data to a Dictionary, String Manipulation. 										
UNIT– V										
Classes: Basics of Classes, Protected Class Attributes, Special Methods, Example: Automatic Differentiation of Functions, Test Functions for Classes, Example: A Polynomial Class. Object-Oriented Programming: Class Hierarchies and Inheritance, Example: Classes for Numerical Differentiation, Example: Classes for Numerical Integration.										

Text Books :

1. Joakim Sundnes, Introduction to Scientific Programming with Python, Springer Open, 2020. **Reference Books :**

1. Christian Hill, Learning Scientific Programming with Python, Cambridge University Press, 2 edition, 2020.

Web References:

1. https://www.tutorialspoint.com/scipy/index.htm

- 2. <u>https://realpython.com/</u>
- 3. <u>https://www.w3schools.com/python/scipy/index.php</u>

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

INTRODUTION TO DATABASE SYSTEMS (IDBS)										
V Semester : B.	Tech	-				-		Scheme : 2020		
Course Code	Category	Ηοι	irs/W	eek	Credits	Max	ximum Ma	rks		
OEC306	OEC - I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional Exam	Duration1½ I	Irs	<u> </u>	1		E	nd Exam D	ouration: 3 Hrs		
Course Outcom	es: At the end	of the	e cou	rse th	e student v	vill be able to				
CO1: Understand the concepts of Database Management Systems and Entity Relationship Modelling.										
CO2: Use SQL commands to create, retrieve, update, and delete data from the Data base.										
CO3: Comprehe	end the concept	s of N	Jorma	alizati	on techniq	ues				
CO4: Understan	d the properties	s of T	ransa	ctions	s in a Data	base System.				
CO5: Understan	d Concurrency	Cont	rol te	chniq	ues and Re	ecovery System.				
				J	JNIT – I					
Introduction: In	ntroduction to		S, Pu	irpose	of Databa	ase Systems, Data	ibase Syster	n Applications,		
View of Data, Data Models, Database Users, Database Architecture.										
Entity-Relationship Diagrams, Modeling using ER Diagrams, Reduction of an E-R Schema to Tables										
UNIT – II Deletional Onema Language SOL D.(. D. S. V. L. C. L. D. (. M. L. L.										
Language Comr key, Select Cla Matching, Order Join Operations.	nands and Data use, Where C r By, Group By	a Con lause, y, Set	trol I , Log	Langu gical ration	age Comn Connectiv s – Union	hands, Candidate ity's – AND, O , Intersect and M	Key, Prima R, Range inus, Aggre	ry key, Foreign Search, Pattern gate Functions,		
				U.	NIT - III					
Relational Dat Normalization, H Form, Third Nor	abase Design: Functional Deportmal Form, Boy	Fea enden vce Co	tures icy, T odd N	of (ypes) lorma	Good Rela of Normal l Form (B0	ational Database Forms - First Nor CNF)	Designs, 1 rmal Form,	Decomposition, Second Normal		
				U	NIT – IV					
Transactions: A Concurrent Exec Serializability :	ACID propertion cutions. Conflict Serial	es, Ti izabil	ransao ity, V	ction View S	States, Im Serializabil	plementation of	Atomicity	and Durability,		
				U	NIT – V					
Concurrency Control: Lock-Based Protocols – Locks, Granting of Locks, The Two-Phase Locking Protocol.										
Recovery System: Failure Classification, Log-Based Recovery, Shadow Paging Technique										
 Database System Concepts, Abraham Silberschatz, Henry F. Korth and S. Sudarshan, McGraw Hill, 7 th Edition, 2019. 										
Reference Book	(S:									
1. Principles of	Database and l	Know	ledge	e - Ba	se System	s, J. D. Ullman, V	ol. 1, 2016.			
2. Fundamental	Is of Database S	syster	$\frac{\text{ns. R}}{\text{R}}$. Elm	asri and S.	Navathe, 7th Edi	tion, 2017.	morry [1]:11 21		
5. Data Base M	lanagement Sys	stems,	, Kagi	nu Ka	makrisnna	and Joinannes G	enrke, MCG	naw miii, sru		

Edition, 2014.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	ETHICAL HACKING (EH)									
V Semester	B.Tech					Scheme : 2020				
Course Code	Category	He	ours/W	'eek	Credits	Max	timum Ma	arks		
OEC307	OEC - I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional E	xam Duration 1	1/2 Hrs				End	Exam Du	iration: 3 Hrs		
Course Out	tcomes : At the e	nd of th	ne cour	se the st	tudent will	be able to				
CO1: Unde	rstand the basics	of secu	rity and	d ethica	l hacking.	. 1				
CO2: Understand about foot printing and types of attacks in social engineering.										
CO4: Understand the importance of web server backing database backing and SOL Injection										
CO5: Unde	rstand about Wire	eless te	chnolo	$\frac{1}{\text{gies}}$ int	rusion dete	ection and firew	alls			
			Cimoro		T I		u115.			
Introductio	n to Ethical He	okina	Introd	luction	$\mathbf{I} = \mathbf{I}$	fundamentals S	ecurity te	sting Hackers		
Introduction to Ethical Hacking: Introduction, Security fundamentals, Security testing, Hackers and Crackers description. Ethical Hackers										
Technical Foundations of Hacking: The Hacking process, Information Security Systems and the										
Stack.										
UNIT – II										
Foot printing: Information Gathering Methodology, OS Fingerprinting, Fingerprinting Services,										
Enumeration, System Hacking.										
Social Engineering: Social Engineering, Malware threats, Vulnerability analysis.										
UNIT – III										
Sniffers: P	assive sniffing,	Active	sniffi	ng, AR	P,ARP po	isoning and M	AC flood	ling, tools for		
sniffing, wi	re shark, sniffing	and spo	oofing	counter	measures.	1	·			
Session Hi	jacking: Transp	ort lay	er Hija	acking,	Applicatio	on layer Hijacl	ang, Sess	ion Hijacking		
1 0015. Denial of S	ervice: DoS attac	k techr	iques	Distrib	ited DoS	DDoS tools				
Demai or S			iiques,	District						
				UNIT	$\Gamma - IV$					
Web Server	r Hacking: HTT DoS/ DDoS and	TP prot	ocol, s ttacks	canning	, web serv	ers, Banner gra	bbing and	Enumeration,		
Database H	acking: Introduc	ction to	SOL a	and SOL	_ injection	and categories.	Finger pri	nting. UNION		
Exploitation	technique, Boo	lean in	SQL	injection	n attacks,	Out-of band ex	ploitation,	exploring the		
time-delay S	SQL injection tec	chnique	, Store	d proce	dure SQL	injection and m	itigations,	SQL injection		
hacking too	ls.									
				UNI	$\Gamma - V$					
Wireless To	echnologies, Mo	bile Se	curity	: Mobil	e device o	peration and se	curity, Wi	reless LAN's-		
Basics, Wireless LAN frequencies and signalling, Wireless LAN security.										
Text Books:										
1. Micheal	1. Micheal Gregg,"Certified Ethical Hacker (CEH) Cert Guide", Pearson education, 2020.									
Reference Books:										
1 FC Corr	incil "Ethical Ua	<u>ekina a</u>	nd Car	Intermo	acurac(CEI	H)" CENGACE	Learning	2020		
2 Sai Sati	ish "Hacking Sec	rets Par	10 COL 1-1" In	dian Se	rvers 2018	II, CENUAUE	Learning,	2020.		
3. David I	Litchfield.Chris A	nlev"T	The Dat	abase H	lackers Ha	ndbook:Defend	ing Databa	ase Servers".		
	,						0	,		

Wiley.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

ENTREPRENEURSHIP DEVELOPMENT (EDP)										
V Semeste	r: B.Tech						Scheme	: 2020		
Course Code	Category	H	ours Wee	s / k	Credits	Maximum	Maximum Marks			
OEC308	OEC - I	L	Т	Р	С	Continuous Internal Assessment	us End T int Exam			
		3	-	-	3	40	60	100		
Sessional l	Exam Duration :	1 ን	⁄2 Hr	S		End Exam D	uration :	3 Hrs		
Course Outcomes : At the end of the course, students will be able to										
CO1: Analyse the role of entrepreneurship in economic development										
CO2:Understand rural entrepreneurship and small enterprises										
CO3: Examine the project reports										
CO4: Understand the ownership structure of company and women entrepreneurship in										
India										
CO5: Understand the support by specified institutions for entrepreneurship development										
UNIT – I										
Entrepreneur: Concept of an entrepreneur; Definition of an entrepreneur; Types of										
entrepreneurs; Characteristics of an entrepreneur.										
Entrepreneurship: Introduction; Elements of entrepreneurship; Six important segments										
of entrepr	eneurship envir	roni	nent	; A	dvantages	of entrepreneurshi	p; Barri	ers to		
entreprene	ursnip; Role of er	itrej	oren	eurs.	nip in econ	omic development.				
Rural Ent	renreneurshin	Mea	ninc	r Ne	ed: Retros	nection of miral indi	ustrializa	tion in		
India; Prob Small Ent economic d	lems of rural entr erprises: Definit evelopment; Prob	repr tion	enet of is fac	urshi SSI; ced t	p; Developr Types, Ch by SSI.	nent plan for rural en aracteristics of SSI;	treprenet Role of	arship. SSI in		
	1 /			τ	JNIT – III					
Project Pla Formulation Financial F	anning: Project I n; Methods of P easibility and Ec	den roje ono	tifica ct A mic I	ation ppra Feas:	; Project So usal – Mar ibility.	election; Project Repo ket Feasibility, Techr	rt – Cont nical Fea	tents & sibility,		
O	Stree strees of	<u>_1_</u>	Dee	U	JNIT – IV	nte analie Campage		anatima		
Selection of Women En	f appropriate own	ners in	hip s Ind	struc ia: I	torship; Pa eture. Introduction	rthership; Company r; Policies and Scher	mes for	Women		
Entreprene	urs; Factors Ini	iue or V	Nom	g th on F	e women	Entrepreneursnip; Ty	pes of	women		
UNIT – V										
Institutional Finance: Commercial banks: Other Financial Institutions – IFCI, IRBI,										
SFC, SIDC & EXIM Bank.										
Institutional Support: Need; Support to Small Entrepreneurs – DICs, Industrial infrastructure corporation, and National institute for MSME, Incubation Centers (Government and private).										
Text Book	S:									
Prof. Satish	ı C. Ailawadi & M	lrs.	Rom	v Ba	nerjee, "Pri	nciples of Entreprene	urship". I	Everest		

Publishing House.

S. S. Khanka, "Entrepreneurial Development", S. Chand, New Delhi.

Robert D. Hisrich, Michael P. Peters, Dean A. Sheperd, "Entrepreneurship", McGraw-Hill,6 ed.

Reference Books:

Poornima M. Charantimath, "Entrepreneurship Development and Small Business Enterprises", 2e, Pearson.

Arya Kumar, "Entrepreneurship", 4 e, Pearson.

Ram Chandran, "Entrepreneurial Development", Tata McGraw Hill, New Delhi

estion Paper Pattern:

ssional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Examination:

	INTRODUCTION TO INFORMATION SYSTEMS (IIS)									
V Semester : B.Tech Scheme : 2020										
Course Code	Category	Н	ours/V	Veek	Credits	Max	ximum Mar	•ks		
OEC309	OEC-I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional E	xam Duration 11/2	2 Hrs				E	nd Exam D	uration: 3 Hrs		
Course Out	tcomes : At the end	$\frac{1}{2}$ of the formula $\frac{1}{2}$	ne cour	se the st	tudent will	be able to	System Sof			
CO2: Unde	erstand the page rer	s of C lacer	vomput nent ar	d CPU	Scheduling	Algorithms	System Sor	tware.		
CO3: Unde	erstand the phases of	of sof	tware c	levelopr	nent life cy	cle and process m	odels.			
CO4: Desi	gn ER model for re	al life	e scena	rios		1				
CO5: Apply SQL commands to create, update, modify and retrieve data from the data bases.										
CO6: Apply normalization techniques to normalize the database										
				III	NIT _ I					
		0	C			T 4 1 4	<u> </u>	C 11		
Fundamentals of Computers & Computer Architecture: Introduction, Organization of a small										
Memory, Input/output devices, BUS, addressing modes										
System Software: Assemblers, Loaders and linkers, Compilers and interpreters.										
UNIT – II										
Onerating System: Introduction Management schemes, Dage replacement algorithms, Dracess										
managemen Software e software pro	t, CPU scheduling ngineering: Softw oject, software Dev	algor vare e elopn	ithms. enginee nent m	ering: In odels.	ntroduction	to Software eng	gineering, L	ife cycle of a		
				UN	IIT – III					
Relational models, Dat	Database Manag abase Users.	gemer	nt Sys	tem: In	troduction	to DBMS, the	database te	chnology, data		
Merits and I	Demerits of E-R m	odelir	ng.	liouucii		ins, wodening L-i		, Case Studies,		
			~	UN	IT – IV					
Structured Query Language (SQL): Introduction to SQL, Data types, Data Definition language commands, Data Manipulation Language Commands and Data control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectives – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations										
UNIT – V										
Normalization: Introduction, Need for Normalization, Process of Normalization, Types of Normal Forms (1NF, 2 NF, 3 NF & BCNF), Merits and Demerits of Normalization.										
Text Books	:									
L										

- 2. Campus Connect Foundation Program Computer Hardware and System Software Concepts, Programming Fundamentals- Vol. 1, INFOSYS
- 3. Campus Connect Foundation Program Relational Database Management System, Client Server Concepts, Introduction to Web Technologies Vol. 4, INFOSYS
- 4. Henry F. Korth& Abraham Silberschatz, Data Base System Concepts, 5th Edition, 2005, Mc Graw hill

Reference Books:

- 1. M. Morris Mano [2011], [3 rd Edition], Computer system architecture, Pearson Education, 2011.
- 2. Sommerville [2008], [7th Edition], Software Engineering, Pearson education.
- 3. Raghu Ramakrishna and Johannes Gehrke [2003], [3rd Edition], Data Base Management Systems, TATA McGraw Hill
- 4. Tanenbaum [2000], Modern Operating System, Pearson Education

Web References:

- 1. https://www.w3schools.com/sql/
- 2. https://www.geeksforgeeks.org/dbms/
- 3. https://www.tutorialride.com/software-engineering/software-engineering-tutorial.htm

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	NEURAL	NETV	VORK	SAN	DFUZZY	LOGIC (NN					
V Semester: B	3.Tech						Schen	ne: 2020			
Course Code	Course Category	Но	ours/W	eek	Credits	Max	ximum Mark	S			
OEC310	OEC-I	L	Т	P	P C Internal End Exam TO Assessment						
		3	0	0	3	40	60	100			
Sessional Exam	n Duration: 1	¹ / ₂ Hrs	5				l Exam Dura	tion: 3 Hr			
Course Outo	the states at the	ena oi	c the co		$\frac{1}{1}$	t will be able t	10				
COI: understar	nd the basic co	ncepts	of Neu	iral ne	etworks						
CO2: analyze S	Supervised Lea	arning	feedbac	ek net	works						
CO3: analyze I	Insupervised	earnir	ng feedl	back r	networks						
					ietworks.						
CO4: understar	nd concepts of	fuzzy	logic ai	nd fuz	zy set theo	ory					
CO5: To apply	the knowledg	e of Ne	eural N	etwor	ks & fuzzy	logic to real ti	me systems.				
				TINIT	TI						
I		1		UNI	$\frac{1-1}{1-1}$						
Dialogical may	o Neural Net	NORKS	and its	Basi itta m	c Concept		of activation	functions			
Noural natural	tons and Med		anu r	maral	louers of I	neuron, Types	of activation	unctions,			
avammlag East	types and adv	s, LIII	earry so	eparat	otre and mi	earry non-sepe	table systems	s and then			
representation	lures and adv	antage	s of he	rootio	n loorning	over statistical	uporvised les	rning and			
unsupervised le	earning proc	CSS, CI	101-0011		li leannig,	, concepts of s	upervised, iea	innig, and			
unsupervised it	carning			UNI	Г <u>–</u> П						
Supervised Le	arning Neura	l Netw	vorks	UI							
Single laver p	erceptron and	l mult	ilaver 1	percer	otron neur	al networks, t	heir architect	ure. Back			
propagation a	lgorithm. gen	eralize	d delta	a rule	e. learning	factors, ster	learning. N	Iomentum			
learning. Conc	ept of training	. testir	ng and	cross	validation	data sets for o	lesign and va	lidation of			
the Networks	opt of duming	,, ,,	ig und	•1000	, and all a second						
				UNIT	- III						
Unsupervised	Learning Neu	ıral No	etwork	S							
Competitive Le	earning networ	ks, kol	henen s	elf-or	ganizing n	etworks, K-me	ans and LMS				
algorithms, RB	F neural netwo	ork and	d its str	ucture	, Hybrid tı	raining algorith	m for RBF ne	ural			
networks, Com	parison of RB	F and I	MLP no	etworl	ks Learnin	g, Hebbian lear	ning, Hopfiel	d			
networks.											
				UNIT	$\Gamma - IV$						
Fuzzy logic											
Basic Fuzzy lo	ogic theory, se	ts and	their p	roper	ties, Opera	tions on fuzzy	set, Fuzzy re	elation and			
operations on f	fuzzy relations	and ex	xtensio	n prin	ciple, Fuzz	zy membership	functions and	l linguistic			
variables, Fuzz	y rules and fu	izzy re	asoning	g, Fuz	zification	and defuzzifica	ation and their	r methods,			
Fuzzy inference	e systems										
				UNI	$\Gamma - V$						
Applications o	of Neural Netv	vorks	& Fuzz	zy sys	tems						
Applications of	t Neural Netw	orks: F	attern	classi	tication, H	andwritten cha	racter recogni	ition, Face			

recognition, Image compression and decompression

Applications of Fuzzy Logic & Fuzzy System: Fuzzy pattern recognition, Fuzzy image processing, Simple applications of Fuzzy knowledge-based controllers like washing machines, traffic

regulations, and lift control

Text Books :

- 1. Timothy J. Ross, Fuzzy Logic with Engineering Applications, John Wiley and sons, 3/e, 2010.
- 2. S. Haykin, Neural Networks, A Comprehensive Foundation, Pearson Education Inc.3/e, 2008.
- 3. Jacek. M. Zurada, -Introduction to Artificial Neural Systems, Jaico Publishing House, 2006.
- 4. LaureneFausett, Fundamentals of Neural Networks-Architectures, algorithms and applications, Pearson Education Inc., 2004.
- 5. J.S.R. Jang, C.T. Sun, E. Mizutani,, -Neuro Fuzzy and Soft Computing A computational Approach to Learning and Machine Intelligence, Pearson Education Inc., 2002.

6. Bart Kosko, Neural networks and Fuzzy Systems, Pearson Education

Reference Books :

1. T.Pradeep, Nano: The Essentials Understanding Nano Science and Nano Technology, Tata McGraw Hill, 2013.

2. Richard Booker and earl Boyson, Nanotechnology: The Fun and Easy Way to Explore the Science of Matters Smallest Particle, Wiley Publications, 2011.

Web References:

- 1. S. Rajsekaran and G. A. VijaylakshmiPai, Neural Networks, Fuzzy Logic, and Genetic Algorithms, PHI
- 2. N. Sivanandam, S. Sumathi, and S. N. Deepa, Introduction to Neural Network Using MATLAB11, Tata McGraw-Hill Publications
- S.N.Sivanandam. M.Pau1Raj, Introduction to Artificail Neural Networks, Vikas Publication House Pvt.Ltd, NewDelhi

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam:

RENEWABLE ENERGY SOURCES (RES)										
VI Semester	B.Tech					S	Scheme	: 2020		
Course Code	Category	F	Iou We	rs/ ek	Credit s	Maxim	um Ma	rks		
OEC311	OEC - II	L	т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional Exa	m Duration :	1	1∕2	Hrs]	End Exam D	uratio	ı:3 Hrs		
Course Outcom	mes : At the e	eno	1 of	the	course	students wil	l be abl	le to		
CO1:Understan	nd various sou	irc	es	of er	nergy ar	nd solar geom	netry.			
CO2:Describe t	he process of	ha	arne	essir	ng solar	energy in the	e form	of heat.		
CO3:Explore bas	ic terms of wind	l a	nd t	the e	xtraction	of energy from	n wind.			
CO4:Understan	d the technol	log	gies	inv	olved ir	n extraction	of bior	nass		
energy and geot	thermal Energ	y.								
CO5: Understan	nd Tidal, Wave		nd	Ocea	an energ	gy conversion	n metho	ds and		
	concepts of emerging technologies. UNIT – I									
Principles of e World energy s Fundamentals radiation- Sola length-Estimat surface and til principle & class	sources-Importance of renewable energy sources and energy chain- Principles of energy conservation –Energy conservation opportunities. World energy status & Energy Scenario in India. Fundamentals of Solar Energy: Extra-terrestrial and terrestrial radiation- Solar constant and solar radiation geometry- time and day length-Estimation of monthly average daily total radiation on horizontal surface and tilted Solar surface-Measurements of radiation data. Basic principle & classification of PV cell UNIT – II									
water heating- refrigeration sy solar drier-sola	solar passive stem – Solar pond.	sc s th	pac pac ern	ce h nal p	eating ower ge	and cooling	system ar Dist	- Solar is-Solar illation-		
			τ	JNIJ	L – III					
Wind Energy: Origin of wind-nature of winds-Applications of wind power –energy estimation of wind – power extraction from wind-Betz limit-Components of wind turbine- horizontal axis wind turbine & vertical axis wind turbine -Types of blades UNIT – IV Biomass Energy: Photosynthesis process. Biomass conversion										
technologies- I the digester pe production. Geothermal I	Biogas producerformance –	Bi	on om of	- Ty ass geo	proce vpes of liquefac thermal	digester- Fa ction – Biom	ctors a ass to	ffecting ethanol -Energy		

conversion through geothermal energy resources-Environmental consideration

 $\mathbf{UNIT} - \mathbf{V}$

Ocean Thermal Energy Conversion: Principle of OTEC- Anderson and Claude cycles, Tidal and Wave energy conversion methods

Emerging Technologies: Principle of magneto hydro dynamics, Fuel cell, Hydrogen energy

Text Books:

1. B.H. Khan, Non-conventional Energy Sources, 3rd edition TMH Publishers, New Delhi

2. G.D Rai, Non-conventional Energy Sources, Khanna Publishers, New Delhi

Reference Books:

- 1. Suhas P.Sukhatme., Solar energy: Principles of thermal collection and storage, Tata McGraw Hill publishing Co. Ltd
- 2. S. Rao and Paulekar, Energy Technology, Khanna Publishers, New Delhi
- 3. H. P. Garg, J. Prakash, Solar energy fundamentals and applications, Tata McGraw Hill publishing Co. Ltd

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

	INDUSTRIAL SAFETY (IS)									
VI Semester	B.Tech						Se	cheme : 2020		
Course Code	Category	Hou	rs /We	ek	Credits	Maximun	a Marks			
		т	т	D	C	Continuous Internal	End	Total		
OEC312	OEC - II		1	ſ		Assessment	Exam	Total		
C · IF		3	-	-	3	40	60	100		
Sessional Exam	Duration : 17	2 Hrs				End E	xam Durat	ion: 3 Hrs		
Course Outeer	mage At the and	laftha	0.011#2	o atuda	anto vill h	a ahla				
Course Outcon	mes: At the end	i of the	cours	e, stude		e able	a a fatar a da			
accident invest	rigation	iples c	of safe	ty man	agement	including salety audit,	, safety edi	ication and		
CO2: To understand the causes and implication of fire and explosion and the preventive measures										
CO3: To understand machine and construction safety assessment and safeguarding methods										
CO4: I o unders	stand the effec	t of to:	xic sul	bstance	es and haz	ardous chemicals				
CO5:To under	stand the mode	es of el	lectric	al haza	ords and sa	afety measures in elec	trical and	information		
technology industries										
Safety in Engineering Industry- Safety need, General hazards and control measures in engineering										
Flixborough, Rana plaza), Safety audit- procedure										
Accident Investigation- Learning from accident, Layered investigations, Investigation process and										
summary	summary									
UNIT –II										
Fire Safety: The fire triangle, Explosions, Distinction between fire and explosions, Flammability										
characteristics	of liquids and	vapou	irs, Fi	re prol	tection tec	chniques, Fire extingu	ishers, Fire	e hazard and		
systems, Explo	sion proof equ	inmer	atter of the stand	instrur	nents	e, File detection, File		. mengnung		
	·····			III						
Machine Safe	tv. Machine	ouard	ίησ Ν	Vachine Aachine	e guardin	g assessment Safeg	uarding m	achines and		
equipment, Gu	ards. Safeguar	ding d	levices	s. Othe	r potentia	l safeguards	Jarung m	actimes and		
Construction	Safety: Sco	pe, Sa	afety	in -U	ndergrou	nd works, Above g	ground wo	orks, Under		
waterworks, D	emolition wor	ks.								
				U	NIT –IV					
Chemical Safe	e ty: Hazardou	s chen	nicals,	Defini	ition of a	hazardous chemical, '	Toxic effec	ets, Working		
with toxins, S	toring hazardo	ous che	emical	ls, Proc	cess hazai	ds, Transportation of	f hazardou	s chemicals,		
Chemical was	te managemen	nt, Haz	zardou	is cher	nical eme	ergency procedures,	Worker co	ntamination,		
Chemicals and	worker health	1								
					NIT - V	~				
Electrical Saf	fety: Electrica	ul dang	gers, I	Electric	cal pathw	ays, Static electricity	y, Result	of electrical		
contact, Shockversus electrocution, Electrical burns, Handling electrical hazards, Controlling										
IT Industry	Safety: Hazar	rdous	in IT	indust	try, Gene	ral precautions, Emr	olover's re	sponsibility,		
Employees responsibilities, Office ergonomics, Computer workstation – health & safety tips, Laptop										
safety precauti	ons									
Text Books:										
1. L. M. Deshr	and I F Lour	al Safe	ery and	i Mana al Proc	gement. N	ACGRAW HILL Education	n (India) Applicatio	ns) Prentice		
Hall, 2011.	and J. F. LOU	vai, Cl		ui i 100	css barety		rppileatio	115 <i>)</i> , 11011100		

3.Reese, Charles D. Industrial Safety and Health for People-oriented Services. CRC Press, 2008. 4. M. P. Poonia, S. C. Sharma. Industrial Safety and Maintenance Management. Khanna Book Publishing, 2019.

Reference Books:

- 1. Reese, Charles D. Industrial Safety and Health for Infrastructure Services. CRC Press, 2009.
- 2. R. K. Jain, Sunil S. Rao, Industrial Safety and Health and Environment Management Systems, Khanna Book Publishing, 2000.
- **3.** K. U. Mistry. Fundamentals of Industrial safety and Health, Siddharth Prakashan Publisher,2008. **Question Paper Pattern:**

Sessional Exam : The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

WEB TECHNOLOGIES (WT)								
VI Semester : 1	B.Tech				Scheme : 2020			
Course Code	Category	Ho	urs/W	eek	Credits	Maximum Marks		
OEC313	OEC - II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional Exan	n Duration : 1½	<u>Hrs</u>		.1 .	1 . 11	End E	xam Dura	tion: 3 Hrs
Course Outcon	nes: At the end	of the	course	the st	udent will	be able to		
CO1: Design a	web Page using	g Text.	Forma	tting I	ags, Hype	rlinks		
CO2: Develop a	a webpage with	mage	s, Tab. ng Iau	aScrin	t	<i>Asts</i> , C55.		
CO4: Design a	Form using HT	MI_F	ng Jav	z Cont	rols			
CO5: Understa	and the basic cor	ncepts	of PHI	P and d	latabase co	onnection using	XAMPP S	erver.
				UNIT	– I			
HTML5: Overview of HTML5 and other web technologies, HTML5 and its essentials, Fundamentals of HTML5, Working with Text and organizing Text in HTML, Working with Links and URLs.								
				UNIT	– II			
Images: Workin CSS: Overview Styles, Table La	ng with Images, of CSS, Backg ayouts,	Image ground	Maps s and	, Creat Color	ting Tables Gradients	s, Frames in CSS, Fonts	and Text	Styles, List
	,		l	U NIT -	- III			
JavaScript: Or Browser Objec Handling in Jav	verview of java ts, Document (aScript.	a scrip Object	ot, Fui , Doci	nctions ument	s, Events, Object M	Java script O Iodel, Validatio	bjects, Wo on, Errors,	orking with Exception
Forms: What's Controls, Subm Script, Interactiv	s a Form? Wha itting Data from ve Elements.	at Cor 1 forms	itrols s, Cust	are av tomizin	ailable? C	Creating a Form s in CSS, Form	n and add validation	ing HTML using Java
				UNIT	– V			
Introduction to PHP: Installing and Configuring PHP: Building PHP with Apache on Windows, The Basics of PHP scripts. The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, XAMPP Server configuration.								
1 HTML 5 Bla	ock Book 2nd F	dition	Drear	ntech I	$\mathbf{D}_{ress} = 2016$	5		
 Deitel and E Hall, 5th Ed 	Deitel and Nieto, ition, 2011.	—Inte	ernet a	nd Wo	orld Wide V	9. Web - How to P	Program ^{II} , P	rentice
3. Julie C. Mel	oni, PHP MySQ	L and	Apacl	ne, SA	MS Teach	yourself, Pears	on Education	on (2007).
Reference Bool 1. Web Technol 2015	<mark>ks:</mark> ologies, Uttam k	K. Roy	, Oxfo	rd Hig	her Educat	tion., 1st edition	i, 10th impi	ression,
2013. 2. Robert Patti Developmer	nson, Beginners nt,2018	Guide	e for H	TML a	and CSS W	Veb Design and	Web	
3. Jeffrey C an	d Jackson, —W	eb Tec	hnolo	gies A	Computer	Science		

PerspectivePearsonEducation, 2011.

4. Gopalan N.P. and Akilandeswari J., -Web Technology, Prentice Hall of India, 2011.

Web References:

1. https://www.tutorialspoint.com/Html/index.htm

2. https://www.w3.org/Style/CSS/

3. https://www.w3schools.com/php/

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	111	INOD			CIDER SE	CURITY(ICS)				
VI Semester :	B.Tech						Scho	eme : 2020		
Course Code	Category	Η	Hours/Week		Credits	Maxim	Maximum Marks			
OE314	OEC- II	L	Т	Р	С	Continuous Internal Assessment	us End I Exam TOTA			
		3	-	-	3	40	60	100		
Sessional Exar	n Duration1½ Hrs					End E	xam Durat	tion: 3 Hrs		
Course Outcon	mes :At the end of the	he cou	rse the st	tudent	will be able t	0				
<u> </u>										
CO1: Discrimi	nate and analyze the	e proble	$\frac{1}{2}$	ybercri	me.					
CO2: Identifyin	ze cybercrime issues	$\frac{01}{5}$ on wi	reless ar	nd moh	ile devices					
CO4: Use and	apply modern cyber	forens	sics tools	5.						
CO5: Analyze	the computer forens	ic prob	olems for	r feasib	ole solutions.					
				UNIT	– I					
Introduction	to Cybercrime:	Introd	luction,	Cybe	rcrime: De	finition and Ori	gins of t	he Word,		
Cybercrime a	nd Information S	ecurity	v, Who	are (Cybercrimin	als? Classificatio	ons of Cy	bercrimes,		
Cybercrime: T	The Legal Perspect	ives, C	Cybercri	mes: A	An Indian Po	erspective, Cybero	crime and	the Indian		
ITA 2000, A C	Blobal Perspective	on Cyb	percrime	es, Cyb	ercrime Era	: Survival Mantra	for the Ne	tizens.		
UNIT – II										
		D1			- II	0 · · 1 P1	<i>1 A 4</i>	1 0 1		
Cyber offense Engineering, O Vector Cloud	es: How Criminals Cyber stalking, Cy Computing.	Plan ber ca	Them– fé and (UNIT - Introc Cyberc	– II luction, Hov rimes, Botn	w Criminals Plan ets: The Fuel for	the Attac Cybercrin	eks, Social ne, Attack		
Cyber offense Engineering, C Vector Cloud	es: How Criminals Cyber stalking, Cyl Computing.	e Plan ber ca	Them– fé and (UNIT - Introc Cyberc JNIT -	– II luction, Hov rimes, Botn - III	w Criminals Plan ets: The Fuel for	the Attac Cybercrin	eks, Social ne, Attack		
Cyber offense Engineering, C Vector Cloud C Cyber crime Devices, Tren Challenges Por Security, Atta Organizational Mobile Compu	es: How Criminals Cyber stalking, Cyl Computing. Mobile and Win ds in Mobility, C sed by Mobile De cks on Mobile/Cel Measures for H uting Era, Laptops.	reless Fredit Vices, Il Photandling	Them– fé and C Device Card Fi Registry nes. Mc g Mobi	UNIT - Introc Cyberc UNIT - s: Intr rauds y Setti obile I le, Or	- II luction, How rimes, Both - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational	w Criminals Plan ets: The Fuel for roliferation of M and Wireless Com bile Devices, Au curity Implication Security Policie	the Attac Cybercrin Iobile and puting Era thenticatic s for Orga es and Mo	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in		
Cyber offense Engineering, C Vector Cloud C Cyber crime Devices, Tren Challenges Pos Security, Attac Organizational Mobile Compu	es: How Criminals Cyber stalking, Cyl Computing. Mobile and Win ds in Mobility, C sed by Mobile De cks on Mobile/Cel Measures for H uting Era, Laptops.	reless Fredit Vices, Il Phor andling	Them– fé and C Device Card Fr Registry nes. Mc g Mobi	UNIT - Introc Cyberc JNIT - s: Intr rauds y Setti obile I le, Or JNIT -	- II luction, How rimes, Both - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational - IV	w Criminals Plan ets: The Fuel for roliferation of M and Wireless Com bile Devices, Au curity Implication Security Policie	the Attac Cybercrin Mobile and puting Era thentications for Organiss for Organiss and Mo	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in		
Cyber offense Engineering, C Vector Cloud C Cyber crime Devices, Tren Challenges Por Security, Atta Organizational Mobile Compu Tools and Me Password Cra Steganography Phishing.	es: How Criminals Cyber stalking, Cyl Computing. Mobile and Win ds in Mobility, C sed by Mobile De cks on Mobile/Cel Measures for H ating Era, Laptops. ethods Used in C cking, Keyloggers , DoS and DDoS At	reless credit vices, ll Phot andling ybercus and ttacks,	Them– fé and C L Device Card Fr Registry nes. Mc g Mobi g Mobi	UNIT - Introd Cyberc UNIT - s: Intr rauds y Setti obile I le, Or UNIT - ntroduc res, V ection,	- II luction, Hor- rimes, Both - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational - IV ction, Proxy irus and W , Buffer Ove	w Criminals Plan ets: The Fuel for roliferation of M and Wireless Com bile Devices, Au curity Implication Security Policie Servers and And forms, Trojan Ho erflow, Attacks on	the Attac Cybercrin Iobile and puting Era thenticatic s for Orga es and Ma onymizers, rses and I wireless	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in Phishing, Backdoors, Networks,		
Cyber offense Engineering, C Vector Cloud C Over crime Devices, Tren Challenges Pos Security, Atta Organizational Mobile Comput Tools and Ma Password Cra Steganography, Phishing.	es: How Criminals Cyber stalking, Cyl Computing. Mobile and Win ds in Mobility, C sed by Mobile De cks on Mobile/Cel Measures for H ating Era, Laptops. ethods Used in C cking, Keyloggers , DoS and DDoS At	reless reless vices, Il Photandling yberch s and ttacks,	Them– fé and C Device Card Fi Registry nes. Mc g Mobi I rime: Ir Spywar SQL Inj	UNIT - Introd Cyberc UNIT - s: Intr rauds y Setti bbile I le, Or UNIT - ntroduc res, V ection,	- II luction, How rimes, Both - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational - IV ction, Proxy irus and W , Buffer Ove	w Criminals Plan ets: The Fuel for roliferation of M and Wireless Com bile Devices, Au curity Implication Security Policie Servers and And forms, Trojan Ho erflow, Attacks on	the Attac Cybercrin fobile and puting Era thenticatic s for Orga es and Mo onymizers, rses and 1 onymizers, wireless	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in Phishing, Backdoors, Networks,		
Cyber offense Engineering, C Vector Cloud C Cyber crime Devices, Tren Challenges Pos Security, Atta Organizational Mobile Compu Tools and Ma Password Cra Steganography, Phishing. Cyber Securi Web threats for Risks and Peri	es: How Criminals Cyber stalking, Cyl Computing. Mobile and Win ds in Mobility, C sed by Mobile De cks on Mobile/Cel Measures for H ating Era, Laptops. ethods Used in C cking, Keyloggers , DoS and DDoS At ty: Organizationa or Organizations, S ls for Organization	Feless Predit vices, Il Photandling yberch andling yberch and tacks, I Imp ecurity s, Soci	Them– fé and C Device Card Fr Registry nes. Mc g Mobi I rime: Ir Spywar SQL Inj Iication y and Pr fal Comp	UNIT - Introd Cyberc UNIT - s: Intr rauds y Setti obile I le, Or UNIT - ntroduc res, V ection, unit s: Int rivacy puting	- II luction, How rimes, Both - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational - IV etion, Proxy irus and W Buffer Ove - V roduction, C Implication and the asso	w Criminals Plan ets: The Fuel for roliferation of M and Wireless Com bile Devices, Au curity Implication Security Policie Servers and And forms, Trojan Ho erflow, Attacks on Cost of Cyber cri s. Social media poiated challenges	the Attact Cybercrin fobile and puting Era thenticatic s for Orga onymizers, rses and Ma onymizers, rses and I wireless mes and I marketing for Organi	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in Phishing, Backdoors, Networks, PR issues, g: Security izations.		
Cyber offense Engineering, C Vector Cloud C Over crime Devices, Tren Challenges Pos Security, Atta Organizational Mobile Computer Tools and Ma Password Cra Steganography, Phishing. Cyber Securi Web threats for Risks and Peri	es: How Criminals Cyber stalking, Cyl Computing. Mobile and Win ds in Mobility, C sed by Mobile De cks on Mobile/Cel Measures for H ating Era, Laptops. ethods Used in C cking, Keyloggers , DoS and DDoS At ty: Organizationa or Organizations, S Is for Organization	Feless Predit vices, Il Photandling yberch andling yberch and ttacks, I Imp ecurity s, Soci	Them– fé and C Device Card Fr Registry nes. Mc g Mobi I rime: Ir Spywar SQL Inj lication y and Pr al Comp	UNIT - Introd Cyberc UNIT - s: Intr rauds y Setti obile I le, Or UNIT - ntroduc res, V ection, s: Int rivacy puting	- II luction, How rimes, Both - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational - IV etion, Proxy irus and W Buffer Ove - V roduction, C Implication and the asso	w Criminals Plan ets: The Fuel for roliferation of M and Wireless Com bile Devices, Au curity Implication Security Policie Servers and And forms, Trojan Ho erflow, Attacks on Cost of Cyber cri s. Social media peiated challenges	the Attact Cybercrin fobile and puting Era thentication is for Orga onymizers, rses and Mo onymizers, rses and I wireless mes and I marketing for Organ	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in Phishing, Backdoors, Networks, PR issues, g: Security izations.		
Cyber offense Engineering, C Vector Cloud C Ovector Cloud C Devices, Tren Challenges Pos Security, Atta Organizational Mobile Compu Tools and Ma Password Cra Steganography Phishing. Cyber Securi Web threats for Risks and Peri Text Books: 1. Cyber Secu Godbole, S	es: How Criminals Cyber stalking, Cyl Computing. Mobile and Win ds in Mobility, C sed by Mobile De cks on Mobile/Cel Measures for H ating Era, Laptops. ethods Used in C cking, Keyloggers , DoS and DDoS At ty: Organizationa or Organizations, S ls for Organization ls for Organization	Feless Predit vices, Il Photandling yberch andling yberch and tacks, I Imp ecurity s, Soci Cyber ey.	Them- fé and C Device Card Fr Registry nes. Mc g Mobi I rime: Ir Spywar SQL Inj Iication y and Pr fal Comp Crimes,	UNIT - Introd Cyberc UNIT - s: Intr rauds y Setti obile I le, Or UNIT - ntroduc res, V ection, unit s: Int rivacy puting Comp	- II luction, How rimes, Both - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational - IV etion, Proxy irus and W Buffer Ove - V roduction, C Implication and the assoc	w Criminals Plan ets: The Fuel for roliferation of M and Wireless Com bile Devices, Au curity Implication Security Policie Servers and And forms, Trojan Ho erflow, Attacks on Cost of Cyber cri s. Social media petiated challenges	the Attact Cybercrin fobile and puting Era thentication is for Orga onymizers, rses and Mo onymizers, rses and I wireless mes and I marketing for Organi	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in Phishing, Backdoors, Networks, PR issues, g: Security izations.		

Reference Books:

1. Information Security, Mark Rhodes, Ousley, MGH.

2. CyberSecurityEssentials,JamesGraham,RichardHowardandRyanOtson,CRCPress.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

			NAI	ΙΤ Ο	ECHNOLOG	GY (NNT)			
VI - Sem	ester: B.Tecl	h					Schem	le: 2020	
Course	Course	Ho	urs/		Credits	Maximum Marks			
Code	Category	We	ek			a			
		-	T	р	C	Continuous	End	тотат	
OEC315	OEC-II	L	1	P	C	Internal	Enu Evam	IUIAL	
		2	_	-	2		<u>60</u>	100	
Sessiona	l Exam Dura	tion	1 ¹ /2	Hrs	5	End Exa	am Durat	ion: 3 Hrs	
Course	Outcomes: A	t the	end	of th	e course t	he student will b	e able to		
CO1: Un	derstand the p	orincij	ples b	ehind	l nanotechr	ology and nanoma	terials		
CO2: An	alyze the fabrio	catior	n, cha	racter	rization, an	d manipulation of	nanomate	rials,	
CO3: Un	derstand abou	ıt met	al nar	io pai	rticle based	sensors			
CO4: An	alyze about na	no wi	re bas	sed se	ensors.				
CO ₅ : Ur	nderstand Sens	sors B	ased	on Na	nostructur	es of Metal Oxides			
					UNIT – I				
Introdu	ction to Nand	otech	inolo	gy:			C		
Definition	1 of nanotechi	nolog	y; ma	in fe	atures of 1	nanomaterials; typ	es of nan	ostructures	
(OD,	1D, al	na (alaata	2 // [D ti.aa	structu	res); nanoco	mposites;	and the definition	
mainchen	nical/physical/	electi	rical/(u propert	les of nanomate	riais. Me	Thous for	
Migrogeo	izing the hand	omate	rians:	Ator Iootn	me Force	microscopy (AFM)), Scannin	g Electron	
witcrosco	by (SEM), 11ai	ISIIIIS	SI011 E	Jectro	$\frac{011 \text{ MICLOSC}}{11 \text{ NIT} - 11}$	opy (TEM), and Sp	ectroscopy	•	
Introdu	ction to Sens	ors'	Scier	ice a	nd Techn	ologu:			
Definition	n of sensors: m	ain el	emen	ts of	sensors: the	e parameters used t	for charact	erizing the	
performa	nce of sensors	acci	uracy.	prec	cision, sens	itivity, detection li	mit. dvna	mic range,	
selectivity	, linearity, reso	olutio	n, res	ponse	e time, hyst	eresis, and life cycl	e.	0,	
					UNIT -	-III			
Metal no	ano particle-	base	d Sei	isor	s:				
Definition	n of nano partic	cle; fe	ature	s of n	ano particl	es; and production	of nano pa	rticles by	
physical a	pproach (laser	ablat	tion) a	and cl	nemical app	proaches (Brust me	thod, seed	-mediated	
growth, et	tc.). Quantum I	Dot S	ensor	s. Def	finition of c	luantum dot; fabric	ation tech	niques of	
quantum	dots;				UNIT – IV	7			
Nanowi	re-based Sen	sors	:						
Definition	n of nanowires	; feat	ures c	of nar	nowires; fal	prication of individ	ual nanow	rire by top-	
down app	proaches and b	otton	n-up a	appro	aches; and	fabrication of nar	nowire arra	ays (fluidic	
channel, l	blown bubble f	ilm, c	ontac	t prii	nting, spray	v coating, etc.).Carb	on Nanoti	ubes-based	
Sensors: 1	Definition of ca	arbon	nano	tube;	features of	f carbon nanotubes	; synthesis	s of carbon	
nanotube	s.						-		
					UNIT -	V			
Sensors	Based on Na	nost	ruct	ures	of Metal	Oxide:			
Synthesis	of metal oxid	de str	uctur	es by	dry and	wet methods; type	es of meta	l oxide gas	
sensors (DD, 1D, and 2I)); de	fect c	hemi	stry of the	metal oxide sensor	s; sensing	mechanism	
ot metal-	oxide gas ser	nsors;	and	pore	ous metal-	oxide structures f	or improv	ved sensing	
applicatio	ons.								
1 ext Bo	OKS:	1	1 • •		N. NT ·	1 1 4 7 .	1		
1. Varghe	ese Thomas and	d Bala	akrish	na K	M, Nanot€	echnology: An Intro	duction to) and	
Synthesi	s, Properties	and	Applic	ation	is of Nanon	nateriais, Atlantic F	udiisners	ana	

Distributers(P) Ltd, 2012.

2. G.Mohan Kumar, Nanotechnology: Nanomaterials and Nano devices, Narosa Publications, 2016.

Reference Books :

1. T.Pradeep, Nano: The Essentials Understanding Nano Science and Nano Technology, Tata McGraw

Hill, 2013.

Richard Booker and earl Boyson, Nanotechnology: The Fun and Easy Way to Explore the Science of Matters Smallest Particle, Wiley Publications, 2011.

Web References:

1.https://nptel.ac.in/courses/118102003

2. online courses.nptel.ac.in/noc19_mm21/preview

3. online courses nptel.ac.in/noc22_ch11/preview

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam:

DISASTER MANAGEMENT (DM)										
VI Semester :B	B.Tech.						Scheme	: 2020		
Course Code	Category	Hou	rs/V	Veek	Credi	Maximum Marks				
	••••••				ts	Continuo				
						US				
050316	OFC II	L	Т	Р	С	Internal	End Evam	Total		
OEC310	OEC-II					Assessme	DAam			
		2			2	<u>nt</u>	60	100		
Sessional Exar	n Duration:	1.5H	rs	-	3	End Exan	1 Duratio	n: 3 Hrs		
Course Outcom	nes :At the	end o	f the	cours	se the stu	udent will be	able to			
CO1: Understa	and the defin	nition	s and	d tern	ninologie	s used in dis	saster			
management.										
CO2: Understa	and the type	s and	cate	egorie	s of disa	sters.				
CO3: Understa	ind the impa	$\frac{\text{act of}}{1}$	disa	sters	on socio	-economic at	nd enviror	iment.		
CO4: Plan Ior (usaster risk	t reau	lCtioi	n, mit	igation a	na managen	inent strate	egies.		
	ind the rela	lionsi	<u>up b</u>			pinent and d	isasters.			
Introduction:	Concepts	and d	efini	tions	disaster	r hazard vi	ılnerahilit	v risks		
severity. freque:	ncv and det	ails. c	capao	city. i	mpact. p	revention. m	itigation.	<i>y</i> , 110100,		
,,,,,			τ	JNIT ·	• II					
Disasters: Dis	asters class	ificati	ion							
Natural Disa	sters: Flo	ods,	drau	ught,	cyclone	es, volcano	es, earth	iquakes,		
tsunami, landsl	lides, coasta	al eros	sion,	soil e	rosion, f	orest fires et	с.,			
Manmade Disc	asters: Ind	ustria	al po	llutio	n – Artifi T	icial flooding	in urban	areas –		
Nuclear radiat	ion – Cher	nical	spil.	ls –	Transpo	rtation acci	dents –	l'errorist		
strikes, etc. – M		u coa	stal a	NIT -	TTT					
Disaster Imn	acts. Di	saste	r in	inact	s _Envi	ronmental	nhysical	social		
ecological econ	omic politi	cal e	to F	Jealth	- nevch	$o_{-social}$ is su	physical,	ographic		
aspects_Hazard	locations	- G	uloho	1 one	1 - psych 1 nation	ol disaster	trende _	Climate		
aspects-Hazard	i locations	- U	noba		i nation	ai uisasici	uciius –	Cillian		
	all ulsaster	5.	TT	NIT	TT7					
Disaster Risk	Reduction		0	<u> 1111 -</u>	. 1.					
Disaster Mar	naaement	Cuc	le	- its	s phas	es: Preven	tion. mi	tigation.		
preparedness,	relief and 1	recove	erv –	Risk	analysi	is, vulnerab	ility and	capacity		
assessment – E	arly warnin	g syst	ems	•	5	,	5	1 5		
Post-Disaster	Environme	ental	Res	pons	e (i.e. wa	ater, sanitat	tion, food	safety,		
waste managen	nent, diseas	se cor	ntrol,	secu	rity, and	l communica	ations) : F	Role and		
responsibilities	of governm	ient,	com	munit	y, local	institutions,	NGOs ar	nd other		
stakeholders -	Policies and	d legi	slatio	on for	[·] disaster	risk reduct	tion – Acti	vities of		
National Disast	er Managen	nent A	Autho	ority.						
			τ	JNIT	- V					
Disasters, Env	vironment d	and D)evel	opme	ent:Facto	ors affecting	vulnerabil	ity such		
as impact of	developme	ntal	proj	ects	and en	vironmental	modifica	tions –		
Sustainable a	nd enviror	nment	al f	friend	ly reco	very – Red	construction	on and		

development methods.

Text Books:

1. PradeepSahni, Disaster Risk Reduction in South Asia, PHI, New Delhi.

2. Ghosh G.K., Disaster Management, APH Publishing Corporation.

3. Singh B.K., *Handbook of Disaster Management Techniques & Guidelines*, Rajat Publication.

4. V. K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, Delhi,

Reference Books:

1. A Status Report Publication of the Govt. of India, Ministry of Home Affairs, National Disaster Management Division, *Disaster Management in India*.

2. A. S. Arya, AnupKaranth, and Ankush Agarwal, *Hazards, Disasters and Your Community; A Primer for Parliamentarians*, GOI–UNDP Disaster Risk Management Programme.

3. Inter Agency Standing Committee (IASC) (Feb. 2007). IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings. Geneva: IASC.

Web References:

http://ndma.gov.in/ (Home page of National Disaster Management Authority) 2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).

3. <u>www.odihpn.org</u>, *Disaster Preparedness Programme in India. A Cost Benefit Analysis*, Commissioned and Published by the Humanitarian Practice Network 'at ODI HPN.

4. www.empowerpoor.org, Drought in India: Challenges and Initiatives; Poorest Areas in Civil Society (PACS) Programme. [2001–2008]

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Exam:

PROJECT MANAGEMENT (PM)									
VI Semester :B.	Tech.						Scher	me: 2020	
Course Code	Category	Hours/Week		Credits	Max	imum Mark	(S		
OEC317	OEC - II	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		3	0	-	3	40	60	100	
Sessional Exam	Duration:1.5 H	lrs				End E	xam Durati	on: 3 Hrs	
Course Outcomes : At the end of the course the student will be able to									
management.	i the methods of	i piaim	mg, s	ciicuu	ing and pr	incipies of cons	Struction		
CO2: Formulate	e, solve CPM an	nd PER	T net	works					
CO3: Understar	nd the structure	of orga	nizat	ion and	d resource	allocation.			
CO4: Understar	nd the procedure	e for do	ocume	entatio	n of tender	s, contracts & 1	time-cost and	alysis.	
CO5: Understar	nd basics of eng	ineerin	ig eco	nomic	$\frac{s \text{ and solvi}}{1 + c}$	ng of cash flow	v problems.		
CO6: Understar	id the concepts	of qua	lity co	ontrol a	and safety i	management.			
Introduction to	Construction	Mana	19 <i>em</i>	ent: S	<u> </u>	e – Obiective	es and fun	ctions of	
construction man	agement – Type	es - Re	sourc	es - St	tages – Tea	um of construct	ion unit.		
<i>Construction Pla</i> Methods of plann Milestone charts.	inning and Schunder and Schunder and schedu	<i>edulin</i> ş ıling –	g: Ob Adva	jective antages	es and impo s and class	ortance of plant ification of sch	ning and Sch nedules – Ba	eduling – r charts –	
			1	UNIT	- II				
Network Techniq Breakdown struc Network. Critical Path M	tures in Constru tures – Repres	sentation Introd	nanag on ar	gemen nd spe n – T	<i>t:</i> Element cifying of	s of network – activities and between CPM	Network tec l events – 1	hniques – Rules for	
estimates – Float	– Critical path -	– Netw	ork a	nalysis	and comp	utation probler	ns.	Time	
			U	J NIT -	- III				
Program Evalua path – Network a	<i>tion and Reviev</i> nalysis and com	w Tech	nique on pro	e (PEF oblems	?<i>T</i>): Introd	uction, time es	timates, slac	k, critical	
<i>Cost–Time Analy</i> planning – Updat	v sis in Net Worl ing – Resources	k <i>Plan</i> s alloca	<i>ning:</i> ition.	Impor	tance of tin	me – Project co	ost analysis in	n network	
			U	J NIT -	- IV				
<i>Tenders and Co</i> Contracts definiti	<i>ntracts:</i> Type on – Essentials	of tend – Type	lers – es – D	- Princ Ocume	ciples of te ents – Cono	endering – No litions of contr	tice inviting acts.	tender –	
<i>Arbitration:</i> Definition – Arbitrator – Arbitration agreement – Qualification of arbitrator – Advantages of arbitration.									
<i>Organisation:</i> Principles of organization – Types of organization – Measurement book.									
			1	UNIT	- V				
<i>Engineering Eco</i> present worth fac	nomics: Basic for the state of	Princip eries p	oles – resent	Equiv t worth	alence – C 1 factor.	ash Flow diag	ram – Single	Payment	
<i>Safety, Inspectio</i> Protection Equip	on and Quality ment – Need fo	or insp	r <i>ol:</i> I ection	mporta n at w	ance of sa ork – Prin	fety – Safety ciples ofinspec	Measures – etion – Impo	Personal ortance of	

quality - Elements of quality - Organisation for quality control.

Text Books:

1. B.C. Punmia& K.K. Kandelwal, *Project Planning & Control with PERT & CPM*, Laxmi Publications (P) Ltd, New Delhi.

2. J.L. Sharma, Construction Management and Accounts, SatyaPrakasan (P), NewDelhi.

3.

Reference Books:

1. U.K. Shrivastava, Construction planning and Management, Galgotia (P), New Delhi.

2. S. Seetha Raman, Construction Engineering and Management, Umesh (P), New Delhi.

3. Chitkara, *Construction project management – Planning, Scheduling and Control*, Tata McGraw Hill.

4. Halpin, D.W, *Financial and Cost Concepts for Construction Management*, JohnWiley and Sons, New York.

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weight age of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

ADVANCED INFORMATION SYSTEMS (AIS)									
VI Semester : B.Tech					Scheme : 2020				
Course Code	Category	Hours/Week Credits Maximum Marks				(S			
OEC318	OEC-II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional E	xam Duration 1 ¹ /2	$\frac{2}{2}$ Hrs		(1 (1 4 111	End	Exam Dura	ation: 3 Hrs	
Course Out	comes : At the end	1 OI U	ted co	se the st	udent Will	be able to			
CO2: Inter	bret different types	of In	heritar	nce and I	Polvmorphi	sm.			
CO3: Class	sify layer functiona	lities	ofOS	I referen	ce model a	nd TCP Protocol s	suite.		
CO4: Sum	marize the concepts	s of it	nternet	working	, security a	nd IP addressing.			
CO5: Dem	onstrate different ty	ypes o	of prote	ocols and	d web conte	ents used in web d	lesign		
				UN	IT – I				
Introduction to Object Oriented Concepts: Introduction, Programming Techniques, Introduction to Object Oriented Concepts, Concept of Structured Procedural Programming, Class, Object Characteristics of Objects: Data Abstraction, Classification, Encapsulation and Message Passing.									
	<u> </u>			UNI	T – II				
Advanced Concepts in Object Oriented Technology: Relationships, Inheritance- Protected Access Specifier, Multiple and Multilevel Inheritance, Generalization and Specialization, Abstract classes, Polymorphism, Implementation of OOC through C++.									
				UNI	Γ–III				
Introductio Protocol Sui	n to computer N oite, Routing Device	e twor es, Ty	• ks: In pes of	troductio Network	on, Networ ks.	k Topology, OSI	Reference 1	Model, TCP	
				UNI	$\Gamma - IV$				
Internetwo Switched Ne	rking: Protocols at the second structure of the second sec	for Iı ivate	nternet Netwo	working orks, and	, Internet Working o	Address and Dor f Internet.	mains, Pacl	kets, Packet	
				UNI	T - V				
Introduction to Web Technology: Introduction, Hyper Text Transfer Protocol (HTTP), File Transfer Protocol (FTP), Domain Name Server (DNS), Web Applications, Types of Web Content, Multi-Tier Web Applications, Performance of Web Applications.									
Text Books	:								
1. Campus	Connect Foundation	on Pre	ogrami	ne – Ob	ject Oriente	ed Concepts – Sys	tem		
2. Campus INFOSY	Connect Foundati	on Pi	ogram	me – Co	omputer Ha	ardware and Syste	em Software	e - Vol. – 3,	
3. Campus Server	Connect Foundat	tion	Progra	mme –	Relational	Database Manag	gement Sys	tem, Client	
4. E.Balagu	uruswamy, Object	Orien	ted pro	ogrammi	ng with C+	+, 2017			
5. Data Co	mmunications & N	etwo	rking,	Forouza	n, Tata Mc	GrawHill, Fifth ed	lition, 2017		
Web Refere	ences:	• .	/ 4	1 /					
I. https	s://www.tutorialspo	oint.co	om/cpl	usplus/	atrena - 4	aniala/			
2. https://www.geeksforgeeks.org/computer-network-tutorials/									

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

		PROD	UCT LI	FE C	YCLE MAN	AGEMENT (PLM)			
VI Semester : B.Tech						Scheme : 2020				
Course Code	Category	Hours/Week			Credits	Max	Maximum Marks			
OEC319	OEC - II	L	Т	P	С	Continuous Internal Assessment	End Exam	TOTAL		
Seccional I	Exam Durat	$\frac{3}{11/2}$	- U#0	-	3	40	60 Syam Duration			
Course Out	tcomes: At 1	the end a	of the c	ourse	the studen	t will be able to		. 5 1115		
CO1: Unde:	rstand Prod	uct life c	vcle ma	inage	ment proce	ss.				
CO2: Unde	rstand differ	ent step	s in Pro	oduct	developme	nt process.				
CO3: Get k	nowledge or	Produc	t data r	nana	gement	-				
CO4: Under	rstand the ir	nplemen	itation (of PLI	M and its in	npact on the orga	anization			
CO5: Unde:	rstand core	function	s of PLI	M and	d supply ch	ain and ERP sys	tems			
					UNIT – I					
Organizatio	n Business	Models	(MTS, N	ITO,	CIO, EIO E	Etc), Basics of Er	iterprise Syste	ms		
(PLM, ERP,	MES), Bac	kground	l, Over	view,	Need, Ben	efits, and Conce	ept of Product	Life Cycle,		
Component	s / Elemen	ts of PL	M, Eme	ergen	ce of PLM,	Significance of l	PLM, Differenc	es between		
PLM and PI	DM									
					UNIT – II					
Integrated I	Product deve	elopment	t proces	s-Co	nceive-Spec	cification, Concep	ot design, Desi	gn-		
Detailed de	sign, Valida	tion and	l analys	sis (S	imulation),	Tool design, Rea	alize-Plan man	ufacturing,		
Manufactur	re, Build/As	semble,	Test(qu	ality	check).					
					UNIT – III					
Workflow H	Processes, I	Design C	Collabor	ration	i, Processes	s Management,	Document Ma	anagement,		
Visualizatio	on, Bill of Ma	aterials (BOM) N	Ianag	gement – La	b exercises.				
					UNIT – IV					
Engineering	g Change C	ontrol, C	Configui	ration	n Manageme	ent, Manufactur	ing Process Ma	anagement,		
Variant Ma	anagement,	Classifi	cation	PLM	Architectu	re, Various PLI	M tools, Data	Modeling,		
Security ma	anagement.									
CAD Intern	ationa Info	masticus	011th 04	ing t	$\frac{\mathbf{UNIT} - \mathbf{V}}{\mathbf{v}^{1} \mathbf{v}^{1} \mathbf{v}^{2} \mathbf{v}^{2} \mathbf{v}^{2}}$	ICAD ECAD To	abrical mublic	hing) Com		
CAD Integr				ing u		ICAD, ECAD, Ie				
functions (e.g., data v	aults),	Data F	low 1	to Other sy	ystems such as	Supply chair	i and ERP		
Text Bool	hours for la	b exerci	sesi							
1. Grieves,	Michael, Pro	oduct Lif	ecycle I	Mana	gement, Mc	Graw-Hill publis	hers.			
2. Antti Saa	lksvuori, An	selmi Im	imonen	, Proc	luct Life Cy	cle Management	– Springer pul	blications		
Reference	Books									
1.Kari Ulric	h and Steve	n D. En	oinger	Produ	act Design 8	& Development	McGraw Hill In	ternational		
2.Burden, I	Rodger PDM	: Produc	t Data 1	Mana	gement, Re	source Publicatio	ons.			
Question P	aper Patter	n:			0 ,					
Sessional I	Exam:									
The questi	on paper f	or sessio	onal ex	amir	nation shall	be for 25 mar	ks, covering	half of the		
syllabus fo	r first sessio	onal and	remai	ning	half for sec	cond sessional e	xam. The ques	stion paper		
shall consi	st of three	section	s with	Two	Questions	(Either or Tvi	be) in each se	ection. The		
student sha	all answer o	ne quest	tion fro	m ea	ch section.	х - ЭТ		_`		
End Exam:

			INI	DUST	RY 4.0 (I40))			
VI Semester :	B.Tech						Sc	heme : 2020	
Course Code	Category	Ho	urs/We	eek	Credits	Maxi	mum Mar	ks	
		L	Т	Р	С	Continuous Internal	End	Total	
OE320	OEC-II					Assessment	Exam		
		3	-	-	3	40	60	100	
Sessional Exam	n Duration : 1	1⁄2 Hrs				End	Exam Dur	ation: 3 Hrs	
Course Outcon	nes : At the end	l of the	course	e the st	udent will b	e able to			
CO1: Understa	nd the Characte	eristics,	Sensor	rs, Act	tuators and C	Communication m	odels for in	dustry 4.0.	
CO2: Understand Fourth revolution and Industry operations.									
CO3: Understa	nd the Cyber-P	hysical	System	ns, Se	nsors, platfor	rms of Industrial I	loT.		
CO4: Understa	nd the Cyber se	curity,	Indust	rial In	ternet Systen	ns.			
CO5: Understa	nd Business Mo	odels a	nd Arcl	hitectu	ire, Key enal	olers in Industrial	IoT.		
				UN	IT – I				
Introduction to	o IoT, Sensing	and A	ctuator	rs, Co	mmunicatio	n			
Introduction, T	ransducer- Defi	inition,	Sensor	r – Sta	atic and Dyn	amic characterist	ics, Types,	Actuator –	
Features, Type	es, Communic	ation	protoc	ol, S	tandards, F	eatures, Variant	s, IoT N	etworking -	
introduction, Pr	oprietary non-I	P based	l soluti	on, IP	based soluti	ons.			
UNIT - II									
Industry 4.0: 7	The Fourth Rev	volutio	n						
Introduction, Su	ustainability As	sessme	nt of N	/anufa	cturing Indu	istry, Lean Produc	ction Syster	n, Smart and	
Connected Busi	ness Perspectiv	ve, Sma	rt Fact	ories					
				UNI	(T – III				
Cyber-Physica	l Systems, Sen	sors, P	latforr	ns					
Cyber-Physical	Systems and 1	Next-G	enerati	on Se	nsors, Colla	boration Platform	and Produ	act Lifecycle	
Management, A	Augmented Rea	lity an	d Virtu	ial Re	ality, Artific	ial Intelligence, I	Big Data ar	nd Advanced	
Analysis.									
				UN	IT - IV				
Cyber security	, Industrial In	ternet	Systen	18:					
Cyber security -	- Introduction,	challen	ges, In	dustri	al Internet Sy	ystems, Industrial	Sensing &	Actuation,	
Industrial Proce	esses and system	ns.							
				UN	IT - V				
Business Mode	els and Archite	cture,	Key E	nablei	rs:				
Industrial Business Models, Reference Architecture for Industrial Business Models of IIoT, Key									
Enablers of Ind	ustrial IoT in S	Sensing	, Key l	Enable	ers of Industr	rial IoT in Conne	ctivity, Key	/ Enablers of	
Industrial IoT in	Industrial IoT in Connectivity.								
Text Books		_	_						
1. Vijay Madis	etti, Arshdeep B	Bahga,	"Intern	et of 7	Things: A Ha	nds-On Approach	n", VPT; 1 o	edition.	
2. Industrial Io	T Challenges,	Design	n Princ	ples,	Application	s, and Security,	Ismail But	un, Springer	
Nature Switz	zerland AG, 202	20.							

3. Industrial Internet of Things Technologies and Research Directions, Anand Sharma, Sunil Kumar Jangir, Manish Kumar, Dilip Kumar Choubey, Tarun Shrivastava, S. Balamurugan, CRC, Taylor & Francis Group, LLC, 2020.

Reference Books

1. Industrial IoT Application Architectures and Use Cases, A. Suresh, Malarvizhi Nandagopal, Pethuru Raj, E. A. Neeba, Jenn-Wei Lin, CRC Press, Taylor & Francis Group, 2020.

2. "Introduction to Industry 4.0 and Industrial Internet of Things", Prof. Sudip Misra, IIT kharagpur

Web References:

- 1. https://www.electricaltechnology.org/2016/07/internet-of-things-iot-and-its-applications-inelectrical- power-industry.html
- 2. http://www.nptelvideos.in/2012/11/internet-technologies.html
- **Question Paper Pattern:**

Internal Assessment: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

	Open Elective Courses (OEC-III)
S. No	Course Title
1.	Multimodal Transportation Engineering
2.	Air pollution and control
3.	Industrial Robotics
4.	Quality & Reliability Engineering
5.	Smart Grid Technologies
6.	Artificial Intelligence and Machine Learning
7.	Distributed Embedded Systems
8.	Natural Language processing
9.	Design Thinking
10.	Cloud, Micro services & Application
11.	Block Chain Technologies
12.	Agile Methodologies
13.	Augmented Reality & Virtual Reality

List of Open Electives - OEC-III & OEC-IV

	Open Elective Courses (OEC-IV)
S. No	Course Title
1.	Composite Materials
2.	Image Processing
3.	Mobile Computing
4.	Enterprise systems
5.	Modern Web Applications
6.	Cognitive Radio
7.	Automation & Control
8.	Human Resource Management
9.	Design Patterns
10.	Pre stressing Systems
11.	Additive Manufacturing Technology
12.	Drone Technology
13.	Infrastructure for Smart City Development

MUL	TIMODAL T	RAN	SPOR	TATI	ON ENG	INEERING (N	ATE)			
VII Semester : B.	Tech					Scheme : 2020				
Course Code	Category	Hou	urs/W	eek	Credits	Maximum Marks				
OEC401	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		3	-	-	3	40	60	100		
Sessional Exam D	ouration : 1 ¹ / ₂	Hrs				End Exa	m Duration	: 3 Hrs		
Correct Orate and	A 4 41 1 -	- £ 41		41 4		1 1. 1				
Course Outcomes	At the end of urban a	of the o	course	the st	actimates 1	be able to unde	t level of ser	avice		
CO2: the compone	ents and function	$\frac{110}{000}$ ons of	ai ilwa	av trac	k	the capacity and		VICE		
CO3: the control f	actors, gradien	its and	geom	etric d	esign of ra	ilway track				
CO4: the various a	arcraft charact	eristic	s and	design	of runway	/s				
CO5: the various f	eatures in Har	bours	and Po	orts, th	eir constru	ction and coast	al protection	1		
works				,			1			
			U	NIT –	Ι					
Highway Enginee	<i>ring:</i> Critical c	cross s	ection	of urb	an and rur	al roads- Road	ecology-			
Classification of ro	oads-Concept c	of Capa	acity a	and Le	vel of Serv	rice-Factors affe	ecting-			
Computation of Ca	apacity and Lev	velof	Servic	e as po	er Indo-HC	CM2017- Measu	ure of			
effectiveness-High	way capacity a	and per	rform	ance cl	naracteristi	cs.				
	·	· · 1	<u>U</u> .	NIT -		· T 1'	0.1	6		
Railway Track: Re	equirements of	an ide	al per	maner	it way – G	auges in India -	- Selection o	1 nonta		
types of sleepers -	sleeper densit	\mathbf{R}	ans– 2 11961	Funct	ions and re	ast- runctions	and requirem	ients,		
Functions of sub g	rade or formati	y – Da ion – S	Sub or	ade ma	aterials and	its improveme	pes – Suo gi ent	auc –		
Track Alignment:	Basic requiren	nents -	- Fact	ors cor	ntrolling al	ignment – Grac	lients – Type	es of		
gradient – Grade c	ompensation o	n curv	es.		U	6				
Geometric Design	of the Track:	Speed	of the	e train	- Speed or	n curves – Radi	us or degree	of		
curvature – Super e	elevation or ca	nt – C	ant de	ficienc	y- negativ	e super elevation	on - Types of	f		
transition curve – I	Length of trans	sition c	urve -	-Wide	ning of gau	uge on curves –	Shift of the	curve.		
	~	<u>.</u>	U	IT – 1	IV					
Airport Engineerin of Runway- Comp Runway – Wind R	<i>ng:</i> Selection of utation of Run ose Diagram –	of site : way le Runw	for Ai ngth - av Li	rport – – Corre 9hting	- Aircraft C ection for r system.	Characteristics- unway length -	Geometric I - Orientation	Design 1 of		
	ose Diagiam	Italiv	U U	<u>NIT -</u>	V					
Harbour Engineering: Definition of Basic Terms: Harbour, Port, Satellite Port, Docks, Waves and Tides – Planning and Design of Harbours: Harbour Layout and Terminal Facilities – Coastal Structures: Piers, Break waters, Wharves, Jetties, Quays, Spring Fenders, Dolphins and Floating Landing Stage – Inland Water Transport – Wave action on Coastal Structures and Coastal Protection Works.										
Text Books										
1. Indian Highway	Capacity Man	$\frac{ ual-D }{ ual-D }$	ecem	$\frac{ber201}{E}$	$\frac{7}{100000000000000000000000000000000000$	ublications, Ne	w Delhi.			
2. C. Saxena and S	.P. Arora [201	5, Ra	ilway	Engine	eering, Dh	anpat Raj Publi	Circle E 114	. N.		
5. Knanna, S. K., P	Mora, M. G., a	110 Ja11 2012	u, S. S	s. Airpo	ori piannin	ig and Design,	SIXIN Edition	II, INEM		
4 C Venkatramaia	h Transportat	$\frac{2012}{100}$	noinee	ring_V	ol 2 Railu	vave Airporte	Docks and			
Harbours. Bridges	and Tunnels	Univer	sities	Press (India) Priv	vate Limited. H	vderabad. 20	015.		
,				(, 11	<u> </u>			

Reference Books

1. Satish Chandra and M. Agrawal, *Railway Engineering*, Second Edition, Oxford University Press, 2013.

2. Rangwala, S.C. Railway Engineering, Charotar Publishing House, Anand, India, 2008.

3. Horonjeff, R., McKelvey, F. X., Sproule, W. J., and Young, S. B. *Planning and Design of Airports*, Fifth Edition, McGraw-Hill, New York, USA, 2010.

Web References:

1. https/www.coursera.org

2. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

	AIR PO	LLUT	ΓΙΟΝ	AND	CONTRO	DL (APC)				
VII Semester :B. 7	Tech						Scheme	: 2020		
Course Code	Category	Ho	urs/W	eek	Credits	Maxin	num Marks			
OEC402	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		3	-	-	3	40	60	100		
Sessional Exam D	ouration: 1 ¹ / ₂	Hrs				End Exa	m Duration	: 3 Hrs		
Course Outcomes	At the end o	fthaa	011#2.0	the stu	dont will h	a abla ta				
CO1: To take up t	the basic conc	ents of	air no	ule stu ollution	n					
CO2: To introduc	e students to b	basic co	oncep	ts of p	ollution.					
CO3: The content	ts involved the	know	ledge	of cau	ses of air p	ollution.				
CO4: The content	ts involved the	know	ledge	of hea	lth related	to air pollution.				
CO5: To develop	skills relevant	to cor	ntrol o	f air p	ollution.					
			U	NIT –	I					
<i>Introduction</i> : History of Air pollution and episodes –Sources of air pollution and types – Introduction to meteorology and transport of air pollution: Global winds, Headley cells, wind rose terrestrial wind profile –Effects of terrain and topography on winds, lapse rate, maximum mixing depths, plume rise.										
			U	NIT -	II					
<i>Transport of Pollution in Atmosphere:</i> Plume behavior under different atmospheric conditions – Mathematical models of dispersion of air pollutants –Plume behavior in valley and terrains – Plume behavior under different meteorological conditions –Concept of isoplates.										
			UN	- TIV						
<i>Effects of Air Pol</i> Properties –Globa Automobile pollut	<i>llution:</i> Effect l Effects –Greation sources an	ts of A eenhou d conti	Air Po ise eff rol –P	ollutior fect –(hotoch	n on huma Ozone dep nemical sm	n beings, plant letion, heat isl og –Future eng	ts and anim and, dust st ines and fue	als and orms – ls.		
			U	- TIV	IV					
<i>Air Pollution cont</i> For particulate ma precipitators, For combustion after b and examples.	t rol: Air Pollur atter –Settling Gaseous pol purners –Work	tion co g cham lutants king pr	ntrol- ibers– -contr incipl	at sour Fabric ol by es adv	rce – Equip filters –S absorptio rantages an	oment for contro crubbers –Cyc n-adsorption s id disadvantage	ol of air poll clones Elect crubbers-sec es – Design	lution – rostatic condary criteria		
			U	NIT –	V					
<i>Air Quality Sam</i> analysis of SO2, 0	p <i>ling and M</i> CO etc, – Legi	onitori slation	i ng: S for c	Stack s ontrol	ampling – of air pollı	Instrumentation	on and meth obile pollut	nods of ion.		
Text Books:										
1. C.S. Rao, <i>Envir</i>	1. C.S. Rao, <i>Environmental Pollution Control Engineering</i> , New Age International publishers.									
2. H.S. Peavy, D.	.K. Kow & C	J. Tch	obano	glous,	Environm	ental Engineer	ing, McGra	w Hill		
3. Martin Crawford, <i>Air Pollution Control Theory</i> , TMH Publication										
Reference Books:	Reference Books:									
 H.C Parkins, A Wark, K., Wa 	<i>ir Pollution ar</i> rner, C.F., and	<i>nd Con</i> d Davi	<i>trol,</i> I s, W.	McGra Г., <i>Air</i>	w Hill Pub <i>Pollution:</i>	lication. Its Origin and	<i>Control</i> , A	ddison-		

Wesley Longman. 1998.

3. Gurjar, B.R., Molina, L., Ojha, C.S.P. (Eds.), *Air Pollution: Health and Environmental Impacts*, CRC Press.

4. Boubel, R.W., Fox, D.L., Turner, D.B., Stern, A.C., Fundamentals of Air Pollution, Academic Press.

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

		IN	DUST	RIAL	ROBOTICS	S (IRT)				
VII Semeste	er: B. Tech						Sche	me: 2020		
Course Code	Category	Ho	ours/W	eek	Credits	Maxin	num Mark	5		
OEC403	OEC - III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional E	xam Duration	: 1 1/2	Hrs			End Exam l	Duration :	3 Hrs		
Course Outcomes : At the end of the course the student will be able to										
CO1: Under	stand the basic	compo	onents (of indu	strial robots.					
CO2: Under	stand the types	of End	1 Effec	tors an	d Sensors in	robots.				
CO3: Under	stand the Robot	t mani	pulator	, forwa	ard and inver	se kinematics.				
CO4: Under	stand the progra	ammir	ng meth	nods fo	r robots and	design considerat	ions of Rob	ot		
work	cell									
CO5: Under	stand the manu	facturi	ng and	proces	ssing applica	tions of robot.				
				UN	I – TI					
Fobot anatom feed-back cc and perman encoders), ve End Effecte other type o other miscel Machine Vis	robot anatomy, robot configurations, work volume, precession of movement, robot actuation and feed-back component, actuators, hydraulic actuators, electrical actuators (variable reluctance type and permanent magnet type stepper motor). Position sensors (potentiometer, resolvers, and encoders), velocity sensors (tachometer), power transmission devices. UNIT – II End Effectors and Sensors: Robot end effectors, types of end effectors, mechanical grippers, other type of grippers- Vacuum cups, magnetic grippers, adhesive grippers, Hooks, Scoops and other miscellaneous devices. Sensors in robotics- tactile sensors, proximity and range sensors,									
		~		UN	IT – III					
Robot Motio representatio three degree dimension, h	on Analysis and on, forward tran e of freedom nomogeneous tra	Contr sforma arm in ansforma	ol: Intration and two mation	nd reve dimen and ho	on to manipu erse transforr usions, four omogeneous IT – IV	lator kinematics, nation of two deg degree freedom transformation ma	position gree freedor manipulate atrix.	n robot arm ors in thre		
Robot Programming: Methods of robot programming- Lead through- WAIT, SIGNAL and delay commands; The textual robot programming languages, robot language structures, constants, variables and other data objects, motion commands, end effectors, sensors commands and monitor mode commands. Robot cell design and control: Robot cell layout, work cell control, interlocks, error detection and recovery, graphical simulation of robot work cell.										
UNIT – V										
Robot Applications in Manufacturing: Material transfer and machine loading and unloading general considerations in material handling.										
processing o	perations.	οροι	vv cruini	5, 001		wording, spray	coaning,			
Text Books										

1. Mickel. P. Groover et. al, Industrial Robotics- Technology, Programming and Applications, McGraw Hill Publishers, New Delhi.

2. Deb S.R., Robotics Technology and Flexible Automation, TMH Publishers, New Delhi.

3. Richard D. Klafter, Robotic Engineering: An Integrated Approach, Pearson Publications.

Reference Books

K. S. Fu, Ralph C. Gonzalez and C.S.G. Lee, Robotics, control, sensing, vision, Mc Graw Hill.
 Rama chandran, Nagarajan, Introduction to Industrial Robotics, Pearson.

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Examination:

	QUALITY &	& RE	LIAE	BILI	TY ENGI	NEERING (QRE	E)					
VII Semester:	VII Semester: B. Tech Scheme : 2020											
Course Code	Category	Hours / Week		/ K	Credits	Max	ximum Mar	ks				
OEC 404	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	-	-	3	40	60	100				
Sessional Exan	n Duration : 1.5	Hrs			End Exa	m Duration : 3 H	Irs					
	A / /1 1	6.1			. 1 .	···· · · · · · ·						
Course Outco	mes : At the end	of th	$\frac{1000}{1000}$	trse s	students w	vill be able to						
CO1: Und	erstand the over	view	of th	le To		ity Management	system					
CO2: Und	erstand concepts	s of c	custor	ner	satisfactio	on and employee	e involveme	ent				
CO3: App for c	ly the appropria ontrolling and i	te too mpro	ols an oving	id te qua	chniques lity	of continuous p	rocess impr	ovement				
CO4: Apply Quality Function Deployment and Bench Marking process for improving a product or process												
CO5: Und	erstand concept	of R	eliab	ility	Engineer	ring						
				UN	IT – I							
Introductiont	oT.Q.M.:Introd	luction	ontoQ	Quali	ity;Evolu	tionofandbasicap	oproachtoTo	otalQualit				
y Managemen	t;Leadershipcor	ncept	s;The	Sev	enhabitsc	ofhighlyeffective	people;Rol	eofTQM				
Leaders; Imple	ementation of T	QM;	Qual	lity o	council, q	uality statement	S					
				UNI	T – II							
CustomerSat	isfaction:Types	ofCu	stom	ers-								
InternalandEx	ternal;Customer	perc	eptio	nofq	uality; Fo	eedback & brief	discussion	on				
Information C	ollecting Tools											
Employee Inv	olvement: Maslo	ow's	hiera	rchy	of needs;	Types of Teams,	, Stages of t	eam				
development, Involvement	Common barrie	rs to	team	pro	gress, Tra	aining; Benefits	of Employe	e				
				UNI	T – III							
ContinuousP	rocessImprove	ment	:Intro	oduc	ction,Juro	ntrilogy,Improvo	ementstrate	gies;P-				
D-S-A cycle &	& Problem solvi	ng m	etho	1; Ba	asic conc	epts of Kaizen a	nd Six sigm	na quality				
control, Taguc	hi method, Qua	ality	circle	S								
Supplier Part	tnership: Introd	ducti	on, P	artn	ering, So	urcing, Supplier	· Selection,	Supplier				
Rating, Relation	onship Develop	ment										
Tools & Techi	niques of TQM	: Par	eto di	agra	m, Cause T – IV	& Effect diagram	1					
Benchmarkin	g: Introduction,	, Ben	chma	rkir	ng proces	S						
Quality Funct	ion Deployment	t: Be	nefits	of Q	QFD, Hou	se of Quality						

UNIT – V

Reliability Engineering: Introduction, Failures & failure modes, Causes of failures

Design for Reliability: Designing for higher Reliability, Reliability & Cost

Component Reliability: MTTF, Time dependent hazard models – Exponential Distribution **System Reliability:** Systems with components- in Series, and in Parallel; Non-Series-Parallel systems

Redundancy Techniques: Introduction, Component & Unit Redundancy, Weakest link technique

Text Books:

1. Dale H. Bester field, Total Quality Management, Pearson Education, New Delhi

2. E. Balagurusamy, Reliability Engineering, TMH Publishers, New Delhi

3. M. Mahajan, Statistical Quality Control, DhanapatRai and Sons Publishers, New Delhi

Reference Books:

1. Douglas C. Montgomery, Introduction to Quality Control, John Wiley and Sons Publishers, New

York

2. N. Logothetis, Managing for Total Quality, From Deming to Taguchi, PHI Publishers, New Delhi

3. L.S. Srinath, Reliability Engineering, East West Press, New Delhi

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Examination:

		SM	ART C	GRID	TECHNOLO	GIES (SGT)			
VII Semester :	B.Tech							Scheme : 2020	
Course Code	Category	Hou	ars/We	eek	Credits	Ma	ximum Marl	KS	
OEC405	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		3	0	0	3	40	60	100	
Sessional Exan	n Duration : 1	¹ / ₂ Hrs					End Exam D	uration: 3 Hrs	
Course Outco	omes : At the e	nd of th	ne cour	se the	student will	be able to			
CO1: Understan	nd the basic con	ncepts,	compo	nents	and architect	ure of smart grid.			
CO2: Understan	nd the various r	neasure	ement t	echno	logies in sma	art grid.			
CO3: Understan	nd about battery	y techno	ology a	and en	ergy storage	in smart grid.			
CO4: Understan	nd the Interoper	ability	and co	ontrol o	of power grid	1.			
CO5: Understan	nd the cyber see	curity is	ssues in	n smar	t grid.				
					UNIT – I				
Introduction: Today's Gird versus Smart Grid, Rationale for smart Grid, Computational Intelligence, Power System Enhancement, Communication and Standards, Environment and Economics, Shareholders Roles and Function, Architecture, Functions of Components.									
				l	UNIT - II				
Sensors and Measurement: Sensors for Smart Grid, Monitoring and Measurement Technologies, PMU, Smart meters, Smart Appliances, Multi Agent Systems (MAS) Technology, Micro grid and Smart grid comparison, Wide Area Monitoring Protection and Control and SCADA.									
E C4				l	NII – III				
Energy Storage Batteries, Flow storage systems	e: Batteries, Fuel , super capacito	Cell a ors, Sim	nd hyd ulatior	lrogen 1 and 0	electrolytes, case studies	, Flywheel, Super	conduction m	nagnetic energy	
				J	J NIT - IV				
Interoperabilit Introduction - Interoperability Control of the P	y: State-of-the-Ar in the Smart C ower Grid, Sta	t-Interc Frid En ndards	operabi vironm - Appr	lity - nent - oach t	Benefits an Smart Grid I o Smart Grid	d Challenges of Network Interoper I Interoperability S	Interoperabil ability - Inter tandards	ity- Model for roperability and	
				1	UNIT - V				
Smart Grid Cy Cyber Security Mitigation App Methodology fo	ber Security: State of the A roach to Cybe or Other Users	art- Cy r Secu	ber Se rity R	curity isks -	Risks - Cy Cyber Secu	ber Security Conductory and Possible	cerns Associa Operation fo	ted with AMI- or Improving -	
Text Books									
1. James Momo 2012.	oh, "Smart Grid	1: Fund	ament	als of	design and a	analysis", John W	iley & sons I	nc, IEEE press	
2. Janaka Ekar Technology	nayake, Nick J and Applicatio	enkins, ns", Jol	Kiths hn Wil	iri Liy ey & S	vanage, Jianz Sons Inc, 201	zhong Wu, Akihil 2.	ko Yokoyama	, "Smart Grid:	
3. Lars.T.Berg Ltd, Reprint	er, K.Iniewski, 2015.	"Smar	rt Grid	: App	lications, Co	ommunications &	Security" W	iley India Pvt.	
Reference Bool	ks								
1. Fereidoon P Academic P	. Sioshansi, "Sı ress, 2012.	nart Gr	rid: Int	egrati	ng Renewab	le, Distributed &	Efficient Ene	ergy",	

- 2. Clark W.Gellings, "The smart grid: Enabling energy efficiency and demand response", Fairmont Press Inc,2009.
- 3. Qi Huang, Shi Jing "Innovative Testing and Measurement Solutions for Smart Grid", John Wiley & Sons Inc, 2015.

Web References:

- 1. https://onlinecourses.nptel.ac.in/noc18_ee42/preview
- 2. https://www.smartgrid.gov/the_smart_grid/smart_grid.html
- 3. https://www.coursera.org/lecture/electric-power-systems/smart-grid-the-environment-aH8g0

Question Paper Pattern:

Sessional Examination: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

AR	TIFICIAL INT	ELLI	GENC	E & N	MACHINE	LEARNING (AI & ML)	
VII - Semester:	B. Tech						Sch	eme:2020
Course Code	Category	Hou	rs/We	ek	Credits	Ma	ximum Marks	
OEC 406	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional Exan	n Duration: 1 ½	Hrs				End E	xam Duration	:3 Hrs
Comme Orate and	A 4 41 1 - 4	241		<u> 1</u>		1 - 4 -		
Course Outcom	re how foundation	s laid	$\frac{\text{for Ar}}{\text{for Ar}}$	tificial	S will be ab.			
CO2: Analyze t	he search strategie	$\frac{15}{2}$ to fi	nd solu	tions t	o the proble	e ms by systematic	ally generating	new states
CO3: Understa	nd the machine le	earning	g conce	epts ar	d the main	steps in a typica	l machine learn	ning
CO4: Design a c	ligit image classifi	ier on 1	MNIST	datas	et	1 71		0
CO5: Analyze	various ML traini	ng mo	odels					
				UNI	T–I			
Introduction: W	hat Is AI? The F	ounda	ations of	of Art	ificial Intel	ligence		
Intelligent Agent	s: Agents and En	vironn	nents, (Good]	Behaviour: '	The Concept of	Rationality, Th	e Nature of
Environments, A	nd the Structure	of Ag	ents.					
				UNI	Γ–ΙΙ			
Uninformed Searc	ch Strategies: BF	S, DF	S, Dep	oth –lir	nited search	, IDA, Bidirect	ional search	
Informed (Heuristic	c) Search Strategi	es- Gi	reedy b	est-fir	st search, A	* search, Memo	ory-bounded he	uristic
search, Learning to	search better. He	euristic	e Funct	tions.				
Machine Learning	3			UNII	-111			
Introduction, Types	s of Machine Lea	rning	System	ns, Cha	allenges, Te	sting and Valida	ating.	
				UNI	ſ–IV			
Classification, Tra	ining a Binary C	lassifi	er, Perl	formar	nce measure	s, Multiclass cla	assification, Err	ror analysis,
End-to-End Mac	hine Learning P	put cia roject	assinca	ation				
Working with Rea	al data, Launch, N	Monito	or and l	Mainta	ain your sys	tem		
				TINIT	F X 7			
Tusining Madala I		Crack	li ant D	UNI	I – V	1 Decreasion I		
Regularized Linea	r Models, Logisti	i, Grac	ressior	escent 1	, Polynomia	al Regression, L	earning Curves	,
TextBooks:	, 8	0						
1.Stuart Russel Edition,201	ll and Peter Norv 0.Pearson Educa	vig, "A ation.	Artifici	al Inte	elligence:A	Modern Appro	oach",Third	
2. Aurelian Ge Flow:Concepts,	ron,"Hands-On M ,Tools,and Techn	Iachin iques	e Lear to build	ning v d Intel	vith Scikit-I ligent Syste	earn and Tenso ms",OReilly Pu	r blications,First	Edition,

2017

ReferenceBooks:

1.Elaine Richie Kevin Knight[2008],[3rdEdition],Artificial Intelligence,TMH

2. Oliver Theobald,"Machine Learning for Absolute Beginners", Second Edition, 2017

3. Miroslav Kubat, "An Introduction to Machine Learning", Springer, 2017

WebReferences:

1.<u>https://onlinecourses.nptel.ac.in/noc18_cs51</u>

2.https://www.geeksforgeeks.org/F-intelligence-an-introduction/

3. https://www.coursera.org/learn/python-machine-learning offered by University of Michigan

4. https://github.com/ageron/handson-ml.

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam

		DISTR	IBUTE	D EN	MBEDDEI	D SYSTEMS (DES	5)				
VII - Seme	ster : B. Tecl	h					Scheme: 202				
Course Code	Category	Hours/	Week		Credits	Max	imum Marks				
OEC 407	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	-	-	3	40	60	100			
Sessional l	Exam Durati	on: 1 ½	Hrs			End	Exam Duratio	n: 3 Hrs			
Course O	utcomes: At	the end	of the c	ourse	the studen	t will be able to					
CO1: Unde	erstand the rea	al time er	nvironm	ent ai	nd applicat	ions.					
CO2: Understand System architecture and design of Distributed Embedded Systems											
CO3: Understand inter task management and scheduling.											
CO4: Analyze the network connection of distributed systems											
CO5: Analyze the working of multiple embedded devices in a distributed network											
UNIT-I											
Real Time	Environment:	Real-tin	ne com	puter	system rec	urements, classifi	cation of real ti	me systems,			
functional r	functional requirements, temporal requirements, global time, examples of real time systems.										
					UNIT-II						
Distributed and dependa	System Desig ability.	gn: Need	of distr	ribute	d systems,	System Architectur	re, compatibility	y, scalability			
					UNIT-III						
System Sch task interact time-trigger	eduling: Inter tions, Schedu red architectu	r compon ling prob ire.	ient con olem - st	nmun tatic &	ication, tas & dynamic	k management, and scheduling – syster	l dual role of tin m design – valio	ne; inter lation –			
D: 11 1	<u>), 1 m</u>				UNIT-IV						
Distributed concepts, E	Networks: Ty thernet	ypes of n	etworks	s, con	nparisons, I	SO-OSI model, TC	CP/IP connection	ns. CAN			
					UNIT-V						
Case Studie trigger base	es: Bluetooth o d embedded a	controlle	d embeo ons.	dded	operations,	GSM based embed	lded operations	, and event			
Text Books	S:	1									
1. Hermann 2nd Edition	, Springer 20	l—Time s 11.	ystems	– Des	sign Princip	bles for distributed	Embedded App	lications,			
2. GlafP.Fei open, Copp	iffer, Andrew erhill Media (Ayre an Corporat	d Chris ion, 200	tian K)8.	Ceyold, Em	bedded Networking	g with CAN and	I CAN			
Reference	Books:										
1. Bernd Kl	einjohann, Ar	rchitectu	re and I	Design	n of Distrib	uted Embedded Sv	stems, Springer	· US,2013			
1. Wayne V	Volf, "Compu	iters as C	Compon	ents",	Second ed	lition, Morgan Kau	fmann, 2008.				
Web Refer	ences:		-								
L											

- 1.https://www.coursera.org/specializations/real-time-embedded-systems
- 2. <u>https://onlinecourses.nptel.ac.in/noc20_ee98/preview</u>

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

		NATU	RAL L	ANGUA	GE PROC	ESSING (NLP)					
VI Semeste	r:B.Tech						S	cheme : 2020			
Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks			
OEC 408	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	0	0	3	40	60	100			
Sessional E	xam Duration: 1	1½ Hrs				En	d Exam Du	ration: 3 Hrs			
Course Out	comes: At the en	nd of th	e cours	se the st	udent will b	e able to					
CO1: Under	rstand the import	ance of	Text V	Wrangli	ng, Cleansir	ng and POS taggir	ng.				
CO2: Devel	lop a NLP applic	ation us	sing the	e NLTK	library.						
CO3: Imple	ment Text classi	fication	algori	thms us	ing scikit-le	arn and NLTK.					
CO4: Under	rstand the basics	of loke	enizing	g text us	sing WordN	et.					
COS: Under	rstand the import	ance of	1 ext 1	eature e	xtraction pr	ocess.					
				UN	I – TI						
Introduction to Natural Language Processing: Why learn NLP, Diving into NLTK, Text Wrangling and Cleansing, Sentence splitter, Tokenization, Stemming, Lemmatization, Stop word removal, Rare word removal, Spell correction, POS tagging, Named Entity Recognition (NER).											
	UNIT – II										
NLP Appli	cations: Building	g your f	irst NI	LP appli	cation, Oth	er NLP applicatio	ns – Machi	ne translation,			
Information	retrieval. Speech	n recogi	nition.	Text cla	ssification.	Information extra	ction.	,			
	,F	8	,		;						
Tart Class	Gastion. Mashi			UN Tavé ala		Compling Nor	Darrag F	Desision turca			
Text Class		he Lear	ning,		issification,	Sampling – Nalv	ve Bayes, L	Decision trees,			
algorithm, T	gradient descent ext clustering – 1	t, Logi K-Meai	stic re	egressio	n, Support	Vector Machin	es, The R	andom forest			
			10.	UN							
Tokenizing	Text and Wo	rdNet	Rasico	UN e. Intro	$\frac{11 - 1}{1}$	kenizing text int	o sentence	s Tokenizing			
sentences in Filtering sto lemmas and collocations	nto words, Token op words in a tol l synonyms in	nizing s cenized the Wo	sentence senter ordNet,	ces usin nce, Loc Calcul	g regular e bking up Sy ating Word	xpressions, Train msets for a word Net Synset simi	ing a senter in WordNe larity, Disc	nce tokenizer, t, Looking up overing word			
				UN	IT – V						
Feature Ex Decision tr Measuring p	Extraction : Bag of words feature extraction, Training a Naïve Bayes classifier, Training a Decision tree classifier, Training a maximum entropy classifier, Training scikit-learn classifiers, Measuring precision and recall of a classifier, Training a classifier with NLTK-Trainer.										
Text Books	:										
1. Natural Hardeniy	Language Proc ya by Packt 2016	essing:	Pytho	on and	NLTK, D	eepti Chopra, Ja	acob Perkir	ns, and Nitin			
2. Practical Systems O'Reily	l Natural Langu , Bodhisattwa Media, Inc, 2020	age Pr Majumo).	ocessii ler, Ai	ng: Ā (nuj Guj	Comprehens ota, Sowm	sive Guide to Bu ya Vajjala, Harsl	uilding Rea hit Surana	l-World NLP published by			

Reference Books:

- 1. Daniel Jurafsky & James H. Martin, Speech and Language Processing, An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition, 2nd Edition, Pearson Education, 2009.
- 2. Tanvier Siddiqui, U.S. Tiwary, Natural Language Processing and Information Retrieval, Oxford Higher Education, 2008.
- 3. Daniel M. Bikel & Imed Zitouni, Multilingual Natural Language Processing Applications: From Theory to Practice, Pearson Publication, 2012.
- 4. Christopher D. Manning, and Hinrich Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

Web References:

- 1. <u>https://www.coursera.org/specializations/natural-language-processing</u>
- 2. https://www.udemy.com/course/speech-recognition-a-z-with-hands-onlearnkarts/
- 3. https://nptel.ac.in/courses/106105158

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

			DES	IGN TH	INKING (DTH)				
VII Semest	er: B. Tech						S	cheme : 2020		
Course Code	Category	Н	ours/W	eek	Credits	Max	imum Mar	ks		
OEC 409	OEC-III	L	Т	P	С	Continuous Internal Assessment	End Exam	TOTAL		
Sessional F	vam Duration 1	5	0	0	3	40 Fn	60 d Exam Du	100		
Course Outcomes : At the end of the course the student will be able to										
CO1: Reco	gnize the importa	nce of	Design	Thinkin	ng					
CO2: Ident	ify the steps in De	esign T	hinkin	g proces	s					
CO3: Ident	ify the difference	betwee	en crea	tivity an	d innovatio	n				
CO4 : Eval	uate the value of	creativ	ity							
CO5: Forn	nulate specific pro	oblem s	stateme	ents of re	al time issu	ies				
				UN	I – TI					
Introductio	on to Design Thi	i nking :	Introd	uction to	o elements	and principles of	Design, bas	ics of design-		
dot, line, sł	hape, form as fur	ndamen	ital des	sign con	ponents. P	rinciples of desig	n. Introduct	tion to design		
thinking, hi	story of Design T	hinking	g, New	materia	ls in Indust	ry				
				UN	IT – II					
Design Th	inking Process	$\therefore Des$	ign th	inking	process (e	empathize, analy	ze, idea &	k prototype),		
1mplementing	ng the process in	drivin	g inve	ntions, c	lesign think	ang in social inno	ovations. 10	ools of design		
uninking - p	erson, costumer,	journey	/ map,		T – III					
Innovation	• Art of innovat	ion D	ifforon	ce betw	$\frac{11 - 111}{200}$	tion and creativit	y role of	creativity and		
innovation	in organizations	Creativ	vity to	Innovat	ion Teams	for innovation N	Aeasuring th	he impact and		
value of cre	ativity.	Cieuti	vity to	mnovut			icusuing u	ie impuet und		
	5			UN	IT – IV					
Product De	esign: Problem for	ormatic	on, intr	oductior	to produc	t design, Product	strategies, I	Product value,		
Product plan	nning, product sp	ecificat	tions. I	nnovatic	n towards	product design Ca	se studies.	,		
				UN	IT – V					
Design Thi	nking in Busine	ss Pro	cesses:	Design	Thinking a	pplied in Busines	s & Strateg	ic Innovation,		
Design Thir	nking principles t	hat red	efine b	usiness -	- Business	challenges: Growt	h, Predictab	oility, Change,		
Maintaining	g Relevance, Extr	eme co	mpetit	ion, Star	ndardization	n. Design thinking	to meet co	rporate needs.		
Design thin	king for Startups	. Defin	ing an	d testing	Business 1	Models and Busin	ess Cases.]	Developing &		
testing proto	testing prototypes.									
Text Books	:									
1.Change by	y design, Tim Bro	own, H	arper E	Bollins (2	2009)					
2 Design 7	Thinking for Strat	egic In	novatio	on, Idris	Mootee, 20	013, John Wiley &	Sons			
Reference	Books:									
1. Design	Thinking in the C	Classro	om by	David L	ee, Ulysses	press				

- 2. Rod Judkins, The Art of Creative Thinking, Rod Judkins, Hodder & Stoughton
- 3. Universal principles of design- William lidwell, kritinaholden, Jill butter.
- 4. The era of open innovation chesbrough. H

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/OR Type) in each section. The student shall answer one question from each section.

End Examination:

CLOUD, MICRO SERVICES & APPLICATION (CMSA)										
VII Semester:	B. Tech	TT / XX 7 X				Sch	neme:2020			
Course Code	Category	Hou	rs/We	ek	Credits	Ma	ximum Marks			
OEC 410	OEC-III	L	Т	Р	С	Internal Assessment	EndExam	TOTAL		
		3	0	-	3	40	60	100		
Sessional E	Exam Duration:	1½ H	[rs			EndEx	xamDuration:3	3 Hrs		
Course Outcomes: At the end of the course students will be able to										
its va	rious delivery an	d dep	loyme	nt mod	lels.	fistics, advanta	ges, key teenno	logics and		
CO2: Devel	lop and design ar	n appli	ication	using	various too	ls in cloud envi	ronment.			
CO3:Acqui techni	re the basic and i	mpor	tant de	sign co	oncepts an d	isuse of web ap	plication devel	opment		
CO4: Struct	ture simple pythe	on pro	oram f	or dev	eloping an a	nplication in c	loud			
CO5:Analy	ze the issue of cl	oud si	uch as	securit	ty, energy ef	ficiency and in	teroperability, a	and provide		
an insi	ght into future p	rospec	ets of c	omput	ing in the cl	oud monitoring	g.	1		
			•		NIT-I					
Cloud Fund	amentals-Cloud	Ser	vice	Compo	onents-Clou	d Service, L	Deployment M	odels-Cloud		
components-G	uiding principle	with	respe	ect to	utilization,	Security, Price	ing- Applicatio	on of Cloud		
Computing. Ca	ase Study: Desig	n and	Imple	mentat	ion of Publi	c and Private C	Cloud Environm	nents – Open		
Stack and AW	S.									
				UN	IT–II					
ApplicationA	rchitectures -Mo	nolith	nic&Di	stribut	ed,Microser	viceFundamen	talandDesignAj	pproach-		
CloudNativeA	pplications-12Fa	ctors	App-A	pplicat	tionIntegrati	onProcessandA	PIficationProc	ess-		
APIFundamen	tal-Microservice	and	API N	/lanage	ement- Spr	ing Boot Fur	ndamental and	Design of		
Microservice -	API Tools - Dev	velope	er Porta	al-App	lications of	Micro service a	and API fication	1		
				UN	IT–III					
Devops funda	mentals - Devo	ps R	ole an	d Res	ponsibility-7	Fools and App	olications- Con	tainerization		
Process and Ap	plication-Evolut	ion of	f APP	Deplo	yment- Doc	ker Fundamen	tals - Docker A	Architecture-		
Docker Comma	nds. Case study	Orche	estratio	n, Kuł	ernetes, Do	cker Container				
	UNIT– IV									
Cloud Securit	y-Cloud Securit	y Sha	ared R	espon	sibility Arc	hitecture-Secur	rity By Design	Principles-		
Identity And A	ccess Managem	ent-C	loud S	ecurity	y Layers Ill	ustration-Cloud	l Network, Hos	st And Data		
Security Conce	pts-Security Ope	eration	ns and	Majo	r Cloud Ser	vice Provider	Tools-Security	Compliance		
and Regulations	s-Cloud Monitor	ing-Bo	enefits	of Clo	oud Monitor	ing-Overview of	of Cloud Monite	oring Tools.		
				UN	IT–V					

Developing and Deploying an Application in the Cloud- Building a python project based on Design-Development-Testing-Deployment of an application in the cloud using a development framework and deployment platform.

Case Study: Python Use case and Python Framework.

TextBooks :

- 1. Thomas Erl, Zaigham Mahmood, and Ricardo Puttini, "Cloud ComputingConcepts, Technology &Architecture", PrenticeHall, 2013.
- GuoNingLiu, Qiang GuoTong, Harm Sluiman, AlexAmies, "Developing and Hosting Applications on the Cloud", IBMPress, 2012.
- 3. KaiHwang,GeofferyC.FoxandJackJ.Dongarra,"Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet", First Edition, Morgan Kaufman Publisher,anImprintofElsevier,2012.
- 4. Rajkumar Buyya ,James Broberg Andrzej M.Goscinski , "Cloud Computing: Principles and Paradigms",Wiley,2011

Reference Books

- 1. Michael J. Kavis "Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS, and IaaS)", 1stEdition, Wiley, 2014.
- 2. AzureVirtual Machineshttps://docs.microsoft.com/enus/azure/virtualmachines/
- 3. GoogleApp Enginehttps://cloud.google.com/appengine#allfeatures
- 4. GoogleKubernetesEnginehttps://cloud.google.com/kubernetesengine#allfeatures
- 5. DockerTutorial:https://dockercurriculum.com

Question Paper Pattern

Sessional Exam

The question paper for sessional examination is for 30marks, covering half of the syllabus for first Sessional and remaining half or second sessional exam. Question No 1which carries 6marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying8marks each

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one uni and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question.

BLOCK CHAIN TECHNOLOGIES (BCT)									
VII Semest	er:B.Tech						S	cheme : 2020	
Course Code	Category	Hours/Week			Credits	Maximum Marks			
OEC411 OEC-I	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	0	0	3	40	60	100	
Sessional Exam Duration 1 ¹ / ₂ Hrs End Exam Duration: 3 Hrs									
Course Outcomes : At the end of the course the student will be able to									
CO1: Unde	erstand the basic	concept	ts of Bl	lockchai	in technolog	gy.			
CO2: Inter	pret the security a	and risk	s invo	lved in I	Blockchain	applications.			
CO3: Inter	pret the types of	Blockcl	hain ap	plication	ns and Bloc	kchain solutions.			
CO4: Under	rstand the proces	s of Eth	nereum	Blocke	hain Implei	nentation			
CO5: Under	rstand the proces	s of Hy	per led	lger Blo	ckchain Im	plementation			
	1	5	1	0					
				UN	$\mathbf{T} - \mathbf{I}$				
Introduction	, Scenarios, Cha	allenges	Artici	ulated, I	Blockchain.	Blockchain Chai	racteristics.	Opportunities	
Using Bloc	kchain, History	of B	Blockch	ain. Év	volution of	f Blockchain :	Evolution	of Computer	
Application	s, Digital Signati	ures, Ha	ashing,	and pu	blic key cry	ptosystems, priva	ate vs. publi	c Blockchain.	
Centralized	Applications, De	ecentral	ized A	pplicatio	ons, Stages	in Blockchain Ev	olution, Cor	nsortia, Forks.	
Public Block	kchain Environm	ents. T	vne of	Players	in Blockch	ain Ecosystem. Pla	avers in Mai	rket.	

UNIT – II

Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction.

UNIT – III

Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications. Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications

UNIT – IV

Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet

UNIT – V

Hyperledger Blockchain Implementation, Introduction, Use Case – Car Ownership Tracking, Hyperledger Fabric, Hyperledger Fabric Transaction Flow, FabCar Use Case Implementation, Invoking Chaincode Functions Using Client Application.

Text Books:

- 3. Ambadas, Arshad Sarfarz Ariff, Sham "Blockchain for Enterprise Application Developers", Wiley
- 2. Andreas M. Antonpoulos, "Mastering Bitcoin: Programming the Open Blockchain", O'Reilly

Reference Books:

- 1. Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions, Joseph Bambara, Paul R. Allen, Mc Graw Hill
- Mastering Bitcoin: Programming the Open Blockchain, 2nd ed., Antonopoulos, O'Reilly, 2017. ISBN: 978
- 3. Blockchain: Blueprint for a New Economy, Melanie Swan, O'Reilly
 - Web Resources
 - 1. NPTEL online course : https://nptel.ac.in/courses/106/104/106104220/#
 - 2.Udemy: https://www.udemy.com/course/build-your-blockchain-az/

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

		A	GILE	METHO	DOLOG	ES (AM)			
VII Semest	er : B. Tech						S	cheme : 2020	
Course Code	Category	Но	ours/W	/eek	Credits	Maximum Marks			
OEC 412	OEC 412 OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	0	0	3	40	60	100	
Sessional E	xam Duration1	∕₂ Hrs				En	d Exam Du	ration: 3 Hrs	
Course Out	tcomes :At the en	nd of th	e cours	se the stu	<u>ident will b</u>	e able to		1	
COI: Unde	rstand the import	ance of	1ntera	cting wi	th business	stakeholders in de	etermining t	he	
CO2. Analy	$\frac{1}{2}$ solution $\frac{1}{2}$ so	ystem vare de	velonn	pent prod	resses how	to plan them how	v to execute	them	
CO3: Identi	ify the impact of	social a	spects	on softy	vare develo	pment success.			
CO4: Unde	rstand Software	process	impro ^v	vement a	as an ongoi	ng task for develo	pment team	s.	
CO5: Analy	ze the Agile Me	trics an	d Qual	ity Assu	rance Activ	vities			
				UN	I – TI				
AGILE M Traditional Agile Proje Testing – A	AGILE METHODOLOGY: Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model - Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams - Agility in Design, Testing – Agile Decumentations – Agile Drivers, Carabilities and Values								
	<u> </u>			UN	IT – II				
AGILE PR Software Do and Practice	COCESSES: Lea evelopment - Ext es.	an Prod creme P	luction Progran	- SCRU nming: N	JM, Crysta Method Ove	ll, Feature Driven erview – Lifecycle	i Developm e – Work Pi	ent- Adaptive roducts, Roles	
				UN	IT – III				
AGILITY Making - Acquisition Managing S Sharing – R	AND KNOWL Earl_S Schools , Refinement, D oftware Knowle ole of Story-Carc	EDGE of K istribut dge – C ls – Sto	MAN M – ion, D Challen ory-Car	AGEM Institutio Deploymo Iges of M rd Matur	ENT: Agi onal Know ent , Leve Migrating to ity Model (le Information Sy rledge Evolution raging – KM in Agile Methodole SMM).	ystems – A Cycle – Software I ogies – Agi	gile Decision Development, Engineering – le Knowledge	
				UN	IT – IV				
AGILITY AND REQUIREMENTS ENGINEERING: Impact of Agile Processes in RE–Current Agile Practices – Variance – Overview of RE Using Agile – Managing Unstable Requirements – Requirements Elicitation – Agile Requirements Abstraction Model – Requirements Management in Agile Environment, Agile Requirements Prioritization – Agile Requirements Modeling and Generation – Concurrency in Agile Requirements Generation.									
				UN	$\mathbf{IT} - \mathbf{V}$				
AGILITY Driven Dev Assurance -	AGILITY AND QUALITY ASSURANCE: Agile Product Development – Agile Metrics – Feature Driven Development (FDD) – Financial and Production Metrics in FDD – Agile Approach to Quality Assurance - Test Driven Development – Agile Approach in Global Software Development.								
Text Books	:								
1. David J. the Theo	Anderson and E ory of Constraints	li Schra s for Bu	agenhe Isiness	im, —A Results	gile Manag , Prentice I	ement for Softwar Hall, 2003.	e Engineeri	ng: Applying	
2. Hazza a Science	nd Dubinsky, — , Springer, 2009.	Agile S	oftwar	e Engine	ering, Serie	es: Undergraduate	Topics in C	Computer	
L									

Reference Books:

1. Craig Larman, —Agile and Iterative Development: A Manager_s Guidel, Addison-Wesley, 2004.

2. Kevin C. Desouza, —Agile Information Systems: Conceptualization, Construction, and Managementl, Butterworth-Heinemann, 2007.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	AUGMI	ENTEI) REA	LITY 8	VIRTUA	L REALITY (AI	RVR)			
VII Semest	er : B. Tech						S	cheme : 2020		
Course Code	Category	Но	ours/W	/eek	Credits	Maximum Marks				
OEC 413	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	0	0	3	40	60	100		
Sessional E	xam Duration1 ¹ /	∕₂ Hrs				En	d Exam Du	ration: 3 Hrs		
Course Out	tcomes :At the er	<u>nd of th</u>	e cours	se the st	udent will b	e able to				
CO1: Explo	ore the history of	spatial	compu	ting and	design inte	eractions	• • 1	•.1		
function .	function									
CO3: Learn	Virtual reality a	nimatic	n and	3D Art o	optimization	1.				
CO4: Demo	onstrate Virtual re	eality			1					
CO5: Introd	luce to the design	n of vis	ualizati	ion tools						
				UN	I – TI					
Designing a	nd Art Across Dig	ital Rea	alities:	Introduc	tion, Modal	ities, Types of con	nmon HCI m	odalities, New		
Modalities,	The current state	of mod	alities	for spat	ial computir	ng Devices, current	t controllers	for immersive		
computing sy	/stems, Voice, Har	nds and	Hardwa	are input	s over the n	ext generation.				
Designing fo	r our senses. not	our dev	vices: E	nvisionir	g a future.	sensory technology	. The Role o	f women in Al.		
Sensory Desi	gn, Five sensory Pr	inciples	, Adobe	es' AR .	.8 a rata a, ,		,			
	5.,,,,,,,, .		,							
				UN	IT – II					
Virtual Reali	ty of Art: A more n	natural v	vay of r	making 3	D art, VR for	animation				
3D Art Optir	mization: Introduc	ction, D	raw Cal	ls, Using	VR Tools fo	r creating 3D Art, A	Acquiring 3D	Models Versus		
Making them	from scratch.									
				UN	IT – III					
Computer vi	sion that makes a	augmen	ted rea	ality Pos	sible works:	History of AR, Ho	w and why t	o select an AR		
Platform, Ma	apping, platforms,	other D	evelopr	nent con	siderations,	The AR Cloud				
Virtual Reali	ty and Augmented	d Reality	y – cros	ss- platfo	orm theory:	Why cross platform	, The role of	game engines.		
understandir	ng 3D Graphics, Po	rtability	lesson	s from vi	, deo game de	esign, simplifying th	e controller i	nput.		
				UN	IT – IV					
Virtual Reali	ty Toolkit: What is	VRTK, H	listory,	Steam V	R Unity Tool	kit, VRTK v4, future	of VRTK, suc	cess of VRTK		
Three Virtua	I Reality and Augr	nented	Reality	Develop	ment Best I	Practices: Handling	Locomotion,	Locomotion in		
VR, Locomo	VR, Locomotion in AR, Effective use of Audio, Audio in VR, Audio in AR, Common interaction paradigms,									
Inventory of	Inventory of VR, Augmented Reality Raycasts									
	UNIT – V									
Data and M	Aachine learning	visuali	zation	Design	and Develo	opment in spatial	computing	Introduction,		
understandir	ng data visualizatio	on, princ	ciples fo	or data a	nd machine	learning visualization	on design an	d development		
in spatial co	omputing, why da	ata and	l mach	ine lear	ning visualiz	ation works in sp	patial compu	iting, 2D data		

visualization vs 3D data visualization in spatial computing, interactivity in data visualizations and in spatial computing, animation, failures in data visualization, good data visualization design optimize 3D spaces, data representations, info graphics, and interactions, defining distinctions in data visualization and big data for machine, how to create data visualization: data visualization creation pipeline, webXR, data visualization industry use case examples of data visualization, 3D reconstruction and direct manipulation of real world data, data visualization is for everyone, hands on tutorials, how to create data visualization is for everyone, hands on tutorials, how to create data visualization, resources.

Character AI and Behaviors: Introduction, behaviors, current practice: Reactive AI, more intelligence in the system, Deliberative AI, machine learning.

Text Books:

1. Erin Pangilinan, Steve lukas, and Vasanth Mohan, "Creating Augmented & Virtual Realities", 1st edition, O'REILLY, 2019.

Reference Books:

1. Steve Aukstakalnis, "Practical Augmented Reality", Pearson Education, 2017

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	COMPOSITE MATERIALS (CM)									
VII Semeste	er: B. Tech					1	Sche	eme: 2020		
Course Code	Category	Ho	ours/W	'eek	Credits	Maximum Marks				
OEC 414	OEC – IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	0	0	3	40	60	100		
Sessional E	Exam Duration	: 1 ½	Hrs			End Exam	Duration :	3 Hrs		
Course Out	Course Outcomes : At the end of the course the student will be able to									
CO1: Identi	CO1: Identify the properties of fiber and matrix materials used in commercial composites.									
and its	s manufacturing	techn	iques.				1	,		
CO2: Under	rstand manufact	uring	nethod	ls and t	heir elastic p	properties of lamin	na.			
CO3: Analy	ze the Hooke's	law fo	or diffe	rent typ	be of materia	ls.				
CO4: Under	rstand the elastic	e beha	vior of	the un	idirectional c	composite				
CO5: Analy lamin	ze a laminated _j a.	plate in	n bendi	ing, inc	luding findi	ng laminate prope	erties from			
				UN	I – TIV					
Reinforcements: Fibers- Glass, Silica, Kevlar, carbon, boron, silicon carbide, and boron carbide fibers. Particulate composites, Polymer composites, Thermoplastics, Thermosets, Metal matrix and ceramic composites UNIT – II Manufacturing methods: Autoclave, tape production, moulding methods, filament winding, hand layup, pultrusion, RTM . Micromechanics: Unidirectional composites, constituent materials and properties, elastic properties of a lamina, properties of typical composite materials, laminate characteristics and configurations. Characterization of composite properties UNIT – III Coordinate transformations: Hooke's law for different types of materials, Hooke's law for two dimensional unidirectional lamina, Transformation of stress and strain, Numerical examples of stress and strain strains stra										
				UN	IT – IV					
Elastic behaviour of Unidirectional Composites: Elastic constants of lamina, relationship between engineering constants and reduced stiffness and compliances, analysis of laminated composites, constitutive relations. UNIT - V Analysis of laminated composite plates: Introduction, thin plate theory, specially orthotropic plate cross and angle ply laminated plates problems using thin plate theory										
, cross (place, cross and angle ply laminated plates, problems using thin plate theory.									
Text Books 1. R.M.Jone 2. Isaac and 3. Madhujit N Reference F	s, Mechanics of M.Daniel, Engi Mukhopadadhya Books	[°] Comp neerin ly, Me	oosite N g Meel chanics	Materia hanics s of con	ls Mc Graw of Composite mposite mate	Hill Company, N e Materials, Oxfo erials and structur	ew York. rd Universi es, Universi	ty Press. ities Press		
ACTUICUTURU I	JOUNS									

1. L. R. Calcote, Analysis of Laminated Composite Structures , Van Nostrand Rainfold

2. B. D. Agarwal and L. J. Broutman, Analysis and performance of fibre Composites, Wiley Interscience, New York

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Exam:

	IMAGE PROCESSING (IP)								
VII Semester :	B. Tech						Sc	heme : 2020	
Course Code	Category	Ho	urs/We	eek	Credits	Maxi	imum Mar	ks	
OEC 415	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		3	0	0	3	40	60	100	
Sessional Exar	n Duration : 1	¹ / ₂ Hrs		.1	. 1	End	Exam Dur	ation: 3 Hrs	
Course Outc	omes : At the e	end of t	he cour	se the	student will	be able to	.1 .	6	
digital in	digital images.								
CO2: Understa	nd the image er	nhancer	nent in	spatia	al and freque	ncy domain.			
CO3: Understa	nd various imag	ge resto	oration	techni	ques.				
CO4: Understa	nd various imag	ge com	pressio	n and	segmentation	n techniques.			
CO5: Understa	nd the various 1	mathen	natical	transfo	orms , color i	mage concepts an	nd processir	ng.	
				UN	$\mathbf{IT} - \mathbf{I}$				
Basic Concept	s Definition, Ap	pplicati	ons of	Digita	l Image Proc	essing, Fundame	ntal Steps, (Components	
of Image Proce	ssing System, F	luman	Visual	Syster	m, Simple In	hage Formation N	lodel, Imag	e Sampling	
And Quantizati	on, Spatial and	Gray L	evel R	esolut	ion, Image Ii	nterpolation, Som	e Basic Rel	ationships	
Between Pixels	, Linear And N	on Line	ear Ope		IS.				
Imaga Enhana				UN	11 - 11				
Spatial Doma Logical And A Smoothing And Frequency Do Fundamental S Sharpening Fre	 Spatial Domain: Basic Gray Level Transformations, Histogram Processing, Enhancement Using Logical And Arithmetic Operations, Image Subtraction, Image Averaging, Basic of Spatial Filtering, Smoothing And Sharpening Spatial Filters, Combining Spatial Enhancement Methods. Frequency Domain: Introduction to Fourier Transforms, Basics of Filtering in Frequency Domain, Fundamental Steps in Filtering in Frequency Domain, Smoothing Frequency Domain Filters, Combined Steps in Filtering in Frequency Domain, Smoothing Frequency Domain Filters, Combined Steps in Filtering in Frequency Domain, Smoothing Frequency Domain Filters, Combined Steps in Filtering in Frequency Domain, Smoothing Frequency Domain Filters, Combined Steps in Filters, Combined Steps i								
	queney Domain		<i>s</i> , 110111		T - III	•			
Image Restoration Model of Image Degradation/Restoration Model, Noise Models, Restoration In Presence of Noise Only-Spatial Filtering, Adaptive Filters, Periodic Noise Reduction by Frequency Domain Filtering, Linear Position Invariant Derivations, Algebraic Approach to Restoration, Inverse Filtering Least Mean Square Filters, Constrained Least Squares Restoration									
				UN	IT - IV				
Image Compre Compression M Coding, Lossler coding	Image Compression File format (bmp, tiff, pcx, gif, jpeg.), Compression fundamentals, Image Compression Models, Error Free Compression: VLC, Arithmetic Coding, LZW coding, Bit plane Coding, Lossless Predictive Coding, Lossy Compression: Lossy Predictive Coding, Block Transform coding								
Image Segmen	tation Fundam	entals,	Detect	ion of	Discontinuit	ies: Point, Line, I	Edge detecti	on, Edge	
Linking and Boundary Detection: Local Processing, Global Processing via Hough Transform.									
Image Transfo	orms Introduction	on One	and Ty	wo Di	mensional D	iscrete Fourier Tr	ansform (D	FT),	
Properties of D	Properties of DFT, Properties of Discrete cosine and sine transforms, Properties of Slant, KL								
Color Image P	rocessing Cold	or fund	amenta	ls. Co	lor models. I	RGB. CMY and C	MYK HS	. Converting	
colors, RGB to	HIS, HIS to R	GB ma	nipulat	ing H	IS componen	it images, Pseudo	color Imag	e	
Processing, Ful	l Color Image I	Process	ing.						
Text Books									
1. Rafael Go publications	onzalez & Rio s, 2012	chard	Woods	s, —l	Digital Imag	ge Processing ^{II} ,	3rd Editio	on. Pearson	

2. Anil K. Jain, —Fundamental of Digital Image Processing, PHI publication, 2013.

3. S. Jayaraman, S. Esakkirajan & T. Veera Kumar, —Digital Image Processing^{II}, Mc. Graw Hill, 2011.

Reference Books

1. Pratt, —Digital Image Processing, 2nd Edition, Wiley Publication, 1991.

2. S. Sridhar, —Digital Image Processing, Oxford University Press, 2011.

Web References:

1. https://nptel.ac.in/courses/117105079/

2. https://nptel.ac.in/courses/117104069/

3. https://nptel.ac.in/courses/106105032/

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

			MOB	ILE CO	MPUTINO	G (MC)				
VII Semest	er : B. Tech						S	cheme : 2020		
Course Code	Category	He	ours/W	/eek	Credits	Max	Maximum Marks			
OEC 416	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional E	xam Duration1	<u>2 Hrs</u>				En	d Exam Du	ration: 3 Hrs		
Course Out	tcomes : At the er	nd of th	e cours	se the st	udent will b	be able to				
1G to $5G$	arn about the mo	one infi	rastruc	ture, rad	110 resource	management, ove	rview of ge	neration		
CO2: To ill	CO2: To illustrate the location management involved in GSM Mobile IP									
CO3: To ill	ustrate the transn	nission,	, transa	ction te	chnology in	volved in mobile.				
CO4: To ex	plore the wireles	s netwo	ork in r	nobile.						
CO5: To dis	scover the cognit	ive rad	io netw	vorks in	mobile					
				UN	I – TIN					
Introductio	n Overview of	f wirel	ess an	d mobil	le infrastru	cture, Preliminary	concepts	on cellular		
architecture.	, Design objectiv	ves and	l perfo	rmance	issues, Rac	lio resource mana	agement and	d interface,		
Propagation	and path loss m	iodels,	Chann	el interf	erence and	frequency reuse,	Cell splittin	ig, Channel		
assignment	strategies, Overv	iew of	genera	tions:- 1	G to 5G					
T (* A		π						1 1/1 D)		
Location And Handon Management Introduction to location management (HLR and VLR), Mobility models characterizing individual node movement (Random walk, Fluid flow, Markovian, Activity based), Mobility models characterizing the movement of groups of nodes (Reference point based group mobility model, Community based group mobility model), Static (Always vs. Never update, Reporting Cells, Location Areas) and Dynamic location management schemes (Time, Movement, Distance, Profile Based), Terminal Paging (Simultaneous paging, Sequential paging), Location management and Mobile IP, Overview of handoff process, Factors affecting handoffs and performance evaluation metrics, Handoff strategies, Different types of handoffs (soft, hard, horizontal, vertical)										
				UN	IT – III					
Wireless Transmission Fundamentals Introduction to narrow and wideband systems, Spread spectrum, Frequency hopping, Introduction to MIMO, MIMO Channel Capacity and diversity gain, Introduction to OFDM, MIMO-OFDM system, Multiple access control (FDMA, TDMA, CDMA, SDMA), Wireless local area network, Wireless personal area network (Bluetooth and zigbee).										
XX/0 1		A 1 1				• .• • •				
Wireless Network Mobile Ad-hoc networks - Characteristics and applications; Coverage and connectivity problems, Routing in MANETs, Wireless sensor networks - Concepts, basic architecture, design objectives and applications; Sensing and communication range, Coverage and connectivity, Sensor placement, Data relaying and aggregation, Energy consumption, Clustering of sensors, Energy efficient Routing (LEACH).										
				UN	IT – V					
Cognitive I sensing, Spo networks, I Introduction	Radio Networks ectrum sharing, introduction to to the radio	s Fixe Interop D2D resourc	ed and erabili commu e mar	dynam ty and o unication nagemen	ic spectrum coexistence ns-High lev nt, power o	n access, Direct issues, Applicati vel requirements control and mod	and indirec ons of cogr for 5G a e selection	t spectrum nitive radio rchitecture, problems,		

Millimeter wave communication in 5G.

Text Books:

- 4. Jochen Schiller, "Mobile Communications", Second Edition, Pearson, 2004.
- 5. Andrea Goldsmith, "Wireless Communications", Cambridge University Press, 2005

Reference Books:

1. Theodore Rappaport, "Wireless Communications: Principles and Practice", Pearson Education, 2014.

2. Ezio Biglieri, MIMO, "Wireless Communications", Cambridge University Press, 2009.

3. Ivan Stojmenovic, "Handbook of Wireless Networking and Mobile Computin", Wiley, 2002.

4. James Cowling, "Dynamic Location Management in Heterogeneous Cellular Networks", 2004.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:
			ENTE	RPRIS	E SYSTEN	IS (ES)		
VII Semest	er : B. Tech						S	cheme : 2020
Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks
OEC 417	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional E	xam Duration1	² Hrs				En	d Exam Du	ration: 3 Hrs
Course Out	tcomes :At the er	nd of th	e cours	se the stu	udent will b	be able to		
CO1:Under	stand basic eleme	ents of	Enterp	rise Sys	tems			
CO2:Devel	op skills in under	tion na	ig arch tterns	llecture				
CO4:Under	stand the integrat	tion and	d natter	ms				
CO5: Analy	ze the deployme	nt	a patto	115				
				UN	I – TIV			
Introduction enterprise s systems, Fir Component management	on to Modern ystems – Busine nancial and huma ts of Enterpris t, workflow, Con	Enterj ss Infor n resou e syste trolling	prise rmation arce systems: (g and A	Systems n system stems. K Channels Auditing,	: Introduc , Decision inds of Ent (Mobile, Accountin	tion to enterpris support systems, erprise systems- E web, desktop, p g etc.	e systems. Knowledge 32C and B2I artner integ	Elements of management models. gration), Data
			_	UN	II – II	-		
Key charac Collaboratio Enterprise oriented, mi	cteristics Enterp on, Data transforr System archite cro service, and o	orise synation. ectures cloud a	y stems : Batcl rchitec	: Distril h proces tures.	outivity, M ssing, Mon	anaged redundand	cy, Exceptic rver, ecomn	on processing, nerce, service
				UN	IT – III			
Introduction Service orien Application Presentation	on to Enterprise nted Architecture a architecture F a, Concurrency.	Applic e, Micro Pattern	cation o servie s: Lay	archited ce archit ering, C	ctures: Lay ecture, Plug Organizing	er Architecture, E g-in architecture. domain logic, Ma	event driven	Architecture, atabase, Web
				UN	IT – IV			
Enterprise Elements of Enterprise SOAP. Intro	Application Int messaging-based Integration pa oduction RESTFu	egratio d Integr tterns: 1 webs	on: Intr ration. Mod ervices	oduction ern serv	n to Enterp vice integra tion. Differ	rise Integration, d ation techniques. ences between SO	ifferent integ Introductio AP and RES	gration styles. n to WSDL, ST.
				UN	IT – V			
Deploymen Security, av Introductio architecture	t of Enterprise ailability, Netwo on to Enterpri models. Zachma	e appl rk, Ava ise A 1 n Fram	icatio r iilabilit r chitec ework	ns: Key y, and T ture: I , TOGA	requireme ransparenc mportance F Framewo	ents in deployme y (Basic Introduct of Enterprise rk.	ent - Stabil ion only). Architectur	ity, capacity, e. Enterprise
Text Books	:							

- 1. Ralph Stair, George Reynold, "Principle of Information Systems", 10 ed.
- 2. Martin Fowler et al, "Pattern of Enterprise Application Architecture", Addison-Wesley, 2012
- 3. Gregor Hohpe, Bobby Woolf, Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions,

Reference Books:

- 1. Mark Richards, Software Architecture patterns, 2015, O'Reilly.
- 2. Sam Newman, "Building Microservices", 2015, O'Reilly.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

		MOI	DERN	WEB A	PPLICATIO	ONS (MWA)						
VI Semeste	r:B. Tech						S	cheme : 2020				
Course Code	Category	Но	Hours/Week Credits Maximum Marks									
OEC 418	OEC-IV	L	TPCContinuous Internal AssessmentEnd ExamTOTAL									
		3	0	0	3	40	60	100				
Sessional E	xam Duration:	1½ Hrs	5			En	d Exam Du	ration: 3 Hrs				
Course Out	tcomes: At the en	nd of th	e cours	se the stu	udent will b	be able to						
COI: Unde	erstand the variou	is steps	to desi	ign stati	c websites.							
CO2: Dev	elop a web Page	using t	ne HI	ML5.	wabsitas							
CO4: Impl	ement client-side	scrinti	no iisin	o IavaS	crint to des	ion dynamic webs	sites					
CO5: Deve	clop end to end at	oplicati	on - we	eb fronte	end and bac	kend developmen	t.					
							••					
				Uľ	1 – 1							
Introduction websites: St and Web P Tier Model,	on to Internet & atic and dynamic rogramming Lan Service Oriented	k Worl c websi iguages l Archi	d Wid te, Wel . Web tecture	le Web : b Brows Standar s, REST	: Concept of sers, – Web rds, Tiered Services, In	of website, its nee Servers, Uniform Architecture: Cli ntroduction to HT	ed and purp Resource I ent Server ML, XML,	ose, Types of Locator, Tools Model, Three JSON				
				UN	II – II							
Hyper Tex formatting t and Externa	t Mark Up Language: - Languages used for website development, HTML5: basic tags, tags, Adding images, Lists, Embedding multimedia in Web pages, Inserting tables, Internal I Linking, Frames, Forms											
				UN	IT – III							
Cascading sheet, Intern	Style Sheets (C) al style sheet, In	SS3) : E line sty	Basics of le shee	of Casca t, CSS S	ding Style Syntax, colo	sheets, Advantag or, background, Fo	es of CSS, l ont, images	External Style				
				UN	IT – IV							
Java Script variables, ta Iterative stat	: Features of Jav g, Document Ob tement: for, for/in	aScript ject Mo n, while	, exten odel (D e, do w	sion of . OM) wi hile, bre	JavaScript, th JavaScri ak and cont	Syntax of JavaScr pt, Selection State tinue	ript: data typ ment using	bes, operators, if and Switch,				
				UN	IT – V							
Front End Introduction Scopes, Dire	Framework : In to Bootstrap – I ectives & Events	ntroduc Basics, , Contro	ction to Grids, ollers, I) jQuer Themes Filters, S	y - Syntax s ; Angular Services, Va	, Selectors, Eve JS – Expressions alidation	nts, Travers, Modules, I	sing, AJAX ; Data Binding,				
Back End Addressing,	Fechnologies: In Methods – (GET	troduct Γ, POS	tion to Γ, PUT	RESTfi , DELE	ul services, TE)	Resources, Messa	ages (Reque	st, Response),				
Text Books	:											
1. Deitel an Edition,	nd Deitel and Nie 2011.	eto, —I	nternet	and Wo	orld Wide V	Veb - How to Prog	gram∥, Prent	ice Hall, 5th				
2. HTML5	Black Book,2nd	Edition	n, Drea	umtech F	Press,2016.							

- 3. HTML & CSS: Design and Build Websites, Jon Duckett, John Wiley & Sons
- 4. RESTful Web Services: Leonard Richardson, Sam Ruby, May 2007

Reference Books:

- 2 Web Technologies, Uttam K. Roy, Oxford Higher Education., 1st edition, 10th impression, 2015.
- 3 Robert Pattinson, Beginners Guide for HTML and CSS Web Design and Web Development,2018
- 4 Jeffrey C and Jackson, —Web Technologies A Computer Science PerspectivePearsonEducation, 2011.

4. Gopalan N.P. and Akilandeswari J., —Web Technology, Prentice Hall of India, 2011.

Web References:

1. https://www.tutorialspoint.com/Html/index.htm

2. https://www.w3.org/Style/CSS/

- 3.Bootstrap CSS Framework: <u>https://getbootstrap.com</u>
- 4. https://docs.angularjs.org/api/ng/function/angular.element

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

		CC	GNIT	IVE R	ADIO (CR	R)					
VII - Semester: B.	Гесh						Sche	me:2020			
Course Code	Category	gory Hours/Week Credits Maximum Marks									
OEC 419	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOT AL			
		3	-	-	3	40	60	100			
SessionalExamDura	tion:1 ½ Hrs.					End E	xam Duration:	3 Hrs.			
Course Out comes: A	At the end of the	he cou	rse the s	studen	t will be abl	e to	<u></u>				
C02: Analyze the A	ware and Adar	$\frac{01}{100}$	vanu n.	radio		icensed spectrui	11.				
CO3: Analyze the st	nectrum aware	ness a	nd inter	ferenc	s. e avoidance	2					
CO4: Understand te	chnical challer	nges in	CR and	d vario	ous spectrun	n sensing metho	ds.				
CO5: Analyze the C	FDM based C	Cognitiv	ve radio	and N	/IMO-OFD	M channel estin	nation				
				UNI	Г-І						
Software defined R Management – Mana development– Cognit	adio: Basic S aging unlicen ive wave form	SDR - sed sp develo	- Softw ectrum- opment	are ar -Noise	nd Hardwar Aggregatio	re Architecture on-Component	of an SDR – development–W	Spectrum Vave form			
	UNIT-II										
Spectrum Awarenes Introduction, TheInter Creating Spectrum analysis, Distributed s	s: ferenceavoidar Awareness-Sp sensing and op	ncepro pectrum peratior	blem,C n usage n, Chann	UNIT ognitiv e repo nel aw	-III veRadioRol orting, Spe- areness and	e,Spectralfootpr ctrum sensing, multiple signals	intminimization Potential Inte s in space	l, rference			
Cognitive Radio tech Design Challenges a	nical challen ssociated with	ges an CR -H	d spect Iardwar	rum s	ensing: irements-H	idden primary u	ser problem-				
Detecting spread spe	ectrum primary	users	-Sensin	g dura	tion and fre	quency-Security	1 /.				
				UNIT	–V						
Spectrum sensing Spectrum sensing ov stationary based sensi sensing methods.	verview – Cla ing –Energy d	ussifica letector	tion -	Match sensin	ed filter – g–Radio Id	waveform base dentifier– Coope	ed sensing – c erative sensing-	yclo- other			
l ext Books:											
1.BruceA.Fetti,-0 2.H.Arslan-Cogn	Cognitive Radi itiveRadio,SD	iotechn RandA	ology". daptive	, 1 st Edi Wirele	ition,Elsevie ss <i>Systems</i> ,S	er. Springer,2007.					
References:											
1.K.C.Chen, R.Prasad 2.J. H. Reed, —Softw 3. Paul Burns, —Soft	l , —Cognitive vare Radiol, Pe ware defined r	e Radio earson, eadio fo) Netwo 2004.)r 3Gll, 4	orks∥,` Artech	Wiley, 2009 House, 200).)3.					
WebReferences:											

1.https://nptel.ac.in/courses/108107107/3

2.https://www.youtube.com/watch?v=hzxgDyXbpt4

3.https://www.youtube.com/watch?v=z-E5jIoUFbA

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ORType)ineachsection. The studentshallans wero nequestion from each section.

End Examination:

	A	AUTC	MAT	ION &	& CONTR	OL (AMC)		
VII Semester :	B. Tech						Sche	me : 2020
Course Code	Category	Hou	rs/We	ek	Credits	Μ	aximum Mark	S
						Continuous		
OFC 420	OFC- IV	L	Т	Р	С	Internal	End Exam	TOTAL
OEC 420	OEC-IV					Assessment		
		3	0	0	3	40	60	100
Sessional Ex	am Duration : 1	1 ½ H	rs			End E	Exam Duration	: 3 Hrs
		1 0						
Course Outc	omes : At the en	$\frac{d \text{ of } t}{d}$	he cou	rse the	$\frac{1}{2}$ student wi	Il be able to		
COI: Unders	stand the element	$\frac{\text{ts of } a}{\sqrt{2}}$	utoma	<u>tion p</u>	orinciples	· · ·		
CO2: Under	stand the constru	lction	and w	orking	; of pneuma	atic systems		
CO3: Under	stand the workin	g of h	ydraul	$\frac{10 \text{ syst}}{10 \text{ syst}}$	tems			
CO4: Under	stand various con	<u>itrol t</u>	echniq	$\frac{\text{ues in}}{1}$	automation	$\frac{1}{1}$		
CUS: Under	stand the automa	ited te	sting a	nd ins	pection met	thods in industi	У	
A who we obtain in	Manufaduuina	- T d-		UI Lutur	duction Ax		- du sti su sustau	Duinsinlag
Automation in	f outomation Da	g Inal	istries	: Intro	auction- Al	itomation in pro	oduction system	functions
I and strategies of	automation, Ba	tod flo	ements	s or an	transfor mo	system, Advan	veis of transfor	lines
without storage	Automated flox	v line	s with	s anu storag	e buffers	chamsins, Ana	lysis of transfer	lines
without storage	, Automated nov		5 WILLI					
Pneumatic Sys	tems: Introducti	on to	nneum	atic s	vstems: adv	antages and lin	nitations, applic	ations
structure and si	gnal flow of pne	umati	c syste	ms: pi	neumatic po	wer pack: air 9	reneration and d	istribution.
air reservoir. co	Instructional deta	ails an	d work	cing of	f filter. lubr	icator, pressure	regulator. actu	ators.
direction control	ol valves, check v	alves	, flow	contro	ol valves, pr	eumatic counte	er.	,
Symbols of pne	eumatic valves, t	traver	se time	e diag	ram, design	of manually o	perated circuits	s: direct and
indirect control	of actuators, cor	ntrol c	of singl	e and	multiple ac	tuators.	-	
				UN	IT - III			
Introduction to	o Hydraulic syst	tems:	Advar	ntages	and limitati	ions, physical p	principles of oil	hydraulics,
hydraulic powe	r pack, hydraulic	e fluid	s, filte	rs, typ	es of hydra	ulic pumps, pu	mp performance	e
calculations, ho	se size calculation	ons, h	ydrauli	ic actu	ators and ad	ccessories, accu	umulator, hydra	ulic valves,
pressure contro	l valves, flow co	ntrol	valves,	open	-center and	closed-center h	ydraulic system	ıs.
				UN	IT - IV			
Control Techn	ologies in Autor	matio	n: Ind	ustrial	Control Sy	stems, Process	Industries Vers	es Discrete-
Manufacturing	Industries, Conti	nuou	s Verse	es Dise	crete Contro	ol, Computer Pi	rocess Control a	and its
Forms. Comput	ter Based Industr	ial Co	ontrol:	Introd	uction & A	utomatic Proce	ss Control, Bui	lding
BIOCKS OF AULO	mation System:	LAN,	Analo	g & D		lodules, SCAD	A System & K	10.
Automated Inc	mation and Ta	sting	Incno	otion	nd tosting	Statistical Qual	ity Control Au	tomated
Inspection Prin	ciples and Metho	ode S	ensor]	Cechno Cechno	logies for /	Statistical Qual Automated Insr	ection Coordin	ate
Measuring mac	hines Other Cor	ntact I	nspect	ion M	ethods Mac	chine Vision O	other ontical Ins	nection
Methods	lines, other cor	itaet i	nspeer		culous, wia	chine vision, o	ther optical ms	peetion
ivietheus.								
Text Books :								
1. Mikell-	PGroover "Auto	omati	on-Pro	ductio	n-Systems-	and-Computer-	-Integrated-	
Manufa	cturing"-Ed-4-20)1 <u>5, P</u>	earson	publi	shers			
2. Majumo Delhi.	lar S.R., "Pneun	natic	Systen	ns Pri	nciples and	Maintenance"	, Tata McGrav	v Hill, New
3. Peter C	roser and Frank	Ebel,	"Pneu	matics	s Basic Lev	el TP 101" Fe	sto Didactic GN	MBH & Co,

Germany.
4. Hasebrink J.P. and Kobler R., "Fundamentals of Pneumatic Control Engineering", Festo
Didactic GMBH & Co, Germany.
5. Krishna Kant "Computer Based Industrial Control" -PHI
6. Groover M. P., "Industrial Robotics, Technology, Programming and Application", McGraw Hill
Book and Co., 2012.
Reference Books :
1. Merkle D., Schrader B. and Thomes M., "Hydraulics Basic Level TP 501" Festo Didactic
GMBH & Co, Germany.
2. Peter Rohner, "Industrial Hydraulic Control" John Wiley and Sons, Brisbane
3. Tiess Chiu Chang & Richard A. Wysk "An Introduction to Automated Process Planning
Systems"
4. Amber G.H & P.S. Amber "Anatomy of Automation" PrenticeHall
5. Srinivas Medida, "Pocket Guide on Industrial Automation", First Edition, IDC Technologies,
2008
Web References:
1. https://www.electrical4u.com/industrial-automation/
2. https://conceptsystemsinc.com/what-is-industrial-automation-types-of-industrial-automation
3. https://www.thomasnet.com/articles/automation-electronics/general-automation-systems
Question Paper Pattern:
Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of
the syllabus for first sessional and remaining half for second sessional exam. The question paper shall
consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall
answer one question from each section.
End Exame The question paper for End examination shall be for 60 mortes. The Question paper shall

	H	UMAN	RESC	DURCE	MANAGI	EMENT (HRM)						
VII Semes	ter : B. Tech						S	cheme : 2020				
Course Code	Category	Category Hours/Week Credits Maximum Marks										
OEC 421	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	-	-	3	40	60	100				
Sessional E	Exam Duration1 ¹ /2	∕₂ Hrs				En	d Exam Du	ration: 3 Hrs				
Course Ou	tcomes :At the er	nd of th	e cours	se the stu	udent will b	e able to						
CO1: Unde	rstand human reso	ource n	nanage	ment con	ncept and c	hallenges						
CO2:Under	stand human reso	urce sy	vstem d	esign								
CO3: Unde	rstand Functional	Areas	of HRI	M								
CO4: Unde	rstand human reso	ource p	lannıng	<u> </u>	<u> </u>							
COS: Unde	rstand human reso	ource n	nanage	ment in	Service Sec	ctor						
				UN	I – TI							
HUMAN F Meaning, I Recent Tre Systems: H	RESOURCE MA Definitions, Char nds -Human Res R Philosophy: HF	NAGE acterist ources	CMEN tics, C Mana es, pra	F : Conce bjective ger – D ctices ar	ept And Ch s, Importa outies and ind processes	allenges: Human nce, Functions a Responsibilities. 7	Resources M and Process The Compo	Aanagement – , Challenges, ments Of HR				
		<u>- p - 11 - 1</u>	, pro		IT – II							
Qualities a Functions a and Huma Evaluation Definition Measureme Conducting	nd Skills ;HR D nd Process of Hu n Resources Do and Management Of Human Re nts In HRA, M Human Resource	epartm uman R evelopr : Select source leaning e Audit	ent-Ma Resourc nent; ted Eva Acco ; of H , Huma	eaning, ees Deve Line M Aluation bunting Iuman I an Resou	Definitions clopment-D fanagement Techniques (HRA), N Resource A irce Audit I	s, Characteristics, ifferences betwee t Responsibility s; Human Resourc Veed, Significanc Audit ,Need Of Process; Informati	n personnel in HRM; e Accountir ce, Objecti Human Re on Manager	, Importance, Management Performance ng And Audit: ves For Hr, source Audit nent In HRA.				
				UN	IT – III							
Functional recruitment Compensat Wages and rise sector a Employee F HR complia Human Re Information Payroll Ma Managemen	Areas of HRM -Internal recruitm ion and Reward S Salary Perquisite and sun set sector. Relations - Define ance: Meaning and source Information Systems, Design inagement: What at Process, Payrol	1: Rec ent, E: System s, Fring emplo d Impo on Sys ing An is Pa 1 Proce	cruitme xternal : Comp ge Beno yee rel rtance; stems: d Impl yroll M sssing S	ent and recruitm pensation efits, Bo ations, f Importa ementin Manager Stages, N	Staffing: S nent, Selec n - Meanin nus and Ind our method nce of HI g an HRIS; nent , Imp Methods of I	Strategic recruitm tion process, Staff g, Definitions, Ob centives – Meanin s for managing en S Information Sy portance of Payro Payroll Manageme	ent decisio fing global a ojectives and gs only, inc nployee rela /stems Fea oll Manager ent.	ns, Types of assignments; d Importance- entives in sun tions; atures of HR ment, Payroll				
				UN	IT – IV							
Human Ro Training A needs asse analysis, Su	esource Plannin nd Development: ssment, Training accession planning	g: Stra Introd g eval g.	tegic a luction uation,	and Hui : Trainii Devel	nan Resou ng-Objectiv opment-De	rce Planning, Th res, Training Proc velopment proce	e HR Plan cess of train ess, Develo	ning Process; iing, Training pment needs				

UNIT – V

Strategic Management of Human Resources: SHRM, relationship between HR strategy and overall corporate strategy, HR as a Factor of Competitive Advantage, Managing Diversity in the Workplace. **Human Resource Management in Service Sector:** Managing Human Element in Service Sector: Human Element in Service Sector – Introduction, Role and Significance; The Services Triangle ; Front Line Employees /Boundary Spanners – Meaning, Issues Faced by Front Line Employees: Person/Role Conflicts, Organization/Client Conflict, Inter client Conflict; Emotional Labour – Meaning, Strategies for Managing Emotional Labor; Flexible Working Practices – Implications for HR.

Text Books:

- 1. Prof. Gary Dessler, Human Resources Management, Pearson, 16th Edition, 2020.
- 2. Prof.JohnM.Ivancevich, "Human Resource Management", Tata McGraw Hill Publication, 12th Edition, 2003.
- 3. Prof.Aswathappa, "Human Resource Management and Personnel Management", 3 rd Edition, Tata McGraw Hill, 2002.

Reference Books:

- 6. Dr.C.B.Gupta, "Human Resource Management", Sultan Chand & Sons, New Delhi, 1st Edition, 2018.
- 7. Prof.S.S.Khanka, "Human Resource Management", Chand & Company, New Delhi, 2019
- 8. Dr.S.Seetharaman et al., "Human Resource Management", SciTech Publications Pvt Ltd. Chennai,2012.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

			DE	SIGN P.	ATTERNS	(DP)		
VII Semest	er: B. Tech				Scheme:	2020		
Course Code	Category	Hour	s/Wee	k	Credits	Maximum Mar	ks	
OEC 422	OEC-IV	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
Sessional E	xam Duration: 1	1½ Hrs		U	End Exa	m Duration: 3 H	rs	100
Course Out	tcomes: At the er	nd of th	e cours	se the stu	udent will b	be able to		
CO1: Unde	rstand the usage	of desig	gn patte	erns for	solving obj	ect-oriented desig	n problems	
CO2: Desci	ribe the creationa	l patter	ns abst	ract fact	ory, factory	y method, builder,	prototype, a	and singleton.
CO4: Expla	nin behavioral pat	terns cl	s: adap hain of	respons	ibility con	mand interpreter	iterator m	ediator
mem	ento, observer, st	ate, stra	ategy, 1	template	method, a	nd visitor.	, normor, m	culator,
CO5: Expla	in the patterns us	sed in s	olving	design p	oroblems of	f Lexi Document H	Editor	
				UN	I – TI			
Design Pat	tern Introductio	on: Wł	nat Is a	a Desigr	n Pattern, I	Describing Design	n Patterns, ti	he Catalog of
Design Patt	erns, Organizing	the Ca	talog, l Droble	How to S	Select a De	esign Pattern, How	v to Use a D	esign Pattern,
How Design	I Fatterils Solve I	Jesigii	FIODIC		ти			
Creational	Patterns. Abst	ract Fa	ctory	Pattern	Builder P	attern Factory M	lethod Patte	ern Prototyne
Pattern, Sin	gleton Pattern.		ctory .	i atterii,	Dunder 1	atterni, i actory ivi		in, mototype
	<u> </u>			UN	IT – III			
Structural Pattern, Fly	Patterns: Adaptweight Pattern, P	ter Patt roxy Pa	tern, B attern.	ridge P	attern, Con	nposite Pattern, I	Decorator Pa	attern, Facade
		•		UN	IT – IV			
Behavioral Pattern, Me method Patt	patterns: Chain diator Pattern, M tern, Visitor Patte	n of re lemento rn.	sponsil Patter	bility Pa rn, Obse	ttern, Com rver Patter	nmand Pattern, In n, State Pattern, S	terpreter Pa Strategy Patt	ttern, Iterator ern, Template
				UN	IT – V			
A Case Stu Embellishin Window Sy	dy: Designing a g the User Inter stems, User Oper	Docur face, S rations	nent E Support Spellin	ditor, D ting Mu g Check	esign Probl ltiple Look ting and Hy	lems, and Documo k-and-Feel Standa phenation.	ent Structure ards, Suppor	e, Formatting, rting Multiple
Text Books	:							
1. Erich G Education.	amma [2008], I	Design	Patter	ns elem	ents of re	eusable object or	iented softw	ware, Pearson
2. Frank Bu Software An	uschmann, Regin rchitecture: A Sys	eMeun stem of	ier, Ha Patter	ins Roh n, John '	nert, Peter Wiley & Sc	Sommerlad, Miclons; 1996.	hael Stal, Pa	atternOriented
Reference l	Books:							
1. Mark Gra	and, Pattern's in J	AVA	Vol-I, V	Viley D	reamTech			
2. Mark Gra	and, Pattern's in J	AVA	Vol-II,	Wiley D	PreamTech	III Wiley Dream	Taab	
4. Eric Free	man-Oreilly-spd	A Enter Head I	First D	esign Pa	tterns	-m, whey Dream	rech	
5. Alan Sha	lloway,Design Pa	atterns]	Explain	ned, Pea	rson Educa	tion.		

Web References:

1. https://sourcemaking.com/design_patterns

2. https://www.oodesign.com/

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

VII Semester : B. Tech Scheme : 2020 Course Code Category Hours/Week Credits Maximum Marks OEC 423 OEC-IV L T P C Internal Assessment End Exam Total Sessional Exam Duration: 1½ Hrs 3 - 3 40 60 100 Sessional Exam Duration: 1½ Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs Course Outcomes : At the end of the course the student will be able to COI: Understand the various methods of prestressing. CO2: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO4: Determine the losses in pre-tensioned and post-tensioned members. CO5: Analyse the prestressed members with straight, concentric and eccentric tendons. Introduction: Historical development - General principles of prestressing – Prectonsioning and post tensioning - Advantages and limitations of prestressing types. UNIT - 11 Methods and Systems of Pretensioning: Prectonioning weeks (MorerChalos System) - Comparison of the variou systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques		PR	ESTR	RESSI	NG S	YSTEMS	(PS)					
Course Code Category Hours/Week Credits Maximum Marks OFC 423 OFC-IV L T P C Internal Assessment End Exam Total Sessional Exam Duration: 1/s Hrs Sessional Exam Duration: 1/s Hrs End Exam Duration: 3 Hrs Course Outcomes: At the end of the course the student will be able to 60 100 CO1: Understand the various methods of prestnessing. CO2: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO4: Determine the losses in pre-tensioned and post-tensioned members. CO5: Analyse the prestressed members with straight, concentric and eccentric tendons. UNIT - 1 Introduction: Historical development - General principles of prestressing - Pretensioning and post tensioning - Advantages and limitations of prestressing types. UNIT - 11 Methods and Systems of Pretensioning: Pre tensioning methods - Tensioning devices - Long line system (Hoyer system) - Individual Mould System - Strut system (ShorerChalos System) - Comparison of the various systems - Precast clements - Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques UNIT - II Methods and Systems of Postensioning: Cresioning device for post tensioning - Methods of	VII Semester :B.	Tech						Scheme	2020			
OEC 423 OEC-IV L T P C Continuous Internal Assessment End Exam Total Sessional Exam Duration: 1/2 Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs Course Outcomes: At the end of the course the student will be able to End Exam Duration: 3 Hrs CO2: Understand the various methods of pretensioning CO3: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO4: Determine the losses in pre-tensioned and post-tensioned members. CO5: Analyse the prestressed members with straight, concentric and eccentric tendons. UNIT - 1 Introduction: Historical development – General principles of prestressing – Pretensioning and post tensioning and post tensioning types. UNIT - 1I Methods and Systems of Pretensioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) – Individual Mould System – Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers theria advantages and disadvantages, applications and manufacturing techniques UNIT - II Methods and Systems of Posttensioning: Tensioning device for post tensioning –Methods of post tensioning and Posttensioning - Lonhardt System – Strut system (Sifford Udall system, Lee McCall System, Precose System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems	Course Code	ourse Code Category Hours/Week Credits Maximum Marks										
3 - 3 40 60 100 Sessional Exam Duration: 1½ Hrs End Exam Duration: 3 Hrs Course Outcomes :At the end of the course the student will be able to CO1: Understand the various methods of pretensioning CO2: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO4: Determine the losses in pre-tensioned and post-tensioned members. CO5: Analyse the prestressed members with straight, concentric and eccentric tendons. UNIT - I Introduction: Historical development – General principles of prestressing – Pretensioning and post tensioning – Advantages and limitations of prestressing – Need for high strength steel and high grade concrete for prestressed elements – Prestressing types. UNIT - II Methods and Systems of Pretensioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) -Individual Mould System – Strut system (ShorerChalos System). Comparison of the various systems. Proles, Masts, Pylons and railway sleepers their advantages and biadvantages, applications and manufacturing techniques UNIT - III Methods and Systems of Posttensioning: Tensioning device for post tensioning – Methods of post tensioning – MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT - IV Losses of Prestress: Losses of prestress in pre tensioned a	OEC 423	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
Sessional Exam Duration: 1½ Hrs End Exam Duration: 3 Hrs Course Outcomes :At the end of the course the student will be able to CO1: Understand the principles and systems of pre-stressing. CO2: Understand the various methods of post tensioning CO2: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioned members. CO5: Analyse the prestressed members with straight, concentric and eccentric tendons. UNIT - 1 Introduction: Historical development – General principles of prestressing – Pretensioning and post tensioning – Advantages and limitations of prestressing – Need for high strength steel and high grade concrete for prestressed elements – Prestressing types. UNIT - II Methods and Systems of Pretensioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) -Individual Mould System - Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques UNIT - III Methods and Systems of Posttensioning: Tensioning device for post tensioning -Methods of post tensioning - MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT - IV Losses of Prestress: Losses of prestress: in pre tensioned and post tensioned members due to instantancous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. <			3	-	-	3	40	60	100			
Course Outcomes :At the end of the course the student will be able to CO1: Understand the principles and systems of pre-stressing. CO2: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioned and post-tensioned members. CO5: Analyse the prestressed members with straight, concentric and eccentric tendons. UNIT - 1 Introduction: Historical development – General principles of prestressing – Pretensioning and post tensioning – Advantages and limitations of prestressing – Need for high strength steel and high grade concrete for prestressed elements – Prestressing types. UNIT - 11 Methods and Systems of Pretensioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) –Individual Mould System - Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques UNIT - II Methods and Systems of Posttensioning: Tensioning device for post tensioning –Methods of post tensioning - MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT - IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip	Sessional Exam D	ouration: 1½ H	Irs				End Exa	m Duration	: 3 Hrs			
Course Outcomes :At the end of the course the student will be able to CO1: Understand the various methods of pre-stressing. CO2: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO4: Determine the losses in pre-tensioned and post-tensioned members. CO5: Analyse the prestressed members with straight, concentric and eccentric tendons. UNIT - 1 Introduction: Historical development – General principles of prestressing – Pretensioning and post tensioning – Advantages and limitations of prestressing – Need for high strength steel and high grade concrete for prestressed elements – Prestressing – Need for high strength steel and high grade concrete for prestressioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) - Individual Mould System - Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques UNIT – III Methods and Systems of Posttensioning: Tensioning device for post tensioning –Methods of post tensioning - MagnelBlatonsystem, Freyssinet system – Comparison of Pretensioning and Posttensioning systems UNIT – IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT – V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight,concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Pearson Education Inc., New Delhi. 3. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Gooks: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. Is 1343-2012, Code of Practice for Prestressed Concrete,			0.1				1.1					
CO1: Understand the principles and systems of pre-stressing. CO2: Understand the various methods of protensioning CO3: Understand the various methods of post tensioning CO4: Determine the losses in pre-tensioned and post-tensioned members. CO5: Analyse the prestressed members with straight, concentric and eccentric tendons. UNIT – I Introduction: Historical development – General principles of prestressing – Pretensioning and post tensioning – Advantages and limitations of prestressing – Need for high strength steel and high grade concrete for prestressed elements – Prestressing types. UNIT - II Methods and Systems of Pretensioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) – Individual Mould System - Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques UNIT – III Methods and Systems of Postensioning: Tensioning device for post tensioning –Methods of post tensioning - MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT – IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT - V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight_concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Pearson Education Inc., New Delhi. 3. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. Is 1343-2012, Code of Practic	Course Outcomes	At the end of	f the co	ourse	the stu	dent will b	e able to					
CO2: Understand the various methods of pretensioning CO3: Understand the various methods of post tensioning CO4: Determine the losses in pre-tensioned and post-tensioned members. CO5: Analyse the prestressed members with straight, concentric and eccentric tendons. UNIT - I Introduction: Historical development – General principles of prestressing – Pretensioning and high grade concrete for prestressed elements – Prestressing – Need for high strength steel and high grade concrete for prestressed elements – Prestressing types. UNIT - II Methods and Systems of Pretensioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) -Individual Mould System - Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques UNIT – III Methods and Systems of Postensioning: Tensioning device for post tensioning –Methods of post tensioning - MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT – IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT - V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight,concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Piason Education Inc., New Delhi. 3. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. Is 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 2. Is 456-2000, Code	COI: Understand	the principles	and sy	/stems	$\frac{5 \text{ of } \text{pre}}{1}$	e-stressing.						
CO3: Diderstand the various inclusion of post tensioning CO4: Determine the losses in pre-tensioned and post-tensioned members. CO5: Analyse the prestressed members with straight, concentric and eccentric tendons. UNIT – I Introduction: Historical development – General principles of prestressing – Pretensioning and post tensioning – Advantages and limitations of prestressing – Need for high strength steel and high grade concrete for prestressed elements – Prestressing types. UNIT - II Methods and Systems of Pretensioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) -Individual Mould System - Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques UNIT – III Methods and Systems of Posttensioning: Tensioning device for post tensioning –Methods of post tensioning is MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT – IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT – V Analysis of Sections for Flexure: Elastic analysis of concre	CO2: Understand	the various me	thoda	of pre	tensio	ning						
COS: Analyse the prestressed members with straight, concentric and eccentric tendons. UNIT - 1 Introduction: Historical development – General principles of prestressing – Pretensioning and post tensioning – Advantages and limitations of prestressing types. UNIT - 1 Methods and Systems of Pretensioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) -Individual Mould System - Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques UNIT - II Methods and Systems of Pretensioning: Tensioning methods – Tensioning devices -Long line system (Hoyer system) -Individual Mould System - Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques UNIT - II Methods and Systems of Posttensioning: Tensioning device for post tensioning –Methods of post tensioning - MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT - IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress.	CO3: Understand	the logged in pr	ethods	or pos	and no	oning	ad mambana					
Construction of the second se	CO4: Determine t	ne losses in pr	e-tens	oned	and po	the concer	tric and accentr	ic tendons				
Introduction: Historical development – General principles of prestressing – Pretensioning and post tensioning – Advantages and limitations of prestressing – Need for high strength steel and high grade concrete for prestressed elements – Prestressing types. UNIT - II Methods and Systems of Pretensioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) - Individual Mould System - Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques UNIT – III Methods and Systems of Posttensioning: Tensioning device for post tensioning –Methods of post tensioning - MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT – IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT - V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. 2. Praveen Nagarajan, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. Is 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 2. IS 456-2000, Code of Practice for Platin and reinforced concrete, BIS, New Delhi.	CO3. Analyse the	presuessed in		<u>s witi</u>	NIT _	III, concen						
 Institution of the prime transformer prime processing of the processing	Introduction: Hist	torical develor	ment	– Gen	eral p	rinciples o	f prestressing –	- Pretension	ing and			
high grade concrete for prestressed elements – Prestressing types. UNIT - II Methods and Systems of Pretensioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) -Individual Mould System - Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques UNIT – III Methods and Systems of Posttensioning: Tensioning device for post tensioning –Methods of post tensioning - MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT – IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT - V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight,concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. 2. Praveen Nagarajan, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 2. IS 456-2000, Code of Practice for Prestressed Concrete, BIS, New Delhi.	post tensioning $-A$	Advantages an	d limi	tations	s of pr	estressing	– Need for hig	1 strength st	teel and			
UNIT - II Methods and Systems of Pretensioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) -Individual Mould System - Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques UNIT - III Methods and Systems of Posttensioning: Tensioning device for post tensioning –Methods of post tensioning - MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT - IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT - V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight,concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Pierson Education Inc., New Delhi. 2. Praveen Nagarajan, Prestressed Concrete, Pearson Education Inc., New Delhi. 3. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1.	high grade concret	e for prestresse	ed eler	nents	- Pres	tressing ty	pes.					
Methods and Systems of Pretensioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) -Individual Mould System - Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and disadvantages, applications and manufacturing techniques UNIT – III Methods and Systems of Posttensioning: Tensioning device for post tensioning –Methods of post tensioning – MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT – IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT - V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight, concentric, ecentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. 2. Praveen Nagarajan, Prestressed Concrete, Pearson Education Inc., New Delhi. 3. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. <td< td=""><td></td><th>1</th><td></td><th>U</th><td>NIT -</td><td>II</td><td>1</td><th></th><th></th></td<>		1		U	NIT -	II	1					
Methods and Systems of Posttensioning: Tensioning device for post tensioning –Methods of post tensioning - MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT – IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT – V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. 2. Praveen Nagarajan, Prestressed Concrete, Pearson Education Inc., New Delhi. 3. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 2. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi.	Methods and Syst line system (Hoyer Comparison of the sleepers their advas	tems of Preten r system) -Ind e various syst ntages and disa	ividua tems - advant	ng: Pr I Mou Prect ages, UN	e tens Id Sys ast ele applic	ioning met stem - Stru ements – I ations and	hods – Tension t system (Shore Poles, Masts, F manufacturing	ning devices erChalos Sy Pylons and techniques	s -Long stem) – railway			
post tensioning - MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT – IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT - V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight,concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. 2. Praveen Nagarajan, Prestressed Concrete, Pearson Education Inc., New Delhi. 3. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 2. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi.	Methods and Syst	tems of Postte	nsioni	ng: T	ensior	ning device	e for post tensi	oning –Met	hods of			
System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems UNIT – IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT - V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight,concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. 2. Praveen Nagarajan, Prestressed Concrete, Pearson Education Inc., New Delhi. 3. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 2. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi.	post tensioning - 1	MagnelBlatons	system	, Frey	yssinet	system, C	bifford Udall s	ystem, Lee	McCall			
Posttensioning systems UNIT – IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT – V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. 2. Praveen Nagarajan, Prestressed Concrete, Pearson Education Inc., New Delhi. 3. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 2. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi.	System, Prescon	System, Baur	' – Le	eonhai	rdt Sy	rstem – C	comparison of	Pretensioni	ng and			
UNIT - IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT - V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. 2. Praveen Nagarajan, Prestressed Concrete, Pearson Education Inc., New Delhi. 3. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 2. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi.	Posttensioning syst	tems		TIN								
 Losses of Prestress: Losses of prestress in pre-tensioned and post-tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT - V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. Praveen Nagarajan, Prestressed Concrete, Pearson Education Inc., New Delhi. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: I. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: I. IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 	Lassas of Duastuce	The Logged of	• • • • • • •		<u> </u>	IV naionad an	d nost tonsion	d maamahama	dua ta			
UNIT - V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. 2. Praveen Nagarajan, Prestressed Concrete, Pearson Education Inc., New Delhi. 3. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 2. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi.	instantaneous losse shrinkage, creep ar	es – elastic del nd relaxation o	format format	ion, fi s.	riction	and ancho	rage slip; time-	dependent l	losses –			
 Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. Praveen Nagarajan, Prestressed Concrete, Pearson Education Inc., New Delhi. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 				U	NIT -	V						
 N. Krishna Raju, <i>Prestressed Concrete</i>, Sixth Edition, Tata McGraw–Hill publishing Company Limited. Praveen Nagarajan, <i>Prestressed Concrete</i>, Pearson Education Inc., New Delhi. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: E. G. Nawy, <i>Prestressed Concrete: A fundamental approach</i>, Prentice Hall. Reference Codes: IS 1343-2012, <i>Code of Practice for Prestressed Concrete</i>, BIS, New Delhi. IS 456-2000, <i>Code of Practice for plain and reinforced concrete</i>, BIS, New Delhi. 	Analysis of Sector straight, concentric.	<i>ions for Flex</i> , eccentric, ber	<i>xure:</i> nt and	Elasti parab	ic ana olic tei	lysis of a ndons – Ke	concrete beams ern lines – Cable	s prestresse e profile.	d with			
 Praveen Nagarajan, <i>Prestressed Concrete</i>, Pearson Education Inc., New Delhi. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: E. G. Nawy, <i>Prestressed Concrete: A fundamental approach</i>, Prentice Hall. Reference Codes: IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi. 	1. N. Krishna Raju Company Limited.	a, Prestressed	Concr	ete, Si	ixth Eo	lition, Tata	n McGraw–Hill	publishing				
Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 2. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi.	 Praveen Nagara G.S. Pandit, S.J. Vijayawada. 	ijan, <i>Prestresse</i> P. Gupta, Pres	ed Con stresse	<i>icrete,</i> d Cor	Pears ncrete,	on Educati CBS Pub	on Inc., New D lishers and Dis	elhi. tributors Pv	rt. Ltd.,			
 E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi. 	Reference Books:	10	4	1.0	1	(1		1				
 IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi. 	I. E. G. Nawy, Pr	estressed Cond	crete: .	A func	ament	tal approa	cn, Prentice Ha	11.				
 IS 1545-2012, Code of Fractice for Frestressed Concrete, BIS, New Defin. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi. 	Keierence Codes	Code of Duran	tion for	Duan	tuacaa	1 Concrete	DIC Now Dal	hi				
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Code of Practic	ce for	<u>i res</u> nlain	and ro	i Concrete. inforced co	ncrete BIS N	m. ew Delhi				
Question Paper Pattern:	Question Paper P	attern:						en Donn.				

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

	ADDITIV	E MA	NUFA	CTU	RING TECH	INOLOGY (AD	MT)	
VII Semeste	er: B. Tech						Sche	me: 2020
Course Code	Category	Ho	ours/W	eek	Credits	Maxin	num Mark	8
OEC 424	OEC – IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional E	xam Duration	: 1 ½	Hrs			End Exam l	Duration :	3 Hrs
Course Out	comes : At the	end of	the co	urse the	e student wil	l be able to		
CO1: Under	stand prototypi	ng, and	d the pl	hases o	f Rapid prote	otyping.		
CO2: Under	stand the rapid	protot	vping r	process	chain.			
CO3: Under	stand the functi	oning	of Liqu	uid bas	ed rapid prot	otyping systems.		
CO4: Under	stand the functi	oning	of Pow	/der ba	sed rapid pro	ototyping systems		
CO5: Under	stand the Direc	t meth	ods of	Toolin	g and Indirec	t methods of Too	ling.	
				UN	<u>s - 1 - 1</u>		8:	
Introduction prototypes, ' prototyping,	n: Historical D Three phases o Applications an	Develog f deve nd adv	pment, lopmer antages	Defin nt lead s of rap	ition of pro- ing to Rapic id prototypin	totype, types of 1 prototyping, Fu 1g.	prototypes, ndamentals	Role of of rapid
				UN	IT – II			
Rapid proto	otyping process	s chair	1: 3D r	nodelli	ng, data con	version and transi	nission, che	ecking and
preparing,	Building and	post p	process	ing. L	liquid based	l rapid prototyp	ing system	is- Stereo
STI file for	Apparatus (SL	A), ap	plicali	ons, ac	ivantages and	d disadvantages (of Stereo III	.nograpny.
Fusion Den	osition Modell	ing: P	rincinl	e nroc	ess applicat	ions advantages	and disady	antages of
FDM, Multi	Jet Modelling S	System	is.	e , pro e	ess, apprica	ions, uu vunuuges	und undur	
,	<u> </u>	2		UN	IT – III			
Solid based LOM, Appli	rapid prototy cations of LOM	ping s [, adva	ystems ntages	s: Lam and di	inated Objec sadvantages	t Manufacturing of LOM.	(LOM), thr	ee phases o
Solid Grou	nd Curing(SG	C): S	teps ir	1 solid	ground cur	ing, Applications	s of solid	ground
curing, adva	ntages and disa	dvanta	ges of	Solid <u>g</u>	round curing	g, build time calcu	ilation.	
				UN	$\frac{\mathbf{IT} - \mathbf{IV}}{\mathbf{I} + \mathbf{I} + \mathbf{I}}$	0.1.		
Powder-bas	sed Rapid prot	iona	ig syst	ems: S	d disadvanta	ser Sintering (SLS	S), Material	s for SLS,
Three Din	vensional Priv	ntinσ	(3DP)• Pri	nciple Pro	cess Applicatio	ns advant	ages and
disadvantage	es of 3DP	11115	(UDI	<i>)</i> • 111	neipie, 110	cess, ripplicatio	ins, uavain	uges und
Laser Engi	neered Net Sha	ping	(LENS	5) : Prin	nciple, Proce	ss steps, Applicat	tions, Adva	ntages and
disadvantage	es of LENS	1 0			-			-
				UN	IT – V			
Direct meth	nods of rapid	tooling	g:AI	M tool	ing, SLS rap	oid steel, Direct l	Laser Metal	Sintering
(DMLS), La	minate tooling	J Ta	lin a.				·····	Desetion
injection Mc	ulding(RIM) W	u 10 /ax Ini	ection	KIV S mould	ng Sprav m	etal tooling 3D k	um casting, elt tool	, Reaction
		un IIIJ		moulu	ing, opiay in	cui tooning, 5D K	011 1001	
Text Books								

- 1. Chua C.K., Leong.K.F, and Lim C, C.S., Rapid Prototyping Principles and Applications, World Scientific Publishing Co. Pte. Ltd
- 2. D.T.Pham and S.S.Dimov, Rapid manufacturing The technologies and applications of rapid Prototyping and rapid tooling. Springer Publications

Reference Books

- 1. Terry Wholers, Wholers report, Wholers Associates
- 2. I. Gibson D. W. Rosen and B. Stucker., Additive manufacturing technologies, Springer Publication

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Exam:

		DF	ONE	E TE	CHNOLC	OGY (DT)		
VII Semester: B	B. Tech						Sch	eme: 2020
Course Code	Category	Hou	rs / V	Veek	Credits	Maximu	ım Marks	
OEC 425	OEC - IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional Exam I	Duration: 1	½ Hr	5			End Exa	am Durati	on: 3 Hrs
Course Outcom	es: At the e	nd of	the c	ourse	e students	will be able to		
CO1: Understa	and the histo	orical o	levelo	opme	nt of unma	anned aerial vehicles		
CO2: Understa	nd different	t dron	e part	s and	their cont	ribution for successfu	l flight op	eration
CO3: Identify	the battery t	o be u	sed fo	or UA	AV applica	tion.		
CO4: Understa	nd working	of mo	otor th	nat ca	in be used	in UAV.		
CO5: Classify	different mi	croco	ntroll	ers a	nd flight c	ontrollers		
				l	JNIT – I			
Introduction to drones and their applications : - Definition of drones, history of drones, Structural classification of drones: - fixed wing structure, lighter than air systems, rotary wings aircraft and applications of drones.								
				U	NIT – II			
Components of a uses of drone fr materials, design controller, flight c Battery and its p	drones:-clas rame mater parameters ontrol board managemen	sifica ials, for d, char nt: Int	tions classi prope racter roduc	of di ficati ellers, istics U	one struct ons and , composi of FCB as NIT – III of Battery	ures and their suitabi applicability of prop tion and structuring nd their structure.	lity, applid beller mot of Electro Po Battery,	cations and cors, drone onic speed Charging /
Discharging of Ba criteria of Battery	attery. Back for Drone a	up, R pplica	ating ation.	s, Sh	elf Life, N	laintenance and safet	y of Batter	y. Selection
				U	NIT – IV			
Sensors : Wi fi de sensor, Image sen of camera for diffe drone. Motors : Differe motors, brief idea application. Work	evices, RAD sor, TOF set erent range. ence betwee of motor of ing and app	DAR a nsor, (Baron en AC capabi licatio	nd ran Chem neters and lities	nge fi ical s s, Ac DC for a BLD	inder, GPS sensor. Ca celeromete motors a a drone bu C motor.	receiver, Gyro senso meras in drones and s er, Magnetometer, ren nd stepper motor, B uild. Selection criterio	r, Speed an election cr note contro rushed an- on of moto	nd Distance iteria ol for d Brushless or for drone
	C 11							
	T		•		$\frac{1 \mathbf{N} \mathbf{I} \mathbf{I} - \mathbf{V}}{\mathbf{D} \mathbf{V}}$	affinter 1 di CDC	1000 D.C.4	22 DO405
Connections and UART ports. Dif techniques. Introduction to l and Python. Instal	ferent types Drone Prog lation of car	of D of co gramm rds.Au	evice onnec ning ito Pi	s in tors Intro lot sc	and their duction to	er introduction of RS specifications. Micro programming langua Ardupilot, Openpilot	o232, RS4 controller age used in	22, KS485, interfacing n drone : C

Text Books:

1. Terry Kilby and Belinda Kilby, "Make:Getting Started with Drones ",Maker Media, Inc, 2016

2. VasilisTzivaras, "Building a Quadcopter with Arduino", Packt Publishing, 2016

3. Donald Norris, "Build Your Own Quadcopter -Power Up Your Designs with the Parallax Elev-8", McGraw-Hill Education, 2014

Reference Books:

1. Baichtal, "Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs", Que Publishing,2016.

2. Austin, Unmanned Aircraft Systems: UAVS Design, Development and Deployment. Wiley, 2010.

3. Sebbane, Smart Autonomous Aircraft: Flight Control and Planning for UAV. CRC Press, 2015

4. Zavrsnik, Drones and Unmanned Aerial Systems: Legal and Social Implications for Security and Surveillance. Springer, 2015.

Web References :

1. https://www.dronezon.com/learn-about-drones-quadcopters/

2.http://ardupilot.org/copter/docs/advanced-multicopter-design.html

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Exam:

INFRA	STRUCTUR	E FOI	R SM	ART (CITY DEV	ELOPMENT	(ISCD)	
VII Semester :B.	Tech						Scheme	: 2020
Course Code	Category	Ho	urs/W	/eek	Credits	Maxin	num Marks	
OEC 426	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total
		3	-	-	3	40	60	100
Sessional Exam D	ouration:1.5H	rs				End Exa	m Duration	: 3 Hrs
Course Outcomes	At the end of	f the co	ourse	the stu	dent will b	e able to		
CO1: Understand	the fundament	tal con	cepts	of sma	art and sust	tainable cities.		
CO2: Understand	the GIS applie	cations	s in Sr	nart Ci	ity Plannin	g.		
CO3: Understand	the component	t of sm	art cit	ties and	d dwell int	o their technolo	ogical	
advancement.	41		4 - 1 1.	. 1 .1	:			
CO4: Understand	the involveme	nt of s	take n	olders	in the desi	gn and impleme	entation of	
CO5: Explain the	importance of	differe	nt lin	kages	and their d	efined roles inc	luding	
government urban	niportance of	versitie	es city	v devel	oners and	communities	luuling	
	i plainieis, ani	ver sitte	<u>, on</u>	$\frac{\mathbf{NIT}}{\mathbf{NIT}}$		communities.		
mission, Smart city Governance of sma Green Building Co	y planning and art cities.	develo tainab	opmer U	nt, Fina NIT - velopn	ancing sma II nent: Gree	n projects in sm	pment,	
sustainability – Gr systems.	een building –	Kating	g syste	em – E	nergy enno	ent building –	Energy sav	ing
GIS Applications a structure and algor error modeling and infrastructure and s sensing, aerial & s interpretation – Ph displacement and p and temporal resol	<i>in Smart City</i> ithms, raster d data uncertain spatial informa atellite remote otogrammetry parallax display utions.	Planni ata stru- nty, de ation sy sensin – Ster cemen	<i>ing:</i> Cucture cision ystem ng – Pr eovisi t. Prin	coordin and al makin Natio rincipl ion – N aciples	hate system lgorithms, ng through nal Urban es of aerial leasureme of satellite	and geo-codin data bases for C GIS, construction Information system remote sensing tof heights/de remote sensing	g, vector da GIS – Conce ing spatial d stem. Why r g – Aerial pl pths by relie g, spatial, sp	ta pts, ata remote hoto- ef ectral
			UN	IT – 1	III			
<i>Smart Urban Tra</i> and services) - Ba provision and pla infrastructure; Rol transport problem Transport cycle, co roads and intersec	ansportation S asic definitions anning of urb le of transpor s and mobili- poncept of acce ctions. Basic p	ystems – Co an ne t, type ty issu- ssibilit princip	s: Ele ncepts twork es of ues; U ty. Hie les of	ments s - Sig s and transp Urban erarchy f Trans	of Infrastr nificance a services; ort system form and y, capacity sport infra	ructure (Physic and importance Resource anal as, evolution o Transport par and geometric structure desig	al, Social, U ; Data requination ysis, Provin f transport tterns, land design elen n. Urban tr	Utilities ired for sion of modes, use – nents of ransport

UNIT – IV

planning process -Transport, environment and safety issues. Principles and approaches of

Traffic Management, Transport System Management.

*Water Supply and Drainage:*Water – sources of water, treatment and storage, transportation and distribution, quality, networks, distribution losses, water harvesting, recycling and reuse, norms and standards of provision, institutional arrangements, planning provisions and management issues. Sanitation – points of generation, collection, treatment, disposal, norms and standards, grey water disposal, DEWATS, institutional arrangements, planning provisions and management issues. Municipal and other wastes –generation, typology, quantity, collection, storage, transportation, treatment, disposal, recycling and reuse, wealth from waste, norms and standards, institutional arrangements, planning provisions and management issues. Power – Sources of power procurement, distribution networks, demand assessment, norms and standards, planning provisions and management issues.

UNIT - V

Project Management for Smart Cities:Philosophy and concepts of Project management phases – Stages of project & their approval status – Planning – Scheduling – PERT model - Project cost analysis – Resource allocation & Levelling – Project monitoring and control – Risk management – Case studies.

E-Governance and IOT: The concept of management – Concept of e-management &ebusiness - e-Government Principles – Form e-Government to e-governance - e-governance and developing countries – Designing and Implementing e-Government Strategy; E-governance: Issues in implementation. IOT- fundamentals, protocols, design and development, data analytics and supporting services, case studies.

Text Books:

1. Gupta Tripati, Smart cities transforming India, Pentagon Press.

2. Marta Peris-Ortize, Dag r Bennett, Diana Perez, Bustamante Yabav, Sustainable Smart Cities, Springer

3. Mani. N, Smart Cities and Urban Development in India, New Century Publications.

Web References:

1. https://smartnet.niua.org

2. <u>https://smartcities</u>council.com

3. https:// mygov.in/group/smart- cities.

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

CSBS	Professional Elective Course (PE-I)
S.No	Course Title
1.	Behavioural Economics
2.	Computational Finance & Modelling
3.	Industrial Psychology

CSBS	Professional Elective Course (PE-II)
S.No	Course Title
1.	Financial & Cost Accounting
2.	Advance Finance
3.	Artificial Intelligence
4.	Data Mining and Analytics
5.	Image Processing and Pattern Recognition

CSBS	Professional Elective Course (PE-III)
S.No	Course Title
1.	Usability Design of Software Applications
2.	Services Science and Service Ops Management
3.	Computer Vision
4.	Quantum Computation & Quantum Information

CSBS	Professional Elective Course (PE-IV)
S.No	Course Title
1.	Cognitive Science and Analytics
2.	Introduction to IoT
3.	Deep Learning
	Modern Day Robotics and its Industrial
4.	Applications

CSBS	Professional Elective Course (PE-V)
S.No	Course Title
1.	IT Project Management
2.	Cryptology
3.	Cryptography & Network Security
4.	Conversational Systems
5.	Advanced Social, Text and Media Analytics

BEHAVIOURAL ECONOMICS (BEM)

V Semester : CSBS							S	cheme : 2020
Course Code	Category	Hours/Week		Credits	Max	imum Mar	ks	
CB313	PEC-I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional E	xam Duration 1	1/2 Hrs				En	d Exam Du	ration: 3 Hrs
Course Out	tcomes : At the e	nd of th	ne cour	se the st	udent will l	be able to		
CO1: Unde	rstand and apply	various	conce	pts in tr	aditional an	d modern Microe	conomics	
CO2: Understand the behavior of various variables								
CO3: Understand the concept of uncertainty								
CO4: Unde	rstand the concep	ots of In	itertem	poral ch	loice			
COS: Analy	/se the strategies							
				UN	$\Gamma - \Gamma$			
The neoclassical/standard model and behavioral economics in contrast; historical background; behavioral economics and other social sciences; theory and evidence in the social sciences and in behavioral economics; applications – gains and losses, money illusion, charitable donation. Basics of choice theory Revisiting the neoclassical model; utility in economics and psychology; models of rationality; connections with evolutionary biology and cognitive neuroscience; policy analysis – consumption and addiction, environmental protection, retail therapy; applications – pricing, valuation, public goods, choice anomalies								
				UN	IT – II			
Beliefs, heu Revisiting ra and self-pro counterfeit g	ristics and biase ationality; causal jection; inconsist goods, financial t	es aspects ent and rading l	s of irra biasec behavio	ationalit l beliefs or, trade	y; different ; probability in memora	kinds of biases ar y estimation; tradi bilia	nd beliefs; se ng applicati	elf-evaluation ons – trade in
				UN	IT – III			
Choice und Background aversion; m income and	er uncertainty and expected unarginal utility; of consumption, per	utility decision rformar	theory; n and nce in s	prospe probabi sports.	ect theory a lity weight	and other theorie ing; applications	es; reference – ownersh	e points; loss ip and trade,
				UN	11 – 1V			
Intertemporal choice Geometric discounting; preferences over time; anomalies of inter-temporal decisions; hyperbolic discounting; instantaneous utility; alternative concepts – future projection, mental accounts, heterogeneous selves, procedural choice; policy analysis – mobile calls, credit cards, organization of government; applications – consumption and savings, clubs and membership, consumption planning UNIT – V Strategic choice								
Review of g strategies, it and negotiat	game theory and terated games, ba tion, monopoly a	Nash e argainir nd marl	equilibi ig, sigi <u>ket enti</u>	rıum – s naling, 1 ry	strategies, in earning; ap	ntormation, equili plications – comp	brium in pu petitive spor	ts, bargaining

Individual preferences; choice anomalies and inconsistencies; social preferences; altruism; fairness; reciprocity; trust; learning; communication; intention; demographic and cultural aspects; social norms; compliance and punishment; inequity aversion; policy analysis – norms and markets, labor markets, market clearing, public goods; applications – logic and knowledge, voluntary contribution, compensation design

Text Books:

1. Introduction to Behavioral Economics, by N. Wilkinson and M. Klaes

Reference Books:

Intermediate Microeconomics: A Modern Approach, Hal R. Varian, 9th Edition, Springer, 2014.
 Economics, Paul Anthony Samuelson, William D. Nordhaus, 19th Edition, McGraw-Hill, 2012...

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

COMPUTATIONAL FINANCE & MODELING (CFM)

V Semester	V Semester : CSBS						Sch	eme : 2020	
Course Code	Category	Но	ours/W	'eek	Credits	Maxir	num Mark	S	
CB314	PEC-I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional E	xam Duration 1	1/2 Hrs				End E	xam Durat	tion: 3 Hrs	
Course Outcomes : At the end of the course the student will be able to									
CO1: Understand numerical methods in finance									
CO2: Understand black-scholes framework and exercise the strategy									
CO3: Under	rstand Financial	Product	is and N	Viarkets					
CO4: Under	rstand the securit	res and	portio	110					
CO3. Allary		cluins							
				UNI	1-1				
Numerical	methods: Nume	erical r	nethod	s releva	ant to integ	ration, differentiation	ation and s	solving the	
partial diffe	rential equations	of ma	themat	ical fina	ance: examp	ples of exact solu	utions inclu	ding Black	
Scholes and	its relatives, fini	te diffe	erence 1	methods	s including	algorithms and qu	lestion of st	ability and	
convergence	e, treatment of no	ear and	l tar bo	oundary	conditions.	, the connection v	with binom	al models,	
interest rate	to numerical ma	exercise thoda f	e, and	the co	rresponding	dela	problems, a	nd a brief	
Introduction	to numerical me	thous I	or solv	ing mui		dels.			
		D1 1	~ 1 1	UNI	<u>I – II</u>		11		
Black-Scho	les framework:	Black-S	Scholes	SPDE: 9	simple Euro	pean calls and pu	its; put-call	parity. The	
PDE for pr	Creative that	y and	curren	cy optio	ons. Discor	itinuous payoris	- Binary a	ind Digital	
early exercise	e Oleeks. illeia, (tions: 1	allilla, pernetu	al calls	and puts: o	ntimal exercise st	rategy and i	the smooth	
nasting con	dition Volatility	consid	eration	ai calis s - actu	and puts, o	al and implied v	olatility. loc	al vol and	
volatility su	rfaces.	consid	cration	s uere		ai, and implied v	olutility, lot	ui voi uila	
				UNI	Γ–III				
Financial P	roducts and Me	rlate	Introdu	uction t	o the financ	vial markets and t	he products	which are	
traded in t	hem \cdot Equities	indices	forei	on exc	hange and	commodities (Interproduces	tracts and	
strategies fo	r speculation and	hedgir	, 10101 19.	511 CAC	nunge, und	commodities.		indets and	
			-0.	UNI	Γ-IV				
Portfolio m	anagemengt · An	nlicatio	n area	s includ	le the pricir	a of American o	ntions prici	na interest	
rate depende	ent claims and c	edit ris	sk The	use of i	importance	sampling for Mor	nte Carlo sir	nulation of	
VaR for por	tfolios of options		. I IIC	450 01	importance	sumpting for mor			
				UNI	T – V				
Statistical	Analysis of Fin	ancial	Retur	ns• Fat-	tailed and	skewed distributi	ions outlier	rs stylized	
facts of vola	tility implied vo	latility	surface	e and v	olatility esti	mation using high	n frequency	data.	
Copulas. He	dging in incomp	lete ma	rkets. A	America	in Options.	Exotic options. El	ectronic tra	ding, Jump	
Diffusion H	Processes, High-	dimens	sional	covaria	nce matric	es, Extreme val	ue theory,	Statistical	
Arbitrage.							•		
Text Books	•		•						
1. R. Sey	del: Tools for Co	mputat	ional F	inance,	2nd edition	, Springer-Verlag	, New York	, 2004.	

- 2. P. Glasserman: Monte Carlo Methods in Financial Engineering, Springer-Verlag, New York, 2004.
- 3. W. Press, S. Teukolsky, W. Vetterling and B. Flannery, Numerical Recipes in C: The Art of Scientific Computing, 1997. Cambridge University Press, Cambridge, UK.

Reference Books:

1. A. Lewis: Option Valuation under Stochastic Volatility, Finance Press, Newport Beach, California, 2000.

2.A. Pelsser: Efficient Methods for Valuing Interest Rate Derivatives, Springer-Verlag, New York, 2000.

3.D. Ruppert, Statistics and Data Analysis for Financial Engineering

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

INDUSTRIAL PSYCHOLOGY(IP)

VSemester: CSBS						Sc	heme: 2020					
Course Code	Category	Но	ours/W	eek	Credits	Maxi	mum Mark	(S				
CB315	PEC-I	L	Т	Р	С	Continuous Internal AssessmentEnd ExamTOTAL						
		3	-	-	3	3 40 60 100						
Sessional E	xam Duration1	<u>2 Hrs</u>				End	Exam Dura	ation: 3 Hrs				
Course Out	comes :At the er	nd of th	e cours	se the st	udent will b	e able to						
CO1:Becon	CO2 : Gain further comfort with statistical concents in the context of making personnel decisions											
CO3:Gain practical experience by completing a series of hands on projects involving ich analysis												
selection de	cisions. training r	orogran	ns. and	emplov	ee well-bei	ng.	Jiving job a	liary sis,				
CO4:Deepe	n the understand	ing of t	ests an	d measu	rements so	that accurate info	rmation is c	ollected and				
make sound	data-based decisi	ons.										
CO5:Prepar	e for other focus	ed sem	inar co	urses in	Industrial/O	Organizational Psy	ychology or	Human				
Resource M	anagement.											
				UN	IT – I							
based Practi Evaluation &	Creanizational ce,Legal Contex & Compensation,	t of Inc Job De	logy : lustrial esign &	Introduc Psycho <u>z Emplo</u> UNI	logy, Job A yee Well-B	analysis & Compe eing, Recruitment	etency Mode	eling, Job				
Identifying (Criteria & Valida	ting Te	ests and	l Measu	res, Screeni	ng Methods, Inter	nsive Metho	ds.				
				UNI	T – III							
Performance Performance	e Goals and Fee e.	dback,	Perfor	rmance	Coaching a	and Evaluation, I	Evaluating I	Employee				
				UNI	T - IV							
Employee N	Iotivation, Satisf	action a	and Co	mmitme	ent, Fairness	s and Diversity.						
				UNI	[T - V]							
Leadership, Organization	Organizational n of Work Behav	Climat ior, Str	e, Cul ess Ma	lture, an inageme	nd Develop nt: Demand	oment, Teams in ls of Life and Wo	Organizati rk.	ons, The				
1. Landy, F Edition,	F. J. and Conte, J. 2013.	. M, "W	/ork in	the 21s	t Century",	Oxford: Blackwe	ll Publishing	g, 4th				
Reference H	Books:											
1. Stephen 2019.	Robbins, Tim Ju	dge, No	eharika	ı Vohra,	"Organizat	ional Behaviour",	Pearson, 18	8th Edition,				
 TV.Rao, Pratibha 	"Performance M Goyal , Alok Ch	lanagei akrawa	nent to ıl , "Str	wards C ess Mar	Drganization nagement",	nal Excellence", S Studera Press, 1st	age, 2nd Ed	ition, 2016. 16.				
Question Pa	aper Pattern:											

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

FINANCIAL & COST ACCOUNTING (FAC)

VI Semeste	er :CSBS						Sche	eme : 2020		
Course Code	Category	Но	ours/W	eek	Credits	Maxin	num Marks	5		
CB316	PEC-II	L	Т	Р	С	Continuous Internal Assessment				
		3	-	-	3	40	60	100		
Sessional E	xam Duration1½	2 Hrs				End E	xam Durat	ion: 3 Hrs		
Course Out	Course Outcomes :At the end of the course the student will be able to									
CO1:Understand the basic concepts of accounting, conventions										
CO2:Under	stand the account	ting pro	cess		1	.1 . 1 .				
CO3:Under	stand the concept	ts of co	st acco	unting a	ind prepare	the cost sheet				
CO4:Under	stand the elemen	us of pro	$\frac{1}{1}$	osting						
	stand the costing	memo	12	TINI						
				UNI	T-1					
 Accounting Concept: Introduction: Meaning of Accounting, Need ,Objectives of Accounting; Basic terms-Entity, Business Transactions, Cash Transactions, Credit Transactions, Adjustment Transactions, Assets, Liabilities, Capital, Drawings, Debtor, Creditor, Solvent, Insolvent, Net worth, Goods, Purchases, Sales, Purchase returns, Sales Returns, Stock, Account, Carried Down, Brought Down, Carried Forward, Brought Forward, Expenses and losses, Incomes and gains, Expenditure, Revenue, Profit, Journal, Ledger, Posting, Debiting, Crediting, Casting, Balance, Debit Balance, Credit Balance, Equity, Accounting Year, Trading Account, Profit and Loss Account, Balance Sheet, Accounting Cycle; Accounting Concepts and Conventions, Differences between Concepts and Conventions; Book Keeping: Meaning of double-entry system, advantages of double-entry system, Classification of Accounts-English System, American System, Rules of Debit and Credit under English System; Journal- Meaning, Features, proforma of Journal, Journalising the entries; 										
Ladgan Ma	aning fasturas i	maanta	naaaf	UNI	I – II Ladgar Dag	ting Dolonoing of	fladgar	aunte:		
Ledger- Meaning, features, importance of Ledger, Ledger Posting, Balancing of ledger accounts; Trial Balance- Meaning, features, Preparation of trial balance from ledger balances Final Accounts- Meaning, Need and basic principles, Simple problems on Trading Account, Profit and Loss Account, Balance Sheet; Final accounts without adjustments, Final accounts with adjustments(Simple problems), Understanding & Interpreting Financial Statements(Theory only);										
				UNI	Γ – III					
COST ACC Accounting, Simple prob Determinar Methods and	COST ACCOUNTING: Cost Accounting, Differences between Financial Accounting and Cost Accounting, Advantages of Costing, Methods and types of costing, Elements of Cost, Cost sheet- Simple problems (RECONCILIATION OF COST not included); Determinants of Product costing: Material Control: Meaning and Definition of Material Control, Methods and Techniques of Material Control - Economic Ordering Quantity, ABC Analysis UNIT – IV									
Labour cos	t control: Mean	ing – T	ypes -	- Direct	Labour – I	Indirect Labour –	Timekeepii	ng – Time		

booking – Idle Time – Overtime – Labour Turn Over. Methods of Labour Remuneration - Time Rate System – Piece Rate System – Incentive Systems – Halsey plan – Rowan Plan – Taylor's differential Piece Rate System and Merrick's Differential Piece Rate System – Problems

Overhead cost control: Meaning and Definition – Classification of Overheads – Procedure for Accounting and Control of Overheads – Allocation of Overheads – Apportionment of Overheads – Primary Overhead Distribution Summary – Secondary Overhead Distribution Summary – Repeated Distribution Method and Simultaneous Equations Method – Absorption of Factory Overheads – Methods of Absorption – Machine Hour Rate – Simple Problems.

UNIT – V

COSTING METHODS AND COST ANALYSIS FOR PLANNING CONTROL & DECISION MAKING:

Job Costing: Definition and Characteristics, Applicability, Procedure, Evaluation, Practical Problems.

Process Costing: Introduction, Meaning and Application, Difference between Job Costing and Process Costing, Main Characteristics, Costing Procedure, Process Losses- Normal Process Loss Abnormal Process Loss, Abnormal Effectiveness.

Marginal Costing and Absorption Costing: Meaning and Definition of Marginal Costing, Contribution, Method of Difference, Method of Coverages;

Absorption Costing- Income Determination under Marginal and Absorption Costing,Cost-Volume-Profit Analysis,Profit-Volume (P/V) Ratio, Break Even Point, Margin of Safety, Application of Marginal Costing -Determination of Sales Mix ,Make or Buy Decisions, Own or Hire, Shut Down or Continue.

Text Books:

- 1. Robert N Anthony, David Hawkins, Kenneth Marchant, *Accounting: Texts and Cases*, McGraw-Hill
- 2. Charles T Horngren –Introduction to Management Accounting Pearson/PHI
- 3. P C Tulsian Practical Costing- Vikas Publishers
- 4. Jawaharlal -Cost Accounting TMH.

Reference Books:

- 1. Robert N Anthony & Vijay Govindrajan Management Control system-(TMH)
- 2. Khan & Jain- Cost Accounting-(TMH)
- 3. Bhattacharya –Cost Accounting: Principles and Practice PHI
- 4. Cost Accounting M.N Arora Vikas Publishers
- 5. P. Saravanavel-Management Control System- (HPH)

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

ADVANCE FINANCE (AF)

VI Semester :CSBS							S	cheme : 2020			
Course Code	Category	He	ours/W	eek	Credits	Maximum Marks					
CB317	PEC-II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	-	-	3	40 60 100					
Sessional E	xam Duration1	∕₂ Hrs				En	d Exam Du	ration: 3 Hrs			
Course Out	tcomes :At the en	nd of th	e cours	se the st	udent will b	be able to					
CO1: Understand and analyse securities											
CO2: Evaluating and analyzing dividend concepts											
CO3:Under	stand the corpora	te strat	egies		<u> </u>						
CO4:Under	stand the concep	ts of res	structu	ring in f	inancial ma	nagement					
CO5:Under	stand the concep	ts of de	rivativ	e marke	t						
				UI	I – TIV						
Sources of	Funds (includin	g regul	atory	framew	ork)-Types	of securities, Issu	uing the cap	ital in market,			
Pricing of is	sue	0 0	·		, ,,	,	0 1	,			
				UN	II – TI						
Dividend D	ecisions: Traditi	ional A	nproac	h. Divid	lend Releva	ance Model. Mille	er and Mod	igliani Model.			
Stability of	Dividends. Form	s of Div	vidends	s. Issue	of bonus sh	ares. Stock Split.		ignum mouer,			
				UN	IT – III						
Corporate	Restructuring_	Merge	ers and	d Acou	isitions- T	vnes of Mergers	Evaluatio	n of Merger			
Proposal, T Liquidation.	ake-over, Amal	gamatic	on, Lev	verage 1	buy-out, M	anagement buy-o	ut,Corporat	e Failure and			
				UN	IT – IV						
Financial Mechanisms	Restructuring-	Share	Split,	Conse	olidation,	Cancellation of	Paid-up C	apital, Other			
				UN	NIT – V						
Introductio Diagrams, F Model, Use	n to derivative Pricing of Future of Derivatives fo	e s : Bas s, Put C or Risk-	ics of Call Par Return	`Future rity, Op Manag	es, Forward tion Pricing ement- Cree	ls, Options, Swa g using Binomial I dit Default Swaps	nps, Interes Model and	t rate Payoff Black Scholes			
1 Brealey	Myers and Aller	n Princ	inlas o	of Corne	vate Financ	30					
1. Dicalcy,	Wryers and Anel	1, <i>1 7 11</i> 0	ipies 0	y corpo		E					
Reference I	Books:										
1. Prasanna	a Chandra,Financ	cial Ma	nagem	ent - Th	eory & Prac	etice					
2. Brigham	n & Houston- Fu	ndamen	tals of	Financi	al Managen	nent					
Question Pa	aper Pattern:										
The question	n paper for session	onal exa	aminati	ion shal	l be for 25 r	narks, covering ha	alf of the sy	llabus for first			

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

ARTIFICIAL INTELLIGENCE (AI)

VI Semeste	r : CSBS						S	cheme : 2020	
Course Code	Category	Ho	ours/W	'eek	Credits	Max	imum Mar	ks	
CB318	PEC-II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional E	xam Duration :	1½ Hrs	8	.1	1	En	d Exam Du	ration: 3 Hrs	
Course Out	tcomes : At the e	nd of th	te cour	se the st	tudent will b	be able to			
CO1: Onderstand the nature, structure and benaviour of agents in the environment.									
deenen	deepening Bidirectional Search Strategies								
CO3:Under	stand constraint s	satisfact	tion pro	oblem a	nd game pla	aving techniques.			
CO4:Acqui	re the knowledge	of real	world	knowle	dge represe	ntation.			
CO5:Under	stand the features	s and w	orking	of Expe	ert System.				
				IIN	NIT – I				
INTRODU								ACENT	
What Is Al	CTION IO AR	ns of A	AL IN	I ELLI	GENCE A	ND PROBLEM-	SOLVING	AGENI:	
environmen	t nature of enviro	onment	struct	ure of a	gente mich	based agents util	itv-based ao	vents learning	
agents. Prob	plems of AI, AI te	chniqu	e.		Benns , Beur	oused ugents, un	ity subsu ug	,•••••	
CE A D CH 7	FECHNIQUES	D 11	1			<u> </u>	· c	1 4 4 *	
SEARCH I breadth firs search strate heuristic sea	t search, depth f egies, Heuristic a arch.	irst sea search	m solv rch, de strateg	ing ager epth lim ies - G	nts, searchin nited search reedy best-	ng for solutions; t a, bidirectional se first search, A* s	arch, compa search, men	aring uniform nory bounded	
				UN	IT – III				
CONSTRA and Optimi Games, opt additional re	INT SATISFAC zation Problems imal decisions & efinements, iterat	CTION , Local z strate ive deej	PRO l searc gies in pening	BLEMS th for a games	S AND GA constraint s , the minin	ME THEORY: satisfaction problemax search procee	Local Searc ems. Adver dure, alpha-	h Algorithms sarial search, beta pruning,	
				UN	IT – IV				
KNOWLE approaches representing	DGE & REAS to knowledge r ginstant & ISA re	ONING epreser elations	G: Kn ntation. hip.	owledge Using	e represent predicate	ation issues, rep logic, representii	ng simple	& mapping, fact in logic,	
				UN	IT – V				
Introduction to Expert System: What are Expert Systems, Features of Expert system, Features of good expert system, Role of human in Expert system, Expert system organization, Difference between expert system and conventional program, Basic activities of expert system and the areas in which they solve problems.									
Text Books	:	_	_						
1. Stuart R	ussell and Peter N	Norvig,	Artific	cial Intel	lligence: A	Modern Approach	n, Third Edit	ion.	
Reference I	Books:								

1. E. Rich and K. Knight, Artificial Intelligence, 2nd Edition, (TMH).

- 2. Judea Pearl, Probabilistic Reasoning in Intelligent Systems, Morgan Kaufmann, 1988.
- 3. Rajendra Akerkar, Introduction to Artificial Intelligence, Prentice Hall of India, 2005.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

DATA MINING AND ANALYTICS (DMA)

VI Semeste	r : CSBS						S	cheme : 2020	
Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks	
CB319	PEC-II	L	Τ	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional E	xam Duration :	1½ Hr	S			En	d Exam Du	ration: 3 Hrs	
Course Outcomes : At the end of the course the student will be able to									
COI: To in	troduce the funda	imental	conce	pts of da	ita mining a	and data representa	ation.		
CO3: Apply association rules and predictive methods for data mining									
CO4: Buil	CO4: Divid data models using linear respective to beings.								
CO4 Build	nowledge on tim	ng nnc ne serie	a regi s analv	rsis and r	rescriptive	analysis			
	thowledge on this		s allaly			anarysis			
				UN	T - 1				
Introduction OLAP, Sta Methods, A	Introduction to Data Mining: What is data mining? Related technologies - Machine Learning, DBMS, OLAP, Stages of the Data Mining Process, Data Mining Techniques, Knowledge Representation Methods, Applications								
	UNIT – II								
discretizatic Data mini input data an Attribute-o measures	on ng knowledge r nd output knowle riented analysis	eprese edge, V : Attrib	ntation isualization oute ge	n: Task ation tec neralizat	relevant da hniques tion, Attrib	ata, Background	knowledge, ss comparis	Representing	
						1. 1 1 1	- 1	• •	
Data minin data, Basic Data minin algorithm, I Data minin Bayesian ne	idea: item sets, G idea: item sets, G ig algorithms - (Decision trees, co ng algorithms etworks, Instance-	Association eneration Classifie vering to vering to Predociation based to	ation r ng item cation: rules liction: method	ules: Mo sets and Basic lo The p ls (neare	otivation and d rules effice earning/mir prediction to st neighbor	nd terminology, E ciently, Correlation ning tasks, Inferrin task, Statistical (), linear models.	Example: m n analysis ng rudiment (Bayesian)	ary rules: 1R, classification,	
				UN	IT – IV				
 Descriptive analytics: Data Modeling, Trend Analysis, Simple Linear Regression Analysis Forecasting models: Heuristic methods, predictive modeling and pattern discovery, Logistic Regression: Logit transform, ML estimation, Tests of hypotheses, Wald test, LR test, score test, test for overall regression, multiple logistic regression. Interpreting Regression Models, Implementing Predictive Models. Generalized Linear model: link functions such as Poisson, binomial, inverse binomial, inverse Gaussian, Gamma. Non Linear Regression (NLS): Linearization transforms, their uses & limitations, examination of non-linearity, initial estimates, iterative procedures for NLS. 									
				UN	IT – V				

Time Series Analysis: Auto - Covariance, Auto-correlation and their properties. Exploratory time series

analysis, Test for trend and seasonality, Introduction to smoothing.

Linear time series models: Autoregressive, Moving Average, Integrated Moving Average models; Estimation of ARMA models such as Yule- 202 Walker estimation for AR Processes, Maximum likelihood and least squares estimation for ARMA Processes, Forecasting using ARIMA models. Prescriptive Analytics: Mathematical optimization, Networks modeling-Multi-objective optimization-Stochastic modeling, Decision and Risk analysis, Decision trees.

Text Books:

- 2. Jiawei Han and Micheline Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufmann Publishers, 3rd ed, 2010.
- 3. LiorRokach and Oded Maimon, "Data Mining and Knowledge Discovery Handbook", Springer, 2nd edition, 2010
- 4. Box, G.E.P and Jenkins G.M. (1970) Time Series Analysis, Forecasting and Control, HoldenDay.

Reference Books:

- 1. Draper, N. R. and Smith, H. (1998). Applied Regression Analysis (John Wiley) Third Edition.
- 2. 2. Hosmer, D. W. and Lemeshow, S. (1989). Applied Logistic Regression (Wiley)

Web References:

- 1. https://nptel.ac.in/courses/106/105/106105174/
- 2. . https://nptel.ac.in/courses/110/106/110106072/
- 3. https://www.tutorialspoint.com/data_mining/index.htm
- 4. https://www.javatpoint.com/data-mining
- 5. <u>https://www.guru99.com/data-mining-tutorial.html</u>

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

IMAGE PROCESSING AND PATTERN RECOGNITION (IPPR)

VI Semeste	r : CSBS						S	cheme : 2020
Course Code	Category	Hours/Week		Credits	Max	imum Mar	ks	
CB320	PEC-II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional E	xam Duration :	$\frac{1\frac{1}{2}}{1}$ Hr	S	.1 .	1 / 111		d Exam Du	ration: 3 Hrs
Course Out	tcomes : At the er	$\frac{10 \text{ of th}}{10 \text{ of th}}$	e cours	se the stu	udent will b	be able to		
CO2: To understand the intensity transformations and filtering techniques								
CO2: To understand the intensity transformations and filtering techniques.								
CO3.10 act	rn the feature ext	raction	and in	nonalio	istration pr	5. DCess		
CO_{5} :To un	derstand the com	nonente		our ima	ge processi	ng		
	derstand the com	ponenta			ge processi	ng.		
				UN	$\Gamma - \Gamma$			
Introduction - Image definition and its representation, Image processing systems and its applications - Basic image file formats. Image formation: Geometric and photometric models; Digitization - sampling, quantization, neighborhood metrics								
UNIT – II								
Intensity 7 specification spatial conv	Fransformation n, local contrast olution, Gaussiar	and enhand smoot	Spatia cement hing.	l Filter ; Smoot	r ing: Enha thing, linea	ancement, contras r and order statis	st stretchin stic filtering	g, histogram g, sharpening,
				UN	IT – III			
Image Segr thresholding edge detecto	nentation: Pixel g - Bayes analysis pr: Region growir	classif s, Deriv ng, split	ication vative t/merge	; Grey l based ec e technic	evel thresho lge detectio jues, line de	olding, global/loca on operators, edge etection, Hough tra	al thresholdi detection/li ansform.	ing; Optimum nking, Canny
	, , , , , , , , , , , , , , , , , , , ,	<u> </u>	0	UN	IT – IV	, 0		
Image/Obje Connected skeletonizat Registration similarity m	ect features ext component an ion/thinning, shap n: Mono-modal/ easures for regist	raction alysis; pe prop multim ration;	r: Tex Conv perties. nodal i Intensi	tural fea /ex hu mage ro ity/pixel	atures - gra ll; Distan egistration; interpolatio	ay level co-occur ce transform, 1 Global/local reg on	rrence matr nedial axi istration; T	ix; Moments; s transform, ransform and
				UN	IT – V			
Colour ima False colour Erosion Ope	ge processing: I r; Pseudo colour; erators, Top Hat I	Fundan Enhan Filters.	nentals cemen	of diffe t; Segmo	erent colour entation. M	models - RGB, Corphological Filte	CMY, HSI, pring Basics	YCbCr, Lab; : Dilation and
Toxt Books	•							
1 CAL DOOKS	• Image Processing	RC	Gonze	lez and	R. E. Wood	ls. Prentice Hall		
Reference I	Books:	<u></u>	2 31120					

1. Image Processing: The Fundamentals. Maria Petrou and Panagiota Bosdogianni, John Wiley & Sons, Ltd.
- 2. Digital Image Processing. K. R. Castleman:, Prentice Hall, Englewood Cliffs.
- 3. Visual Reconstruction. A. Blake and A. Zisserman, MIT Press, Cambridge.
- 4. Digital Pictures. A. N. Netravali and B. G. Haskell, Plenum Press.
- 5. Digital Images and Human Vision. A. B. Watson:, MIT Press, Cambridge

Web References:

- 1. https://www.tutorialspoint.com/dip/index.htm
- 2. https://www.geeksforgeeks.org/pattern-recognition-introduction/
- 3. <u>https://www.wiley.com/en-</u> ie/Image+Processing+and+Pattern+Recognition:+Fundamentals+and+Techniques-p-9780470590416

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

USABILITY DESIGN OF SOFTWARE APPLICATIONS (UDSA)

VII Semest	er :CSBS						Sche	me: 2020		
Course Code	Category	Ho	urs/W	'eek	Credits	Maxin	num Marks	5		
CB401	PEC_III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
~		3	-	-	3	40	60	100		
Sessional E	xam Duration :	1½ Hrs	5	.1 .	1 / '11 1	End E	xam Durat	ion: 3 Hrs		
CO1: Identify the appropriate User Centered Design and User Experience their significance and contribution to software applications										
CO2:Analyz	ze the usability h	euristic	s and i	dentify 1	the effective	e designs using he	uristic evalu	ation		
CO4: Understanding the facets of User Experience (UX) Design										
CO4: Understanding the facets of User Experience (UA) Design										
CUS: Apply Usability design to solve real world software design problems										
				UNI	T – I					
Introduction to User Centered Design: Aspects of User CentEred Design. Product Appreciation Assignment – Evaluating the product from user centred design aspects such as functionality, ease of use, ergonomics, aesthetics.										
UNIT – II										
Heuristic E initiation (W severity, rec	valuation: 10 H Vebsite and App) ommendations. (leuristic . Evalu Group A	Princ ation f	iples, Ež for key t nent Pre	xamples. H asks of the sentations a	euristic Evaluatio app or website fo and reviews.	n: Group A or heuristic	ssignment principles,		
				UNIT	ſ−III					
Group Pro Redesigning Prototype),	ject identification project through Usability Testing	on :Iden the d Impar	ntifyin esign ting of	g a proj lifecycle design r	ect such as e: Discover nethods and	s a website or mo y, Define Design techniques to the	bile app to , Implemen group proje	redesign. nt (Design ect.		
				UNIT	$\Gamma - IV$					
UX Resear Techniques: Persona Tec Discovery at	ch: Understandi Contextual Eno chnique. Present nd brainstorming	ng use quiry, U ation o	rs, the Jser In f Perso	ir goals nterview onas for	s, context vs, Compet the group	of use, environm itive Analysis fo project. Design	ent of use. r UX. Scer Thinking 7	Research narios and Fechnique.		
				UNI	$\Gamma - V$					
Concept D Electronic, I and feedbac	evelopment: Ta Prototyping Tools k. Final presentat	ask flo s. Projection of s	w det ct Prot solution	ailing f otyping n.	or the Pro Iteration 1.	oject. Prototyping Project Prototypi	g Technique ng Iteration	es. Paper, 2. Review		
Text Books	:									
1. Interacti Sharp an	on Design: Beyo d Yvonne Roger	nd Hum s	nan-Co	mputer	Interaction,	, 4th Edition, Jenn	ifer Preece,	Helen		
Reference H	Books:									
1. About Fa	ce, 4th Edition, A	Alan Co	oper a	nd Robe	ert Reimann	1				

2. 2. Observing the User Experience, Second Edition: A Practitioner's Guide to User Research.

Elizabeth Goodman, Mike Kuniavsky, Andrea Moed

3. 3. The Elements of User Experience: User-Centered Design for the Web and Beyond. 2nd Edition, Jesse James Garrett

4. Understanding Design Thinking, Lean, and Agile - Jonny Schneider

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

SERVICES SCIENCE AND SERVICE OPS MANAGEMENT (SSOP)

Text Books:

1. Fitzsimmons & Fitzsimmons, Service Management: Operations, Strategy, Information Technology, McGraw Hill publications (7th edition)

Reference Books:

- 1. Wilson, A., Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2012). Services marketing: Integrating customer focus across the firm. McGraw Hill.
- 2. Lovelock, C. (2011). Services Marketing, 7/e. Pearson Education India
- 3. Reason, Ben, and Lovlie, Lavrans, (2016) Service Design for Business: A Practical Guide to Optimizing the Customer Experience, Pan Macmillan India
- 4. Chesbrough, H. (2010). Open services innovation: Rethinking your business to grow and compete in a new era. John Wiley & Sons.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

COMPUTER VISION (CV)

VII Semest CSE(DS) &	VII Semester : Common for CSE(AIML), CSE(DS) & CSBS			L),	Scheme : 2020						
Course Code	Category	Но	ours/W	'eek	Credits	Maxir	num Marks	5			
CM403	PEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	-	-	3	40 60 100					
Sessional E	xam Duration:1	1/2 Hrs				End E	xam Durat	ion: 3 Hrs			
Course Ou	tcomes :At the en	nd of th	e cours	se the st	udent will b	be able to					
CO1: Prese	nt the image forn	nation p	process	•							
CO2:Use th	ie image processi	ng oper	ators f	or imag	e preproces	sing and conversi	on.				
CO3: Apply the data interpolation techniques for model fitting and optimization.											
CO4: Understand the Deep Neural Networks and CNNs for computer vision recognition and lower											
level vision tasks.											
CO5: Understand object detection and semantic segmentation methods.											
UNIT – I											
Image formation Introduction to computer vision, Geometric primitives and transformations: 2D transformations, 3D transformations, 3D rotations, 3D to 2D projections, Lens distortions, Photometric image formation: Lighting, Reflectance and shading, Optics, The digital camera: Sampling and aliasing, Color, Compression											
				UNI	T – II						
Image proc	essing			0111							
Point oper equalization operators: N	ators: Pixel tra n, Linear filtering Ion-linear filterin	nsform : Separ g, Bilat	s, Co able fil eral fil	lor tran tering, l tering, l	nsforms, C Band-pass a Binary imag	Compositing and and steerable filter ge processing.	matting, rs, More nei	Histogram ghborhood			
				UNI	Γ–III	• •					
Model fittin Scattered da Variational solver, App	ng and optimizata ata interpolation: methods and re- lication: Interacti	tion Radial egulariz ve colo	basis t ation: rization	function Discret n, Mark	ns, Overfittin e energy n ov random	ng and underfittin ninimization, Tot fields: Conditiona	ig, Robust d al variation l random fie	ata fitting, , Bilateral elds.			
				UNI	$\Gamma - IV$						
Deep Learn Deep neura Loss function Convolution	ning 1 networks:Weig ons, Backpropag nal neural networ	hts and ation, T ks(CNN	l layers Training N): LA	s, Activ g and op YERS I	ation functi otimization. N CNN.	ions, Regularizati	on and nor	nalization,			
				UNI	T - V						
Recognition Instance recognition. OF SEGME	Recognition Instance recognition, Image classification: Feature-based methods Deep networks, Face recognition.Object detection: Face detection, Pedestrian detection, General object detection, BASICS OF SEGMENTATION.										
Text Books	:										
2. Richard	Szeliski, Compu	ter Visi	on:Alg	orithms	s and Applic	cations, Springer,	2nd Edition	, 2022.			

Reference Books:

1. WESLEY E. SNYDER, HAIRONG QI, Fundamentals of Computer Vision, Cambridge University Press, 2017.

2. Aditi Majumder, M. Gopi, Introduction toVISUAL COMPUTINGCore Concepts in Computer Vision, Graphics, and Image Processing, CRC Press, Taylor & Francis Group, 2018.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

QUANTUM COMPUTATION & QUANTUM INFORMATION (QCQI)

VII Semest	er : CSBS						Sche	eme : 2020	
Course Code	Category	Но	ours/W	'eek	Credits	Maxir	num Mark	5	
CB403	PEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional E	xam Duration 1	¹ / ₂ Hrs				End E	xam Durat	ion: 3 Hrs	
Course Out	tcomes : At the e	nd of th	ne cour	se the st	udent will b	be able to			
CO1: Under	rstand the Quantu	$\frac{1}{10}$	rmatio	n V C					
CO2: Under	rstand the Classic	$\frac{1}{K}$	imetric	Key Cr	yptosystem	S			
CO3: Under	rstand the Public	Key Ci	ryptosy	stems	Tran Day	la ma Camanata na			
CO5: Understand the Design and Issues of Quantum True Random Generators									
CUS: Understand the QKD protocols									
UNIT – I									
Introduction to Quantum Information: States, Operators, Measurements, Quantum Entanglement:									
Quantum Teleportation, Super-dense coding, CHSH Game, Quantum gates and circuits									
Ou ou trune A	Jacuithura 1. D.		T.=		$\frac{1 - 11}{C_{maxim}}$		<u>C</u>	1 Cimen'a	
Quantum A	agoritanis-1: De	summe	Jozsa, i tric kor	Simon,	Grover, Sho	or, implication of	Grover's an	a Simon s	
	owards classical	symme							
0 (r 1'	<u>.</u>			. 1 6 .	•	1. D' (
Logarithm h	Algorithms-2:	mpiica	tion o	I Snor	s algorithm	n towards factor	rization and	a Discrete	
Logaritiini u	lased classical pu		y crypt		$\Gamma - IV$				
Quantum	Twue Dandom	Num	han (Concept		NC). Detailed d	acian and	issues of	
quantumnes	s, Commercial pr	roducts	and ap	plicatio	ns	NG):Detailed de	esign and	issues of	
				UNI	$\Gamma - V$				
Ouantum	kev distributio	n (Ok	(D): BE	384. El	cert. Semi-	Ouantum OKD	protocols	and their	
variations, Is	ssues of Device I	ndepen	dence,	Comme	ercial produ	cts	Protocolo		
		1	Be	yond C	urriculum				
Introductor	ry topics in Pos	t-Quan	tum (Cryptog	raphy: Ref	fer to <u>https://csrc.</u>	.nist.gov/pro	pjects/post-	
<u>quantum-cry</u>	<u>yptograpny</u> . May	discuss	s any tv	vo cipite		5 1151.			
tt Books									
1. Quantun Universi	n Computation a ity Press	nd Qua	antum]	Informa	tion. M. A.	Nielsen and I. I	Chuang, O	Cambridge	
2. Presskil	Lecture notes: A	vailable	e online	e: http://	www.theor	y.caltech.edu/~pr	eskill/ph229)/	
Reference I	Books								
1. Presskil	Lecture notes: Av	vailable	online	: http://	www.theory	y.caltech.edu/~pre	eskill/ph229	/	
2. An Intro	duction to Quanti	um Cor	nputing	g. P. Ka	ye				
3. Quantum	Computer Scien	ice. N.	David	Mermin	:				
Question Pa	aper Pattern:								

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

COGNITIVE SCIENCE AND ANALYTICS (CSA)

VII Semest	ter :CSBS						S	cheme : 2020	
Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks	
CB404	PEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional E	xam Duration :	1½ Hr	S			En	d Exam Du	ration: 3 Hrs	
Course Out	tcomes :At the en	$\frac{10 \text{ of th}}{1000 \text{ of th}}$	$\frac{e \text{ cours}}{c}$	se the stu	udent will b	e able to			
COL: Under	rstand the foundation	tions of	f analy	tics.					
CO2:Under	fy views of data	nd its o	<u>Cogni</u> caling	tive scie	ence.				
CO4:Relate concepts of data and cognitive analytics									
CO5:Organize real life work in AI & ML									
8	UNIT – I								
FOUNDATIONAL AREAS OF ANALYTICS:									
Introduction to Analytics: Definition, Description & Evolution of Analytics, Applicability of Analytics									
with development of Technology and Computer.									
Emerging Areas in Analytics: Understanding of emerging research areas of Analytics: Mathematical									
programming, Evolutionary computation, Simulation, Machine learning/data mining.									
value Unain of Analytics: Descriptive Analytics -Covering Exploratory Data Analysis & Basic of Statistics									
				UN	$ \mathbf{IT} - \mathbf{II} $				
FOUNDAT Introductio	TONAL AREAS	S OF C of Cog	OGNI	TIVE S Science:	CIENCE.	on to the study of	f cognitive s	ciences, Brief	
history of co	gnitive science of	levelop	ment.	T 0			a .	D	
Understand	Brain and Ser	isory N	lotor	Informa	ation: Func	lamentals of Neu	ro Science,	Processing of	
Memory &	Processing The	an, and	I Diall	ation Pr	ocessing Fi	undamentals of SI	hort term Me	emory	
	Trocessing. The	ory or	mom	UN	IT – III			emory.	
рата тні	TORV & TAXO	NOM) 4 Т 4					
DATA III Data as a w	hole: Understan	ding of	' Data a	os a who	le for distir	ouishing and rela	nting various	s types of data	
and Categor	ization of Data: S	Structur	ed, Un	structur	ed Data, Qu	antitative & Qua	litative Data		
Views of L	Data: Understand	ling Da	ata as	an inte	rdisciplinar	y framework for	learning m	nethodologies:	
covering sta	tistics, neural net	works.							
				UN	IT – IV				
Measureme	ent & Scaling (Concep	ts: Me	asureme	ent of varia	bles and commo	nly used sta	atistical tools:	
Number of	procedures for m	neasure	ment o	of the va	riables, Cat	tegorization proce	edures, Scale	e construction	
procedures a	and Techniques of	of data p	process	ing for o	qualitative a	as well as quantita	tive data;		
				UN	$\mathbf{IT} - \mathbf{V}$				
MULTIVA	RIATE DATA	ANAL	YTICS	& CO	GNITIVE A	ANALYTICS			
Overview of Commonly Used Inter-dependence Techniques: Factor Analysis, Principal Component									
Analysis (FCA), Clusici Analysis Overview of Commonly Used Dependence Techniques: Pegression I existic Degression									
Types of an	alvtice Descript	ive dis	onosti	c predic	niques: Re	intive and cogniti	ve		
- jpcs of all	any nes. Desempt	, ulc	ignosti	e, preute	, preser	ipire and cogniti			

Text Books:

- Hall, P., Phan, W., & Whitson, K. (2016). Evolution of Analytics. O'Reilly Media Incorporated.
 Cognitive Science: An Introduction to the Science of the Mind by José Luis Bermúdez
- Cherkassky, V., & Mulier, F. M. (2007). Learning from data: concepts, theory, and methods. John Wiley & Sons.
- 4. Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). Multivariate data analysis. Englewood Cliff. New Jersey, USA, 5(3), 207-2019.
- 5. Kelleher, J. D., Mac Namee, B., & D'arcy, A. (2020). Fundamentals of machine learning for predictive data analytics: algorithms, worked examples, and case studies. MIT press.

Reference Books:

- 1. Cognitive Science and Artificial Intelligence Advances and Applications: Authors: Gurumoorthy, Sasikumar, Rao, B Narendrakumar, Gao, Xiao-Zhi
- 2. The visual display of Quantitative Information: Edward Tufte, Graphics Press, 2001.
- 3. Scaling Measurement and Statistical Tools for Extension Workers by Krunal D. Gulkari, Hemant V. Borate, Mayur S. Shitap, 2016.
- 4. Kumar, U. D. (2017). Business analytics: The science of data-driven decision making. Wiley.

Web References:

- 1. http://cognet.mit.edu/book/foundations-of-cognitive-science
- 2. <u>https://www.dataversity.net/fundamentals-of-cognitive-analytics/</u>
- 3. <u>https://towardsdatascience.com/why-my-cognitive-science-degree-was-a-great-foundation-for-data-science-and-machine-learning-f5838b527d40</u>

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

INTRODUCTION TO INTERNET OF THINGS (IIOT)

VII Semest	er : CSBS						S	cheme : 2020	
Course Code	Category	Ho	ours/W	eek	Credits	Max	imum Mar	ks	
CB405	PEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional E	xam Duration 1	1 ¹ / ₂ Hrs				En	d Exam Du	ration: 3 Hrs	
Course Out	tcomes : At the e	nd of th	ne cour	se the st	tudent will l	be able to			
CO1: Under	rstand basic prine	ciples a	nd con	cepts of	Internet-of	Things use cases	, application	IS.	
CO2: Under	rstand the lol are	chitectu	re and	technol	ogies.				
CO3: Remo	otely monitor data	a and co		levices.	n for IOT				
CO5: Development life LeT have developed									
COS: Devel	lop real life lot t	based pr	ojects.						
T (1 (1			TT 1						
Introductio	n to loT and U	se case	s: Und	erstand	ng basic co	ncepts of IoT, Co	onsumer lo'l	vs Industrial	
Internet, Fui	ndamental buildi	ng bloc	ks, Use	e Cases	of lo I in va	rious industry doi	mains.		
				UN					
Architectur	e: loT reference	archite	ectures.	, Industi	rial Internet	Reference Archi	tecture, Edg	e Computing,	
Io I Gateways, Data Ingestion and Data Processing Pipelines, Data Stream Processing.									
				UN	11 – 111				
Sensors and	d Industrial Sys	tems: I	ntrodu	ction to	sensors and	d transducers, int	egrating sen	sors to sensor	
processing t	boards, introducti	on to 1r	idustria	al data a	equisition s	ystems, industrial	control sys	tems and their	
functions.				UN	IT_IV				
		•	<u>е</u> т		11 - 11 100 3	7 1 1 .	· 1	· · · · · · · · · · · · · · · · · · ·	
Networking	g and Commun	to pr	IOP I	01: Kec	cap of USI	/ layer architect	ture and matching \mathbf{P}_{22} \mathbf{P}_{112}	apping to 101	
Communica	tion) Industrial	netwo	ork ni	y new	(Modbus	CANbus) Con	nmunicating	with cloud	
applications	(web services.	REST	TC	P/IP an	d UDP/IP	sockets. MOTT.	WebSocke	ets. protocols.	
Message en	coding (JSON, P	rotocol	Buffer	s).		·····, ··· 、 ··· 、 ···		, F	
C				UN	IT – V				
IoT Data P	rocessing and S	Storage	e: Tim	e Series	Data and	their characteristi	cs. time ser	ies databases.	
basic time	series analytics,	data si	ımmar	ization	and sketchi	ing, dealing with	noisy and	missing data,	
anomaly and	d outlier detection	n.					•	0	
Text Books	:								
3. The Inte	rnet of Things, S	amuel (Greeng	ard, MI	T Press Ess	ential Knowledge	Series		
Reference I	Books:								
1. Visualiz Publishe	ing Data-Explori er: O'Reilly Medi	ng and a	Explai	ning Da	ta with the	Processing Enviro	onment, By	Ben Fry,	
2. Raspber	ry Pi Computer A	Archited	ture E	ssentials	s, by Andrev	w K Dennis			
3. Getting	Started with Ard	uino, M	[. Banz	i, O Rei	lly Media.				

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

DEEP LEARNING (DLE)

VII Semester : Common for CSE , CST , CSBS, CSE(AIML) & CSE(DS)							S	cheme : 2020	
Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks	
CS407	PEC-IV	L 3	T	P	C	Continuous Internal Assessment	End Exam	TOTAL	
Sessional E	xam Duration 1	J 1/2 Hrs	U	U	5	40 En	d Exam Du	ration: 3 Hrs	
Course Out	tcomes : At the e	nd of tl	ne cour	se the st	udent will l	be able to			
CO1: Under	rstand concept of	deep l	earning	g and Ar	tificial Neu	ral Network.			
CO2: Sumn	narize the Deep N	Jeural 1	Nets.						
CO3: Under	CO3: Understand the Convolutional Neural Networks Operations.								
CO4: Under	rstand the differe	nt type	s of Co	onvolutio	onal Neural	Networks Archite	ectures.		
CO5: Under	rstand the Recurr	ent Ne	ural Ne	etworks a	and deep R	NN training.			
UNIT – I									
Deep Learn of Deep Lea Artificial N Neurons, Di Fine-Tuning Case Study Deep Neura Avoiding O	Deep Learning: Introduction, Difference between Machine Learning and Deep Learning, Applications of Deep Learning Artificial Neural Network: Introduction, Artificial Neural Networks from Biological to Artificial Neurons, Difference between ANN and BNN, Single Layer Perceptron, Training Multi-layer perceptron, Fine-Tuning Neural Network Hyper parameters. Case Study: Heart Disease Prediction using ANN UNIT – II Deep Neural Network: Training a DNN, Vanishing/Exploding Gradients Problems, Faster Optimizers, Avoiding Overfitting through Regularization								
Convolutio Outputs, Ap	nal Neural Net	work- IN	1: The	e Convo	olutional o	peration, Motiva	tion, Poolin	ng, structured	
				UN	IT – IV				
Convolution advantages of Case Study	nal Neural Ne of CNN : Handwritten Di	twork- git Rec	2 : CN	IN Arcl	hitectures:	LeNet5, AlexNo	et, GoogLe	Net, ResNet,	
				UN	IT – V				
Recurrent TensorFlow Case Study	Recurrent Neural Network : Recurrent Neurons, Types of Recurrent Neural Network, Basic RNNs in TensorFlow, Training RNNs, Deep RNNs, LSTM, Case Study: Time series prediction with LSTM recurrent neural networks,								
Text Books	Text Books:								
1. "Hands	-On Machine Lea	urning v	with Sc	ikit-Lea	rn and Tens	sorFlow" March 2	2017: First E	dition	
2. "Deep L	earning" Ian Goo	od fello	w Yos	hua Ber	igio Aaron	Courville, MIT P	ress book		

Reference Books:

1. "Neural Networks and Deep Learning", Michael Nielsen.

2. "Neural Networks and Deep Learning" Aggarwal, Charu C.Springer International Publishing.

Web References:

1. https://www.geeksforgeeks.org

2. https://www.coursera.org/specializations/deep-learning

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

MODERN DAY ROBOTICS AND ITS INDUSTRIAL APPLICATIONS (MRIA)

VII Semest	er :CSBS						S	cheme : 2020	
Course Code	Category	Но	ours/W	/eek	Credits	Max	imum Mar	ks	
CB406	PEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional E	xam Duration1	² Hrs				En	d Exam Du	ration: 3 Hrs	
Course Out	tcomes :At the er	nd of th	e cours	se the st	udent will b	e able to			
CO1:Devel	op skills of using	advano	ced sof	tware fo	or solving p	ractical problems	in robotics p	pertaining to	
various indu	istries	2= 4				<u> </u>			
CO2:Under	stand the basics of	of Robo	otic ope	erating s	ystems and	communication s	ystem.		
CO3:Understand basic concepts and technological advancements in AI and robotics									
CO4:Understand and apply several statistical analysis techniques, business analytics for cognitive									
robotics and programming of robots using python and R languages.									
CO5: Understand and apply the cloud computing concepts in robotics									
UNIT – I									
Introduction to Modern Day Robotics and their Industrial Applications : Industry 4.0 Concept:									
Background and Overview-Industry 4.0 technologies: Implementation patterns in manufacturing									
companies-Evolution of Industrial Robots and their Applications-Advancements in Robotics and Its									
Future Uses-Types of robotics in various fields for applications.									
Technologi	es essential for	Cognit	ive Ro	obotics:	Computer	systems and Tee	chnologies 1	relevant to	
modern day	y robotics- Robo	tic Pro	cess A	utomat	ion: Overv	iew of RPA and	its applicati	ons.	
				UN	II – II				
Basics of	Robotic operation	ng Syst	tem:A	n overvi	ew of ROS	for beginners -	AnIntroduct	ion to Robot	
Operating	System: The U	timate	Robot	t Applic	ation Fram	nework by Adnar	nQuality of	Service and	
Cybersecu	rity Communicat	ion Pro	tocols	-Threat	modelling u	using ROS.			
				UN	ΓΓ – ΠΙ				
Foundatio	n for Advanced	Robot	ics and	d AI : A	Concept fo	or a Practical Rob	ot Design Pi	rocess- Demo	
to train A I	Robot Using AI -	Deep 1	earning	g core aj	oplications-	Deep learning bus	siness applic	ations.	
				UN	IT – IV				
Cognitive	Technologies:T	he Nex	xt Ste	p Up fo	or Data an	d Analytics in 1	obotics-Cog	gnitive Deep	
Learning T	Technology for B	ig Data	a Cogr	nitive As	ssistant Rob	oots for Reducing	Variability	in Industrial	
Human-Ro	bot Activities.								
Introducti	on to Python a	nd R P	rogra	mming	in the cont	text of Robotics:	Introduction	to Python -	
Python Fu	nctions for Data	Scienc	e-Basi	c ROS I	Learning Py	thon for robotics	- An introdu	uction to R -	
The R in R	obotics rosR: A	New La	inguag	e Extens	sion for the	Robot Operating	System.		
				UN	$(\mathbf{I}\mathbf{I} - \mathbf{V})$				
Artificial	Intelligence and	Roboti	ics :Th	e Revie	w of Reliab	ility Factors Relat	ed to Indust	rial Robots -	
Failure ana	lysis of mature r	obots ir	1 auton	nated pr	oduction- D	ata Analytics for	Predictive N	laintenance	
of Industrial Robots - Failure Is an Option: How the Severity of Robot Errors Affects Human-Robot									
Interaction									
Text Books		• 1 •	11 '	0 -	1	'1 1 T , 11' · · · ·	1 1	C 11	
1. Francis X	. Govers," Artifi	cial Int	elligen	ice for R	lobotics: Bu	illd Intelligent Ro	bots that Per	rtorm Human	
2 Simon I	D Prince "Com	us, rai	Jision.	Models	Learning	and Inference" C	ambridge U	niversity	
Tancis XTasks Us2. Simon J.	ing AI Techniqu D. Prince, "Com	es", Pac puter V	cht pub vision:	blishing, Models,	2018. Learning, a	and Inference", Ca	ambridge Ui	niversity	

Press,	20	12.
--------	----	-----

3.	Saeed Benjamin Niku, "Introduction to Robotics: Analysis, Control, Applications", Wiley Publishers,	,
	2nd edition, 2011.	

Reference Books:

- 1. Krishnendu Kar, "Mastering Computer Vision with TensorFlow 2.x: Build Advanced Computer Vision Applications Using Machine Learning and Deep Learning Techniques", Packt publishing, 2020.
- Armando Vieira, Bernardete Ribeiro," Introduction to Deep Learning Business Applications for Developers from Conversational Bots in Customer Service to Medical Image processing", Apress, 2018.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

IT PROJECT MANAGEMENT (ITPM)

VII Semest	er :CSBS						S	cheme : 2020	
Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks	
CB407	PEC-V	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional E	xam Duration1	<u>/2 Hrs</u>				En	d Exam Du	ration: 3 Hrs	
Course Out	tcomes : At the en	nd of th	e cours	se the stu	udent will b	e able to			
COI: Learn	to effectively pl	an, and	schedu	<u>ile proje</u>	ects within t	ime and cost targe	ets.		
CO2:Have	Knowledge in Co	ost Con	trol, Sc	hedulin	g and Mana	igement Features			
CO3:Be aware of different Agile Project Methodologies & Know in detail about Scrum									
CO4:Obtain	n good knowledg	e n De	vOps.			in animation and la		aniana Asila	
CO5 :Distinguish traditional application deployment and containerization and learn about various Agile									
methods									
UN11 – 1									
Project Ov	erview and Feas	sibility	Studie	es: Ident	tification, N	Aarket and Demai	nd Analysis	, Project Cost	
Estimate, Financial Appraisal. Project Scheduling: Project Scheduling, Introduction to PERT and CPM,									
Critical Path Calculation, Precedence Relationship, Difference between PERT and CPM, Float									
Calculation and its importance, Cost reduction by Crashing of activity.									
							<u>a 1 1 1'</u>		
Cost Contr	ol and Schedul	ing: Pr	oject (Cost Coi	ntrol (PER	I/Cost), Resource	Scheduling	g & Resource	
Leveling. P	roject Managem	ent Fe	atures:	KISK A	Analysis, Pi	roject Control, P	roject Audi	t and Project	
Termination	1			UN	т ш				
		T ,	ı .•			A 11 .1 1 1	·	1 • 1	
Agile Proje	ct Management	: Introc	luction	, Agile I	Principles, A	Agile methodolog	ies, Relation	iship between	
Agile Scrun	n, Lean, DevOps	and I	int hoc	ce Mana	agement (1)	retro perspective	ous termino	logies used in	
Scrum) Bes	and, product back	iog, spi um	IIII Dat	kiog, sp	onni ieview	, leuo perspective	e), various i	oles (Roles III	
Seruin), Des	st practices of Sel	um.		UN	IT – IV				
D 0		C				Leine Deeleen Me			
DevOps: O	Puilds Autor	Compo	nents, Tostin	Contain	TootDriver	Sing Docker, Ma	naging Sou	rce Code and	
Configuratio	Dullus, Autor	Contin	nous D	g anu Jenlovma	ent Autom	ated Monitoring	Commuous	, integration,	
Configuration	on wanagement,	Contin	uous D		$\mathbf{T} - \mathbf{V}$	ated Womtoning.			
Other Agil	Mathadalagia	. Introd	nation			A Cruzatal Casa a	tudiog		
Taxt Books	• Methodologies	: mtroc	uction	10 AP, I	רטס, אין דער	vi, Crystal, Case s	ludies		
1 Mike Co	• hn Succeedings	with A	rile: So	ftware I	Developmen	nt Using Serum A	ddison Wes	1ev 2009	
2 Pearson	Robert C Marti	n Iuli	James	Shore 7	The Art Of	A gile Developme	nt O'Reilly	2013	
Reference I	Books:	, . u11,	- unico	511010, 1			$\ldots, \cup \operatorname{rem}_y,$	2015	
		1 .			1 ~ .	1.1	0.1.1		
I. Roman	Pichler, Agile Pro	$\frac{1}{1}$	lanage	ment wi	th Scrum, A	Addison Wesley, 2	011	2017	
2. Somervi	IIIe, Software Eng	gineerir	ng, 10tl	n edition	(Chapter 3	, Chapters 22 to 2	(6), Pearson,	, 2017	
3. Ken Sch	waber, Agile Pro	oject Ma	anagen	nent with	n Scrum (M	accosoft Professio	nai), 2004		
4. Andrew	Stellman, Jenifer	r Green	e, Hea	a First A	gile, Oreill	y, 2017			
Question P	aper Pattern:								

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

CRYPTOLOGY (CRY)

VII Semeste	er :CSBS						S	cheme : 2020	
Course Code	Category	Ho	ours/W	eek	Credits	Max	imum Mar	ks	
CB408	PEC-V	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional Ex	xam Duration :	1½ Hrs	8			En	d Exam Du	ration: 3 Hrs	
Course Out	comes :At the en	nd of the	e cours	se the st	udent will b	e able to			
CO1: Under	rstand mathemati	cal four	ndatio	ns, servı	ces of Secu	rity.			
CO2:Analyz	ze Symmetric Ke	y Cryp	tosyste	ems					
CO4:Implement Authentication mechanisms									
CO5: Apply	Cryptographic te	chniqu	$\frac{11}{11}$	iiis dvanced	lsystems				
	Cryptographic a	onnqu			$\mathbf{NIT} = \mathbf{I}$				
Introduction Fermat's and Basic Sect Authentication Examples w family, ZUC Public Key Exchange ,E Authenticat Hash Funct Secure Hash Digital sign	n to Cryptograp d Euler's Theoren urity Services: on. Key Cryptosyst rith some promin c; Block Ciphers: Cryptosystem Cliptic Curve Cry tion: Requirement tions: Requirement Algorithm (SHA atures: Propertie	ohy: El m, Pseu con ems: S nent cip DES, <i>A</i> s: Prin ptograp nts, Mes ents of A).	ementa ido-rar fidenti tream hers: 2 AES, M nciples phy (E ssage A crypto uireme	ary num adom bit ality, UN Cipher: A5/1, G Modes o UN of Pu CC). Authenti UN ographic	ber theory, t generation Integrity, IT – II Basic Ideas rain family, f Operation IT – III blic-key C cation func IT – IV c hash func	Euclidean Algorit , Elementary cryp Availability, No s, Hardware and S , RC4, Salsa and ryptosystems, RS tions, Security of tions, Message D ure Standard, Dig	thm, Modula tosystems. on-repudiation oftware Imp ChaCha, Ho SA, Diffie-I MACs.	ar Arithmetic, on, Privacy, olementations, C128, SNOW Hellman Key ithm (MD-5), re Algorithm.	
and RSA Sig	gnature Scheme.	cs, rreq	unenn	JIII 5, DI	gital Signat	ure Standard, Dig	ital Signatu	ic Aigoriumi,	
				UN	NIT – V				
Security Applications (Selected Topics):Electronic commerce (anonymous cash, micro-payments), Zero-knowledge protocols, Cryptology in Contact Tracing Applications. Post Quantum Cryptography: Introduction, Lattice based Cryptography, Code based Cryptography									
Text Books:									
1. Cryptogr 2. Handboo Press	raphy, Theory an ok of Applied Cr	d Pract yptogra	tice. D uphy. A	. R. Stin A. J. Me	ison, C RC I enezes, P. C	Press. 4 th Ed, 2. Van Oorschot, a	and S. A. Va	anstone, CRC	
1. A course in number theory and cryptography. N. Koblitz:, GTM, Springer.									
2. Cryptogr	raphy and Netwo	rk Secu	erity. V	v. Stall11	ngs, Prentic	e Hall.			

- 3. Security Engineering, R. Anderson, Wiley.
- 4. *RC4 Stream Cipher and Its Variants*. G. Paul and S. Maitra: CRC Press, Taylor& Francis Group, A Chapman & Hall Book, 2012.
- 5. Design & Cryptanalysis of ZUC A Stream Cipher in Mobile Telephony. C. S. Mukherjee, D. Roy, S. Maitra, Springer 2020
- 6. Contact Tracing in Post-Covid World A Cryptologic Approach. P. Chakraborty, S. Maitra, M. Nandi, S. Talnikar, Springer 2020
- 7. Presskil Lecture notes: Available online: http://www.theory.caltech.edu/~preskill/ph229/

Web References:

- 1. <u>https://onlinecourses.nptel.ac.in/noc21_cs43/preview</u>
- 2. <u>https://www.coursera.org/learn/crypto</u>
- 3. <u>https://csrc.nist.gov/projects/post-quantum-cryptography</u>

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

CRYPTOGRAPHY & NETWORK SECURITY (CNS)

VII Semester : Common for CSBS, CSE(AIML) & CSE(DS)							S	cheme : 2020	
Course	Category	Hours/Week			Credits	Maximum Marks			
CM409	PEC-V	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional Exam Duration 1½ Hrs End Exam Duration: 3 Hrs									
Course Outcomes : At the end of the course the student will be able to									
CO1: Understand the concepts and principles of Network Security.									
CO2: Ana	lyze various class	sical en	cryptic	n techni	iques and b	lock cipher structu	ıre.		
CO3: Ana	lyze advanced en	cryptio	n stand	lard.					
CO4: Und	erstand block cip	her mo	des of	operatio	n.				
CO5: Explain various asymmetric ciphers									
CO6: Und	erstand cryptogra	aphic ha	ash fun	ctions a	nd digital si	ignatures			
UNIT – I									
<i>Introduction to Security concepts:</i> Computer Security concepts, OSI Security Architecture, Security attacks, Security services, Security mechanisms, Fundamental security design principles, A model for Network Security. <i>Number Theory:</i> Euclidean Algorithm, Modular Arithmetic, Fermat's and Euler's Theorem, Testing for									
primality									
UNIT – II									
<i>Symmetric Ciphers:</i> Classical Encryption Techniques: Symmetric Cipher model, Substitution techniques, Transposition techniques, Steganography. <i>Block Ciphers and DES:</i> Traditional block cipher structure, Data Encryption Standard, DES Example, Strength of DES Block cipher design principles									
0	· · · · ·		, 1	UN	III – III				
Advanced Encryption Standard: AES Structure, AES transformation functions, AES Key Expansion, AES Example, AES Implementation. Block Cipher Operation Modes: Multiple Encryption and Triple DES, Electronic codebook, Cipher Block Chaining Mode, Cipher feedback mode, output feedback mode.									
Asymmetric Cinhers and Public key counterpostens: Public Key Cruntagraphy and PSA. Dringinlas of									
Public-key cryptosystems, RSA Algorithm. Daffier Hellman Key Exchange, Elgamal Cryptographic systems.									
UNIT – V									
 Cryptographic Hash Functions: Applications of cryptographic hash functions, Hash functions based on cipher block chaining, SHA. Message Authentication codes: Requirements, Message authentication functions, security of MACs. Digital Signatures: Digital Signature requirements, Elgamal Digital Signature, Schnorr Digital 									
Signature scheme.									
I. William Stallings, [/th Edition], Cryptography and Network Security, Pearson, 2017									
2. Beh 3. MC	 Behrouz A. Forouzan, D Mukhopadhayay, [2nd Edition], Cryptography and Network Security, MC Graw Hill, 2010 								

Reference Books:

- 1. Eric Cole, Dr. Ronald Kurtz and James W. Conley, Network Security Bible, Wiley Publishers, 2009
- 2. Bruce C. Berndt, Number Theory in the Spirit of Ramanujan, University Press, American Mathematical Society, 2006
- 3. V.K. Jain, Cryptography and Network Security, Khanna Publishing House, 2017
- 4. Atul Kahate, Cryptography and Network Security, TMH, 4th Edition, 2019

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

CONVERSATIONAL SYSTEMS (CS)

VI I Semester :CSBS							S	cheme : 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks				
CB409	PEC-V	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional Exam Duration1½ HrsEnd Exam Duration: 3 Hrs										
Course Outcomes :At the end of the course the student will be able to										
CO1: Understand basic technologies required for building a conversational system.										
CO3: Puild a shathet for any application and deploy it										
CO4: Apply	AI in building c	onvers	ational	system	and build a	dvanced systems.				
CO5: Build	a real time work	ing con	versati	onal svs	tem for soc	tial domain that ca	an intelligen	tly process		
inputs and g	enerate relevant	replies.		2			0	5 1		
				UN	I – TI					
Fundamentals of conversational systems : Overview, Explanation about different modes of engagement for a human being, History and impact of AI - Underlying technologies: Natural Language Processing, Artificial Intelligence and Machine Learning, Natural Language Generation, Speech-To-Text, Text-To-Speech, Computer Vision. Introduction to Top players in Current Market –										
	Tationins. Etinea		egai Co			Overview.				
UNIT – II										
Natural language processing : Introduction: Brief history, Phases of NLP, Application of chatbots. General chatbot architecture, Basic concepts in chatbots: Intents, Entities, Utterances, Variables and Slots, Fulfillment.										
UNIT – III										
Building a Chatbot/Conversational AI systems : Fundamentals of Conversational Systems (NLU, DM and NLG) - Chatbot framework & Architecture, Conversational Flow & Design, Dialogue Management Strategies, Usage of Conversational Design Tools - Introduction to popular chatbot frameworks – Google Dialog flow, Microsoft Bot - Framework, Amazon Lex, RASA Channels: Facebook Messenger, Google Home, Alexa, WhatsApp.										
UNIT – IV										
Role of ML/AI in Conversational Technologies : Understanding on how conversational systems uses ML technologies in ASR, NLP - Advanced Dialog management - Language Translation - Emotion/Sentiment Analysis - Information extraction to effectively converse.										
UNIT – V										
Conversational Analytics and the Future of Conversational systems : Introduction to contact centers – Impact & Terminologies - Case studies & Trends, How does a Virtual Agent/Assistant fit in here? - Conversation Analytics: The need of it. Introduction to Conversational Metrics - Summary, Robots and Sensory Applications overview - Future technologies and market innovations overview. Text Books:										
1. Michael McTear, "Conversational AI: Dialogue Systems, Conversational Agents, and Chatbots", Second Edition, Moran and Claypool Publishers, 2020.										
Reference Books:										
 Cathy Pearl, "Designing Voice User Interfaces: Principles of Conversational Experiences", O'REILLY, 2016. 										

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

ADVANCED SOCIAL, TEXT AND MEDIA ANALYTICS (ASA)

VII Semester : CSBS							S	cheme : 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks				
CB410	PEC-V	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional Exam Duration : 1 ¹ / ₂ Hrs End Exam Duration: 3 Hrs										
Course Outcomes :At the end of the course the student will be able to										
CO1: To learn the fundamentals of text mining analysis.										
CO2: To be able to use various tools for text mining and carry out pattern discovery, predictive modeling.										
CO3:Explor	CO3: Explore the use of social network analysis to understand the growing connectivity and complexity.									
CO4:Perfor	m social network	$\frac{1}{1}$	is to ic	lentify i	mportant ne	twork properties	in social me	dia sites		
CO5 : Analysing interactions between people, and determine structural patterns in such interactions in real time application.										
UNIT – I										
Text Mining: Introduction- Defining text mining, general architecture of text mining systems. Core text mining operations- Using background knowledge for text mining, Text mining query languages. Pre-processing techniques-Task oriented approaches. Categorization-Applications of text categorizations, Definition of the problem, Document representations, Knowledge engineering approach to TC, Machine learning approach to TC, Using unlabeled evaluation of text classifiers UNIT – II Information extraction –Introduction, Historical evolution, Examples, Architecture of IE systems, Anaphora Resolution, Inductive algorithms, Structural IE.										
Grammars, Maximal entropy 1380deling, Maximal entropy Markov Models, Stochastic Context Free Fields Text mining applications										
UNIT – III										
Text Mining Methods and Approaches: Content Analysis; Natural Language Processing; Clustering & Topic Detection; Simple Predictive Modelling; Sentiment Analysis; Sentiment Prediction										
UNIT – IV										
Web analytics: Web analytic tools, Click stream analysis, A/B testing, online surveys; Web search and retrieval, Search engine optimization, Web crawling and Indexing, Ranking algorithms, Web traffic models.										
$\mathbf{UNIT} - \mathbf{V}$										
Social Media Analytics: Social network and web data and methods. Graphs and Matrices-Why Graphs? Graphs, Directed Graphs, Signed Graphs, Valued Graphs, Multigraphs, Hypergraphs, Relations, Matrices. Basic measures for individuals and networks. Information visualization: Architectural considerations, common visualization approaches for text mining, visualization technique in link analysis; Making connections: Link analysis. Random graphs and network evolution. Social contexts: Affiliation and identity; Social network analysis.										

Text Books:

- 1. Ronen Feldman and James Sanger, "The Text Mining Handbook: Advanced Approaches in Analyzing Unstructured Data", Cambridge University Press, 2006.
- 2. Avinash Kaushik. 2009. Web Analytics 2.0: The Art of Online Accountability.
- 3. Hanneman, Robert and Mark Riddle. 2005. Introduction to Social Network Method
- 4. Hansen, Derek, Ben Sheiderman, Marc Smith. 2011 Analyzing Social Media Networks with NodeXL: Insights from a Connected World, Morgan Kaufmann, 304

Reference Books:

- 1. Wasserman, S. & Faust, K. (1994). Social network analysis: Methods and applications. New York: Cambridge University Press.
- 2. 2. Monge, P. R. & Contractor, N. S. (2003). Theories of communication networks. New York: Oxford University Press. <u>http://nosh.northwestern.edu/vita.html</u>

Web References:

- 1. https://www.ibm.com/topics/social-media-analytics
- 2. https://emplifi.io/resources/blog/social-media-analytics-the-complete-guide

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination: