

#### DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING B.Tech – Computer Science and Engineering (Part Time) Curriculum and Syllabus 2018 Regulation

		I SEMESTER									
S.NO.	SUBJECT CODE	SUBJECT NAME	SUBJECT NAME Ty/ Lb/ ETL								
1	BMA18008	Discrete Mathematics	Ту	3	1/0	0/0	4				
2	BCS18004	Database Management Systems	Ту	3	0/1	0/0	4				
3	BEC18I01	Digital Systems	Ту	3	0/0	0/0	3				
4	BCS18002	Object Oriented Programming with C++	Ту	3	0/1	0/0	4				
		PRACTICALS*									
1	BCS18L02	Object Oriented Programming with C++Lab	Lb	0	0/0	3/0	1				
2	BCS18ET1	Java Programming	ETL	1	0/1	3/0	3				
Credits Sub Total 19											

II SEMESTER												
S.NO.	SUBJECT	SUBJECT NAME	Ty/	L	Τ/	P/R	С					
	CODE		Lb/		SLr							
			ETL									
1	BMA18016	Statistics for Computer Engineers	Ту	3	1/0	0/0	4					
2	BCS18003	Computer Organization and Architecture	Ту	3	1/0	0/0	4					
3	BCS18001	Data Structures	Ту	3	1/0	0/0	4					
		PRACTICALS*										
1	BCS18ET2	Computer Graphics	ETL	1	0/1	3/0	3					
2	BCS18L01	Lb	0	0/0	3/0	1						
Credits Sub Total 16												

		III SEMESTER							
S.NO.	SUBJECT	SUBJECT NAME	Ty/	L	Τ/	P/R	С		
	CODE		Lb/		SLr				
			ETL						
1	BCS18007	Computer Networks	Ту	3	0/0	0/0	3		
2	BCS18005	Design and Analysis of Algorithms	Ту	3	0/0	0/0	3		
3	BEC18I02	Microprocessors and Microcontrollers	Ту	3	0/0	0/0	3		
		<b>PRACTICALS*</b>							
1	BCS18ET3	PHP/MySQL	ETL	1	0/1	3/0	3		
2	BCS18L05	Network Programming Lab	Lb	0	0/0	3/0	1		
Credits Sub Total 13									

C: Credits L: Lecture T: Tutorial S.Lr: Supervised Learning P: Problem / Practical R: Research Ty/Lb/ETL: Theory /Lab/Embedded Theory and Lab \* Internal Evaluation



		IV SEMESTER									
S.NO.	SUBJECT	SUBJECT NAME	Ty/	L	T/	P/R	С				
	CODE		Lb/		SLr						
			EL								
1	BCS18009	Object Oriented Software Engineering	Ту	3	1/0	0/0	4				
2	BIT18003	Web Technology and Web Services	Ту	3	0/0	0/0	3				
3	BCS18012	Open Source Scripting Languages	Ту	3	0/0	0/0	3				
4	BXX18EXX	ELECTIVE 1	Ту	3	0/0	0/0	3				
	PRACTICALS*										
1	BCS18L08	Object Oriented Software Engineering Lab	Lb	0	0/0	3/0	1				
				~ 11			4				

**Credits Sub Total: 14** 

V SEMESTER												
S.NO.	SUBJECT	SUBJECT NAME	Ty/	L	<b>T</b> /	P/R	С					
	CODE		Lb/		SLr							
			ETL									
1	BCS18008	System Software and Principles Of Compiler	$T_{V}$	3	0/0	0/0	3					
		Design	Тy									
2	BCS18006	Operating Systems	Ту	3	0/0	0/0	3					
3	BCS18011	Dot Net Framework	Ту	3	1/0	0/0	3					
4	BXX18EXX	ELECTIVE II	Ту	3	0/0	0/0	3					
		PRACTICALS*										
1	BCS18L06	Operating Systems lab	Lb	0	0/0	3/0	1					
	Credits Sub Total 14											

		VI SEMESTER							
S.NO.	SUBJECT	SUBJECT NAME	Ty/	L	<b>T</b> /	P/R	С		
	CODE		Lb/		SLr				
			ETL						
1	BCS18010	Data Warehousing and Data Mining	Ту	3	0/0	0/3	4		
2	DMC19002	Management Concepts and Organizational	Ту	3	0/0	0/0	3		
	DIVIG18002	Behavior	-						
3	BXX18EXX	ELECTIVE III	Ту	3	0/0	0/0	3		
		PRACTICALS*							
1	BCS18L13	PROJECT PHASE - I	Lb	0	0/0	3/3	2		
2			T 1	0	0/0	2/0	1		
2	BCS18L11	Data Mining Lab	Lb	0	0/0	3/0	1		
Credits Sub Total 13									

C: Credits L: Lecture T: Tutorial S. Lr : Supervised Learning P : Problem / Practical R : ResearchTy/Lb/ETL: Theory/Lab/Embedded Theory and Lab\*Internal evaluation



VII SEMESTER												
S.NO.	SUBJECT	SUBJECT NAME	Ty/	L	Τ/	P/R	С					
	CODE		Lb/		SLr							
			ETL									
1	BXX18EX	ELECTIVE IV	Ту	3	0/0	0/0	3					
	Х											
PRACTICALS*												
1	BCS18L14	Project (Phase – II)	Lb	0	0/0	12/1	8					
	DESTOLIT		10	0	0,0	2	3					
Credits Sub Total 1												

C: Credits L: Lecture T: Tutorial S.Lr: Supervised Learning P: Problem / Practical R: Research Ty/Lb/ETL: Theory /Lab/Embedded Theory and Lab \* Internal Evaluation

**Credit Summary** 

Semester 1:19Semester 2:16Semester 3:13Semester 4:14Semester 5:14Semester 6:13Semester 7:11Total Credits:100



	ELECTIVE -I (Common to CSE&IT)												
S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	С						
1	BCS18E01	Image Processing	Ту	3	0/0	0/0	3						
2	BCS18E02	Geographical Information Systems	Ту	3	0/0	0/0	3						
3	BCS18E03	Database Tuning	Ту	3	0/0	0/0	3						
4	BCS18E04	Component Based Technology	Ту	3	0/0	0/0	3						
5	BCS18E05	E-Commerce	Ту	3	0/0	0/0	3						
6	BCS18E06	Artificial Intelligence	Ту	3	0/0	0/0	3						
7	BCS18E07	Human Computer Interaction	Ty	3	0/0	0/0	3						
8	BCS18E08	Wireless and Mobile Networking	Ty	3	0/0	0/0	3						

	ELECTIVE -II												
S.NO.	SUBJECT	SUBJECT NAME	Ty/	L	<b>T</b> /	P/R	С						
	CODE		Lb/		S.Lr								
			ETL										
1	BCS18E09	Web Mining	Ту	3	0/0	0/0	3						
2	BCS18E10	Web Data Design and Management	Ту	3	0/0	0/0	3						
3	BCS18E11	Risk Management	Ту	3	0/0	0/0	3						
4	BCS18E12	Cryptography and Network Security	Ту	3	0/0	0/0	3						
5	BCS18E13	Mobile Adhoc Networks	Ту	3	0/0	0/0	3						
6	BCS18E14	TCP/IP Design and Implementation	Ту	3	0/0	0/0	3						
7	BCS18E15	Cyber Forensics and Internet Security	Ту	3	0/0	0/0	3						
8	BCS18E16	Database Security	Ту	3	0/0	0/0	3						
9	BCS18E17	Management Information Systems	Ту	3	0/0	0/0	3						

	ELECTIVE –III												
S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	С						
1	BCS18E41	Mobile Application Development(only for CSE)	Ту	3	0/0	0/0	3						
2	BCS18E18	Data Science and Big Data Analytics	Ту	3	0/0	0/0	3						
3	BIT18006	Cloud Technology (only for CSE)	Ту	3	0/0	0/0	3						
4	BCS18E19	Network Forensics	Ту	3	0/0	0/0	3						
5	BCS18E20	Internet of Things	Ту	3	0/0	0/0	3						
6	BCS18E21	Social Computing	Ту	3	0/0	0/0	3						
7	BCS18E22	Enterprise Architecture	Ту	3	0/0	0/0	3						
8	BCS18EXX	Subject based on Industry Demand	Ту	3	0/0	0/0	3						
9	BCS18E23	Optimization Techniques	Ту	3	0/0	0/0	3						

B.Tech – Computer Science and Engineering (Part Time) – 2018 Regulation



		ELECTIVE –IV					
S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	С
1	BCS18E24	Information Storage Management	Ту	3	0/0	0/0	3
2	BCS18E25	Network Infrastructure Management	Ту	3	0/0	0/0	3
3	BCS18E26	Foundations of Parallel Programming	Ту	3	0/0	0/0	3
4	BCS18E27	Virtualization	Ту	3	0/0	0/0	3
5	BCS18E28	Hadoop Distributed File System	Ту	3	0/0	0/0	3
6	BCS18E29	Mobile Databases	Ту	3	0/0	0/0	3
7	BCS18E30	Web Engineering	Ту	3	0/0	0/0	3
8	BCS18E31	4G Networks	Ту	3	0/0	0/0	3
9	BCS18E32	Enterprise Resource Planning	Ту	3	0/0	0/0	3
10	BCS18E33	Supply Chain Management	Ту	3	0/0	0/0	3
11	BCS18E34	Mainframe Computing	Ту	3	0/0	0/0	3
12	BCS18E35	Neuro Fuzzy Computing	Ту	3	0/0	0/0	3
13	BCS18E36	Web Content Management	Ту	3	0/0	0/0	3
14	BCS18E37	Machine Learning	Ту	3	0/0	0/0	3
15	BCS18E38	M-Commerce	Ту	3	0/0	0/0	3
16	BCS18E39	Real Time Systems	Ту	3	0/0	0/0	3
17	BCS18E40	Distributed Computing	Ту	3	0/0	0/0	3





#### DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING SEMESTER – I

Subject Coo BMA18008	de : 3	S	ubject I	t Na DISC	ime : C <b>RETE MA</b> '	TH	EM	AT	ICS			Ty/ Lb/ ETI	/ / L	L	T/ SLr	P/R	C
		P	Prerequ	isit	e : None							Ту		3	1/0	0/0	4
L : Lecture	T : Tu	torial	SLr	: Su	pervised Lea	rnir	ng P	: Pr	ojec	t F	R : F	Researc	h C	C: Ci	redits		
T/L/ETL : T	Theory	/La	b / Em	bed	lded Theory a	ind	Lab										
OBJECTI	VES :		.1 D					1.5									
• To	unders	tand	the Ba	asıc	concepts in I	Log	ic ar	nd P	red	cat	e ca	lculus					
• 10 • To	unders	tand	the Ba	asic	concepts in C	2011 Proj	idini un tl		1CS								
• To	unders	tand	the Ba	asic	concepts in C	atti	up u ices		у								
• To	unders	tand	the Ba	asic	concepts in C	Gran	oh th	neor	v								
COURSE	COURSE OUTCOMES (COs) :																
Students co	tudents completing the course were able to																
CO1	Find	the summation of the given series logical equations and predicate calculus.															
CO2	To de	eterm	ine th	e fu	nctions of per	rmu	itatio	on a	nd c	com	ıbin	ation.					
CO3	To ur	nders	tand tl	he c	oncept of gro	up	theo	ory a	and a	ina	lysi	s opera	tion	of s	set opera	tions.	
CO4	Apply maxin	y kno ma / :	owledg minim	ge a na of	and concepts f the given fu	in ncti	find ion 1	ing usin	the g lat	der tice	riva es.	tive of	giv	en f	unction	and to f	ind the
CO5	Evalu	Evaluate the partial / total differentiation and maxima / minima of a function of several															
	varia	oles.							/-								
Mapping o	f Cour	se O	utcon	nes	with Program	m (	)utc	om	es (I	209	s)	-					
COs/POs	PO1	РО	2   P(	)3	PO4	P	05	PC	)6	P(	)7	PO8	PC	)9	PO10	PO11	PO12
CO1	Н	н				М	[	м					н		Н		н
CO2	Н	Н				н		L									н
CO3	H	Н				M	[						Μ		Н		L
CO4	Н	H				L							Μ		Н		Μ
CO5	Н	Н						Μ					Μ		Μ		Н
H/M/L ind	icates	stren	igth o	f co	rrelation H	– I	High	h, M	[ – N	/lec	liun	n, L –	Lov	V			
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	$\checkmark$																



## BMA18008DISCRETE MATHEMATICSTy31/00/04

(Common to II yr. / III Sem. B.Tech (Full Time), I yr. / I Sem. B.Tech (Part Time) - CSE,IT)

#### UNIT I LOGIC

Statements – Truth Table – Connectives – Normal Forms – Predicate Calculus – Inference Theory.

#### UNIT II COMBINATORICS

Mathematical Induction – Pigeon Hole Principle – Principle of Inclusion and Exclusion – Recurrence Relations – Generating Functions.

#### UNIT III GROUPS

Basic Concepts – Groups – Subgroups – Homomorphism – Kernel – Cosets – Lagrange's theorem (simple theorems and problems).

#### UNIT IV LATTICES

Partial ordering – Posets – Hasse Diagram – Lattices – Properties of lattices – Sub lattices – Special lattices – Boolean Algebra(Definition & simple problems).

#### UNIT V GRAPHS

Introduction to Graphs – Terminology – Matrix representation of Graphs: Incidence matrix, Adjacency matrix – Graph Isomorphism – Connectivity – Euler and Hamiltonian Paths (simple theorems and problems).

#### **TEXT BOOKS:**

- 1. Veerarajan T., *Discrete Mathematics*, Tata McGraw Hill Publishing Co., (2008).
- 2. Tremblay J.P., Manohar R., *Discrete Mathematical structures with applications to Computer science*, Tata McGraw Hill Publishing Co., (2008).

#### **REFERENCE BOOKS:**

- 1. Kolman, Busby, Ross, Discrete Mathematical Structures, Pearson, (2014).
- 2. Kenneth Rosen, Discrete Mathematics and its applications (SIE), Tata McGraw Hill Publishing Co., (2007).

# 12 Hrs

12 Hrs

12 Hrs

#### 12 Hrs

#### **Total Hours: 60**



Subject Code:	Subje DA'	ct Name <b>TABAS</b>	e : SE MAI	NAGE	MENT	SYSTI	EMS	Ty Lb	r/ 0/	L	T/ SLr	P/R	С
BCS18004								ET	L				
	Prerec	quisite: 1	BCS18	001				Ту	7	3	0/1	0/0	4
L : Lecture T	: Tutor	ial S.I	Lr : Sup	ervised	Learni	ng P:	Project	R : Res	search (	C: Ci	redits		
Ty/Lb/ETL :	Theory	/Lab/En	nbeddeo	d Theor	y and L	Lab							
OBJECTIVE	ES:	1: 66								0			
• To unders	stand th	e differ	ent issu	es invo	lved in	the des	ign and	implem	entatio	on of	a data	abase syst	tem.
To study	the phy	sical an	d logica	al datab	ase des	igns, da	itabase	modelin	ig, rela	tiona	al, hiei	rarchical,	and
	nodels.		1:			10		ah aa d	<b>.</b>				a m d
• 10 develo	op an ui	iderstan	ang or	essent	Iai DBN	AS conc	epts su	ch as: d	atabase	e sec	urity,	integrity,	and
		<u>y.</u> TCOMES (COs) : ( 3- 5)											
CO1		Understand the most fundamental DBMS concepts and techniques											
CO2	•	Learn techniques required for building, maintaining, and querying databases.											
CO3	•	Design Databases for applications											
Mapping of	Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	PC	)10	PO11	PO12
CO1	Н	Μ	Μ	L	Μ	Н	Μ	Μ	Μ	N	A	Μ	Н
CO2	Μ	Н	Μ	Μ	Η	Μ	Μ	Μ	Η	I	L	L	Μ
CO3	Η	Μ	Η	Η	Μ	Μ	L	L	Μ	Ι	L	Μ	Н
COs /	PS	01	PS	02	PS	03	PS	04	PS	<b>SO</b> 5		PSC	)6
PSOs													
CO1	I	H	H	I	I	H	N	1		H		H	
<u>CO2</u>	N	A	<u> </u>	<u>/</u>	I	<u>I</u>	I			M		<u> </u>	
CO3				<u>1</u>				1	r	H		H	
H/M/L indica	ates Sti	rength d	of Corr	elation	H-E	lign, M	- Medi	um, L-I	Low				
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills				
				~									



BCS18004	DATABASE MANAGEMENT SYSTEMS	Ту	3	0/1	0/0	4
BCS18004	DATABASE MANAGEMENT SYSTEMS	Ту	3	0/1	0/0	4

#### UNIT I FUNDAMENTALS OF DATABASE

Introduction - Purpose of database systems - Data Abstraction -Data models - Instances and schemas -Data Independence – DDL – DML – Database user – ER model – Entity sets- keys – ER diagram – relational model - structure - relational algebra- relational calculus- views

#### UNIT II SQL

SQL - OBE - level - Basic Structure - various operations - relational database design - problems in the relational database design - normalization - normalization using functional - Multivalued join dependence

#### UNIT III FILE STRUCTURE, INDEXING & HASHING

File and system structure – overall system structure – file transaction – data dictionary – indexing and hashing basic concepts and B+ tree Indices - static and dynamic hash functions

#### **QUERY PROCESSING AND TRANSACTIONS** UNIT IV

Overview - Measures of Query Cost - Selection Operation - Sorting - Join Operation- Transaction Concept - A Simple Transaction Model - Storage Structure - Serializability

#### CONCURRENCY CONTROL AND RECOVERY SYSTEM UNIT V

Lock-Based Protocols - Deadlock Handling - Timestamp-Based Protocols - Validation-Based Protocols -Failures Classification - Storage - Recovery and Atomicity - Recovery Algorithm - Buffer Management

**Total Hours: 60** 

#### **TEXT BOOKS:**

1. Abraham, Silberschatz. Henry, F. K. Sudharshan, S. (2013) Database System Concepts (6<sup>th</sup>ed.) Tata McGraw Hill, New Delhi

#### **REFERENCE BOOKS:**

- 1. Ramez, E. Shamkant, B. Navathe (2008) Fundamentals of database systems (5<sup>th</sup> ed.), Pearson Education
- 2. Date, C. J, (2012) An Introduction to Database Systems (8<sup>th</sup> ed.), Pearson Education

#### 12 Hrs

12Hrs

#### 12 Hrs

12 Hrs



Subject Code: BEC18I01	Su	ıbject N	ame :	DIG	ITAL S	YSTEN	AS	Ty/ Lb/ ETL	L	T/ SLr	P/R	С	
	Pr	erequisi	ite: BE	S18001				Ту	3	0/0	0/0	3	
L : Lecture T : ' Ty/Lb/ETL : Tl	Tutoria heory/L	l S.Lr .ab/Emt	: Super	vised L Theory	earning	g P:Pro	oject R	: Resea	rch C:	Credits			
OBJECTIVES	5:												
To intro	oduce r	umber	systems	and co	des and	its con	versions	5					
To intro	oduce H	Boolean	algebra	and its	applica	ations in	digital	system	s				
To intro	oduce t	he desig	gn of va	rious co	ombinat	ional di	gital cir	cuits us	ing log	ic gates			
• To brin	g out tl	ne analy	vsis for s	synchro	nous an	d async	hronou	s Seque	ntial ci	rcuits			
COURSE OUT	ГСОМ	ES (CC	<b>Ds</b> ):(3	- 5)									
CO1		Acqui	red kno	wledge	about n	umber	systems	and its	conver	sions			
CO2		Acqui	Acquired knowledge about boolean algebra										
CO3		Abilit	Ability to identify, analyze & design combinational circuits										
CO4		Abilit	Ability to identify & analyze synchronous & asynchronous circuits										
Mapping of Co	ourse (	Outcom	es with	Progra	am Out	comes (	POs)	-					
COs/POs	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	PO7	PO8	<b>PO9</b>	PO10	PO11	PO12	
CO1	Η	L	Μ	L	L	L	L	L	L	Μ	L	L	
CO2	H	Μ	L	L	L	L	L	L	L	L	L	L	
CO3	Μ	Μ	Η	L	L	Μ	L	L	Μ	Μ	L	L	
CO4	Μ	Μ	Η	L	L	Μ	L	L	Μ	Μ	L	L	
COs / PSOs	PS	01	PS	02	PS	03	PS	04	PS	505	PS	06	
CO1	L		Н		L		L		Μ		L		
CO2	L		Η		L		L		Μ		L		
CO3	Η		Μ		L		L		Μ		Μ		
CO4	Η		Μ		L		L		Μ		Μ		
H/M/L indicat	es Stre	ngth of	Correl	ation	H- Hig	<b>gh, M-</b> I	Mediun	ı, L-Lo	W				
		Ices						1					
Category	Basic Sciences	Engineering Scienc	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills				
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BEC18I01	DIGITAL SYSTEMS	Ту	3	0/0	0/0	3
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#### UNIT I NUMBER SYSTEMS

Review of Decimal, Binary, Octal And Hexadecimal Number Systems - Number Conversions - Signed Magnitude form – 1's and 2's Complement – Binary weighted codes- Binary arithmetic – codes – BCD code, Gray code, Excess-3 Code.

#### **UNIT II BOOLEAN ALGEBRA**

Binary logic Functions- Boolean laws - De Morgan's Theorems, Sum Of Products - Product Of Sums karnaugh map- Quine McCluskey Method.

#### **UNIT III COMBINATIONAL LOGIC**

Logic gates - AND, OR, NOT, NOR, NAND and EX-OR Gates- Half adder - Full adder- Half subtractor-Full subtractor - Multiplexer - Demultiplexer - Encoder - Decoder - Code converters - PAL-PLA.

#### **UNIT IV** SYNCHRONOUS SEQUENTIAL LOGIC

Latches-R-S- Flip Flop, S-R Flip Flop, D Flip Flop, JK Flip Flop, T Flip-Flop - Master slave Flip-Flop -Counters – Up Down counters- Binary counters-Ring counter- Shift Registers.

#### **ASYNCHRONOUS SEQUENTIAL LOGIC** UNIT V

Asynchronous counters – Decade counters - State diagram - State Table – State Reduction – State Assignment- Excitation Table-Analysis of Asynchronous sequential circuits - Design of ASynchronous Sequential Circuits.

#### **Total Hours: 45**

#### **TEXT BOOKS**

- 1. Charles H. Roth & Larry L.Kinney, "Fundamentals of Logic Design", Cengage Learning, 7th Edition.
- 2. M. Morris Mano & Michael D.Ciletti (2008) Digital Design. Pearson Education
- 3. Thomas.L.Floyd (2013) "Digital Fundamentals", 10th Edition Pearson Education

#### **REFERENCE BOOKS**

- 1. Ronald J. Neal S. Gregory L (2009), "Digital Systems", 10<sup>th</sup> Edition, Pearson Prentice Hall.
- 2. R P Jain, (2010), "Modern Digital Electronics", 4th Edition, Tata Mcgraw Hill Ed. Pvt. Ltd.

#### 9 Hrs

9 Hrs

9 Hrs

## 9 Hrs



Subject Code: BCS18002	S	ubject N OBJI	ame : ECT O	RIENT WI	ED PR FH C++	OGRA ⊦	MMIN	G	Ty/ Lb/ ETL	L	T/ SLr	P/R	C
	P	rerequisi	ite: BES	S18ET2					Ту	3	0/1	0/0	4
L : Lecture T : Ty/Lb/ETL : T	Tutori heory/	al S.L. Lab/Em	r : Supe bedded	rvised l Theory	Learning and La	g P:P lb	roject F	R : Rese	arch C:	Cred	its		<u> </u>
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CO5		To deve	lop an a	applicat	ion usir	ng C++							
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B.Tech – Computer Science and Engineering (Part Time) – 2018 Regulation



BCS18002	OBJECT ORIENTED PROGRAMMING WITH C++	Ту	3	0/1	0/0	4	
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#### UNIT I BASICS, TOKENS, EXPRESSIONS

Software Evolution, Procedure Oriented Programming, Object Oriented Programming Paradigm, Basic Concepts of OOP, Benefits of OOP, Object Oriented Languages, Features of OOP. How OOP Differ from POP. Applications of OOP, A Simple C++ Program, Structure of C++ Program. Tokens, Keywords, Identifiers and Constants, Basic Data Types, User Defined Data Types, Derived Data Types, Dynamic Initialization of Variables, Reference Variables, Operators in C++, Scope Resolution Operator, Member Dereferencing Operators, Memory Management Operators.

#### UNIT II FUNCTIONS, CLASSES AND OBJECTS

Introduction of Classes, Specifying a Class, Defining a Member Functions, A C++ Program with Class Access Specifiers, Inline functions, Nesting of Member Functions, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Objects as Function Arguments, Default Arguments, Const Arguments, Function Overloading, Friend Functions.

#### UNIT III CONSTRUCTORS AND DESTRUCTOR

Introduction, Constructors, Default constructors, Copy Constructors, Dynamic Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic initialization of Objects, Destructors.

#### UNIT IV INHERITANCE

Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi Level Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Abstract Classes, Constructors in Derived Classes, Containership, Operator overloading, Rules for Operator overloading, overloading of binary and unary operators.

#### UNIT VPOINTERS, VIRTUAL FUNCTIONS AND POLYMORPHISM12 Hrs

Introduction to Memory Management, new Operator and delete Operator, Pointer to Objects, this Pointer, Pointers to Derived Classes, Polymorphism, Compile time polymorphism, Run time polymorphism, Virtual Functions, Pure Virtual Functions, Virtual Base Classes, Virtual Destructors.

#### **TEXT BOOK:**

1. E.Balagurusamy, "Object Oriented Programming in C++", 6thed., Tata McGraw-Hill, 2013

#### **REFERENCE BOOKS:**

- 1. K.R. Venugopal, "Mastering C++", published by Tata McGraw-Hill. -2013, Second Edition.
- 2. RohitKhurana, "Object Oriented Programming With C++", Vikas Publishing House- 2014, Second Edition.
- 3. Robert Lafore, "Object-Oriented Programming in C++", Sams Publishing-2002, Fourth Edition

#### 12 Hrs

#### 12 Hrs

#### **Total Hours: 60**

# **12 Hrs** tructors.



Subject Code BCS18L02	:		Subject OBJE	Name : CT OR	: XIENTI WITH	ED PR C++ L	OGRA AB	MMI	NG	Ty/ Lb/ ET L	L	T/ SL r	P/R	С
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CO2	Be c	capable to identity the appropriate data structure for given problem												
CO3	Have	ve practical knowledge on the application of data structures												
Mapping of	ing of Course Outcomes with Program Outcomes (POs)													
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#### LIST OF EXPERIMENTS

- 1. Simple C++ Programs to Implement Various Control Structures.
  - a. If statement
  - b. Switch case statement and do while loop
  - c. For loop
  - d. While loop
- 2. Programs to Understand Structure & Unions.
  - a. Structure
  - b. Union
- 3. Programs to Understand Pointer Arithmetic.
- 4. Functions & Recursion.
  - a. Function
  - b. Recursion
- 5. Inline Functions.
- 6. Programs to Understand Different Function Call Mechanism.
  - a. Call by reference & Call by Value
- 8. Programs to Understand Storage Specifiers.
- 8. Constructors & Destructors.
- 9. Use of "this" Pointer, using class
- 10. Programs to Implement Inheritance and Function Overriding.
  - a. Multiple inheritances –Access Specifiers
  - b. Hierarchical inheritance Function Overriding /Virtual Function
- 11. Programs to Overload Unary & Binary Operators as Member Function & Non Member Function.
  - a. Unary operator as member function
  - b. Binary operator as non member function
- 12. Programs to Understand Friend Function & Friend Class.
  - a. Friend Function
  - b. Friend class
- 13. Programs on Class Template



Subject Code BCS18ET1	e: Su	bject N JA	ame : VA PRC	OGRAN	AMINO	3	I E	Гу/ Lb/ TL	L T/ P/R C SLr					
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COURSE O		OMES (COs) : ( 3- 5)												
CO1	Т	To design, create, build, and debug Java applications and applets.												
CO2	Т	To write Java programs using object-oriented programming techniques incl										including		
		classes, objects, methods, instance variables, composition, inheritance, polymorphism.										ce, and		
CO3	г Т	To write programs using graphical user interface (GUI) components and Java's F									a's Event			
000	H	Handling Model.												
Mapping of	Course	e Outco	mes wit	h Progi	ram Ou	itcomes	s (POs)							
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PO10	PO11	PO12		
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CO2	H	H	H	H	L	L	H	Μ	H	H	H	H		
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BCS18ET1	JAVA PROGRAMMING	ETL	1	0/1	3/0	3
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#### UNIT I OVERVIEW OF JAVA LANGUAGE

Introduction to Java, Features of Java, Comparison with C and C++, Java and World Wide Web, Java Environment, Java Development kit (JDK), Java Runtime Environment(JRE), Application Programming Interface (API), Java Virtual Machine (JVM), Primitive Datatypes, Declarations, Ranges, Variable Names Conventions, Numeric Literals, Character Literals, StringLiterals, Arrays(One dimensional, two-dimensional), Enumerated Data Types

#### UNIT II CLASSES, OBJECTS AND METHODS:

Classes and Objects, Defining a class; Defining instance variables and methods, Creating objects out of a class, Method calls via object references, Abstraction, Packages, Interfaces and Abstract classes, Abstract and non-abstract methods, Inheritance, extends and implements keywords in Java, Super class and Sub class, this keyword, super keyword in Java for inheritance, Concrete classes in Java, Polymorphism, Compile time polymorphism - Overloading of methods, Run time polymorphism - Overriding of methods, Method Overriding rules and method overloading rules, Encapsulation.

#### UNIT III EXCEPTION AND MULTITHREADED PROGRAMMING

Exception handling, Need for exceptions, API hierarchy for Exceptions, Types of Exceptions, Keywords in Exception API: try, catch, finally, throw, throws, -Introduction to Threads – Creating Threads, Extending the Thread Class, Implementing the runnable interface, life cycle of a thread, priority of a thread, Multithreading, Synchronization, Dead Lock.

#### UNIT IV STREAMS AND OBJECT SERIALIZATION

Overview of Streams, Bytes vs. Characters, Overview of the entire Java IO API Reading a file; writing to a file usinf various APIs, Reading User input from console, PrintWriter Class, Object Serialization, Serializable Interface, Serialization API, ObjectInputStream and ObjectOutput, Transient Fields, readObject and writeObject.

#### UNIT V GRAPHICS PROGRAMMING:

Introduction, Abstract Window Toolkit (AWT), Applets-Life Cycle- Basics of event handling – event handlers – adapter classes – actions – mouse events –AWT event hierarchy – introduction to Swing – buttons–Layout Management–Swing Components.

#### **Total Hours: 45**

#### TEXT BOOKS

1. Herbert Schildt, "The Complete Reference JAVA 2", Tata McGraw Hill publications, 7th Ed., 2007.

2. Balagurusamy, "Programming with JAVA A primer 3<sup>rd</sup> Edition", Tata McGraw-Hill, 2007

#### **REFERENCE BOOKS**

1. Y.Daniel Liang, "An Introduction to JAVA Programming", Pearson, 2015

2. Kathy Sierra, Bert Bates, "Head First Java", Oreilly Publication, 2<sup>nd</sup> Edition, 2005

#### 9Hrs

9Hrs

# 9Hrs

9Hrs



#### SEMESTER – II

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Students co	ompleting	the cours	se were a	able to										
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CO2	To determ	mine the	function	s of perr	nutation	and com	binatio	n.						
CO3	To under	To understand the concept of corelation operations.												
CO4	Apply knowledge and concepts in finding the derivative of given function and to find the maxima													
	/ minima of the given function using lattices.													
C05	Evaluate	the parti	al / total	differen	tiation ar	id maxir	na / mi	nima of	a funct	ion of se	veral var	ables.		
Mapping	of Course	Outcom	es with	Program	n Outcor	nes (PO	s)							
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B.Tech – Computer Science and Engineering (Part Time) – 2018 Regulation



BMA18016	STATISTICS FOR COMPUTER ENGINEERS	Ту	3	1/0	0/0	4
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(Common to III yr. / V Sem. B.Tech (Full Time), I yr. / II Sem. B.Tech (Part Time) – CSE,IT)

#### UNIT I BASICS OF STATISTICS

Variables – Uni-variate Data – Frequency Distribution – Measures of Central Tendency – Mean – Median – Mode – Quartiles – Measures of Dispersion – The Range – Quartile Deviation – Standard Deviation – Relative Measures of Dispersion – Coefficient of Variation – Quartile Coefficient of Variation.

#### UNIT II PROBABILITY AND RANDOM VARIABLE

Axioms of Probability – Conditional probability – Total probability – Baye's Theorem – Random variable – Probability mass function – Probability density function – Properties – Moments (Definition and simple problems).

#### UNIT III CORRELATION & REGRESSION

Measures of Skewness & Kurtosis – Bi-variate data – Applications of Correlation: Karl Pearson's Coefficient of Correlation – Rank Correlation: Spearman's Rank Correlation – Linear Regression.

#### UNIT IV STANDARD DISTRIBUTIONS

Binomial – Poisson – Geometric – Uniform – Exponential – Normal distributions.

#### UNIT V TESTING OF HYPOTHESIS

Tests of Significance – Large Sample Tests – Mean – Proportions – Small Sample Tests – t, F, Chi-square Tests: Independence of Attributes, Goodness of Fit.

#### Total no. of hrs: 60

#### **TEXT BOOKS:**

- 1. Veerarajan T., Probability, Statistics and, Random Processes, Tata McGraw Hill Publishing Co., (2008).
- 2. Gupta S.C., Kapoor V.K., Fundamentals of Mathematical Statistics, S.Chand& Co., (2007).

#### **REFERENCE BOOKS:**

- 1. Singaravelu, Probability and Random Processes, Meenakshi Agency, (2017).
- 2. Richard Johnson A., *Miller & Freund's Probability and statistics for Engineers (9<sup>th</sup>ed)*, Prentice Hall of India, (2016).

# 12 hrs

12 hrs

## 12 hrs

12 hrs

#### 12 hrs



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CO2	S	tudents	will und	erstand	the basi	c struct	ure and	operati	on of d	igita	l con	nputer					
CO3	S	tudents	will und	erstand	a wide v	variety	of mem	ory tech	nologi	es bo	oth in	iternal an	d exter	nal.			
CO4	S	tudents	will und	erstand	the diff	erent w	vays of	commu	nicating	g wit	h I/O	devices	and sta	ndard I/O			
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BCS18003	COMPUTER ORGANIZATION AND	Tv	3	1/0	0/0	4
	ARCHITECTURE	цì	5	1/0	0/0	-

#### UNIT I BASIC STRUCTURE OF COMPUTERS

Basic structure of Computer Hardware-Von-Neumann Architecture-Functional units – Bus Structures - Software performance - Memory locations and addresses - Memory operations -Instruction and instruction sequencing

#### UNIT II ARITHMETIC AND LOGIC UNIT

Fixed point arithmetic operation-addition – subtraction – multiplication - division Floating point arithmetic operation-Design of ALU

#### UNIT III PROCESSOR UNIT

Data path implementation-Control unit-hardwired control - micro programmed control, nano programming -Concepts of pipelining - Pipeline hazards

#### UNIT IV MEMORY SYSTEM

Memory hierarchy-Internal organization of RAM – ROM - Interleaved memory-Cache and associative memories -Virtual memory - Memory organization and cache coherence issues

#### UNIT V INPUT/OUTPUT AND PERIPHERALS

Accessing I/O devices – Programmed Input/ Output -Interrupts – Direct Memory Access – IO Processor -Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB) - I/O devices

#### **Total Hours: 60**

#### **TEXT BOOKS:**

- 1. John Hayes (2012), (2007) digitized Computer Architecture and Organization, Tata McGraw Hill
- 2. Carl Hamacher, ZvonkoVranesic, SafwatZaky and NaraigManjikian, "Computer Organization and Embedded Systems", Sixth Edition, Tata McGraw Hill, 2012.

#### **REFERENCE BOOKS:**

- 1. Morris Mano (2009) Computer System Architecture, (3rd ed.), Pearson Education
- 2. John L. Hennessey and David A. Patterson, "Computer Architecture A Quantitative Approach", Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.

#### 12 Hrs

12 Hrs

12 Hrs

#### 12 Hrs



Subjec BCS18	t Code 8001	e: Su	bject N DA	ame : ATA ST	RUCT	URES		Ty/ Lb/	L	T/ S.Lr	P/	R	С
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	on v	arious c	lata stri	ictures.								_	
CO3	Stud	ents wi	ll be ab	le to app	ly conc	epts lea	arned in	various	domai	ns like DI	BMS, co	ompiler	
<u> </u>	cons	truction	<u>1 etc.</u>					-					
CO4	Stud	ents wi	II be ab	le to use	linear a	and non	-linear	data stru	actures	like stack	s, queu	es , linke	d list
Маррі	ing of	Course	e Outco	omes wit	h Prog	ram O	utcome	s (POs)					
COs/P	Os	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	0.5	H	H	L	H	M	L	L	L	L	L	M	M
CO2		Н	Н	Н	L	Μ	L	Μ	Μ	Η	L	Μ	Μ
CO3		Η	Μ	Н	H	Η	Μ	L	Μ	H	L	Μ	Μ
CO4		H	Η	Н	H	Μ	L	Μ	Μ	H	L	Μ	Μ
COs /		PS	01	PSC	02	PS	03	PS	04	PSC	)5	PS	06
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C01		н u		н						п u		M	
CO2		H		M		L		L		H		M	
CO4		H		H		L		L		H		L	
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B.Tech – Computer Science and Engineering (Part Time) – 2018 Regulation



BCS18001	DATA STRUCTURES	Ту	3	1/0	0/0	4
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#### UNIT I

Data Representation: Introduction, Linear Lists, Formula Based Representation, indirect addressing, simulating pointers, comparisons and applications. Arrays, matrices, special and sparse matrices,

#### **UNIT II**

Stack Operations and Applications, Queue Operations and Applications, Single Linked List, Double Linked List, Circular Linked List.

#### **UNIT III**

Trees: Definitions and Properties, Representation of binary trees and its operations, Binary Tree Traversal, Binary Search Tree, AVL trees and its operations, 2-3 tree, 2-3-4 tree.

#### **UNIT IV**

#### Searching & Sorting: Selection Sort, Merge Sort, Quick Sort, Heap Sort, and Radix Sort - Complexity analysis. Sequential Search, Binary Search, Hashing and its Types.

UNIT V Graphs: Definitions and Representation of Graphs, DFS, BFS, Prim's Algorithm, Kruskal's Algorithm **Total Hours: 60** 

#### **TEXT BOOKS:**

- 1. S.Sahani, "Data Structures. Algorithms and Applications in C++", Tata Mc-Graw Hill, 2005
- 2. YedidyahLangsam, MosheJAugenstein Aaron M. Tenenbaum, "Data Structures using C and C++", Prentice Hall India, 1996, Second Edition.

#### **REFERENCE BOOKS:**

- 1. Seymour Lipschutz (Schaum"s Outline series). McGraw-Hill 2005,3rd Edition
- 2. SartazSahani McGraw HillS.K. Srivatsava, DeepliSrivatsava. BPB Publications.

#### 12 Hrs

# 12 Hrs

#### 12 Hrs

#### 12 Hrs



Subject Code BCS18ET2	e Sul	bject Na (	ame : C <b>OMPU</b>	J <b>TER (</b>	GRAPH	HICS		Ty/ Lb/	L	T/ S.Lr	P/R	C
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	Pre	erequisi	te: BES	18ET2				ETL	1	0/1	3/0	3
L : Lecture 7	C: Tuto	orial S	J.Lr:Su	pervise	d Learn	ing P:	Projec	t R : Re	esearch	C: Credit	s	
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COURSE C	UTCC	OMES (	(COs) :	(3-5)								
CO1	Т	ransfor	m geom	etrical s	structur	es, perf	orm cli	pping oi	n geom	etrical obj	ects	
CO2	A	nalyze	a 3D str	ucture								
<b>CO3</b>		Create a	and eval	uate gra	aphic pi	roiects						
Mapping of	Cours	se Outco	omes wi	ith Pro	gram C	Jutcom	es (PO	s)				
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12
CO1	Н	Μ	Н	Μ	Μ	Μ	L	Μ	Μ	L	L	L
CO2	Η	Μ	Н	L	Η	Μ	L	Μ	Μ	L	L	L
CO3	H	Μ	Н	Μ	Η	Μ	L	Μ	Μ	L	L	L
COs /	PS	501	PS	02	PS	03	PS	<b>604</b>	P	SO5	P	506
PSOs					-		-				-	
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egory	suces	ng Sciences	ies and Social	Core	Electives	ectives	/ Project	hips / Technical Skill	ls			
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# BCS18ET2COMPUTER GRAPHICSETL10/13/03

#### UNIT I OUTPUT PRIMITIVES

Output primitives-Line drawing algorithms-Loading the frame buffer-Line function-Circle generation algorithms –Ellipse generation algorithms- Attributes of output primitives-Numerical problem solving and programs on line, circle and ellipse drawing algorithms

#### UNIT II TWO DIMENSIONAL TRANSFORMATION & VIEWING 9 Hrs

Two dimensional transformations- Matrix representations and homogeneous coordinates - Composite transformations – two dimensional viewing -Window to view port transformation - Clipping operations - Point clipping - Line clipping (Cohen - Sutherland line Clipping) - Polygon clipping(Sutherland - Hodgeman algorithm) –Numerical problem solving and programming on two dimensional transformation ,viewing and clipping

# UNIT IIITHREE DIMENSIONAL GRAPHICS9 HrsThree dimensional concepts - Three dimensional object representation -Three Dimensional

Three dimensional concepts - Three dimensional object representation - Three Dimensional Transformations - Visible surface detection methods (Back Face Detection - Depth Buffer Method - Scan Line Method) - Numerical problem solving and programming on three dimensional transformations

#### UNIT IV POLYGONRENDERING METHODS AND COLOUR MODELS 9 Hrs

Constant-Intensity Shading – Gouraud Shading- Phong Shading- chromaticity diagram - RGB colour model - YIQ colour model - CMY colour model - Colour selection

#### UNIT V ANIMATION GRAPHICS

Design of Animation sequences – animation function – raster animation – key frame systems – motion specification –morphing - create Interactive animation for gamming

#### **Total Hours: 45**

9 Hrs

#### **TEXT BOOKS:**

- 1. Donald, D. Hearn. Pauline, Baker, M. Warren, Carithers. (2010) Computer graphics with Open GL, (4<sup>th</sup>ed.)
- 2. Computer Graphics (Special Indian Edition) (Schaum's Outline Series) 2nd Edition, 2006 (English, Paperback, Xiang, Plastock, Avadhani), McGraw Hill Education (India) Private Limited

#### **REFERENCE BOOKS:**

- 1. John F. Hughes, Andries Van Dam, Morgan Mc Guire ,David F. Sklar , James D. Foley, Steven K. Feiner and Kurt Akeley ,"Computer Graphics: Principles and Practice", 3rd Edition, Addison- Wesley Professional,2013.
- 2. Peter Shirley, Michael Ashikhmin, Michael Gleicher, Stephen R Marschner, Erik Reinhard, Kelvin Sung, and AK Peters, Fundamental of Computer Graphics, CRC Press, 2010.



Subject Code:		Subie	ct Name	e :				Tv/	L	Τ/	P/R	С
BCS18L01		]	DATA	STRU	CTURI	ES LAF	3	Lb/		S.Lr	-	_
								ETL				
		Prerec	quisite:	NIL				Lb	0	0/0	3/0	1
L: Lecture T : T	futorial	S.Lr	: Super	vised L	earning	g P:Pr	oject F	R : Resea	arch C:	Credits		
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OBJECTIVES	:											
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To intro	duce of	bject or	iented c	concept	s in C+	+ and Ja	ava.					
COURSE OUT	COMI	ES (CO	os):(3-	· 5)								
C01	Fynla	in what	constit	utes an	object-	oriente	d annro	ach to r	rooram	ming and	d identify	V
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CO2	Apply	an obj	ect-orie	nted ap	proach	to deve	loping	applicat	tions of	varying	complex	aties
CO3	Descr	ibe the	basic oj	peration	ns on ar	rays, lis	sts, stac	ks and c	queue d	ata struct	tures	
Mapping of Co	urse O	utcome	es with	Progra	m Out	comes	(POs)					
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	<b>PO10</b>	PO11	PO12
COs/POs CO1	PO1 H	PO2 H	PO3 L	PO4 M	PO5 L	PO6 M	PO7 L	PO8 L	PO9 M	PO10 M	PO11 M	PO12 M
COs/POs CO1 CO2	PO1 H H	PO2 H H	PO3 L L	PO4 M M	PO5 L L	PO6 M M	PO7 L H	PO8 L L	PO9 M M	PO10 M L	PO11 M H	PO12 M M
COs/POs CO1 CO2 CO3	PO1 H H H	PO2 H H M	PO3 L L L	PO4 M M M	PO5 L L L	PO6 M M M	PO7 L H L	PO8 L L L	PO9 M M M	PO10 M L M	PO11 M H M	PO12 M M M
COs/POs CO1 CO2 CO3 COs / PSOs	PO1 H H H PS	PO2 H H M O1	PO3 L L L PS	PO4 M M M O2	PO5 L L L PS	PO6 M M M O3	PO7 L H L PS	PO8 L L L O4	PO9 M M M	PO10 M L M SO5	PO11 M H M PS	PO12 M M M O6
COs/POs CO1 CO2 CO3 COs / PSOs CO1	PO1 H H H PS H	PO2 H H M O1	PO3 L L L PS H	PO4 M M 02	PO5 L L L PS L	PO6 M M M O3	PO7 L H L PS L	PO8 L L L O4	PO9 M M M PS M	PO10 M L M 505 L	PO11 M H M PS H	PO12 M M M O6 M
COs/POs CO1 CO2 CO3 COs / PSOs CO1 CO2	PO1 H H PS H H	PO2 H H M O1	PO3 L L L PS H L	PO4 M M 02	PO5 L L L PS L M	PO6 M M 03	PO7 L H L PS L L	PO8 L L L O4	PO9 M M M PS M H	PO10 M L M 055 L L	PO11 M H M PS H L	PO12 M M M 06 M M
COs/POsCO1CO2CO3COs / PSOsCO1CO2CO3	PO1 H H PS H H M	PO2 H H O1	PO3 L L L PS H L M	PO4 M M O2	PO5 L L L PS L M L	PO6 M M 03	PO7 L H L S L L H	PO8 L L L O4	PO9 M M M PS M H L	PO10 M L M 505 L L M	PO11 M H M PS H L H	PO12 M M M O6 M M L
COs/POs CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L indicate	PO1 H H PS H H M es Strer	PO2 H M O1	PO3 L L PS H L M Correl	PO4 M M O2 ation	PO5 L L L PS L M L H-Hiş	PO6 M M O3 gh, M-	PO7 L H L S L L H Medium	PO8 L L O4 n, L-Lo	PO9 M M M PS M H L	PO10 M L M 505 L L L M	PO11 M H M PS H L H	PO12 M M M O6 M M L
COs/POs CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L indicate	PO1 H H PS H H M es Strer	PO2 H M O1	PO3 L L L PS H L M Correl	PO4 M M O2 ation	PO5 L L PS L M L H- Hig	PO6 M M O3 gh, M-	PO7 L H L L L H Medium	PO8 L L O4 n, L-Lo	PO9 M M M PS M H L W	PO10 M L M 505 L L M	PO11 M H M PS H L H	PO12 M M M O6 M M L
COs/POs CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L indicate	PO1 H H PS H H M es Strer	PO2 H M O1	PO3 L L FS H L M Correl	PO4 M M O2 ation	PO5 L L PS L M L H- Hiş	PO6 M M O3	PO7 L H L L L H Medium	PO8 L L O4 m, L-Lo	PO9 M M PS M H L	PO10 M L M 505 L L M	PO11 M H PS H L H	PO12 M M 06 M L
COs/POs CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L indicate	PO1 H H M H M es Strer	PO2 H M O1	PO3 L L PS H L M Correl	PO4 M M O2 ation	PO5 L L L PS L M L H- Hig	PO6 M M O3 gh, M-	PO7 L H L L L H Medium	PO8 L L O4 n, L-Lo	PO9 M M PS M H L	PO10 M L M 505 L L M	PO11 M M PS H L H	PO12 M M 06 M L
COs/POs CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L indicate	PO1 H H PS H H S Strer	PO2 H H O1 O1	PO3 L L L PS H L M Correl	PO4 M M O2 ation	PO5 L L L M L H- Hig	PO6 M M O3 gh, M-	PO7 L H L L H Medium	/ Lechnical D. Lechnical	PO9 M M M PS M H L	PO10 M L M 305 L L M	PO11 M H PS H L H	PO12 M M O6 M L
COs/POs CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L indicate	PO1 H H H H M es Strer	PO2 H H O1 O1	PO3 L L PS H L M Correl	PO4 M M O2 ation	PO5 L L L PS L M L H- Hig	PO6 M M O3 o3	PO7 L H L L H Medium	ips / Technical Technical Skill	PO9 M M M PS M H L W	PO10 M L M 505 L L M	PO11 M H M PS H L H	PO12 M M O6 M L
COs/POs CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L indicate	PO1 H H M M s Stree	PO2 H H O1 O1	PO3 L L L PS H L M Correl	PO4 M M O2 ation	PO5 L L L M L H-Hig	PO6 M M O3 gh, M-	PO7 L H L L H Medium	Nahips / Technical T T T C T Skill Skill	PO9 M M M PS M H L w	PO10 M L M 05 L L M	PO11 M M PS H L H	PO12 M M O6 M L
COs/POs CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L indicate	PO1 H H H H M es Strer	PO2 H H O1 O1 mgth of	PO3 L L PS H L M Correl	PO4 M M O2 ation	PO5 L L L M L H-Hig	en Electives	PO7 L H L L H Medium	PO8 L L L D4 O4 Skill	tt Skills	PO10 M L M 505 L L M	PO11 M H PS H L H	PO12 M M O6 M L
COs/POs CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L indicate	PO1 H H H M Ss Stree	PO2 H H O1 O1	<b>bookLLLLBHLMCorrelSciences</b>	PO4 M M O2 ation	PO5 L L L M L H- Hig	PO6 M M O3 gh, M-	PO7 L H L L H Medium	Internships / Technical Vector	PO9 M M M M H L W W	PO10 M L M 055 L L M	PO11 M M PS H L H	PO12 M M O6 M L



BCS18L01	DATA STRUCTURES LAB	Lb	0	0/0	3/0	1	
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#### LIST OF EXPERIMENTS

- 1. Operation on arrays insertion and deletion
- 2. Linked lists-creation, insertion, deletion of single, double and circular lists.
- 3. Stack- operations using arrays and linked lists.
- 4. Infix to postfix conversion
- 5. Evaluation to postfix expression.
- 6. Queue- operations using arrays and linked lists.
- 7. Dequeue, circular-operations
- 8. Binary tree traversals- In order, pre order, post order using recursion
- 9. Binary tree traversals- In order, pre order, post order using non recursion
- 10. Linear and binary search
- 11. Sorting Selection Sort, Quick sort, Heap Sort and Merge Sort.
- 12. Addition, multiplication of sparse matrices
- 13. Polynomial addition and multiplication
- 14. Depth first search of a graph
- 15. Breadth first search of a graph.



#### SEMESTER – III

Subject Code BCS18007	e: Su	ıbject N	ame : COMPU	FER N	ETWO	RKS		Ty Lb	 	L	T/ S.Lr	P/R	C
								ET.	L				
	Pr	rerequisi	te: NIL					Ту	7	3	0/0	0/0	3
L : Lecture 7	C: Tuto	rial S.	Lr : Supe	ervised	Learnin	ng P:F	Project	R : Res	earch	C:	Credits		
Ty/Lb/ETL :	Theor	y/Lab/E	mbedded	Theory	y and La	ab							
OBJECTIV	ES:				C .1		1 0						
• The	student	s will be	e have kn	lowledg	ge of th	e netwo	orks fui	nctions	-				
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COURSE O	UTCO	MES (	COs):( $($	3- 5)									
CO1	H	Have know	owledge	on func	tions of	f Netwo	ork Dev	vices &	OSI I	Lay	ers for Co	mmunic	ation
CO2	ł	Knowled	lge on IP	address	ses and	protoco	ols.						
CO3	ŀ	Have kno	owledge	on how	to avoi	d the er	ror and	conges	tion c	n r	network us	ing algo	orithms
Mapping of	Cours	e Outco	mes witl	n Progr	ram Ou	tcomes	s (POs)		1			I	
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO		PO10	PO1	PO12
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CO1	H	M	M	L	H	Μ	L	L	H		M	H	H
CO2	H	H	H	Μ	H	H	Μ	L	H		Μ	H	H
CO3	H	H	H	H	H	Μ	Μ	L	H		Μ	H	H
COs /	PS	501	PSC	)2	PS	03	PS	04		P:	805	P	<b>SO6</b>
PSUs													
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CO2		H	H	[	I	[	I	I			H		M
<u>CO3</u>		H	H	L				1			H		M
H/M/L indic	cates S	trength	of Corre	elation	H-H	igh, M·	• Mediu	ım, L-I	JOW			Γ	
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills				



BCS18007	COMPUTER NETWORKS	Ту	3	0/0	0/0	3

#### UNIT I INTRODUCTION

Introduction to computer networks and uses - Network: devices, topology, types - Reference model - The physical layer - The theoretical basis for data communication - Transmission media: Guided and unguided- Public Switched Telephone Network.

#### UNIT II DATA LINK LAYER

Data link layer design issues - Error detection and correction - Sliding window protocols- HDLC - Channel access on links: SDMA - TDMA - FDMA - CDMA - ETHERNET - 802.11, 802.16 - Bridges and Switches-Bluetooth

#### UNIT III NETWORK LAYER

Network layer design issues - Circuit switching – Packet switching – Virtual circuit switching-Routing algorithms – Congestion control algorithms - Internetworking- Network layer in Internet -IPV6

#### UNIT IV TRANSPORT LAYER

Transport layer design issues - Transport protocols - Simple transport protocol - Internet transport protocols UDP, TCP - Flow Control - Congestion control - Congestion avoidance

#### UNIT V APPLICATION LAYER

Domain name system - Electronic mail – Introduction to World Wide Web: HTTP, SNMP, Telnet, FTP, RTP.

# **Total Hours: 45**

#### **TEXT BOOKS:**

- 1. Peterson Davie (2012) Computer Networks A System Approach (2nd ed.), Morgan Kauffman Harcourt Publishers.
- 2. James F. Kurose, Keith W. Ross Computer Networking: A Top-Down Approach / Edition 6, Pearson publication, 2012.

#### **REFERENCE BOOKS:**

- 1. Andrew S. Tanenbaum. David J. Wetherall, "Computer Networks "5th Edition PHI, 2011
- 2. William Stallings," Data and computer communications", PHI, 2001
- 3. Douglas E. comer," Internetworking with TCP/IP-Volume-I", PHI, 5th edition 2006
- 4. Godbole, "Data communication and networking", TMH, 2004.
- 5. Forouzan B. A., "Data Communications and networking", TMH, 2003.

#### 9 Hrs

9 Hrs

#### 9 Hrs

9 Hrs



Subject	t Code	e:	Subject	Name				Б	Ty/	L	T/	P/R	С
BCS18	005		DI	LSIGN A	AND A LGOR	ANALI	515 U. S	Г	ETL		S.Lr		
20010			Prerequ	isite: B	CS180	01			Ty	3	0/0	0/0	3
L : Lec	ture T	: Tuto	rial S.I	Lr : Sup	pervised	d Learni	ng P:	Project	R : Res	earch C:	Credits	I	
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OBJE	CTIV	ES :											
•	To L	earn th	e algorit	hm ana	lysis te	chnique	es.						
•	To u	ndersta	and the d	ifferent	algorit	hm desi	ign tech	niques.					
•	To U	Inderst	and Itera	tive alg	gorithm	S							
•	To U	Inderst	and the l	imitatio	ons of A	Algorith	m powe	er.					
COUR	SE O	UTCC	OMES (C	<b>COs</b> ) : (	(3-5)								
CO1	Desi	ign alg	orithms f	for varie	ous cor	nputing	problem	ms					
CO2	Ana	lyze th	e time ar	nd space	e comp	lexity of	f algori	thms.					
CO3	Criti	ically	analyze	the	differ	ent alc	orithm	desig	n tech	niques	for a	given	nrohlem
005	Mod	lifv exi	sting alg	orithms	s to im	prove ef	ficiency	v ucsig	,n teen	inques	101 a	given	problem.
Mappi	ng of	Cours	e Outcoi	mes wit	th Prog	pram O	utcome	es (POs	)				
COs/P	Os	PO	PO2 I	203	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PO1	PO11	PO12
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CO1		1 H	H	Μ	М	L	L	L	M	L	0 L	Μ	L
CO1 CO2		1HH	H H	M H	M L	L M	L L	L M	M M	L H	0 L M	M M	L M
CO1 CO2 CO3		IHHH	H H M	M H M	M L M	L M H	L L M	L M L	M M M	L H H	0 L M L	M M M	L M M
CO1 CO2 CO3 COs /		1 H H H PSO	H H M PS	M H M O2	M L M	L M H SO3	L L M	L M L SO4	M M M	L H H PSO5	0 L M L	M M M PSC	L M M 06
CO1 CO2 CO3 COs / PSOs		1 H H PSO 1	H H M PS	M H M O2	M L M P	L M H SO3	L L M P	L M L SO4	M M M	L H H PSO5	0 L M L	M M M PSC	L M M 06
CO1 CO2 CO3 COs / PSOs CO1		1 H H PSO 1 H	H H M PS	M H M O2 H	M L M P	L M H SO3 M	L L M P	L M SO4 L	M M M I H	L H H PSO5 H	0 L M L L	M M M PSC	L L L L
CO1 CO2 CO3 COs / PSOs CO1 CO2		1 H H PSO 1 H M	H H M PS	M H M O2 H H	M L M P	L M H SO3 M M	L L M P	L L L	M M M H H	L H PSO5	0 L M L M M M M	M M PSC	L L L
CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3		1 H H PSO 1 H M M	H H M PS	M H M O2 H H A	M L M	L M SO3 M L	L L M P	L SO4 L L L	M M M H H H	L H PSO5 H M M	0 L M L M M M M M	M M PSC	L L L L
CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L	, indic	I       H       H       H       PSO       1       H       M       M       cates S	H H M PS H H H H	M H M O2 H H J of Corr	M L M P: 	L M SO3 M M L n H-F	L L M P	L SO4 L L L L L - Medi	M M M H H H um, L-I	L H PSO5 H M Low	0 L M L M M M M	M M PSC	L L L L
CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L	, indic	I       H       H       H       PSO       1       H       M       M       cates S	H H M PS H H H trength	M H O2 H H A of Corr	M L M P: celation	L M SO3 M L n H-F	L L M P	L SO4 L L L L L L L L	M M M H H H um, L-I	L H PSO5 H M M Low	0 L M L M M M M	M M PSC	L L L L
CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L	, indic	I       H       H       PSO       1       H       M       M       cates S	H H PS H H H H Krength	M H O2 H H J Of Corr	M L M P: relation	L M SO3 M L L SO3	L L M P	L SO4 L L L L L L L	M M M I H H H um, L-I	L H PSO5 H M Aow	0 L M L M M M M	M M PSC	L L L L
CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L	, indic	I   H   H   H   PSO   1   H   M   M   cates S   S	H H M PS H H H H H H H	M H O2 H H M of Corr	M L M P: relation	L M SO3 M M L h H-F	L L M F High, M	L SO4 L L L L L L L L	M M M M H H H H um, L-I	L H PSO5 H M Low	0 L M L M M M M	M M PSC	L L L L L
CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L	, indic	I   H   H   H   PSO   1   H   M   M   cates S	H H M PS H H H trength	M H M O2 H H M of Corr	M L M P Concelation	Electives Blectives Elections	L L M P High, M	L L L L L L L L L L L	nships / M M M M H H H H H H H H H H H H H H H H	L H PSO5 H M Aow	0 L M L M M M M	M M PSC	L L L L
CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L	indic	I H H PSO 1 H M M cates S	H H M PS H H H H H H S S S S S S S S S S S S	M H M O2 H H Of Corr	M L M P: relation	um Electives	Electives	cal / Broject	ternships / M M M M H H H H H H H H H	L H PSO5 H M Aow	0 L M L M M M M	M M PSC	L L L L
CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L	Category	I   H   H   H   PSO   1   H   M   M   cates S	H H M PS I I I I I I I I I I I I I I I I I I	M H M O2 H H M O2 Corr soud Corr	M L M P P Cote	ogram Electives	L L M High, M	actical / Project	Internships / M M M H H H H H H H H H H H H H	L H PSO5	0 L M L M M M M	M M PSC	L L L L L
CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L		I   H   H   H   PSO   1   H   M   Mates S	H H M PS Engineering Sciences	M Hnmanities and O2 H M of Corr Social Sciences	M L M Produce Core	L Brogram Electives M T H-H H-H	L   M   High, M	L L L L L L L L L L L L L L L L L L L	Internships / M Technical Skill	L H H SO5 M M Low	0 L M L M M M	M M PSC	L L L L
CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L	Category	I   H   H   H   PSO   1   H   M   M   cates S   states S	H H M PS I H H H PS I H H H H Sciences	MHMO2IIOIIOSocial Sciences	M L M Program Core	L Brogram Electives M L H-H-H	L L M High, M	L SO4 L L L Hedi	Internships / M M M H H H H H H H H H H H H H H H H H	L H H PSO5 Soft Skills Soft Skills	0 L M L M M M		L L L L L



BCS18005	DESIGN AND ANALYSIS OF ALGORITHMS	Ту	3	0/0	0/0	3
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UNIT I INTRODUCTION

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non-recursive algorithms.

# UNIT IIBRUTE FORCE AND DIVIDE-AND-CONQUER9 HrsBrute Force - Closest-Pair and Convex Hull Problems-Exhaustive Search - Traveling Salesman Problem- Knapsack Problem - Assignment problem. Divide and conquer methodology - Merge sort - Quick sort- Binary search - Multiplication of Large Integers - Strassen's Matrix Multiplication-Closest-Pair andConvex Hull Problems.

# UNIT IIIDYNAMIC PROGRAMMING AND GREEDY TECHNIQUE9 HrsComputing a Binomial Coefficient – Warshall's and Floyd' algorithm – Optimal Binary Search Trees –<br/>Knapsack Problem and Memory functions. Greedy Technique– Prim's algorithm- Kruskal's Algorithm-<br/>Dijkstra's Algorithm-Huffman Trees.9 Hrs

# UNIT IVITERATIVE IMPROVEMENT9 HrsThe Simplex Method-The Maximum-Flow Problem – Maximum Matching in Bipartite Graphs- The Stable<br/>marriage Problem.9 Hrs

#### UNIT VCOPING WITH THE LIMITATIONS OF ALGORITHM POWER9 Hrs

Limitations of Algorithm Power-Lower-Bound Arguments-Decision Trees-P, NP and NP-Complete Problems–Coping with the Limitations – Backtracking – n-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem-Branch and Bound – Assignment problem – Knapsack Problem – Traveling Salesman Problem- Approximation Algorithms for NP – Hard Problems – Traveling Salesman problem – Knapsack problem.

#### **Total Hours: 45**

9 Hrs

#### **TEXT BOOK:**

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2012.

#### **REFERENCE BOOKS**:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.

2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.

3. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education, 2009. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008. 4. <u>http://nptel.ac.in/</u>

B.Tech – Computer Science and Engineering (Part Time) – 2018 Regulation



Subject Code:	Su	bject N MIC	ame : ROPR	OCES	SORS A	AND		y/ b/	L	T/ S.Lr	P/R	С
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	Pre	erequisi	te: BES	S18I01			Т	y	3	0/0	0/0	3
L : Lecture	T : Tuto	orial S	S.Lr:Si	upervis	ed Lea	rning F	• : Proje	ct R:	Researc	h C: Credi	its	
Ty/Lb/ETL	: Theor	y/Lab/I	Embedd	led The	eory and	d Lab						
OBJECTIV	/ES :											
• To	study t	he basi	c archit	ectures	and op	peration	al featu	res of t	he proc	essors and	controller	s.
• To	learn th	he assei	nbly la	nguage	progra	mming	of 808	6.				
• To	design	and un	derstan	d the m	ultipro	cessor	configu	rations				
• To	unders	tand the	e interfa	acing co	oncepts	of the	periphe	ral dev	ices wit	h processo	ors.	
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CO1	A	bility to	o under	stand t	he arch	itecture	e of 808	6 micro	process	sor		
CO2	A	bility to	o under	stand t	he arch	itecture	e of 805	1 micro	control	ler		
CO3	A	bility to	o under	stand t	he inter	facing	of diffe	rent per	ripheral	devices w	ith the	
	n	nicropro	ocessors	5								
CO4	U	Indersta	ind the	applica	tions of	f micro	process	ors & r	nicroco	ntrollers		
Mapping of	f Cours	se Outc	omes w	vith Pr	ogram	Outco	mes (P	Os)		1		
COs/POs	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	PO9	PO10	PO11	PO12
CO1	Η	Μ	L	L	L	Μ	L	L	Μ	L	L	Μ
CO2	Η	Μ	L	L	L	Μ	L	L	Μ	L	L	Μ
CO3	Η	Μ	L	L	Μ	L	L	L	L	L	L	Μ
CO4	Η	Μ	L	L	Μ	L	L	L	L	L	L	Μ
COs /	PS	01	PS	02	PS	03	PS	04		PSO5	P	SO6
PSOs												
CO1	Η		L		L		Μ		Μ		L	
CO2	Η		L		L		Μ		Μ		L	
CO3	Η		L		L		Μ		Μ		L	
CO4	H		Μ		Μ		L		L		L	
H/M/L indi	cates S	trengtl	1 of Co	rrelati	on H	- High,	M-Me	edium,	L-Low			
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BEC18I02	MICROPROCESSORS AND MICROCONTROLLERS	Ту	3	0/0	0/0	3
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<b>UNIT I</b> Evolution of processor Addresses – Minimum	<b>16 BIT MICROPROCESSOR</b> rs – 8086 Architecture – Functional Diagram – Register organization – mode – Maximum mode – Interrupts of 8086	9 Hrs Memory
<b>UNIT II</b> Instruction Formats – A and call instructions – S	<b>INSTRUCTION SET AND ALP</b> Addressing modes – Instruction set – Simple programs involving logical, sorting – string manipulations	<b>9 Hrs</b> , branch
UNIT III Memory Interfacing – controller – Programm	<b>INTERFACING</b> I/O Interfacing – Programmable Peripheral Interface 8255 – USART able Interval Timer 8253	<b>9 Hrs</b> – DMA
UNIT IV Introduction – 8051 Ar	MICROCONTROLLER architecture – I/O Ports – Memory Organization – Addressing modes – Inter	<b>9 Hrs</b> rrupts

UNIT VAPPLICATIONS9 HrsInstruction set of 8051 – Applications – Simple programs – Interfacing with ADC- Interfacing with<br/>DAC- Stepper Motor – Traffic Light Controller9 Hrs

#### **Total Hours: 45**

#### **TEXT BOOKS:**

- 1. Ray A.K. &Bhurchandi K.M. (2013) Advanced Microprocessors and Peripherals, Tata McGraw Hill Education pvt Ltd
- 2. Douglas v Hall. (2006) Microprocessors and Interfacing (2<sup>nd</sup> ed.), Tata McGraw Hill Publishing company Limited

#### **REFERENCE BOOKS:**

- 1. Badri Ram. (2006) Advanced Microprocessors and Interfacing, Tata McGraaw Hill Publishing company limited
- 2. Kenneth J. Ayala (2008) "The 8051 Micro Controller", 3<sup>rd</sup> Edition, Thomas Delmar Learning.



BCS18ET3	e: Su	bject Na I	ame : PHP / M	YSQL		T L E1	y/ b/ ГL	L	s	T/ .Lr	P/R	С
	Pre	erequisi	te: BCS1	8L03		E	ſL	1		0/1	3/0	3
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits												
Ty/Lb/ETL :	Theory	/Lab/E	mbedded	Theory	y and La	ab						
OBJECTIV	ES:											
• The students will learn the technology about scripting languages basics.												
• To learn install PHP and work on that.												
• To learn the basic and advance concepts of PHP language.												
• Tou	ndersta	nd insta	Ill the My	ySQL a	nd worl	k with N	MySQL	databas	e in ac	lmin level	and clien	t to store
and	retrieve	the data	a in appli	cation	with PF	IP. · ·		. 114	COL			
	earn des	aign bas	$\frac{1c}{20}$ and $\frac{ad}{c}$	vance a	applicat	ions usi	ing PHI	$^{\circ}$ and M	ySQL.			
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		earn the	e rundam	entais c		e conce	pt and N	MYSQL	T			
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Mapping of			mes with	n Progi	ram Ou	DO6	B (POS)	DOg	DO	<b>DO10</b>	DO11	DO12
	POI	PO2	PUS	PO4	PUS	POO	PO/	PUð	9 9	POIU	ron	PO12
CO1	H	Μ	Н	L	Н	Μ	L	L	Η	Н	H	H
CO2	H	Н	Н	Μ	Н	Η	Μ	L	H	Μ	H	H
CO3	H	Η	H	H	Н	М	M	T.	Н	Μ	TT	Н
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BCS18ET3	PHP / MYSQL	ETL	1	0/1	3/0	3
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#### UNIT I INTRODUCTION

Introduction to Web server and Web browser - Introduction to PHP - Lexical structure - Language basics - Function and String - Default parameters - Variable function, Anonymous function Printing functions - Manipulating and searching strings - Regular expressions.

#### UNIT II ARRAYS

Identifying elements of an array - Indexed Vs Associative arrays - Storing data in arrays - Multidimensional arrays - Extracting multiple values - Converting between arrays and variables - Traversing arrays - Sorting - Action on entire arrays - Using arrays.

#### UNIT III OBJECTS AND WEB TECHNIQUES

OOP – Class – Objects – Introspection – Serialization – Inheritance - Interfaces - Encapsulation HTTP Basics – Variables – Server information – Processing Form, Setting Response headers – maintain state – SSL.

#### UNIT IV DATABASES AND GRAPHICS

Using PHP to access Database – Relational Databases and SQL – MySQLi Object interface – SQLite-Direct file level manipulation – mongoDB. Embedding an image in a page – Basic Graphic concepts – Creating and drawing images.

#### UNIT V FILES AND DIRECTORIES

Filter input – cross-site scripting – Escape output – Session fixation – file uploads – file access – PHP code – Shell commands – Core libraries – Templating systems – Handling output – Error Handling – Performance Tuning.

#### **TEXT BOOKS:**

- 1. www.spoken-tutorials.org
- 2. Kevin Tatroe, Peter MacIntyre, etal "Programming PHP" O REILLY 3rd Edition 2013
- 3. Luke Welling, Laura Thomson " PHP and MySQL Web Development" Person Education 5<sup>th</sup> Edition 2016.

#### **REFERENCE BOOKS:**

- 1. Robin Nixon "Learning PHP, MySQL & JavaScript" O REILLY 5<sup>th</sup> Edition 2015.
- 2. Elizabeth Naramore, Jason Gerner, etal "Beginning PHP5, Apache, MySQL web development" Wrox Publishing – 2005.

#### 9 Hrs

#### 9 Hrs

# Total Hours: 45

#### 9 Hrs

9 Hrs


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L : Lecture T	' : Tut	orial	S.Lr:	Superv	vised L	earning	P:Pro	oject R	R : Res	earch C:	Cre	dits	•	
Ty/Lb/ETL :	Theo	ry/Lat	o/Embe	dded T	heory	and Lat	)	5						
OBJECTIV	ES :													
Hand	ls on	Experi	ence to	o desigr	1 an ap	plicatio	n using	TCP a	nd UI	OP socket	ts.			
Hand	ls on	Experi	ence to	o desigr	ı an int	erface t	o transf	fer a fil	e betv	veen two	end	s using	g FTP	
Hand	ls on	Experi	ence to	o develo	op a Rl	MI appl	ication	for spe	cific c	peration				
To ha	ave a	knowl	edge to	o work	with N	etwork	Simula	tors						
COURSE O	UTC	OMES	S (COs	5):(3-	5)									
CO1			Ability	to desi	ign a S	ocket P	rogrami	ing usi	ng TC	P and UI	OP			
CO2		'	To des	ign Clie	ent /Se	rver Ap	plicatio	on Prog	ram					
CO3			Ability	to crea	ate a Se	erver ba	sed app	lication	n usin	g RMI ar	nd R	PC co	ncepts.	
Mapping of	Cour	se Ou	tcomes	s with I	Progra	m Out	comes (	(POs)	1		1			
COs/POs	PO1	PC	D2 I	203	PO4	PO5	PO6	PO7	PO8	PO9	PO	10	PO11	PO12
CO1	H	]	H	Η	H	Η	Μ	L	L	H	Ι	M	Η	H
CO2	H	]	H	Η	Μ	H	H	L	L	H	Ι	M	H	H
CO3	H	]	H	Η	H	Μ	Μ	Μ	L	H	Ι	M	Η	H
COs /		PSO1		PSO	2	PS	03	PS	<b>504</b>	P	<b>SO5</b>		PS	06
PSOs														
<u>CO1</u>		H		H		I	4		H		H		N	<u>/</u>
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BCS18L05	NETWORK PROGRAMMING LAB	Lb	0	0/0	3/0	1
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# **EXPERIMENTS**

- 1. Networking Commands with options. (Case Study).
- 2. Socket program to extent communication between two deferent ends using TCP.
- 3. Socket program to extent communication between two deferent ends using UDP
- 4. Create a Socket (TCP) between two computers and enable file transfer between them.
- 5. Implementation of RPC in server-client model
- 6. Implementation of ARP/RARP.
- 7. HTTP Socket program to download a web page.
- 8. File transfer in Client-Server architecture using following methods

a) Using RS232C b) Using TCP/IP

- 9. To implement RMI (Remote Method Invocation)
- 10. Write a network program to broadcast/ multicast a message to a group in the same network.
- 11. Demonstration of Network Simulators.



# SEMESTER - IV

Subject Code	Su	bject Na	me :					Ty/	L	Τ/	P/R	С
BCS18009		OBJE	CT OR	IENTE	D SOF	TWAR	E	Lb/		S.Lr		
			EN	GINEE	RING			ETL				
	Pre	erequisite	e: BCS1	8002				Ту	3	1/0	0/0	4
L : Lecture T	: Tuto	rial S.	Lr : Sup	ervised	Learning	g P:Pr	oject R	: Resea	rch C:	Credits		
Ty/Lb/ETL :	Theor	y/Lab/Er	nbedded	1 Theory	and La	b	5					
<b>OBJECTIV</b>	ES :											
• Unde	erstand	the phas	ses in a s	software	e develor	oment						
• Unde	erstand	fundam	ental co	ncents o	f require	ements a	engineer	ing and	Analy	sis Mode	llino	
• Unde	retand	the diffe	erent an	roach f	or Object	et Orien	ted Desi	an an	- i illui y	515 1 <b>110 ac</b>	<u>8</u> .	
• Lear	n vari	uie testir	or and m	aintena	nce mea			511				
		MFS (C	$(\mathbf{O}_{\mathbf{S}}) \cdot ($	$\frac{1}{3}$		isures						
		JOINED (JOB) : (J-J) Identify the key activities in managing a software Development										
		Compare different process models										
CO2		Concepts of requirements engineering and Analysis Modeling										
CO4		Apply systematic procedure for software design and deployment										
C05		Compare and contrast the various testing and maintenance										
Manning of	Cours	rse Outcomes with Program Outcomes (POs)										
COs/POs		PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	105 M	H	M	L	L	<u>н</u>	<u>н</u>	H	M	Н
CO2	Н	H	H	H	H	M	M	H	H	M	L	M
CO3	Н	H	H	M	M	M	M	M	H	M	L	M
CO4	H	H	H	H	H	M	M	H	H	H	M	H
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CO3		H	I	I	H	I	H	I	I	М	I	I
CO4		H	I	I	H	I	H	I	1	M	I	I
CO5		H	I	I	N	ſ	H	I	I	М	I	I
H/M/L indic	ates S	trength	of Corr	elation	H- Hi	gh, M-	Mediun	n, L-Lo	w			
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BCS18009	ENGINEERING	Ty	3	1/0	0/0	4	

#### **UNIT I** SOFTWARE DEVELOPMENT LIFE CYCLE

Introduction -Software process models: The waterfall model, Incremental development, Reuse-oriented software engineering – OOSD Life cycle: Process activities Software specification – Software design and implementation - Software validation - Software evolution- Process iteration: Prototyping, Incremental delivery, Boehm's spiral model - Agile methodology - OMT - Booch Methodology - Jacobson methodology – patterns – unified approach

#### UNIT II OBJECT ORIENTED SOFTWARE REOUIREMENTS AND ANALYSIS 12 Hrs

Requirements engineering: Functional and non-functional requirements – The software requirements document - System Modeling: Context models - Interaction models - Structural models - Behavioral models - UML: Static and Dynamic Models-Introduction to UML -Use case Diagram - Class diagrams -Dynamic modeling-Packages and Model Organization-UML Extensibility - Use case model - Creation of Classes: Noun Phrase Approach - Identifying Object Relationships, Attributes and Methods

# UNIT III OBJECT ORIENTED SOFTWARE DESIGN

Architectural design: Architectural design decisions - Architectural views - Architectural patterns -Application architectures - Design and implementation: Object-oriented design using the UML - OO Design Axioms - Corollaries-Design Patterns- Designing Classes: Class Visibility - refining Attributes -Designing Methods – Access layer: Object Store and Persistence- OODBMS – Table Class mapping – Designing Access layer classes - View layer: Designing Interface Objects

# UNIT IV TESTING

Software testing: Development testing - Test-driven development - Release testing - User testing - Quality Assurance Test – Testing strategies – Impact of OO Testing – Test Cases – Test Plan – Continuous Testing - Myers's Debugging principles.

# **UNIT V SOFTWARE QUALITY & MANAGEMENT**

Project management: Risk management- Managing people - Teamwork - Project planning: Software pricing - Plan-driven development - Project scheduling - Agile planning - Estimation techniques Quality management: Software quality - Software standards - Reviews and inspections - Software measurement and metrics - Configuration management: Change management - Version management - System building - Release management

# **TEXT BOOK:**

1. Yogesh Singh, Ruchika Malhotra (2012), Object – Oriented Software Engineering PHI Learning Private Limited.

# **REFERENCE BOOKS:**

- 1. Ian Sommerville (2008) Software Engineering (9thed.) Pearson Education Asia
- Ali Bahrami (2008) Object Oriented System Development McGraw Hill international 2.
- 3. Roger S. Pressman (2010) Software Engineering: A Practitioner Approach (8thed.) McGraw hill **Publications**
- 4. Grady Booch (2009) Object oriented Analysis & design , Pearson Education India

# 12 Hrs

# 15 Hrs

# 12 Hrs

9 Hrs

# **Total Hours: 60**



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BIT18003	WEB TECHNOLOGY AND WEB SERVICES	Ту	3	0/0	0/0	3
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### UNIT I HTML 5 & CSS 3

HTML – forms – frames – tables – web page design – Dynamic HTML – introduction – cascading style sheets – object model and collections –event model – filters and transition – data binding – data control – ActiveX control – handling of multimedia data

# UNIT II XML

Role of XML - XML and The Web - XML Language Basics - Revolutions of XML - Service Oriented Architecture (SOA). XML - Name Spaces - Structuring With Schemas and DTD - Presentation Techniques - Transformation - XML Infrastructure.

# UNIT III

Overview of SOAP - HTTP - XML-RPC - SOAP: Protocol - Message Structure - Intermediaries - Actors - Design Patterns and Faults - SOAP With Attachments. Introduction to SGML - COM - DCOM - CORBA.

# UNIT IV SERVER SIDE PROGRAMMING

SOAP

Introduction to Servlets and Java Server Page (JSP), Servlets lifecycle, Servlet Classes and Sessions. JSP Application Design, JSP objects, sharing data between JSP pages, Sharing Session and Application Data, Database Programming using JDBC, development of java beans in JSP.

# UNIT V WEB SERVICES

Overview - Architecture - Technologies - UDDI - WSDL - ebXML - SOAP and Web Services in E-Com, Rest full in Web service.

# Total Hours: 45

# **TEXT BOOKS:**

- 1. Richard Clark, Oli Studholme, Christopher Murphy and DivyaManian,"Beginning HTML5 and CSS 3" @ Apress , 2012.
- 2. Frank. P. Coyle, "XML, Web Services and The Data Revolution", Pearson Education, 2002.
- 3. Phil Hanna, "JSP: The Complete Reference", McGraw-Hill, 2001

# **REFERENCE BOOKS:**

1. Laura Lemay, Rafe Coburn, Jennifer Kyrnin, "Mastering HTML, CSS & JavaScript Web Publishing", Pearson Education.2015

Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.

### 9 Hrs

9 Hrs

9 Hrs

# 9 Hrs



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BCS18012	OPEN SOURCE SCRIPTING LANGUAGES	Ту	3	0/0	0/0	3
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# UNIT I INTRODUCTION TO SCRIPTING LANGUAGES

Introduction to Scripting: Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages.

# UNIT II JAVASCRIPT

JavaScript introduction – control structures – functions – arrays – document objects model – Event handling – object oriented in JavaScript - simple web applications

# UNIT III PERL

PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines. Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

# UNIT IV PYTHON

Python: Installing Python, Introduction to Python language, Basic syntax, interactive shell, editing, saving, and running a script. The concept of data types; variables, assignments; immutable variables-operators and expressions - Conditions and Control statements – String handling, files and directories - functions and its types. Simple Graphics and Image Processing, Python with OOP - Exception handling

# UNIT V RUBY

Introduction to RUBY : Basics, Comments, Variables Strings, Operators, Conditional Statements, Arrays and Hashes, Methods Files, classes, Exception Handling Introduction to Ruby on Rail .

# **Total Hours: 45**

- **TEXT BOOKS:** 1. David Barron, "The World of Scripting Languages", Wiley Publications, 2002
  - 2. Kenneth A. Lambert, Martin Osborne, "Fundamentals of Python: First Programs", Contributing Author published by Course Technology, Cengage Learning Publications.2010.
  - 3. Michael Fitzgerald, "Learning Ruby", O'Reilly Publications, 2007.

# **REFERENCE BOOKS:**

- 1. Richard Clark, Oli Studholme, Christopher Murphy and DivyaManian, "Beginning HTML5 and CSS 3" @ Apress.
- 2. Jennifer Campbell, Paul Gries, Jason Montojo, Greg Wilson, "Practical Programming An Introduction to Computer Science Using Python", The Pragmatic Bookshelf Raleigh, North Carolina Dallas, Texas, 2009
- 3. Tom Christiansen, brian d foy& Larry Wall, with Jon Orwant, "Programming Perl, Fourth Edition", O'Reilly, 2012.

# 9 Hrs

10 Hrs

### 9 Hrs

# 8 Hrs



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# LIST OF EXPERIMENTS

- 1. Study of case tools such as rational rose or equivalent tools
- 2. Railway reservation system
- 3. Student Mark Analysis system
- 4. Payroll processing application
- 5. Inventory system
- 6. Automating the Banking process
- 7. Course Registration System
- 8. Library management system
- 9. Passport Automation System

# SOFTWARE REQUIRED:

Languages: C/C++/JDK 1.3, JSDK, WEB BROWSER & UML Any Front End Tools (Like VB, VC++, Developer 2000) Any Back End Tools (Like Oracle, MS-Access, SQL, DB2) Modelling and Design : Rational Rose



# SEMESTER - V

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### UNIT I ASSEMBLERS & MACROS

Overview of Language processors – Assemblers: Design of two pass assemblers - single pass assemblers MACRO: Macro definition- macro call – macro expansion- nested macroadvanced macro facilities.

# UNIT II LINKERS & LOADERS

Loaders and Linkers: Functions – design - bootstrap loader - machine dependent loader features - machine independent loader features - loader design options - Dynamic linking and Linkage Editors – Implementation Examples

# UNIT III COMPILERS : GRAMMARS & AUTOMATA

Structure of compiler-Languages –Context free grammar - regular expression - Recognizing of patterns - finite automation (deterministic & non deterministic) Conversion of NDFA to DFA - Conversion of regular expression to DFA – Thompson's construction- minimization of NDFA - Lexical analysis-handles - token specification - design of lexical analysis (LEX) - Automatic generation of lexical analyzer - input buffering - A language for specifying lexical analyzers - implementation of lexical analyzer.

# UNIT IV SYNTAX ANALYSIS – PARSING

Definition - role of parsers - top down parsing - bottom-up parsing - Left recursion - left factoring -Handle pruning , Shift reduce parsing - operator precedence parsing – FIRST- FOLLOW- LEADING-TRAILING- Predictive parsing - recursive descent parsing. LR parsing – LR (0) items - S.LR parsing – Canonical LR - LALR parsing - generation of LALR - error recovery

# UNIT V SYNTAX DIRECTED TRANSLATION & CODE OPTIMIZATION 12 Hrs

Intermediate Languages - prefix - postfix - Quadruple - triple - indirect triples – syntax tree- Evaluation of expression - three-address code- Synthesized attributes – Inherited attributes – Conversion of Assignment statements- Boolean expressions –Backpatching - Declaration - CASE statements

CODE OPTIMIZATION: Local optimization- Loop Optimization techniques – DAG – Dominators- Flow graphs – Storage allocations- Peephole optimization – Issues in Code Generation.

# **Total Hours: 45**

# **TEXT BOOKS:**

- 1. Alfred V Aho, Jeffrey D Ullman, Ravi Sethi, "Compilers, Techniques, and Tools", Addison Wesley, 2006
- 2. Leland L Beck, D. Manjula, "System Software",III Edition, Pearson Education -- First Impression, 2007

# **REFERENCE BOOKS:**

- 1. D.M.Dhamdhere (2009) Systems Programming and Operating Systems, (2nd ed.), Tata McGraw-Hill Publishing Company Ltd
- 2. John J Donavan (2009) System Programming, Tata McGraw-Hill Publishing Company Ltd
- 3. John R. Levine, "Linkers & Loaders", Morgan Kauffman, 2003.
- 4. Allen Holub I. (2007) Compiler Design in C, PHI
- 5. V Raghavan (2009) Principles of compiler, Tata Mc Graw Hill
- 6. Kenneth C Louden (2003) Compiler Construction Principles & Practice Thompson learning

6 Hrs

6 Hrs

9 Hrs



Subjec	t	Su	bject N	ame :					Ty/	L	Τ/	P/R	С				
Code:	2005			OPER	ATING	G SYST	EMS		Lb/		S.Lr						
BCS18	8006								ETL								
		Pre	erequisi	te: BCS	18004				Ту	3	0/0	0/0	3				
L : Leo	cture T	: Tuto	orial S	S.Lr : Su	pervise	d Learr	ning P	: Projec	t R : Res	earch	C: Credits						
Ty/Lb/	ETL :	Theor	y/Lab/H	Embedd	ed Theo	ory and	Lab	Ũ									
OBJE	CTIVI	ES:															
•	The s	tudent	ts will u	ındersta	nd the	concept	s of Op	erating	System a	nd pro	ocess.						
•	Illust	rate th	e Schee	duling o	f a proc	cessor fo	or a giv	en prot	olem insta	nce, ic	lentify the	dead loc	ĸ				
	situat	ion an	d provi	de appr	opriate	solution	n, analy	ze mer	nory man	ageme	nt techniqu	ies and					
	1mple	ement	page re	placeme	ent Alg	orithm,	unders	tand the	e impleme	entatio	n of file sy	stems an	d				
		ories.	to omo	naina ta	anda in	anarati	n a areat										
COUR	10 ap	UTCC	MES (	(COs):	$\frac{1}{(3-5)}$	operati	ng syste	ems.									
CO1	Maste	er fund	ctions. s	structure	$\frac{(v - v)}{v}$ and h	istory o	of opera	nting sv	stems								
CO2	Maste	er und	erstand	ing of d	esign is	sues as	sociate	d with o	operating	svsten	ns						
<b>C03</b>	Maste	er vari	ous pro	cess ma	inagem	ent con	cepts in	cluding	g scheduli	ng, sy	g, synchronization, deadlocks						
	and n	nultith	reading	<u>;</u>	U		I			<i>U</i> , <i>i</i>							
C04	Maste	er con	cents of	fmemor	v mana	gemen	t includ	ing virt	ual memo	orv							
C05	Maste	er issu	es relat	ed to fil	e syster	n interf	ace and	imple	mentation	, disk	manageme	nt					
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	$\frac{1}{2}$		e Outc	$\frac{\text{omes } W}{PO3}$	Ith Pro	gram (	Dutcon	DO7	DOS	<b>D</b> O0	<b>DO10</b>	<b>D</b> O11	PO12				
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C03		н	н	Μ	L	L	Н	Μ	М	М	М	М	М				
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C03		H H H	H H H	M M M	L L L	L M L	H M L	M M L	M M M	M L M	M L H	M L M	M M M				
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C04 C05 COs /		H H H H PS	H H H H 01	M M M PS	L L M 02	L M L M PS	H M L M O3	M M L M	M M L SO4	M L M L	M L H L PSO5	M L M M PS	M M M M 06				
C04 C05 COs / PSOs		H H H PS	H H H 01	M M M PS	L L M 02	L M L M PS	H M L M O3	M M L M P	M M L SO4	M L M L	M L H L PSO5	M L M M PS	M M M M 006				
C04 C05 COs / PSOs CO1		H H H PS H	H H H 01	M M M PSo H	L L M 02	L M L PS L	H M L M O3	M M L M P M	M M L SO4	M L L I M	M L H L PSO5	M L M PS L	M M M 06				
C04 C05 COs / PSOs CO1 CO2		H H H PS H H	H H H 01	M M M PS H H	L L M O2	L M L PS L L	H M L 03	M M M P M M M	M M L SO4	M L L M M L	M L H L PSO5	M L M PS L M	M M M O6				
C03 C04 C05 CO5 / PSOs C01 C02 C03 C04		H H H PS H H H	H H H 01	M M M PSO H H H H	L L M 02	L M L PS L L L L	H M L M O3	M M L M M M M M	M M L SO4	M L L M L L M	M L H L PSO5	M L M PS L L L L	M M M 06				
C04 C05 COs / PSOs CO1 CO2 C03 C04 C05		H H H PS H H H H	H H H 01	M M M PS H H H H	L L M O2	L M M PS L L L M M	H M L O3	M M M M M M M M	M M L SO4	M L L M L M L M M	M L H L PSO5	M L M PS L L L L M	M M M O6				
C04 C05 COs / PSOs CO1 CO2 C03 C04 C05 H/M/I		H H H PS H H H H H H H H	H H H O1	M M M PSO H H H H H H Of Cor	L L M O2	L M PS L L L L M M	H M L O3 High, 1	M M L M M M M M M M M M	M M L SO4	M L L M L M L M L M L	M L H L PSO5	M L M PS L L L L M	M M M O6				
C04 C05 COs / PSOs CO1 CO2 C03 C04 C05 H/M/I		H H H PS H H H H H ates S	H H H O1 trength	M M M PS H H H H H Cor	L L M O2	L M PS L L L L M M N n H-	H M L O3 High, I	M M L M M M M M M M M M	M M L SO4	M L L M L M L M L Cow	M L H L PSO5	M L M PS L L L L M	M M M O6				
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C04 C05 COs / PSOs CO1 CO2 C03 C04 C05 H/M/I	→ indic	H H H H H H H H H H H H H S C Ciences	H H H O1 trength	M M M M PSo H H H H H H H H Cor	L L D O2	L M PS L L L L M M N n H-	H M L M O3 High, 1	M M L M M M M M M M M M M M M M M M	mships / M M L SO4 SO4	M L I M L M L M L	M L H L PSO5	M L M PS L L L L M	M M M O6				
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B.Tech – Computer Science and Engineering (Part Time) – 2018 Regulation



BCS18006	OPERATING SYSTEMS	Ту	3	0/0	0/0	3
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### UNIT I CONCEPTS & PROCESSES

Computer system architecture-operating system structure-operations-management of process, memory, storage-protection and security-Operating System Services-System Calls-types-System Programs-System Structure-Virtual Machines-System Design and Implementation- Process concept-Process Scheduling-Operation on Process-Cooperating Processes- Inter Process Communication

# UNIT II PROCESS MANAGEMENT, SYNCHRONIZATION AND DEADLOCKS 9 Hrs

Threads-Multithreading Models. CPU Scheduling concepts-Scheduling Criteria-Scheduling Algorithms-Threads and Multiple-Processor Scheduling-Real Time Scheduling- Process Synchronization-The Critical Section Problem-Synchronization-Petersonsolution,mutex-Hardware-Semaphores monitor-Deadlocks-Deadlock Characterization-Methods of Handling Deadlocks-Deadlock Prevention-Deadlock Avoidance-Deadlock Detection-Recovery form Deadlock

# UNIT III MEMORY MANAGEMENT

Main Memory-Swapping-Contiguous Memory Allocation - Address Translation - Paging - Segmentation – Virtual memory-Demand paging-page replacement-thrashing-allocating Kernel memory.

# UNIT IV STORAGE MANAGEMENT

Files And Secondary Storage Management: File Concepts - Access Methods - Directory Structure - File System Mounting - File Sharing - Protection - File System Structure - Implementation - Recovery - Disk Structure - Disk Scheduling - Disk Management

# UNIT V CASE STUDY

Special purpose systems -Open source operating systems-Operating system generation-Examples of IPC systems-threading Issues-Operating system examples- Algorithm Evaluation of scheduling algorithms-Classical Problems Of Synchronization-Synchronization examples-Intel 32 bit and 64 bit architectures-ARM architecture-STREAMS.

# **Total Hours: 45**

# **TEXT BOOK:**

1. Silberschatz. Galvin. Gagne (2012) Operating System Concepts (9th ed.), John Wiley

### **REFERENCE BOOKS:**

- 1. D.M.Dhamdhere. D. M. (2012) Operating Systems, (3 rd ed.), Tata McGraw Hill
- 2. Tanenbaum (2015) Modern Operating Systems, Pearson Publication.
- 3. William Stallings (2015) Operating Systems (8 th ed.) Prentice Hall of India

# 9 Hrs

# 9 Hrs

9 Hrs



Subject Coo	le:	Su	bject Na	me :						Ty/	L	T/	P/	С	
BCS18	8011		DC	T NE	T FR	RAM	EWO	RK	I	Lb/ ETL		S.Lr	R		
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Ty/Lb/ETL	: Theory	/Lab/H	Embedde	d Theo	ory ai	nd La	ıb								
OBJECTIV	'ES :														
• To 1	earn the	conce	pts of C‡	‡ Dot N	Net la	ingua	ge and	l ability	to write	progra	ms.				
• To	understa	erstand the concepts of VB Dot Net, ADO.NET language and learn to deve												lop an	
appl	<ul> <li>application.</li> <li>To develop knowledge to design web based application using ASP Net.</li> </ul>														
	I o develop knowledge to design web based application using ASP.Net.														
COURSEO	OURSE OUTCOMES (COS) : ( 5- 5)														
CO1	To develop, implement and creating Applications with C#.														
CO2		Integrate selected advanced topics in a Visual Basic .NET project													
CO3		(	Create w	eb fori	ms w	ith A	SP.NE	T control	ols						
Mapping of	Course	Outcor	nes with	Progra	am O	outcor	mes (P	Os)							
COs/POs	PO1	PO2	PO3	PO4	P	05	PO6	PO7	PO8	PO9	I	PO10	PO11	PO1 2	
CO1	Η	Η	Η	H	H	[	Μ	Μ	L	Н	Ι	М	H	Μ	
CO2	Н	Η	Н	Η	H	[	Μ	Μ	L	Η	Ι	М	Η	Μ	
CO3	Н	Η	Н	Η	Η	[	Μ	Μ	L	Η	Ι	М	Н	Μ	
COs /	PS	01	PS	<b>SO2</b>		PSC	03	PS	<b>504</b>	I	PSO	95	PS	<b>O6</b>	
PSOs															
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CO2	H					1		H							
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BCS18011	DOT NET FRAMEWORK	Ту	3	1/0	0/0	4
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#### UNIT I **DOT NET FRAMEWORK**

.NET platform, .NET Frame work, Common Language Runtime, Namespace, assemblies, .NET memory management Introduction to C#.net, Introduction to VB.NET

#### C#.NET UNIT II

Introduction to C#, Understanding C# in .NET, Overview of C#, literals, Variables, Data Types. Operators, Expressions, Branching and Looping Operations- Methods, Arrays Strings. Structures and Enumerations - Classes and Objects- inheritance and Polymorphism ,Multiple Inheritance, Operator Overloading, Events, Console I/O Operations and Exception

#### UNIT III **VB.NET**

Introduction, Windows application, Web application, Building Blocks, programming Fundamentals, Creation of Windows Forms, SDI Vs MDI, Crating run time Windows Controls. File handling, Interaction with other Applications, Creating and using reports, Debugging and Packaging

#### UNIT IV ADO.NET

ADO.NET, Connected Objects, Disconnected Objects, Data Form Wizard, Data Bound Form, Various Connection Methodologies for Database, Querying database, usage of Data Adapter class. Working with data off-line, Data view object, strongly typed Dataset Objects. Working with XML data, Building Windows based and web based application, .Net data providers

#### UNIT V **ASP.NET& WEB SERVICES**

Creation of web services, web service with ASP.NET, ASP.NET applications with databases, cookies and session handling

# **TEXT BOOKS:**

- 1. ThuanL.Thai, Hoang Lam, (2003).NET Framework Essentials, (3<sup>rd</sup>ed.) O'reilly Media Inc.
- 2. Balagurusamy, E. (2010) Programming in C#(3<sup>rd</sup> ed.) Tata McGraw-Hill

# **REFERENCE BOOKS:**

- 1. Kogent Solutions Inc (2009) C# 2008 Programming: Covers .Net 3.5 Black Book, (Platinum ed.) Dreamtech Press
- 2. Kip R Irvine Tony Gaddis (2009) Starting Out with Visual Basic 2008 (4<sup>th</sup>ed.) Addison Wesleypublication
- 3. Evjen, Hanselman, Rader (2005) Profesional ASP.NET 2.0, John Wiley & Sons
- 4. David Sceppa (2013) Programming Microsoft ADO.NET4, Amazon.com
- 5. web reference http://msdn.microsoft.com/en-us/vstudio/default.aspx

### 12 Hrs

12 Hrs

# 12 Hrs

### 12Hrs

**Total Hours: 60** 



Subject BCS	t Code 18L06	: Su	bject Na	ame : OPERA	TING	SYSTE	MS LA	AB		Ty/	L	T/ SIr	P/R	C			
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		Pre	erequisi	te: NIL						Lb	0	0/0	3/0	1			
L : Lec	ture T	: Tuto	rial S.	Lr : Sup	ervised	Learnir	ng P:F	roject	R : Res	earch (	C: Cr	redits					
Ty/LbE	ETL : T	Theory/	/Lab/En	nbedded	Theory	and La	ıb	U									
OBJE	CTIV	ES :															
•	To le	arn she	ll progr	amming	and the	use of	filters i	n the U	NIX er	nvironm	lent						
•	To le	arn to u	use syst	em calls	through	n C prog	grams										
•	To le	earn to	use the	file syste	em relat	ed systemet	em call	s.									
•	To ga	ain kno	wledge	of proce	ss creat	ion and	comm	unicatio	on betw	een pro	cess	es.					
•	To le	arn hov	w proce	ss synch	ronizati	on can	be done	using s	semaph	ores.							
COUR	SE O	UTCO	MES (O	COs):(	3- 5)												
CO1	Mast	ter func	tions, s	tructures	and his	story of	operati	ng syste	ems								
CO2	Mast	ter unde	erstandi	ng of de	sign iss	ues asso	ociated	with op	erating	system	S						
C03	Mast	ter vari	ous pro	cess man	agemer	nt conce	epts incl	luding s	chedul	ing, syr	chro	onizatio	n, deadl	ocks and			
	mult	ithread	ing														
C04	Mast	ter conc	cepts of	memory	<sup>7</sup> manag	ement i	ncludin	ig virtua	al mem	ory							
C05	Mast	ter issu	es relate	ed to file	system	interfac	ce and i	mpleme	entation	n, disk 1	nana	igement	t				
Mappi	ng of	Course	Outco	mes wit	h Progi	am Ou	itcomes	s (Pos)	r	T							
COs/P	Os	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PC	<b>D10</b>	PO11	PO12			
CO1		Η	H	Μ	М	Μ	L	L	L	M	Μ		Н	Μ			
CO2		Η	Η	Μ	L	L	Η	Μ	Μ	Μ	Μ		Μ	Μ			
C03		Н	Н	Μ	Μ	Μ	Μ	Μ	Μ	L	L		L	Μ			
C04		Η	Η	Μ	L	L	L	L	Η	Η	Η		Μ	Μ			
C05		Η	Н	Μ	Μ	Μ	Μ	Μ	L	L	Μ		M M M M				
COs /		PSO1		PSO2		PSO3		PSO4		PSO	5		PSO6				
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Category Basic Sciences			Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills							
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BCS18L06 OPERATING SYSTEMS LAB Lb 0 0/0 3/0	1
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### LIST OF EXPERIMENTS

1. Basic UNIX commands – learning and usage.

2. Shell Programming.

3. File system related system calls. (Learn to create, open, read, write, seek into, close files & open, read, write, search, close directories).

4. Process management – Fork, Exec (Learn to create a new process and to overlay an executable binary image on an existing process).

5. Inter-process communication between related processes using pipes.

6. Process synchronization using semaphores (Solutions to synchronization problems like producer consumer problem, dining philosopher's problem etc...).

7. Inter-process communication among unrelated processes using Shared memory.

8. Inter-process communication among unrelated processes using Message Queues.

9. CPU Scheduling algorithms.

10. Contiguous memory allocation strategies – best fit, first fit and worst fit strategies.

11. Page replacement algorithms



### **SEMESTER - VI**

Subject		Su	bject N	ame :	DEIIO	USING		ПАТА		Ty/	/ L	T/	P/R		С
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2001	0010	Pre	erequisi	te: BCS	18004					Ty	3	0/0	0/3	4	
L : Lect	ture [	T : Tut	orial S	S.Lr : Sı	ipervis	ed Leai	ming P	P: Proje	ct R:	Rese	earch (	C: Credits	5		
Ty/Lb/I	ETL	: Theor	ry/Lab/	Embedd	ed The	eory and	l Lab								
OBJEC	CTIV	ES:													
•	Prov	vide an	overvi	ew of th	e meth	odolog	ies and	approa	ches to	o data	a minir	ıg			
•	Gair	n insigl	ht into t	he chall	enges a	and lim	itations	of data	ı minir	ng teo	chniqu	es and da	ita war	eho	asing
•	App	olying c	lata mir	ning solu	utions u	using co	ommon	data m	ining t	tools					
COUR	SE C	DUTCO	JMES	(COs) :	(3-5)										
CO1	Une	derstan	d the di	ifference	e betwe	en Dat	a Ware	housing	g and g	gener	al data	bases			
CO2	Uno	derstan Is	d the di	ifferent	steps fo	ollowed	l in Dat	a minin	g and	pre-p	process	ing tech	niques	usir	ıg
CO3	Abl	le to ap	ply Ass	sociation	n Rule	mining	and Cl	ustering	g appro	oache	es				
CO4	Familiarize with multi-dimensional data cubes and related analysis														
Mappi	pping of Course Outcomes with Program Outcomes (POs)														
COs/P	pping of Course Outcomes with Program Outcomes (POs) Ds/POs PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12														
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CO3	5	Н	Н	Н	Η	Н	Μ	Μ	L		Μ	Μ	H	[	L
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B.Tech – Computer Science and Engineering (Part Time) – 2018 Regulation



BCS18010	DATA WAREHOUSING AND DATA MINING	Ту	3	0/0	0/3	4
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#### UNIT I **DATA WAREHOUSING**

Introduction to Data Warehousing- Advantages- What makes Data Warehousing a reality- Data warehousing Components-Building a Data Warehouse-mapping Data Warehouse to a Multiprocessor-Architecture-DBMS Schemas for Design Support

#### **UNIT II ETL AND BUSINESS TOOLS** 12 Hrs

Data Extraction-Cleaning and Transformation tools- Meta data. Reporting and Query tools and Application-OLAP Patterns and Models- Statistics

**UNIT III DATA MINING** 12 Hrs Introduction - Data - Types of Data - Data Mining Functionalities - Interestingness of Patterns -Classification of Data Mining Systems - Data Mining Task Primitives - Integration of a Data Mining System with a Data Warehouse - Issues -Data Preprocessing.- Data Cleaning -Missing Values-Noisy Data-Inconsistent Data-Data Integration and Transformation-Data Reduction -Dimensionality Reduction - Evaluation criteria of Various Mining Techniques

#### **UNIT IV** ASSOCIATION RULE MINING AND CLASSIFICATION 12 Hrs Mining Frequent Patterns, Associations and Correlations - Mining Methods - Mining Various Kinds of Association Rules - Constraint Based Association Mining - Classification and Prediction - Decision Tree Induction - Entropy and Classification Algorithms -Bayesian Classification - Rule Based Classification

#### UNIT V **CLUSTERING TECHNIQUES**

Cluster Analysis - Types of Data - Categorization of Major Clustering Methods - Kmeans - Partitioning Methods - Hierarchical Methods - Density-Based Methods - Grid Based Methods - Model-Based Clustering Methods - Clustering High Dimensional Data - Constraint - Based Cluster Analysis - Outlier Analysis –Genetic Algorithm For Mining - Data Mining Applications

# **Total Hours: 60**

# **TEXT BOOKS:**

- 1. Alex Berson and Stephen J.Smith, "Data Warehousing, Data Mining and OLAP", Tata McGraw Hill Edition, Thirteenth Reprint 2008.
- 2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Third Edition, Elsevier, 2012.

# **REFERENCE BOOKS:**

- 1. Arun K Pujari (2017) Data Mining Techniques 4<sup>th</sup> edition, Universities Press (India) Ltd.
- 2. Sam Anahory, Dennis Murry (2004) Data Warehousing in the real world, Pearson Education
- 3. Margaret H. Dunham (2006) Data Mining: Introductory and Advanced Topics, Pearson

12 Hrs



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**BMG18002** 

# MANAGEMENT CONCEPTS AND ORGANIZATIONAL BEHAVIOR

# UNIT I INTRODUCTION TO MANAGEMENT

 $\label{eq:constraint} \begin{array}{l} \text{Definition of Management} - \text{Science or Art or Profession} - \text{Manager} \ v_s \ \text{Entrepreneur vs Leader} - \text{Types} \\ \text{of Managers} - \text{Managerial roles and skills} - \text{Evolution of Management} - \text{Scientific, Human relations and} \\ \text{system approaches} \end{array}$ 

# UNIT II PLANNING AND ORGANIZING

Nature and purpose of planning – planning process – types of planning – planning premises – Nature and purpose of organizing – Formal and Informal organization – organization chart – organization structure – types - Line and staff authority

# UNIT III DIRECTING AND CONTROLLING

Leadership – Types and theories of leadership – communication – process of communication – barriers in communication – System and process of controlling – Budgetary and non budgetary control techniques – Direct and preventive control – reporting

# UNIT IV INDIVIDUAL BEHAVIOR

Diversity - Attitudes and Job satisfaction – Emotions and Moods – personality and values – perception – Decision making – Motivation concepts – Motivation Applications

# UNIT V GROUP BEHAVIOR

Foundations of Group Behavior – Understanding Teams – power and politics – Conflict and Negotiation – Stress Management

# **TEXT BOOKS:**

- 1. Harold Koontz and Heinz Weihrich "Essentials of Management" Tata McGraw Hill Education 2015
- Stephen. P. Robbins, Timothy A. Judge and Seema Sanghi "Essentials of Organizational Behavior" Pearson 10<sup>th</sup> Edition 2010

# **REFERENCE BOOKS:**

- 1. Tripathi PC & Reddy PN "Priciples of Management" Tata McGraw Hill 2012
- 2. Stephen P. Robbins, David A.De.Cenzo, Mary Coulter "Fundamentals of Management" Pearson Education 2016



# 9 Hrs

# Total Hours: 45

# 9 Hrs

9 Hrs

9 Hrs



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B.Tech CSE Project carries 12 credits of which , Phase I carries 2 credit.

In Phase I ,Students are expected to

(i) Identify a Problem.

(ii) Have the feasibility explored.

(iii) Freeze the Requirement specification (both user and system).

(iv) Construct the architectural model (as many as required).

(v) Design the solution.

(vi) If possible publish the Feasibilty study as a survey paper



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BCS18L11

DATA MINING LAB



# LIST OF EXPERIMENTS

- 1. Introduction to the Weka machine learning toolkit
- 2. Classification Introduction to exploratory data analysis using Rattle an open source Tool(R)
- 3. Introduction to regression using Rattle an open source Tool. (R)
- 4. Using the Weka toolkit Part 1
- 5. Classification using the Weka toolkit Part 2
- 6. Performing data preprocessing for data mining in Weka
- 7. Performing clustering in Weka
- 8. Association rule analysis in Weka
- 9. Data mining case study using the CRISP-DM standard
- 10. Data mining case study using the CRISP-DM standard



# SEMESTER – VII

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Students are expected to carry out the following :

- (i) Implement the Design using suitable technologies.
- (ii) Generate the test cases.
- (iii) Demonstrate the solution with suitable user interface.
- (iv) Prepare a project report consolidating the phase-I and II activities.



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# UNIT I INTRODUCTION

Digital image representation-Fundamental steps in image processing -Elements of digital image processing systems, Digital Image Fundamentals - :Elements of visual perception-A simple image model -Sampling and quantalization -Some basic relationship between pixels-Imaging geometry -Photographic film.

# UNIT II IMAGE TRANSFORMS

Introduction to the Fourier transform -The Discrete Fourier transform -Some properties of the two dimensional Fourier transform -The fast Fourier transform-Other seperable image transforms-The hotelling transform.

# UNIT III IMAGE ENHANCEMENT

Background -Enhancement by point Processing -Spatial filtering-Enhancement in the frequency domains -Generations of the spatial masks from frequency Domain specifications- Color image processing -Image Restoration: Degradation Model -diagonalization of Circulant and Block circulant Matrices -Algebraic approach to restoration-Inverse filtering -Least mean square filter -constrained least square restoration-Restoration in spatial domain-Geometric transformation.

# UNIT IV IMAGE COMPRESSION

Fundamentals -image Compression models -Elements of information Theory - Error-free Compression - Lossy Compression - Image Compression standards, Images Segmentation : Edge linking and boundary detection - Thresholding - Region - Oriented segmentation – The use of motion in segmentation.

# UNIT V REPRESENTATION AND DESCRIPTION

Representation Schemes - Boundary descriptors - Morphology - Relational descriptors, Recognition and Interpretation: Elements of image Analylsis - Pattern and pattern classes - Decision theoretic methods - Structural Methods - Interpretation.

# **TEXT BOOKS:**

- 1. RAFAEL C.GONZALEZ and RICHARD E.WOODS. Digital Image Processing 2009, Prentice Hall.
- 2. Jayaraman, S. Esakkirajan and T. Veerakumar, Digital Image Processing Tata McGraw Hill, 2009

# **REFERENCE BOOKS :**

- 1. M.A.SID AHMAED, Image Processing Theory, Algorithm and Architecture McGraw Hill, 1995
- 2. DON PEARSON, Image Processing, McGraw Hill, 1991.

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CO2	(	Create a	new ge	eo codi	ng tech	nique								
CO3	4	Apply th	ne learn	t GIS n	nodelin	g for a	real tim	le case	study					
Mapping of Cours	se Out	comes v	with Pr	ogram	Outco	mes (P	Os)							
COs/POs	PO1	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	PO9	PO	10	PO11	PC	)12
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CO2	Η	H	Η	Μ	Μ	H	Μ	Μ	L	N	1	Μ	]	Ĺ
CO3	Η	Н	Μ	Μ	Μ	Н	Н	Η	Η	H	[	Μ	Ι	А
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H/M/L indicates S	Streng	th of Co	orrelati	on H	- High,	<b>M- M</b>	edium,	L-Low	7	1				
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills					
					V									



BCS18E02GEOGRAPHICAL INFORMATION SYTEMSTy30/00/03
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# UNIT I BASIC CONCEPTS

Introduction - Coordinate Systems - Vector Data Model - Raster Data Model.

# UNIT II DATA ACQUISTION & MANIPULATION

GIS Data Acquisition - Geometric Transformation - Spatial Data Editing - Attribute Data Input and Management - Data Display and Cartography.

### UNIT III DATA ANALYSIS

Data Exploration - Vector Data Analysis - Raster Data Analysis - Terrain Mapping and Analysis - Viewsheds and Watersheds.

# UNIT IV INTERPOLATION & APPLICATIONS

Spatial Interpolation - Geocoding and Dynamic Segmentation - Path Analysis and Network Applications.

# UNIT V MODELLING

GIS Model and Modelling.

# TEXT BOOK:

1. Kang-tsung Chang (2015), *Introduction to Geographic Information Systems*, (8<sup>th</sup> ed.), Mcgrawhill ISBN 0078095131, 9780078095139

# **REFERENCE BOOKS:**

- 1. Prithvish Nag And Smita Sengupta, Introduction To Geographical Information Systems, Concept Publishing Company, 2007, ISBN 8180694399, 9788180694394
- 2. Paul Longley, Geographical information systems, 2/e, Wiley, 1999, Digitised 2007, ISBN 0471321826, 9780471321828

9 Hrs

### **Total Hours: 45**

9 Hrs

9 Hrs

9 Hrs



Subject Code:	Su	ıbject Na I	ame : DATA	BASE	TUNII	NG		Ty Lt	y/ o/	L	T/ SIr	P/R	С
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<b>OBJECTIVES</b> :													
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To develop	p case	e studies	in data	ı bases,	, and at	ole to tr	oublesl	hoot th	e dat	a bas	ses		
Identify the second secon	ne criti	ical perf	ormanc	e tunir	ng steps	5							
COURSE OUTC	OME	S (COs)	):(3-	5)									
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CO2		Able to	Develo	op Case	e Studie	es in da	ta base	s.					
CO3		Able to	Troubl	eshoot	the dat	a bases	5						
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CO3	Μ	Η	Η	Μ	Η	Μ	Η	Η	N	1	H	H	Η
COs / PSOs	P	SO1	PS	02	PS	03	P	SO4		PS	505	PS	06
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CO2	Η		Η		Η		Μ		H	I		Μ	
CO3	Η		Η		Μ		Η		Ν	1		Η	
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Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills				
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BCS18E03	DATABASE TUNING	Ту	3	0/0	0/0	3
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# UNIT I Fundamentals of Tuning

Review of Relational Databases – Relational Algebra - Locking and Concurrency Control – Correctness Consideration – Lock Tuning – Logging and the Recovery Subsystem – Principles of Recovery – Tuning the Recovery Subsystem – Operating Systems Considerations – Hardware Tuning

### UNIT II Indexing and Hashing

Types of Queries – Data Structures – B tree – B+ Tree - Hash Structures – Bit Map Indexes – Clustering Indexes – Non Clustering Indexes – Composite Indexes – Hot Tables – Comparison of Indexing and Hashing Techniques

# UNIT III Query Optimization

Techniques - Tuning Relational Systems – Normalization – Tuning De-normalization – Clustering Two Tables – Aggregate Maintenance – Record Layout – Query Tuning – Triggers – Client Server Mechanisms – Objects, Application Tools and Performance – Tuning the Application Interface – Bulk Loading Data – Accessing Multiple Databases

### UNIT IV Troubleshooting

Query Plan Explainers – Performance Monitors – Event Monitors – Finding – Suspicious || Queries – Analyzing a Query's Access Plan – Profiling a Query Execution – DBMS Subsystems

# UNIT V Case Studies

Transaction Chopping – Time Series Databases – Understanding Access Plans – Configuration Parameters: ORACLE; SQL SERVER; DB2UDB – DISTRIBUTED DATABASE – IMPLEMENTATION.

### **TOTAL HOURS: 45**

### **TEXT BOOKS:**

- 1. Dennis Shasha and Philippe Bonnet (2005) Database Tuning, Principles, Experiments, and Troubleshooting Techniques, Elsevier
- 2. Thomas Connoly and Carlolyn Begg (2009) Database Systems, A Practical Approach to Design, Implementation and Management, (4th ed.) Pearson Education

### 9 Hrs

9 Hrs

9 Hrs

# 9 Hrs



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L : Lecture T : Tutorial S.L : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab OBJECTIVES : • Show clear understanding of theoretical concepts of component based development and be able to apply the appropriate techniques of implementation using EJB 3 technology. • To show the ability to critically discuss the key concepts in component based development and influence of this topic to modern trends in business computing and software engineering. • Show detailed knowledge of aspects of EJB 3 technology that allow development of applications based on components and service oriented architecture. COURSE OUTCOMES (COs) : (3 - 5) CO1 Mastering the principles for building software systems from components. CO2 Familiarity with the technologies and standards for component models and service- oriented computing. CO3 Familiarity with the Java realization of components including Java Beans, JSP, Servlets, EJB, and Java RMI and how Web services are realized in Java. CO4 Familiarity with the CORBA realization of components (CCM). Mapping of Course Outcomes with Program Outcomes (POS) COs/POs PO			Pre	erequis	site: BC	CS18E	Г2 & В	CS180	12	]	Гу	3	0/0	0/0	3
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B.Tech – Computer Science and Engineering (Part Time) – 2018 Regulation



BCS18E04 COMPONENT BASED TECHNOLOGY	Ту	3	0/0	0/0	3
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# UNIT I DISTRIBUTED OBJECT TECHNOLOGY

Introduction-Evolution of distributed systems-Evolution of distributed objects- Methods of distribution-Multi-Tier Architecture. **Component Technology:** Component Concepts-Modules- Interfaces-Callbacks – Directory services-Component Architecture-Component Based Software development.

# UNIT II ENTERPRISE FOUNDATIONS

Enterprise Architecture Overview-Object Oriented Software Development for the Enterprise- Component based Software development for the Enterprise- Java Enterprise System Architecture with J2EE.JAVA Based Component Model: JAVA Beans-Remote Method Invocation(RMI)-RMI-IIOP. Enterprise Java Beans: Introduction-EJP Architecture-Types of Enterprise Beans-Life Cycle of Beans-Steps in developing an EJP.

# UNIT III ARCHITECTURE OF CORBA

The History of CORBA- CORBA Architecture-ORB-Portable Object Adapter-Internet inter-ORB Protocol(IIOP)- Dynamic CORBA-OMG IDL-CORBA Services-CORBA Object Location Service-CORBA Activation Framework-CORBA Messaging Services-CORBA Event Service-CORBA Security Service-CORBA Object Transaction Service. CORBA Component Model-Model Driven Architecture.

# UNIT IV MICROSOFT COMPONENT TECHNOLOGIES

Evolution of Microsoft Component Technologies-OLE-Active X Controls-DLL Surrogates and Executables-Components with ATL-DCOM Architecture-Interface-COM IDL. Service Oriented Architecture: Introduction to Web Services-Introduction to Service oriented architecture-Business Value of SOA- Architectural Elements of SOA- Web Services and Service Oriented Architecture.

# UNIT V APPLICATION

Client Server using –RMI-RMI/IIOP- CORBA-Enterprise Beans. Componentized Application Development using EJP.

# **Total Hours: 45**

# **TEXT BOOKS:**

1. G. Sudha Sadasivam(2008)- Component Based Technology, Wiley India Pvt.Ltd.

# **REFERENCE BOOKS:**

- 1. Robert Orfali, Dan Harkey and Jeri Edwards (2002)-The Essential Client / Server Survival Guide, Galgotia
- 2. Publications Pvt. Ltd.
- 3. Tom Valesky (2002) Enterprise Java Beans, Pearson Education.
- 4. Jason Pritchard (2000) COM and CORBA Side by Side, Addison Wesley.
- 5. Joel Murach, Anne Boehm (2012)- C#, Murach.

# 9 Hrs

# 9 Hrs

# 9 Hrs

9 Hrs


Subject Code: BCS18E05	Sut	oject	Name	: E-CO]	MMEI	RCE			Ty Lt ET	y/ D/ `L	L	T S.I	/ 	P/R	С
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<b>OBJECTIVES</b> :															
Understand	l the natu	ire of	f e-Cor	nmerco	e										
Recognize	the busir	ness i	impact	and po	otential	of e-C	Comme	rce							
Explain the	e technol	ogies	s requi	red to r	nake e	-Comn	nerce v	iable							
Discuss the	current	drive	ers and	inhibi	tors fac	cing the	e busin	ess woi	rld ir	ı adoj	oting	and	using		
eCommerce	e;														
Explain the	econom	nic consequences of e-Commerce;													
Discuss the	trends i	s in e-Commerce and the use of the Internet.													
COURSE OUTCO	OMES (O	COs)	:(3-	5)											
CO1	A	Analy	ze the	impac	t of E-c	comme	rce on	busines	ss mo	odels	and	strate	egy		
CO2	Ι	Descr	ibe the	infras	tructur	e for E	-comm	erce							
CO3	A	Asses	s elect	ronic p	aymen	t syste	ms								
Mapping of Cours	e Outco	mes	with P	rogra	m Out	comes	(POs)								
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Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Ski	Soft Skills						
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BCS18E05	E-COMMERCE	Ту	3	0/0	0/0	3
UNIT I	INTRODUCTION					9 Hrs

History of E-Commerce -E-Commerce Vs E-Business-Emergence of the Internet- Advantages-Disadvantages-Business model- E -Business Models based on the relationship of Transaction Parties- E -Business Models based on the relationship of Transaction Types- Technologies of World Wide Web-Internet Client Server Applications-Networks and Internets-Software Agents-Internet Standards and Specification-Internet Service Provider-Markup Language and the web-JavaScript-XML-Intranets and Extranets.

#### **UNIT II E-MARKETING**

Identifying Web Presence Goals- The Browsing Behavior Model-Online Marketing-E-Advertising-Internet Marketing Trends-Targets Markets-E-Branding-Marketing Strategies E-Security: Security on the Internet-E-Business Risk Management Issues-E-Payment Systems: Digital Token based e-payment System-Classification of New Payment System- Electronic Cash-Risk and E-Payment System-Designing E-payment System- Digital Signature.

#### UNIT III **E-CUSTOMER RELATIONSHIP MANAGEMENT**

CRM-ECRM Solutions- ECRM Toolkit-Typical Business Touch point. E-Supply Chain Management-Supply Chain Management- Supply chain Management for Various Industries- E- Strategy and Knowledge management.

#### UNIT IV **MOBILE COMMERCE**

Information System for Mobile Commerce-Mobile Payments-Cellular Networks-Different Generations in wireless Communication- Technologies for mobile Commerce-WAP Programming Model. Portals for E-Business: Portals-Requirements of Intelligent Websites.

#### UNIT V **APPLICATIONS**

Plan your Business and create a web Site with wordpress.

#### **TEXT BOOK:**

1. P.T. Joseph, S.J. (2015), E-Commerce Indian Perspective Fifth Edition, PHI Learning

#### **REFERENCE BOOKS:**

- 1. Zheng Qin(2009), Introduction to E-Commerce, Springer.
- 2. Mamta Bhusry, E-Commerce, Laxmi Publications PVT Ltd.

#### 9 Hrs

9 Hrs

#### 9 Hrs

**Total Hours: 45** 

9 Hrs



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CO2	Kno	now various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction,											
CO3	Un	derstan	d the fi	1ndame	ntals of	knowle	edge re	presenta	tion (1	ogic-ha	sed. fra	me-based	semantic
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	WOI	rld prob	olems										
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BCS18E06	ARTIFICIAL INTELLIGENCE	Ту	3	0/0	0/0	3
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#### UNIT I **INTRODUCTION AND PROBLEM SOLVING**

Introduction-Intelligent agent - Types of agents - Agent Structure - Problem solving agents - Problem Formulation - Uninformed search strategies - Breadth first search - Uniform cost search - Depth first search – Depth limited search – Bidirectional search – Searching with partial Information

#### UNIT II **INFORMED SEARCH METHODS AND GAME PLAYING** 9 Hrs

Informed search Strategies - A\* Heuristic function - Hill Climbing search - Constraint Satisfaction problem - Optimal decisions in games - Pruning - Alpha-Beta pruning - State-of-the-Art Game Programs

#### **UNIT III KNOWLEDGE AND REASONING**

Knowledge based agent - The Wumpus world environment - First-order logic -Building a Knowledge base - Properties of Good and Bad Knowledge bases - The Grocery Shopping World - Inferences in FOL - Forward and backward chaining algorithm

#### **UNIT IV** ACTING LOGICALLY

Planning-Simple planning agent-Planning with state space search-Partial order planning-Practical planning – Practical planners – Planning and Acting – Conditional Planning – Fully Integrated planning and execution

#### UNIT V **UNCERTAIN KNOWLEDGE REASONING AND ROBOTICS** 9 Hrs

Acting under Uncertainty - Knowledge Engineering for Uncertain Reasoning - Case study: The Pathfinder system – Robotics Introduction – Goods of Robots – Parts of Robots – Navigation and Motion planning.

#### **Total Hours: 45**

#### **TEXT BOOKS:**

- 1. Stuart R. Peter N. (2010) Artificial Intelligence A modern Approach, Prentice Hall
- 2. Elaine R. Kevin K. (2008) Artificial Intelligence Tata McGraw Hill

#### **REFERENCE BOOKS:**

1. Tim Jones M. (2008) Artificial Intelligence, A System Approach(Computer Science) 2. Ben Coppin (2004) Artificial intelligence illuminated, Jones and Bartlett Learning

9 Hrs

9 Hrs



Subject Code: BCS18E07	Sul	bject N I	ame : IUMA INT	N CON ERAC	APUTE TION	ER		Ty/ Lb/ ETL	L	T/ S.L	r P/	/R	С			
	Pre	erequisi	te: NIL					Ту	3	0/0	0	/0	3			
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OBJECTIVES	:															
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• ]	Manage	e HCI														
COURSE OUT	COMI	ES (CO	s):(3∙	- 5)												
CO1	To le	earn the	basic to	ermino	logies o	of HCI										
CO2	Unde	nderstand the design technologies for individuals and persons with disabilities														
CO3	Unde	Jnderstand how to manage the emerging issues in HCI														
Mapping of Co	urse O	utcom	es with	Progra	am Out	tcomes	(POs)									
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BCS18E07	HUMAN COMPUTER INTERACTION	Ту	3	0/0	0/0	3
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#### UNIT I HUMANS IN HCI

Introduction-implications for HCI-overview of HCI-Mentor models in HCI-emotions in HCI-cognitive architecture –task loading and stress in HCI-theoretical framework and mitigation strategies-motivating ,influencing and persuading users – human error identification in HCI

#### UNIT II COMPUTERS IN HCI

Input technologies and techniques – sensor and recognition based input for interaction-visual displayshaptic interfaces-nonspeech auditory output-network based interaction-wearable computers-design of computer workstation

### UNIT III APPLICATION/DOMAIN SPECIFIC DESIGN 9 Hrs

HCI in health care-designing emotions for games, entertainment interfaces and interactive products-motor vehicle driver interfaces-HCI in aerospace-user centred design in games

#### UNIT IV DESIGNING FOR DIVERSITY

The digital divide-the role of gender in HCI-IT and older adults-HCI for kids-IT for cognitive supportphysical disabilities and computing technologies – an analysis of impairments-computing technologies for deaf and hard of hearing users

# UNIT VMANAGING HCI AND EMERGING ISSUES9 HrsTechnology transfer-augmenting cognition in HCI-human values, ethics and design, cost justification-<br/>future trends in HCI

#### **Total Hours: 45**

#### **TEXT BOOK:**

1. The Human Computer Interaction Handbook –Fundamentals evolving Technologies and emerging Applications – Andrew Sears, Julie A Jacko, CRC Press ,3<sup>rd</sup> edition,2012.

#### **REFERENCE BOOK:**

1. Alan Dix , Janet Finlay, Gregory D.Abowd, Russell Beale, "Human Computer Interaction", Third Edition, Pearson Education.

#### 9 Hrs

9 Hrs



Subject Code BCS18E08	e: Su	bject N WIR	ame : ELESS A	<b>ND M</b>	OBILI	E NETV	WORK	ING	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
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CO2	C	loncept	cepts of mobile communications, their architecture and procedures										
CO3	Ν	obile networking and application layer including WAP protocols											
Mapping of	Course	e Outco	mes wit	h Progi	ram Ou	itcome	s (POs)						
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Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills				
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#### **UNIT I** WIRELESS COMMUNICATION

Cellular systems- Frequency Management and Channel Assignment- dropped call rates & their evaluation - MAC-SDMA-FDMA-TDMA - CDMA - Cellular Wireless Networks.

#### **UNIT II** WIRELESS LAN

IEEE 802.11 Standards - Architecture - Services - Mobile Ad hoc Networks- WiFi and WiMAX -Wireless Local Loop.

#### **UNIT III** MOBILE COMMUNICATIONS

GSM-architecture-Location tracking and call setup- Mobility management- GSM SMS —-Mobile Number portability -VoIP service for Mobile Networks - GPRS - Architecture and procedures.

#### **UNIT IV MOBILE NETWORKING**

Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols– Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Wireless Networks. Recovery

#### UNIT V **APPLICATION LAYER**

WAP Model- Mobile Location based services -WAP Gateway -WAP protocols - WAP user agent profile- caching model-wireless bearers for WAP - WML - WMLScripts - WTA - iMode- SyncML.

**Total Hours: 45** 

#### **TEXT BOOK:**

1. Goldsmith, Andrea (2005). Wireless Communications. Cambridge University Press. ISBN 0-521-83716-2.

#### **REFERENCES BOOKS:**

- 1. Lenzini, L.; Luise, M.; Reggiannini, R. (June 2001). "CRDA: A Collision Resolution and Dynamic Allocation MAC Protocol to Integrate Date and Voice in Wireless Networks". IEEE Journal on Selected Areas in Communications (IEEE Communications Society) 19 (6): 1153-1163. ISSN 0733-8716
- 2. Pahlavan, Kaveh; Krishnamurthy, Prashant (2002). Principles of Wireless Networks a Unified Approach. Prentice Hall. ISBN 0-13-093003-2.
- 3. Rappaport, Theodore (2002). Wireless Communications: Principles and Practice. Prentice Hall. ISBN 0-13-042232-0.

## 9 Hrs

9 Hrs

## 9 Hrs

## 9 Hrs



### **DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING** 6<sup>th</sup> SEMESTER ELECTIVES – E-II (Common to CSE&IT)

Subject Code	e: Su	bject N	ame :			]	Гу/Lb/		L	]	Γ/	P/R	C	
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	Pr	erequisi	te: BCS1	8011			Ту		3	0	/0	0/0	3	
L : Lecture T	: Tuto	rial S.	Lr : Supe	ervised	Learnin	ng P:F	Project 1	R : Res	search	C: Cr	edits			
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OBJECTIV	ES :		_											
• To u	ndersta	nd the c	character	istics of	the Int	ernet ar	nd data i	nining						
• To k	now ab	out the	web crav	vling al	gorithm	implei	nentatio	on						
• To s	study th	e web c	lata colle	ction ar	nd analy	sis of v	veb data	t for ne	ew patt	erns				
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CO3		•	Predict h	uman b	ehaviou	ur in so	cial web	o and re	elated	comn	nunities			
CO4		• `	Visualize	social	network	KS .								
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BCS18E09	WEB MINING	Ту	3	0/0	0/0	3	
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#### UNIT I DATA MINING FOUNDATIONS

Association Rules and Sequential Patterns - Basic Concepts of Association Rules - Apriori Algorithm-Data Formats for Association Rule Mining - Mining with Multiple Minimum Supports - Mining Class Association Rules - Basic Concepts of Sequential Patterns - Generating Rules from Sequential Patterns.

UNIT IIINFORMATION RETRIEVAL AND WEB SEARCH9 HrsBasic Concepts of Information Retrieval - Information Retrieval Models - Relevance Feedback -<br/>Evaluation Measures - Text and Web Page Pre-Processing - Inverted Index and Its Compression - Latent<br/>Semantic Indexing - Web Search - Meta-Search - Web Spamming.9 Hrs

 UNIT III
 SOCIAL NETWORK ANALYSIS
 9 Hrs

 Social Network Analysis - Co-Citation and Bibliographic Coupling – Page Rank – HITS- Community Discovery
 9 Hrs

UNIT IVWEB CRAWLING9 HrsA Basic Crawler Algorithm - Implementation Issues - Universal Crawlers - Focused Crawlers - CrawlerEthics and Conflicts.

UNIT VOPINION MINING AND SENTIMENT ANALYSIS9 HrsThe Problem of Opinion Mining - Document Sentiment Classification - Sentence Subjectivity and<br/>Sentiment Classification- Opinion Lexicon Expansion - Aspect-Based Opinion Mining - Mining<br/>Comparative Opinions - Opinion Search and Retrieval.9 Hrs

#### **Total Hours: 45**

9 Hrs

#### **TEXT BOOK:**

1. Bing Liu, 2011, Web Data Mining Exploring Hyperlinks, Contents and Usage Data, , Second Edition, Springer.

#### **REFERENCE BOOK:**

1. Soumen Chakrabarti, 2002, "Mining the Web", Morgan-Kaufmann Publishers, Elseiver.



Subject Code BCS18E10	e: Su	bject Na WEB	ame : DATA l	DESIG	N & M	ANAG	EMEN	Т	Ty/ Lb/ ETI	L	T/ S.Lr	P/R	С
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Ty/Lb/ETL :	Theor	y/Lab/E	mbedded	Theory	and L	ab	5						
OBJECTIV	ES :												
• The stude	ents wi	ll be abl	le to anal	ysis and	i evalua	ate to pi	opose a	a new w	eb site l	based	d upon	recent t	rend
• To learn	to dev	elop a c	lient-serv	ver base	ed appli	ication	using se	erver an	d client	side	e script	ing lang	guages like
Java scri	pt, JSP	, ASP a	nd PHP.										-
• To learn	n to develop a dynamic web site using scripting languages and the technologies like XML, AJAX.												
• The stud	ent wil	l learn l	now to p	lan, des	ign, tes	ting an	d produ	iction a	nd post-	- pro	duction	n proces	s in a web
site desig	gning.												
• The stude	ent wil	l have th	ne ability	to desi	gn a sta	tic and	dynami	c web s	ite base	d up	on the	end use	r need.
COURSE O	UTCO	MES (	C <b>Os</b> ):(2	3- 5)									
CO1	A	Able to e	valuate a	a web si	te								
CO2	A	Ability to	o make a	well in	teractiv	e online	e applic	ations.					
CO3	H	lave kno	owledge	to analy	vsis and	evalua	te on w	eb site a	and desi	gn a	quality	v web si	te.
Mapping of	Cours	e Outco	mes wit	h Progr	ram Ou	itcomes	s (POs)	1	1	T			
COs/POs	PO1	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	<b>PO9</b>	PC	<b>D10</b>	PO11	PO12
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<u>CO2</u>	H	M	H	M	H	H	M	L	H		M	H	H
<u>CO3</u>	H	H	H	H	H	M	M	L	H		M	H	H
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Category	Basic Sciences	Engineering Sciences	Engineering Sciences Humanities and Social Sciences Program Core Open Electives Practical / Project Internships / Technical Skill Soft Skills										



BCS18E10	WEB DATA DESIGN & MANAGEMENT	Ту	3	0/0	0/0	3
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#### UNIT I SITE ORGANIZATION AND NAVIGATION

User centered design – Web medium – Web design process – Evaluating process – Site types and architectures – Navigation theory – Basic navigation practices – Search – Site maps

#### UNIT II ELEMENTS OF PAGE DESIGN

Browser compatible design issues - Pages and Layout – Templates – Text – Color – Images – Graphics and Multimedia - GUI Widgets and Forms – Web Design patterns.

#### UNIT III SCRIPTING LANGUAGES

Client side scripting: XHTML – DHTML– JavaScript– XML Server side scripting: Perl – PHP – ASP/JSP Designing a Simple web application.

#### UNIT IV PRE-PRODUCTION MANAGEMENT

Principles of Project Management – Web Project Method – Project Road Map – Project Clarification – Solution Definition – Project Specification – Content – Writing and Managing content.

#### UNIT V PRODUCTION, MAINTENANCE AND EVALUATION

Design and Construction – Testing, Launch and Handover – Maintenance – Review and Evaluation – Case Study

#### **Total Hours: 45**

#### **TEXT BOOKS:**

- 1. Themas A. Powell (2003) The Complete Reference Web Design (3rd ed.), Tata McGraw Hill
- 2. Ashley Friedlein (2001) Web Project Management, Morgan Kaufmann Publishers
- 3. H. M. Deitel, P. J. Deitel, A. B. Goldberg (2004)*Internet and World Wide Web How to Program*(3<sup>rd</sup> ed.) Pearson Education

#### **REFERENCE BOOKS:**

- 1. Joel Sklar (2001)Principles of Web Design, Thomson Learning
- 2. Van Duyne, Landay, and Hong (2006)The Design of Sites: Patterns for creating winning websites (2<sup>nd</sup> edition.) Prentice Hall
- 3. Lynch, Horton and Rosenfeld (2002) Web Style Guide: Basic Design Principles for Creating Web Sites (2<sup>nd</sup> edition.) Yale University Press.

# 9 Hrs

9 Hrs

9 Hrs

9 Hrs



Subject 0 BCS18E	Code: 211	Subjec	t Name <b>RI</b>	: SK MA	NAGE	MENT			Ty/Lb/ ETL	L	T/ S.L	r P/	R	С				
		Prereq	uisite: N	IL					Ту	3	0/0	) 0/	0	3				
L : Lectu Ty/Lb/E	ire T : T TL : The	utorial eory/Lab	S.Lr : S Embed	upervis ded The	ed Lear eory and	ning P I Lab	: Projec	t R : F	: Research C: Credits									
OBJEC	TIVES Identify	and cate	gories th	ne vario	us risks	face by	an orga	anizatio	on									
• ]	Explain the various risk control measures available Design a risk management program for a business organization.																	
COURS	RSE OUTCOMES (COs) : ( 3- 5)																	
CO1	demonstrate knowledge of the range of financial and financial related risks facing organizations																	
CO2	understand the approach to risk management through risk identification, risk measurement and risk management (or mitigation)																	
CO3	understand operational risk and how to manage it.																	
Mappin	g of Cou	urse Ou	tcomes	with Pr	ogram	Outcon	nes (PO	s)		-								
COs/P Os	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO	10	PO11	PC	012				
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CO2	L	L	Μ	Н	Η	Μ	Μ	Η	Н	Η		L	Η					
CO3	H	M	L	H	M	L	H	M	L	L		M	M					
COs / PSOs	PS	01	PS	02	PS	03	PS	504	P	805		F	'SO6					
CO1	Н		Μ		Μ		Μ		Н	Η		Μ	Μ					
CO2	N	Л	Μ		Μ		L		Μ	Η		Μ	Η					
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H/M/L 1	ndicate	s Streng	th of Co	orrelati	on H-	High,	M- Mee	lium, l	L-LOW				1					
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical	Soft Skills									





BCS18E11 RISK MANAGEMENT	Ту	3	0/0	0/0	3
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#### UNIT I THE RISK MANAGEMENT PROCESS

Introduction to software risk management, why do we need to manage risk in software development, Use, Objectives, Risk Management Paradigm, Risk management and litigation. Models for Risk Management.

#### UNIT II DISCOVERING RISK IN SOFTWARE DEVELOPMENT

Risk attributes and Identification, Identifying software risk, Common software project risks, Risk Taxonomy, Risk Mapping, statements, reviews., Risk ownership and stakeholder management.

#### UNIT III RISK ASSESSMENT

Objectives and goals. Approach to assessment, Risk assessment tools and techniques, presenting the risk findings.

#### UNIT IV PLANNING RISK MITIGATION STRATEGIES

Risk Planning, Best practices in the risk planning, Risk management tools, Risk mitigation strategies, Formulating and Implementing risk management plans.

#### UNIT V MONITORING RISK IN SOFTWARE PROJECTS

Developing a process for monitoring risk, formulating a project risk database, Managing and tracking risk, Risk support tools. Software Risk Metrics, organization, estimation, development methodology.

#### **Total Hours: 45**

#### **TEXT BOOKS:**

- 1. Yacov Y. Haimes, (2011) Risk Modeling, Assessment, and Management, Wiley
- 2. John Mcmanus,(2004) Risk Management in software development projects,Elsevier Butterworth-Heinemann

#### **REFERENCE BOOKS:**

- 1. Martin Loosemore, John Raftery, (2006) Risk management in projects, Taylor & Francis Ltd
- 2. Ravindranath P. C, (2007) Applied Software Risk Management, Auerbach,
- 3. Dale Walter Karolak,,(1995) Software engineering risk management, Wiley-Ieee Computer Society

#### **9 Hrs** ent. Us

9 Hrs

#### 9 Hrs the ris

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Subject Code:	:	Subje	ct Nam	ne :				Ty/				
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OBJECTIVE	ES:											
The student	will be a	able :										
• Under	rstand OS	SI secur	rity arcl	hitectu	re and	classic	al encry	yption to	echnique	3.		
• gain b	basic kno	wledge	on the	numb	er theo	ry.						
• Under	rstand va	rious bl	lock cip	oher m	odes.							
• unde	erstands th	ne prino	ciples o	of publi	c key o	cryptos	ystems	, and di	fferent m	essage au	thenticati	ion and
integr	ity techn	iques										
COURSE OU	TCOM	ES (CC	<b>)s):(</b> 3	5-5)	£ (1	(- (- N	( <b>.</b> 1.	•			1 - 44 1	
COI	To iden	tify the	major	types of	of threa	its to N	etwork	securit	y and the	associate	d attacks	
CO2	To deve	elop sti	rategies	s to pr	otect c	organiz	ation i	nformat	ion asset	s from co	ommon a	attacks,
	understa	and how	v secur	ity poli	icies, s	tandaro	is and p	practice	s are dev	eloped		
CO3	To desig	gn, ana	lyse an	d imple	ement o	differe	nt netw	ork secu	urity prot	ocols		
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COs/POs	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO	PO1 0	PO1 1	PO1 2
COs/POs CO1	PO1 H	PO2 H	PO 3 H	PO 4 M	PO 5 M	PO 6 M	PO 7 M	PO8 M	PO9	PO1 0 L	PO1 1 L	PO1 2 L
COs/POs CO1 CO2	PO1 H H	PO2 H M	PO 3 H H	PO 4 M M	PO 5 M H	PO 6 M M	PO 7 M M	PO8 M M	PO9 M M	<ul> <li>PO1 0</li> <li>L</li> <li>L</li> </ul>	PO1 1 L L	PO1 2 L L
COs/POs CO1 CO2 CO3	PO1 H H H	PO2 H M H	PO 3 H H H	PO 4 M M M	PO 5 M H H	PO 6 M M M	PO 7 M M M	PO8 M M M	PO9 M M M	<ul> <li>PO1 0</li> <li>L</li> <li>L</li> <li>L</li> </ul>	PO1 1 L L L	PO1 2 L L L
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COs/POs CO1 CO2 CO3 COs / PSOs CO1	PO1 H H H PS( H	PO2 H M H D1	PO 3 H H H PS L	PO 4 M M O2	PO 5 M H H PS M	PO 6 M M M O3	PO 7 M M M H M	PO8 M M M PSO4	PO9 M M M L	PO1 0 L L L PSO5	PO1 1 L L L H H	PO1 2 L L L 506
COs/POs CO1 CO2 CO3 COs / PSOs CO1 CO2 CO2	PO1 H H H PS( H H	PO2 H M H D1	PO 3 H H H PS L L L	PO 4 M M O2	PO 5 M H H PS M M	PO 6 M M O3	PO 7 M M M M M M	PO8 M M M PSO4	PO9 M M M L L L	PO1 0 L L L PSO5	PO1 1 L L L H H	PO1 2 L L L SO6
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COs/POs CO1 CO2 CO3 CO5 / PSOs CO1 CO2 CO3 H/M/L indica	PO1 H H H H H H H H ates Stree	PO2 H M H D1	PO 3 H H H PS L L L Corre	PO 4 M M O2 lation	PO 5 M H H PS M M M H-H	PO 6 M M O3 ligh, M	PO 7 M M M M M 1- Med	PO8 M M M PSO4	PO9 M M L L L L -Low	PO1 0 L L L PSO5	PO1 1 L L H H H	PO1 2 L L 506
COs/POs CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L indica	PO1 H H H H H H H ates Stree	PO2 H M H D1	PO 3 H H H PS L L L Corre	PO 4 M M O2 lation	PO 5 M H H PS M M M H- H	PO 6 M M O3	PO 7 M M M M M M 1- Med	PO8 M M M PSO4	PO9 M M M L L L L -Low	PO1 0 L L PSO5	PO1           1           L           L           H           H           H	PO1 2 L L L SO6
COs/POs CO1 CO2 CO3 COs / PSOs CO1 CO2 CO3 H/M/L indica	PO1 H H H H H H H ates Stree	PO2 H M H D1	PO 3 H H H PS L L L Corre	PO 4 M M O2 lation	PO 5 M H H PS M M M H-H	PO 6 M M O3 Iigh, N	PO 7 M M M M M 1- Med	PO8 M M M PSO4	PO9 M M M L L L L -Low	PO1 0 L L PSO5	PO1 1 L L H H H	PO1 2 L L L SO6
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COs/POs CO1 CO2 CO3 CO5 / PSOs CO1 CO2 CO3 H/M/L indica	PO1 H H H H H H ates Stree	PO2 H H D1	PO 3 H H H PS L L L Corre	PO 4 M M O2 lation	PO 5 M H H PS M M H-H	PO 6 M M O3 Iigh, N	PO 7 M M M M M 1- Med	echnical Skill minimited and a second	PO9 M M L L L L -Low	PO1 0 L L L PSO5	PO1 1 L L H H H	PO1 2 L L SO6
COs/POs CO1 CO2 CO3 CO3 CO5 / PSOs CO1 CO2 CO3 H/M/L indica	PO1 H H H H H H H H S S S	PO2 H M H D1	and Social Socia	PO 4 M M O2 lation	PO 5 M H H M M M H-H S S S S S S S S S S S S S S S S S S	PO 6 M M O3 Iigh, N	PO 7 M M M M M I- Med	/ Lechnical Skill M M SO4	PO9 M M L L L L -Low	PO1 0 L L PSO5	PO1 1 L L H H H	PO1 2 L L L SO6
COs/POs CO1 CO2 CO3 CO3 CO1 CO2 CO3 CO1 CO2 CO3 H/M/L indica	PO1 H H H H H H H ates Stree	PO2 H M H D1	PO 3 H H H PS L L Corree	PO 4 M M O2 lation	PO 5 M H H PS M M H-E	PO 6 M M O3 Iigh, N	PO 7 M M M M I- Med	ips / Technical Skill ni	PO9 M M L L L -Low	PO1 0 L L PSO5	PO1 1 L L H H H	PO1 2 L L 506
COs/POs CO1 CO2 CO3 CO3 CO5 / PSOs CO1 CO2 CO3 H/M/L indica	PO1 H H H H H H H H ates Stree	PO2 H M H D1	anities and Social H H H D Corre	PO 4 M M O2 lation	am Election and the section of the s	PO 6 M M M O3 Iigh, N	PO 7 M M M M M M A I- Med	PO8 M M M SO4 SO4	PO9 M M L L L L -Low	PO1 0 L L PSO5	PO1 1 L L H H H	PO1 2 L L SO6
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COs/POs CO1 CO2 CO3 CO3 CO1 CO2 CO3 H/M/L indica	PO1 H H H H H H ates Stree	PO2 H M H D1 ngth of	Humanities and Social Action Social Action Social Sciences	Program Core	Program Electives	PO 6 M M O3 Iigh, M	Practical / Project M M M M I- Med	Internships / Technical Skill <b>m</b>	PO9 M M L L L -Low	PO1 0 L L PSO5	PO1 1 L L H H H	PO1 2 L L 506



3 Ty 0/0 0/0 3 **BCS18E12 CRYPTOGRAPHY AND NETWORK SECURITY** 

#### UNIT I INTRODUCTION & NUMBER THEORY

OSI security architecture - Security attacks ,Services and Mechanisms - -Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, stenography)- **NUMBER THEORY**: Modular arithmetic-Euclid's algorithm- Fermat's and Euler's theorem- The Chinese remainder theorem- Discrete logarithms.

#### UNIT IIBLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY9 Hrs

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES -RC5 algorithm. **Public key cryptography:** Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange--Elliptic curve cryptography.

# UNIT IIICRYPTOGRAPHIC DATA INTEGRITY ALGORITHMS9 HrsAuthenticationrequirement – Authentication function – MAC – Hash function – Security of hash

function and MAC – MD5 - SHA - HMAC – CMAC - Digital signature and authentication protocols-DSS.

#### UNIT IV NETWORK SECURITY PRACTICE

Authentication Applications – Kerberos – X.509 Authentication Service – Electronic mail Security – Pretty Good Privacy – S/MIME – IP Security – Web Security.

#### UNIT V SYSTEM SECURITY

Intruders – Intrusion Detection – Password Management – Malicious Software – Viruses and Related Threats -Viruses Countermeasures – Distributed Denial of Service Attacks - Firewalls – Firewall Design Principles – Trusted Systems.

#### **Total Hours: 45**

#### **TEXT BOOK:**

1. William Stallings (2011) *Cryptography And Network Security – Principles and Practices*, (5th ed.) Pearson Education.

#### **REFERENCE BOOKS:**

- 1. Atul Kahate (2008) Cryptography and Network Security Tata McGraw Hill
- 2. Bruce Schneier (2007) Applied Cryptography, John Wiley & Sons Inc.
- 3. Charles B. Pfleeger, Shari Lawrence Pfleeger (2007) Security in Computing (4th ed.), Pearson Education

### 9 Hrs

## 9 Hrs



Subject Code:	Subje	ct Nam	e :				Ty/		<b>T</b> /						
BCS18E13	M(	OBILE	ADHC	DC NE	ГWOR	KS	Lb/ ETL	L	I/ S.Lr	P/R	(	C			
	Prerec	quisite:	BIT18	I01			Ту	3	0/0	0/0		3			
L : Lecture T : Tut	orial	S.Lr : S	upervis	ed Lea	rning I	P: Proje	ect R:	Researc	ch C: Ci	redits					
Ty/Lb/ETL : Theorem	ry/Lab/	Embed	ded The	eory an	d Lab										
<b>OBJECTIVES :</b>															
Knowl	ledge of	f mobil	e ad ho	c netwo	orks, de	sign an	d imple	mentati	on issu	es, and a	vailable				
solutio	ons.														
knowle	edge of	routing	g mecha	nisms											
Knowl	ledge of	f the 80	2.11 W	ireless	Lan (W	/iFi) an	d Bluet	ooth sta	ndards						
• This in	ncludes	their de	esigns, o	operatio	ons, plu	is appro	aches to	o interc	perabil	ity.					
COURSE OUTC	OMES (COs) : (3-5)														
C01	Have	Have gained an understanding of the current topics in MANETs and WSNs, both from													
	an inc	an industry and research point of views.													
CO2	Have	an und	erstandi	ng of t	he prind	ciples o	f mobil	e ad ho	c netwo	orks (MA	NETs) a	and			
	what	what distinguishes them from infrastructure-based networks.													
CO3	Under	rstand h	now pro	active	routing	protoco	ols func	tion and	d their i	mplicati	ons on d	ata			
	transmission delay and bandwidth consumption.														
Mapping of Cours	se Outo	comes v	with Pr	ogram	Outco	mes (P	Ôs)								
COs/POs	<b>PO1</b>	PO2	PO3	PO4	PO5	PO <sub>6</sub>	<b>PO7</b>	<b>PO8</b>	PO9	<b>PO10</b>	PO11	PO12			
CO1	Н	Μ	Μ	L	Μ	L	L	L	L	Μ	L	L			
CO2	Н	Н	Μ	L	Μ	L	L	L	L	Μ	L	L			
CO3	Н	Μ	Μ	L	Μ	L	L	L	L	Μ	L	L			
COs / PSOs	PS	01	PS	02	PS	03	PS	04	PS	605	PS	06			
CO1	Н		Μ		L		L		Н		L				
CO2	Н		L		L		Μ		Μ		L				
CO3	Н		Μ		L		Μ		L		L				
H/M/L indicates S	Strengt	h of Co	orrelati	on H	- High,	, M- M	edium,	L-Low	7						
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#### UNIT I INTRODUCTION

Introduction to adhoc networks – definition, characteristics features, applications -Characteristics of Wireless channel, Adhoc Mobility Models:- Indoor and outdoor models.

#### UNIT II MEDIUM ACCESS PROTOCOLS

MAC Protocols: design issues, goals and classification. Contention based protocols- with reservation, scheduling algorithms, protocols using directional antennas. IEEE standards: 802.11a, 802.11b, 802.11g, 802.15. HIPERLAN.

#### UNIT III NETWORK PROTOCOLS

Routing Protocols: Design issues, goals and classification. Proactive Vs reactive routing, Unicast routing algorithms, Multicast routing algorithms, hybrid routing algorithm, Energy aware routing algorithm, Hierarchical Routing, QoS aware routing.

#### UNIT IV END-END DELIVERY AND SECURITY

Transport layer : Issues in designing- Transport layer classification, adhoc transport protocols. Security issues in adhoc networks: issues and challenges, network security attacks, secure routing protocols.

#### UNIT V CROSS LAYER DESIGN AND INTEGRATION OF ADHOC FOR 4G 9 Hrs

Cross layer Design: Need for cross layer design, cross layer optimization, parameter optimization techniques, Cross layer cautionary perspective. Integration of adhoc with Mobile IP networks.

**Total Hours: 45** 

#### **TEXT BOOKS:**

- 1. C.Siva Ram Murthy and B.S.Manoj (2007) Ad hoc Wireless Networks Architectures and Protocols, (2nd ed.), Pearson Education
- 2. Charles E. Perkins (2000) Ad hoc Networking , Addison Wesley

#### **REFERENCE BOOKS:**

1. Mohammad Ilyas (2002) The handbook of adhoc wireless networks, CRC press,

- 2. T. Camp, J. Boleng, and V. Davies , A Survey of Mobility Models for Ad Hoc Network Research, WirelessCommun. and Mobile Comp., Special Issue on Mobile
- 3. V.T.Raisinhani and S.Iyer (2004) ÉCLAIR; "An Efficient Cross-Layer Architecture for wireless protocol stacks, World Wireless cong., San francisco, CA,

#### 9 Hrs

9 Hrs

9 Hrs



Subject Code: BCS18E14	S	ubject l	Name : TCP/I IMPL	P DES .EMEN	SIGN A NTATI	Ty, Lb, ET	/ / L	T/ S.Lr	P/R	С						
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Ty/Lb/ETL : Th	eory/La	b/Embe	edded 7	Theory	and La	b										
OBJECTIVES	:															
To learn	the principles of TCP / IP and its Architecture and the transport layer protocols															
Underst	and the transport layer protocols ssing and routing															
IP addre	essing and routing <b>FCOMES (COs) : (3-5)</b>															
COURSE OUT	<b>TCOMES</b> (COs) : ( 3- 5)															
CO1	Understand IP Addressing schemes and TCP/IP Architecture															
CO2	Learn the fundamentals of network design and implementation															
CO3	Unde	rstand r	networl	k mana												
CO4	Learn and implement network applications															
Mapping of Co	urse Oi	utcome	s with	Progra	m Out	comes	(POs)									
COs/POs	PO1	PO	PO	PO	PO	PO	PO	PO	PO9	PO1	PO1	<b>PO1</b>				
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CO2	Н	Μ	Μ	L	М	М	М	L	Н	М	Н	Μ				
CO3	Н	Н	Н	Μ	М	Μ	Μ	L	Н	М	Н	Μ				
CO4	Η	Н	Н	Μ	Μ	Μ	Μ	Μ	Н	Μ	Н	Μ				
COs / PSOs	PS	01	PS	02	PS	03	PS	04	PS	05	PS	06				
CO1	H	I	I	I	I		N	Л	ł	I	N	/I				
CO2	I	I	ł	I	N	1	I	I	I	I	I	I				
CO3	H	I	ł	I	N	1	I	H	ŀ	ł	I	I				
CO4	H	I	ł	I	I		I	H	ŀ	ł	I	I				
H/M/L indicate	es Stren	gth of (	Correla	ation	H- Hig	gh, M-	Mediu	m, L-L	ow		L					
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#### UNIT I INTRODUCTION

Protocols and standards-standards organizations-internet standards-internet administration – Protocol layers-OSI model-TCP/IP Protocol suite-addressing.

#### UNIT II UNDERLYING TECHNOLOGIES

Wired LANs: IEEE Standards, frame format, addressing, Ethernet evolution, standard Ethernet, fast Ethernet Gigabyte Ethernet, Ten-Gigabyte Ethernet-Wireless LAN- Point-to-Point WANS-Switched WANs-Connecting Devices- Case study – developing simple LAN setup using ns-2 simulator

#### UNIT III IP ADDRESSES AND ROUTING

Switching-network layer services- issues- IPv4 Addresses: Classful addressing, classless addressing, special addresses-delivery-forwarding- IPv4: datagrams, fragmentation, options, checksums, IP package-ARP- RARP- ICMP-IGMP- Case study – Analyzing the trace file using awk and plot graph using xgraph.

### UNIT IV UNICAST AND MULTICAST ROUTING PROTOCOLS 9 Hrs

Unicast routing – intra and inter domain routing – distance vector routing :Routing Information Protocol(RIP) – link state routing: Open Shortest Path First (OSPF) – path vector routing: Border Gateway Protocol (BGP) – Multicasting and Multicast routing protocols - Case study – Developing a topology using more than two router and analyze the routing.

#### UNIT V TCP & UDP

Introduction to Transport Layer – Services – Protocols. UDP – user datagram – UDP services – UDP package – UDP applications. TCP – segment - flow control – error control – congestion control – state transition diagram – TCP package. SCTP – services – features – Case study – Develop a network, attach various type TCP variant and analyze the trace file.

#### **Total Hours: 45**

#### **TEXT BOOK:**

1. Behrouz A. Forouzam (2010), "TCP/IP Protocol Suite", 4th Edition, Tata McGraw Hill..

#### **REFERENCE BOOKS:**

- 1. Douglas E. Comer, David L. Stevens (2009), "Internetworking with TCP/IP Volume II, III" 3rd Edition, PHI Learning Private Limited.
- 2. Richard Stevens W., (2011) "TCP/IP Illustrated, The Protocol-Volume I, II, II", 2nd Edition Addison-Wesley Pub Co.
- 3. Dougles E. Comer,(2000) "Internetworking with TCP/IP–Principles, Protocols & Architecture", 4th Edition,Pearson education.

### 9 Hrs

9 Hrs

9 Hrs



Subject Code:	Su C	ıbject N YBER I	ame : FOREN	SICS	AND I	NTER	NET	Ty/ Lb/	L	T/ S.L	/ P	/ <b>R</b>	С		
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OBJECTIV	ES :				<i>.</i>										
• To le	arn the	e compu	ter fore	ensic fu	ndamer	ntals									
• To u	nderstand various types of cyber crime activities involved in the digital world														
To st	tudy various network security technologies to prevent the data from hacker or intruder														
<b>COURSE O</b>	UTCC	<b>MES</b> (	$\overline{COs}$ ):	(3-5)											
CO1	S	tudents	underst	tood ho	w to pr	otect th	e data	or how	to s	ecure	their pe	rsonal ai	nd official		
	d	ata in th	eir con	nputer.											
CO2	Γ	he stud	ents hav	ve the a	warene	ess on d	igital fo	orensic	s fra	uds					
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N	u	sing net	work se	ecurity	technol	logies.	- ( <b>D</b> (	• •							
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BCS18F15	CYBER FORENSICS AND INTERNET	Τv	3	0/0	0/0	3
DC510E15	SECURITY	1 y	5	0/0	0/0	5

#### UNIT I **CYBER FORENSICS FUNDAMENTALS**

Introduction to Cyber forensics: Information Security Investigations, Corporate Cyber Forensics, Scientific method in forensic analysis, investigating large scale Data breach cases. Analyzing Malicious software.

#### UNIT II **COMPUTER FORENSICS TECHNOLOGY**

Types of Computer Forensics Technology, Types of Military Computer Forensic Technology, Types of Law Enforcement: Computer Forensic Technology, Types of Business Computer Forensic Technology, Specialized Forensics Techniques, Hidden Data and How to Find It, Spyware and Adware, Encryption Methods and Vulnerabilities, Protecting Data from Being Compromised Internet Tracing Methods, Security and Wireless Technologies, Avoiding Pitfalls with Firewalls Biometric Security Systems

#### **COMPUTER FORENSICS SYSTEMS** UNIT III

Internet Security Systems, Intrusion Detection Systems, Firewall Security Systems, Storage Area Network Security Systems, Network Disaster Recovery Systems, Public Key Infrastructure Systems, Wireless Network Security Systems, Satellite Encryption Security Systems, Instant Messaging (IM) Security Systems, Net Privacy Systems, Identity Management Security Systems, Identity Theft, Biometric Security Systems

#### UNIT IV **NETWORK SECURITY TECHNIQUES**

Network Security Applications, Authentication Mechanisms: Passwords, Cryptographic authentication protocol, Smart Card, Biometrics, Digital Signatures and seals, Kerberos, X.509 LDAP, Directory. Web Security: SSL Encryption, TLS, SET

#### UNIT V CASE STUDY

E-mail Security, Pretty Good Privacy (PGPs) / MIME, IP Security, Access and System Security, Intruders, Intrusion Detection and Prevention, Firewall, Hardware Firewall, Software Firewall, Application Firewall, Packet Filtering., Packet Analysis, Proxy Servers, Firewall setting in Proxy, ACL in Proxy.

#### **Total Hours: 45**

#### **TEXT BOOKS:**

1. John R. Vacca, (2005) Computer Forensics: Computer Crime Scene Investigation, 2nd Edition, Charles River Media.

2. Man Young Rhee, (2003) "Internet Security Cryptographic Principles, Algorithms and Protocols", WILEY.

#### **REFERENCE BOOKS:**

- 1. William Stallings, "Cryptography and Network Security: Principles and Standards", Prentice Hall India, 3rd Edition, 2003
- 2. Computer Forensics: Investigating Network Intrusions and Cyber Crime (Ec-Council Press Series: Computer Forensics), 2010
- 3. Christof Paar, Jan Pelzl, Understanding Cryptography: A Textbook for Students and Practitioners, 2nd Edition, Springers, 2010.

B.Tech – Computer Science and Engineering (Part Time) – 2018 Regulation

### 9 Hrs

# 9 Hrs

#### 9 Hrs

9 Hrs



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING																		
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<b>OBJECTIVES</b> :	vide a foundation in database security																	
To provid	<ul><li>To provide a foundation in database security</li><li>Understand the various database vulnerabilities</li></ul>																	
• Understar	<ul> <li>Understand the various database vulnerabilities</li> <li>Learn to audit the databases.</li> </ul>																	
• Learn to a	Learn to audit the databases.																	
COURSE OUTCOMES (COs) : ( 3- 5)																		
CO1     To understand the fundamentals of security and architecture.																		
CO2     To identify risks and vulnerabilities in operating systems from a database perspective       CO3     To learn acquirity policies and techniques																		
CO3	To learn security policies and techniques.																	
CO4	To understand the various database security models and their advantages.																	
Mapping of Cou	rse Out	tcomes	with P	rogran	n Outco	mes (P	'Os)											
COs/POs	PO 1	PO 2	PO 3	PO 4	PO5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2						
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CO2	Н	Н	Μ	Н	Н	Н	Μ	Μ	Н	Μ	Н	Μ						
CO3	Н	Н	Н	Н	Μ	Μ	Μ	Μ	Н	Μ	Н	Μ						
CO4	Н	Н	Μ	L	Μ	Μ	Μ	Μ	Н	Μ	Н	Μ						
COs / PSOs	PS	01	PS	02	PSO 3		PSO4		PS	505	PS	06						
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BCS18E16	DATABASE SECURITY	Ту	3	0/0	0/0	3	
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# UNIT I SECURITY ARCHITECTURE & OPERATING SYSTEM SECURITY FUNDAMENTALS

Security Architecture: Introduction-Information Systems- Database Management Systems-Information Security Architecture- Database Security–Asset Types and value-Security Methods Operating System Security Fundamentals: Introduction-Operating System Overview-Security Environment – Components-Authentication Methods-User Administration-Password Policies-Vulnerabilities-E-mail Security.

#### UNIT II ADMINISTRATION OF USERS, PROFILES, PASSWORD POLICIES, PRIVILEGES AND ROLES

Administration of Users: Introduction-Authentication-Creating Users, SQL Server User-Removing, Modifying Users-Default, Remote Users-Database Links-Linked Servers-Remote Servers-Practices for Administrators and Managers-Best Practices Profiles, Password Policies, Privileges and Roles: Introduction-Defining and Using Profiles-Designing and Implementing Password Policies-Granting and Revoking User Privileges-Creating, Assigning and Revoking User Roles-Best Practices.

#### UNIT III DATABASE APPLICATION SECURITY MODELS

Introduction-Types of Users-Security Models: Access Matrix model, Access mode model- Application Types: Client/Server Applications, Web Applications, Data ware house applications- Application Security Models-Data Encryption.

#### UNIT IV VIRTUAL PRIVATE DATABASES

Virtual Private Databases: Introduction-Overview of VPD-Implementation of VPD using Views, Application Context in Oracle-Implementing Oracle VPD-Viewing VPD Policies and Application contexts using Data Dictionary, Policy Manager Implementing Row and Column level Security with SQL Server.

#### UNIT V SECURITY AND AUDITING PROJECT CASES

Case Studies : Developing an online database, payroll management, tracking database changes, developing a secured authorization repository.

#### **Total Hours: 45**

#### **TEXT BOOK:**

1. Hassan A. Afyouni, 2009 "Database Security and Auditing", Third Edition, Cengage Learning.

#### **REFERENCE BOOKS:**

- 1. Charu C. Aggarwal, Philip S Yu, 2008, "Privacy Preserving Data Mining": Models and Algorithms, Kluwer Academic Publishers.
- 2. Ron Ben Natan, 2005, "Implementing Database Security and Auditing", Elsevier Digital Press.

# 9 Hrs

9 Hrs

### 9 Hrs

### 9 Hrs



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# UNIT I ORGANIZATIONS, MANAGEMENT AND THE NETWORKED ENTERPRISE

Information Systems in Global Business- Global E-Business-Information Systems-Strategy Systems-Ethical and Social issues in Information System - Analyzing Business Resource for an Enterprise System.

#### UNIT II IT INFRASTRUCTURE

IT infrastructure- Emerging Technology - Business Intelligence: Databases and Information Management – Telecommunication - Internet and Wireless Technology - Information Security Systems

#### UNIT III KEY SYSTEM APPLICATION FOR THE DIGITAL AGE

Enterprise application- Ecommerce-Digital Markets- Digital Goods- Managing knowledge- Decision Making – Enterprise portal design

#### UNIT IV BUILDING AND MANAGING SYSTEMS

Building Systems - Project Management- Establishing Business values - Managing Change - Managing Global System - Redesigning Business Processes- Case studies

#### UNIT V ADVANCED CONCEPTS IN INFORMATION SYSTEM

Enterprise Resource Planning - modules : Human Resources, Finance – Accounting - Production & Logistics - Supply Chain Management – CRM - Procurement - Management System Object Oriented modeling- case studies

#### **Total Hours: 45**

#### **TEXT BOOKS :**

- 1. James A, O' Brian,(2007) Management information systems ,( 7th ed.), TMH Publisher
- 2. Kenneth C. Laudon, Jane P.(2008) Management Information Systems: Managing the Digital Firms Pearson Education, TMH, 2008.

#### **REFERENCE BOOKS:**

- 1. James A. O'Brien, Northern Arizona University, George M. Marakas, University of Kansas, (2007) Introduction to Information Systems
- 2. Ross and Clagget (2004) Information System for Modern Management, Prentice-Hall of India Pvt. Ltd.
- 3. Alexis Leon, (2007) Enterprise Resource Planning, TMH

#### **9 Hrs** Systems

#### 9 Hrs

### 9 Hrs

#### **9 Hrs** agemer



### DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING 7<sup>th</sup> SEMESTER ELECTIVES E- III (Common to CSE&IT)

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<b>OBJECTIVES :</b>														
Describe	the lin	nitation	s and c	hallen	ges of v	workin	g in a 1	nobile a	and	wirele	ss env	viror	nment	
Describe	and ap	ply the	differe	ent type	es of ap	oplicat	ion mo	dels/arc	hite	ectures	used	to d	evelop	
mobile	softwa	re appli	cations	5.										
Describe	the con	mponer	nts and	structu	re of a	l mobil	e deve	lopment	t fra	mewo	rks			
COURSE OUT	COME	S (CO	s):(3-	- 5)										
CO1	A	Able to	unders	tand th	e vario	ous Mo	bile Pl	atforms	and	l analy	ze its	arch	nitectur	es
CO2		Able to	design	and d	evelop	variou	s Mobi	ile Appl	icat	tions fo	or And	droi	d and A	pple
CO3	1	Able to	develo	op own	mobil	e appli	cation							
Mapping of Cou	rse Ou	itcome	s with	Progra	am Ou	tcome	s (POs	)			_			
COs/POs	PO	PO	PO	PO	PO	PO	PO	PO8	F	<b>PO9</b>	PO	1	PO1	PO1
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BCS18E41	MOBILE APPLICATION DEVELOPMENT	Ту	3	0/0	0/0	3
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#### UNIT I INTRODUCTION

Introduction to Mobile Platforms – Exploring Android Platform – Android Studio, Java, XML – Exploring Apple IPhone Platform – XCode, Objective C, Swift – Options for development

## UNIT II USER INTERFACE (UI) DEVELOPMENT FOR MOBILE APPS 9 Hrs 9 Hrs 9 Hrs 9 Hrs

UI Elements – User Interface Frameworks – Layouts – Gesture based interfaces – Applying Styles & Themes – Adding Settings

#### UNIT III GOOGLE ANDRIOD PLATFORM

Google Application Architecture – Basic Building Blocks - The Android Emulator – Event based programming – SQLite Database Access – ADB – Location based Services

#### UNIT IV APPLE IPHONE PLATFORM

UI Kit for Interfaces - Event Handling and Graphics Services – SQLite Database Access – Application Debugging – Location Handling

#### UNIT V IMPLEMENTING SOFTWARE AS A SERVICE

Service Oriented Computing Examples – Google Maps – Enabling Map based services in Application – Amazon Web Services – Exploring AWS S3 & AWS IoT APIs

#### **TEXT BOOKS:**

- 1. Ed Burnette (2015) Hello, Android: Introducing Google's Mobile Development Platform, 4<sup>th</sup> edition, Pragmatic Bookshelf.
- 2. Marko Gargenta (2011) Learning Android, O'Reilly Media.

#### **REFERENCE BOOKS:**

- 1. Richard Rodger (2012) Beginning Mobile application development in the cloud, Wrox Publication.
- 2. Jonathan A. Zdziarski (2008), iPhone Open Application Development, 2<sup>nd</sup> edition, O'Reilly Media Publication.

### Total hours: 45



9 Hrs

9 Hrs



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CO3	Applying appropriate analytic techniques and tools to analyze big data, create statistical models,													
~ ~ ~ ~	and identify insights that can lead to actionable results													
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3 0/0 Ty 0/0 3 **BCS18E18** DATA SCIENCE AND BIG DATA ANALYTICS

#### **UNIT I INTRODUCTION**

Big data overview - State of the practice in analytics, BI vs data science, current analytical architecture, drivers of big data - Big data ecosystem - Data analytics lifecycle - overview - Discovery Phase - Data preparation Phase - Model Planning Phase - Model building Phase - Communicate results Phase -Operationalisation Phase.

#### BASIC DATA ANALYTIC METHODS USING R **UNIT II**

Introduction to R, R Graphical User interfaces, Data import and export, Attribute and data types, descriptive statistics - Exploratory data analysis, visualization data analysis, dirty data, visualizing a single variable, examining multiple variables, data exploration vs presentation, - Statistical methods for evaluation, Hypothesis testing, Difference of Means, Wilcoxon Rank-sum test, Type I and II errors, power and sample size, ANOVA

#### UNIT III **ADVANCED ANALYTICAL THEORY & METHODS** (CLUSTERING, ASSOCIATION RULES AND REGRESSION) 9 Hrs

Clustering- k-means, use cases, determining the number of clusters, diagnostics, Reasons to choose and cautions, additional algorithms - Association rules- Apriori algorithm, Evaluation of candidate rules, Application of association rules, an example- transactions in a grocery store, the groceries dataset, frequent itemset generation, rule generation and visualization, validation and testing, diagnostics -Regression- linear and logistic regression, usecases, model description, diagnostics - Additional **Regression Models** 

#### **UNIT IV** ADVANCED ANALYTICAL THEORY & METHODS (CLASSIFICATION, TIME SERIES ANALYSIS AND TEXT ANALYSIS) 9 Hrs

Classification - Decision Trees, general algorithm, evaluating a decision tree, Decision trees in R - Naive Bayes - Bayes theorem, Naive Bayes classifier, Smoothing, diagnostics, Additional Classification Methods - Time Series Analysis- Box-Jenkins Methodology, ARIMA Model, Auto correlation Function(ACF), Auto regressive models, moving average models, ARMA and ARIMA Models, building and evaluating a ARIMA Model - Text Analysis- collecting raw text, representing text, term frequency-Inverse document frequency(TFIDF), Categorizing documents by topics, determining sentiments, gaining insights

#### UNIT V ADVANCED ANALYTICS-TECHNOLOGY AND TOOLS: MAPREDUCE **AND HADOOP** 9Hrs

Analytics for unstructured data, usecases, Mapreduce, Apache Hadoop - The Hadoop Ecosystem - Pig, Hive, HBase, Mahout, NoSOL - In-database analytics - SOL Essentials, Joins, Set operations, Grouping extensions, In-Database text analytics, Advanced SQL, Window functions, User-defined functions and aggregates, Ordered Aggregates, MADlib.

#### **Total Hours: 45**

#### **TEXT BOOK:**

1. EMC Education Services (Editor), 2015 Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, Wiley Publications, ISBN: 978-1-118-87613-8

#### 9 Hrs



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L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory/Lab/Embedded Theory and Lab														
<ul> <li>OBJECTIVE :</li> <li>To learn Cloud computing infrastructure and services, to acquire knowledge about cloud storage. to understand cloud computing security and to test web application in cloud platform.</li> </ul>														
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#### UNIT I **CLOUD COMPUTING INTRODUCTION**

Characteristics - cloud models - cloud services - cloud based services and applications - virtualization -Load balancing – deployment – replication – monitoring – MapReduce – Identity and Access management.

#### **UNIT II CLOUD SERVICES AND PLATFORMS**

Compute services – storage services – database services – application services – content delivery services - analysis services - Deployment & management services - identity and Access management services open source private cloud software - Hadoop MapReduce job execution - Hadoop schedulers - Hadoop cluster setup

#### **UNIT III CLOUD APPLICATION DESIGN & PYTHON**

Design consideration for cloud applications - reference architecture for cloud applications - cloud application design methodologies - data storage approaches – Python data types & data structures – control flow - functions - modules - packages - file handling - classes.

#### CLOUD APPLICATION DEVELOPMENT **UNIT IV**

Python for Amazon web services - Google cloud platform - windows Azure - packages of Internet -JSON - XML - HTTPLib and URLLib - Web application framework - Django - design approaches image processing App – document storage app – MapReduce app.

#### UNIT V **ADVANCED APPICATIONS**

Clustering Big Data - Classification of Big Data - multimedia cloud - Streaming protocols - cloud application benchmarking and tuning - workload characteristics - application performance matrix design consideration – benchmarking tools- deployment prototyping – CSA cloud security architecture – authentication – authorization – data security – auditing.

#### **TEXT BOOKS:**

- 1. Arshdeep Bahga et al, "Cloud computing a hands-on approach" Universities press 2014
- Anthony T.Velte et al, "Cloud Computing A Practical Approach" Tata McGraw-Hill 2013 2.
- 3. Zaigham Mahmood et al, "Cloud Computing Concept Technology Architecture" Pearson, 2014.

#### **REFERENCE BOOKS:**

- 1. Barrie Sosinsky, "Cloud Computing Bible" Wiley India Publication 2011
- 2. Rishabh Sharma "Cloud Computing Fundamentals, Industry Approach and Trends" Wiley 2015.
- 3. David Crookes "Cloud Computing in easy steps" McGraw Hill 2012

### 9Hrs

# 9Hrs

#### 9Hrs

**Total Hours: 45** 

#### 9Hrs



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#### UNIT I TECHNICAL FUNDAMENTALS

Concepts in digital evidence- challenges- investigative methodology- sources of network based evidenceprinciples of internetworking-Internet Protocol suite- Evidence acquisition

#### UNIT II PACKET AND STATISTICAL FLOW ANALYSIS

Packet analysis - protocol analysis - flow analysis- higher layer traffic analysis - Statistical Flow analysis:- sensors-flow record export protocols- collection and aggregation- analysis tools and techniques - Case study and Tools Analysis: Wire Shark

#### UNIT III NETWORK INTRUSION DETECTION AND ANALYSIS

NIDS/NIPS functionality- modes of detection-types-NIDS/NIPS evidence acquisition -NIPS/NIDS interfaces -packet logging - Case study and Tools Analysis : Snort

#### UNIT IV NETWORK DEVICES AND SERVERS

Sources of Logs-Network log architecture- collecting and analyzing evidence- Switches- routers – firewalls-interfaces-logging - Case study and Tools Analysis: Angry IP Scanner

#### UNIT V NETWORK TUNNELING AND CASE STUDIES

Tunneling for functionality, confidentiality- covert tunneling- trends in malware evolution-network behavior of malware – future of malware and network forensics - Case study and Tools Analysis : Cuckoo Sandbox

#### **Total Hours: 45**

#### **TEXT BOOK:**

1. Network Forensics : Tracking Hackers Through CyberSpace Sherri Davidoff, Jonathan Ham Pearson Education 2012

#### **REFERENCE BOOKS:**

- 1. Introduction to Security and Network Forensics William J. Buchanan Auerbach Publications 2012
- 2. Handbook of Digital Forensics and Investigations, 1<sup>st</sup> Edition Eoghan Casey ed., Elsevier Academic Press, ISBN 13: 978-0-12-374267-4,.

#### 9 Hrs

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#### UNIT I INTRODUCTION TO IOT

Definition – characteristics of IoT-Physical Design of IoT – Logical Design of IoT- IoT enabling technologies – IoT Levels and Deployment Templates

#### UNIT II IOT AND M2M

**M2M to IoT – A Basic Perspective**– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies.

**M2M to IoT-An Architectural Overview**– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

#### UNIT III IOT PLATFORMS DESIGN METHODOLOGY

Introduction – IoT Design Methodoloy – Case study on IoT system for Weather Monitoring – Motivation of using Python

#### UNIT IV IOT PHYSICAL DEVICES AND ENDPOINTS

IoT Device – Basic building blocks of an IoT Device – Exemplary Device: Raspberry Pi – Linux on Raspberry Pi – Raspberry Pi Interfaces – Raspberry Pi with Python – Simple Programs

#### UNIT V IOT APPLICATIONS FOR VALUE CREATIONS

Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth. Case Studies Illustrating to IoT Design.

#### **Total Hours: 45**

#### **TEXT BOOK:**

1. Vijay Madisetti and Arshdeep Bahga, , 2015"Internet of Things (A Hands-on-Approach)", Universities Press

#### **REFERENCE BOOKS:**

- 1. Francis daCosta, 2013 "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, A press Publications
- 2. Cuno Pfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1-4493-9357-1

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CO2	Use specialist Application Programming Interfaces (APIs) for analysing social media data feeds												
CO3	Unders	Understand the use of graph theory in representing relationships in social networks and distributed											
	systems												
CO4	Unders	Understand and make use of specialist technologies used to harvest, analyse and visualise "social											
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#### UNIT I **BASIC CONCEPTS**

Web 2.0 Introduction – Advantages & Disadvantages of Web2.0 – Business Aspects of Web2.0 – Web2.0 Principles - Characteristics - design aspects - Introduction to Web services.

#### **UNIT II WEB2.0 SERVICES**

Web2.0 Services – Applications –Communication - Blogs – Topic, Event, Marketing, Learning, Scholarly - Wiki – Wikia, Wetpaint, Pbwiki, Wikispaces -Podcasting, Vodcasting - 21st century skills -Social Networking- Social Bookmarking - RSS & Syndication -Newer Web2.0 services and Applications

#### **UNIT III TECHNOLOGY**

Ajax – Alternatives to Ajax – Open APIs – SOAP – REST - Microformats – Client side technologies – Web gateway - Security Challenges with Web2.0 - Content Management System(CMS)

#### **UNIT IV APPLICATION CREATION**

DOJO toolkit - Creation of Application with DOJO, JSON, Adobe Flex, Cloud computing, Hadoop -Building Offline Applications using Adobe AIR.

#### UNIT V CASE STUDIES

Teaching & Learning Issues - Research - Academic Publishing - Library - Repositories - Archiving -Future of Web2.0 – Web2.0 & Semantic Web – Emergence of Web Science.

## **Total Hours: 45**

## **REFERENCE BOOKS:**

- 1. shelly / Frydenberg, 2011, "Web2.0- concepts & Applications", Cengage Learning.
- Gwen Solomon, Lynne Schrum, 2007, "Web 2.0 new tools, new schools", ISTE Publication. 2
- 3. www.jisc.ac.uk JISC Technology and Standards Watch, Feb. 2007 Web 2.0(PDF)
- 4. Web2.0 Tutorials(from web)
- 5. Mastering Web2.0 Technologies(from web)
- 6. www.dojotoolkit.org

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CO3	Identi	entify critical success factors for common enterprise architect approaches											
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## UNIT I INTRODUCTION

TOGAF- General Presentation-Keypoints-ADM Method: ADM Cycle-The Phases of the ADM-Iterations-ADM Techniques and Guidelines. **Components of TOGAF Architecture:** Architecture components-The Metamodel-Artifacts-Building Blocks-Deliverables. Repository and Governance: Architecture Repository-Architecture Governance.

## UNIT II KEY MODELING TECHNIQUES

Models: Benefits Uses and Characteristics-The concepts of viewpoints-Special role played by diagramsconsistency and traceability-Architecture Repository-Risks and main difficulties-Repository governance-Tools and Languages. **TOGAF Models:** TOGAF Artifacts-UML and BPMN for TOGAF Modeling-**Model Vision**: Stakeholder Matrix-Artifacts linked to Goals, Requirement, and Business Process-Solution Concept Diagram-Value Chain Diagram.

## UNIT III MODEL BUSINESS ARCHITECTURE

Business Dictionary Artifacts-Artifacts linked to Enterprise Organization, function and Services, Business Processes, Data. Information System Architecture: Application Communication Diagram-Migration Diagram- User Location Diagram-System use Case Diagram-Process System Realization Diagram-Enterprise Manageability diagram-Data Architecture-Service Data Diagram-

## UNIT IV TECHNOLOGY ARCHITECTURE

Environment and Location Diagram-Processing Diagram-Network Computing Hardware Diagram-Benefits Diagram. SOA Processes and Information:SOA-Business Processes-Information-TOGAF Within AMUE, EDF. Archimate.

## UNIT V

Draw Business Process Diagram Using UML and BPMN.

### **Total Hours: 45**

## **TEXT BOOK:**

1. Philippe Desfray, Gilbert Raymond (2014) – Modelling Enterprise Architecture with TOGAF A Practical Guide Using UML and BPMN. Elsevier Pub.

## **REFERENCE BOOKS:**

Peter Rittgen, (2007)-Enterprise Modeling and Computing with UML, Idea Group Publishing.
 Marc Lankhorst et al (2013), The Enterprise Engineering Series, Springer

## 9 Hrs

## 9 Hrs

9 Hrs

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<b>OBJECTIVES</b> :														
• To und	erstan	d impor	tance of	f optim	ization	of indu	istrial p	rocess	s man	agemen	nt and ap	ply basic	2	
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• To ana	lyse ai	nd appre	eciate va	ariety o	of perfor	rmance	measur	res foi	vario	ous opti	imization	n probler	ns	
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CO2	J	Jndersta	derstand the different methods of optimization and be able to suggest a technique											
	f	or a spe	r a specific problem.											
CO3	U	Jndersta	and how	optim	ization	can be	used to	solve	indu	strial p	roblems	of releva	nce to	
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BCS18E23	<b>OPTIMIZATION TECHNIQUES</b>	Ту	3	0/0	0/0	3	
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#### UNIT I INTRODUCTION TO OPERATION RESEARCH

Operation Research approach, scientific methods, introduction to models and modeling techniques, general methods for Operation Research models, methodology and advantages of Operation Research, history of Operation Research.

#### **UNIT II** LINEAR PROGRAMMING (LP)

Introduction to LP and formulation of Linear Programming problems, Graphical solution method, alternative or multiple optimal solutions, Unbounded solutions, Infeasible solutions, Maximization -Simplex Algorithm, Minimization - Simplex Algorithm using Big-M method, Two phase method, Duality in linear programming, Integer linear programming.

#### **UNIT III TRANSPORTATION & ASSIGNMENT PROBLEMS**

Introduction to Transportation problems, various methods of Transportation problem, Variations in Transportation problem, introduction to Assignment problems, variations in Assignment problems

#### UNIT IV **NETWORK ANALYSIS**

Network definition and Network diagram, probability in PERT analysis, project time cost trade off, introduction to resource smoothing and allocation.

#### UNIT V **SEQUENCING**

Introduction, processing N jobs through two machines, processing N jobs through three machines, processing N jobs through m machines. Inventory Model: Introduction to inventory control, deterministic inventory model, EOQ model with quantity discount. Queuing Models: Concepts relating to queuing systems, basic elements of queuing model, role of Poison & exponential distribution, concepts of birth and death process.

## **Total Hours: 45**

## **REFERENCE BOOKS:**

- 1. J K Sharma, Operations Research Theory and Applications, MacMillan India Ltd.
- 2. ND Vohra, Quantitative Techniques in management, Tata McGraw Hill.
- 3. Handy A Taha, Operations Research An Introduction, Prentice Hall of India, New Delhi.
- 4. Wagner H M, Principles of Operations Research: With Applications to Management Decisions, Prentice-Hall of India, New Delhi.

## 9 Hrs

9 Hrs

### 9 Hrs

## 9 Hrs



### DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING 8<sup>th</sup> SEMESTER ELECTIVES E-IV AND E-V (Common to CSE&IT)

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Subject Code: BCS18E24	Subject Name : INFORMATION STORAGE MANAGEMENT	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	С
	Prerequisite: BCS18004	Ту	3	0/0	0/0	3
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 $\label{eq:L} L: Lecture \ T: Tutorial \quad S.Lr: Supervised \ Learning \ P: Project \ R: Research \ C: Credits \\ T \ / \ L/ \ ETL: Theory \ / Lab \ / Embedded \ Theory \ and \ Lab$ 

## **OBJECTIVES :**

- Provides a comprehensive understanding of the various storage infrastructure components in data center environments.
- It enables participants to make informed decisions on storage-related technologies in an increasingly complex IT environment
- The adoption of software-defined infrastructure management and third platform technologies.
- It provides a strong understanding of storage technologies and prepares participants for advanced concepts, technologies, and processes.
- To learn the architectures, features, and benefits of intelligent storage systems
- Includes block-based, file-based, object-based, and unified storage; software-defined storage; storage networking technologies such as FC SAN, IP SAN, and FCoE SAN; business continuity solutions such as backup and replication; the highly-critical area of information security; and storage infrastructure management.

COURS	URSE OUTCOMES (COs) : (3-5)														
<b>CO1</b>	Evaluate storage architectures, including storage subsystems, DAS, SAN, NAS, CAS														
<b>CO2</b>	Def	ine bac	kup, ree	covery,	disaste	r recov	ery, bu	siness c	continuit	y, and r	eplication				
<b>CO3</b>	Und	lerstand	1 logica	l and pl	hysical	compo	nents o	f a stora	age infra	structu	re				
<b>CO4</b>	Ider	ntify co	mponei	nts of m	nanagin	g and n	nonitor	ing the	data cen	ter					
CO5	Define information security and identify different storage virtualization technologies														
Mappin	apping of Course Outcomes with Program Outcomes (POs)														
COs/PO	'Os         PO1         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11         PO12           H <td< th=""></td<>														
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BCS18E24	INFORMATION STORAGE MANAGEMENT	Ту	3	0/0	0/0	3
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### UNIT I STORAGE SYSTEMS

Information Storage - Evolution of Storage Technology and Architecture – Data Centre – Infrastructure – ILM – Components of Storage System Environment – Logical Components of Host RAID: Implementation, levels & comparison – ISS components, Intelligent Storage Array.

### UNIT II STORAGE TECHNOLOGIES

Networking Technologies & Virtualization DAS – SCSI – SAN – NAS –IPSAN – CAS –Forms of Virtualization.

## UNIT III BUSINESS CONTINUITY

Information availability – BC Planning Life Cycle failure analysis – Backup & Recovery – Local Replication – Remote Replication.

## UNIT IV STORAGE SECURITY

Storage Security Framework – Risk Triad – Storage Security Domains – Security Implementation in Storage Networking.

### UNIT V MANAGING STORAGE INFRASTRUCTURE

Infrastructure – Storage Management Activities and Challenges – Developing an Ideal solution. Total Hours: 45

## **TEXT BOOK:**

1. EMC Corporation, Information Storage and Management, Wiley India, 2<sup>nd</sup> edition 2012

### **REFERENCE BOOKS:**

1. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, 2003.

2. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne, 2001.

## 9Hrs

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CO1	1	Understand the use of network infrastructure Recognize the importance and relevance of VLANs and EIGRP													
CO2	]	Recognize the importance and relevance of VLANs and EIGRP													
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Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills						
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BCS18E25	NETWORK INFRASTRUCTURE MANAGEMENT	Ту	3	0/0	0/0	3	

#### **UNIT I INTERNETWORKING & IP ADDRESSING**

Internetworking Models – Layered Approach – OSI Reference Models – Ethernet Networking – Cabling - Data Encapsulation - Three Layer Hierarchical model - core layer - distribution layer - Access layer -TCP/IP and DoD Model – IP Addressing – Hierarchical IP Addressing scheme - Broadcast Address.

#### UNIT II SUBNETTING, VLSM AND IOS

Subnetting basics - CIDR - VLSM Design - Summarization - Troubleshooting IP Addressing - IOS user interface - CLI - Router and switch Administrative Configuration - Router Interfaces - viewing, saving, and erasing configuration

#### MANAGING INTERNETWORK AND IP ROUTING UNIT III

Internal component of a Router – routing boot sequence – configuration register – backing up and restoring configuration - CDP - resolving hostnames - Checking network connectivity - IP routing basics - Static routing - default routing - dynamic routing - RIP - IGRP

#### **UNIT IV** EIGRP, OSPF, STP AND VLANS

EIGRP features - RTP - DUAL - EIGRP to support large Networks - Configuring EIGRP - Load balancing – OSPF terminology – Configuring and verifying OSPF – DR and BDR elections – Loopback interfaces - troubleshooting - STP spanning tree terms and operations - VLANs Basics - memberships -VTP - Configuring VLAN - Inter VLAN routing.

#### ACLS, NAT AND WIRELESS TECHNOLOGIES UNIT V

Access Lists, VTY access, advanced Access List, Named ACLs, monitoring Access List, configuring access list - NAT names - PAT configuration - NAT using SDM - Wireless technologies - Unified wireless solutions - split MAC architecture - MESH and LWAPP - wireless security

### **Total Hours: 45**

## **TEXT BOOKS:**

- 1. Todd Lammle, 2011 "CCNA Cisco Certified Network Associate study guide Wiley India.
- 2. Brian Hill, 2013 "The complete Reference Cisco " Tata McGraw-Hill.

### **REFERENCE BOOKS:**

- 1. Richard Deal, 2013 "CCNA Cisco Certified Network Associate study guide" Tata McGraw-Hill.
- 2. Steven Latre et al 2015 "Intelligent Mechanism for Network Component and Security" Springer.

## 9Hrs

9Hrs

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BCS18E26 FOUNDATIONS OF PARALLEL PROGRAMMING	Ту	3	0/0	0/0	3	
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#### UNIT I CONCURRENT PROGRAMMING CONCEPTS

Concurrent programming concepts, Techniques for parallelizing programs, Shared Variable Programming: Process and Synchronisation - Synchronization, atomic actions, and await statements, Semantics of concurrent programs; ways to avoid interference, Safety and liveness properties; Critical sections: spin locks, efficient spin locks; fair solutions, Parallel programming concepts; bag of tasks paradigm; Pthreads library, Barriers: counter, coordinator, combining tree, Symmetric barriers; data parallel algorithms, Parallel scientific computing

#### SEMAPHORES AND MONITORS **UNIT II**

Semaphores: mutual exclusion, signaling, split binary, resource counting, dining philosophers, readers/writers, passing the baton, resource allocation and scheduling, Implementations of Semaphores in kernels, multiprocessors;

Monitors: basic concepts, signaling disciplines, synchronization techniques, larger examples; use in Java, Pthreads, Implementation of Monitors in Kernel

#### **UNIT III** MESSAGE PASSING AND RMI

**Message passing**: basic concepts and examples, clients and servers, file servers, interacting peers, Synchronous, Message passing in MPI, and Java; Remote operations; RPC; Java RMI, Rendezvous, distributed readers and writers

#### **UNIT IV** PROCESS INTERACTION AND DISTRIBUTED PROGRAMMING 9Hrs

Process interaction Paradigms: Managers/Workers, heartbeat algorithms; pipeline algorithms, Probe/Echo Algorithm, Broadcast Algorithm, Token Passing Algorithms - Distributed programming: replicated files, dining philosophers, distributed file systems

#### UNIT V PARALLEL PROGRAMMING

Speed and Efficiency, Overhead and Challenges – Scientific Computing : Grid Computations, Particle Computations, Matrix Computations - Case Study of Parallel Programming Libraries in Pthread, MPI and OpenMP - Parallelizing Compilers - Other Parallel Programming Models - Parallel **Programming Tools** 

### **TEXT BOOK:**

1. Greg Andrews ,2000, Foundations of Multithreaded, Parallel, and Distributed Programming. Addison-Wesley, Digitized in 16 Nov 2007, ISBN 0201357526, 9780201357523

### **REFERENCE BOOK:**

1. Zbigniew J. Czech, 2016, Introduction to Parallel Computing, Cambridge University Press, ISBN 1316802787, 9781316802786

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## **Total Hours: 45**



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#### **OVERVIEW OF VIRTUALIZATION** UNIT I

Basics of Virtualization - Virtualization Types - Desktop Virtualization - Network Virtualization -Server and Machine Virtualization - Storage Virtualization - System-level or Operating Virtualization -Application Virtualization-Virtualization Advantages - Virtual Machine Basics - Taxonomy of Virtual machines - Process Virtual Machines - System Virtual Machines - Hypervisor - Key Concepts

#### **UNIT II** SERVER CONSOLIDATION

Hardware Virtualization - Virtual Hardware Overview - Sever Virtualization - Physical and Logical Partitioning - Types of Server Virtualization - Business cases for Sever Virtualization - Uses of Virtual server Consolidation - Planning for Development - Selecting server Virtualization Platform

#### UNIT III NETWORK VIRTUALIZATION

Design of Scalable Enterprise Networks - Virtualizing the Campus WAN Design - WAN Architecture -WAN Virtualization - Virtual Enterprise Transport Virtualization-VLANs and Scalability - Theory Network Device Virtualization Layer 2 - VLANs Layer 3 VRF Instances Layer 2 - VFIs Virtual Firewall Contexts Network Device Virtualization - Data-Path Virtualization Layer 2: 802.1q - Trunking Generic Routing Encapsulation - IPsec L2TPv3 Label Switched Paths - Control-Plane Virtualization-Routing Protocols- VRF - Aware Routing Multi-Topology Routing.

#### **UNIT IV** VIRTUALIZING STORAGE

SCSI- Speaking SCSI- Using SCSI buses - Fiber Channel - Fiber Channel Cables - Fiber Channel Hardware Devices - iSCSI Architecture - Securing iSCSI - SAN backup and recovery techniques -RAID - SNIA Shared Storage Model - Classical Storage Model - SNIA Shared Storage Model - Host based Architecture - Storage based architecture - Network based Architecture - Fault tolerance to SAN -Performing Backups – Virtual tape libraries.

### VIRTUAL MACHINES PRODUCTS UNIT V

Xen Virtual machine monitors- Xen API – VMware – VMware products - Vmware Features – Microsoft Virtual Server – Features of Microsoft Virtual Server

## **Total Hours: 45**

## **TEXT BOOKS:**

- 1. William von Hagen (2008) Professional Xen Virtualization, Wrox Publications
- 2. Chris Wolf, Erick M. Halter (2005) Virtualization: From the Desktop to the Enterprise, APress

## **REFERENCE BOOKS:**

- 1. Reddy, Victor Moreno (2006) Network virtualization, Cisco Press
- 2. James E. Smith, Ravi Nair (2005) Virtual Machines: Versatile Platforms for Systems and Processes, Elsevier/Morgan Kaufmann
- 3. David Marshall, Wade A. Reynolds (2006) Advanced Server Virtualization: VMware and Microsoft Platform in the Virtual Data Center, Auerbach Publications

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BCS18E28	HADOOP DISTRIBUTED FILE SYSTEM	Ту	3	0/0	0/0	3	

## UNIT I HADOOP INTRODUCTION

Distributed and parallel computing - HDFS and MapReduce – Hadoop function – cloud deployment and delivery model – In memory computing technology – Hadoop ecosystem – Hadoop distributed file system – HDFS architecture – HDFS files – HDFS high availability – Hadoop YARN – Hbase and HDFS – Hive – Pig – Sqoop – ZooKeeper – Flume – Oozie.

### UNIT II MAPREDUCE, HBASE AND BIG DATA TECHNOLOGY

MapReduce framework – optimaize MapReduce job – roles of HBase in Big Data Processing. Big Data stack – Virtualization and Big Data – Virtualization Approaches – CAP Theorem – non-relational database – polyglot persistence – Big Data analytics and Data warehouse – simple MapReduce application – designing MapReduce.

## UNIT III YARN AND HIVE

Background of YARN – Advantages – Architecture –schedulers – configurations – commands – YARN containers – Registry – Hive Services – data types – built in functions – Hive DDL – data manipulation in Hive – Data retrieval Queries – using JOINS in Hive.

## UNIT IV PIG AND OOZIE

Pig architecture – running Pig – Pig Latin – working with operators in Pig – Debugging Pig – functions in pig – Error Handling in Pig – Oozie – benefits – configuration – Oozie workflow – Oozie coordinator – Oozie bundle – Oozie parameterization – Oozie job execution model – Oozie SLA.

## UNIT V NOSQL, FLUME AND SQOOP

Characteristics of NoSQL – Types of NoSQL data Models – Schema less databases – materialized view – distribution models – sharding – Flume – Flume Architecture – Sqoop – importing data – Mahout – machine learning – collaborative filtering – clustering – classification – Mahout algorithms – Environment for Mahout

### **Total Hours: 45**

## **TEXT BOOKS:**

- 1. DT Editorial Services, 2016 "Big Data Black Book" dreamteck press .
- 2. Alex Holmes, 2015 "Hadoop in Practice" dreamteck press.

## **REFERENCE BOOKS:**

- 1. Tom White, 2015 "Hadoop The Definitive Guide 4<sup>th</sup> edition Oreilly.
- 2. Shiva Achari 2015 "Hadoop Essentials" Packt Publishing.
- 3. Henry H Liu, 2014 "Hadoop 2 Essential" Creative Independent Publishing.
- 4. Jeffrey Aren, 2017 "Sams Teach Yourself Hadoop in 24 hours" Pearson.

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#### UNIT I **INTRODUCTION**

Fully connected information space - Types of Mobility - Wireless Network Communication. Radio Frequency: Spectrum and Band - Cellular Communication - Continuous Connectivity - Structure of a Channel – Absence of Free Channel – Signal Fading – Frequency Reuse – PCS and GSM – PCS Personal Communication Service - Interface - Call Processing - GSM Global System for Mobile Communication - Location and Handoff Management - Location Management - Handoff Management – Roaming.

#### UNIT II FUNDAMENTALS OF DISTRIBUTED DATABASES

Conventional Database Architecture - Database Partition and Distribution - Database Processing -Transaction Structure - Serialization of Transactions - Serializability - Based Correctness Criteria -Serializability Theory - Degree of Isolation - Advanced Transaction Model - Nested Transaction Model - SAGA - Cooperative Transaction - ConTract - Flex Transaction - Introduction to Concurrency Control Mechanisms – Ways of Locking Data Items – The Phantom Problem – Multigranularity Locking - Heuristic Approach in Locking Schemes - Non-Locking Based Schemes

#### **UNIT III** DATA PROCESSING AND MOBILITY

Effect of Mobility on the Management of Data – Transaction Management in Mobile Database Systems - Mobile Database System - Transaction Execution in MDS - Mobile Transaction Model - Execution Model based on ACID Transaction 230 CS-Engg&Tech-SRM-2013 Framework - Pre-write Transaction Execution Model - Mobile Transaction Models - HiCoMo - Moflex - Kangaroo - MDSTPM Transaction Execution Model – Mobilaction – Atomicity for Mobilaction – Isolation for Mobilaction – Consistency and Durability for Mobilaction

#### **UNIT IV** DATA CONSISTENCY AND CONCURRENCY

Data Consistency in intermittent |Connectivity - The Consistency Model - Weak Connectivity Operation - A Consistency Restoration Schema - Concurrency Control Mechanism - Transaction Commit - Commitment of Mobile Transactions - Transaction Commitment in Mobile Database Systems.

#### UNIT V MOBILE DATABASE RECOVERY

Log Management in Mobile Database Systems - Mobile Database Recovery Schemes - Wireless information Broadcast - introduction - Broadcast Disk - Broadcast Infrastructure - Exponential Index -Location-Based Indexing – OnDemand Data Scheduling – Data Dissemination System.

Total Hours: 45

## **TEXT BOOK:**

1. Vijay Kumar, 2006 "Mobile Database Systems", Wiley Inderscience Publication, 2006

## **REFERENCE BOOKS:**

- 1. Leong (Hong VA), 1999 Lee (Wang Chen), "Mobile Data Access", Springer.
- 2. Rifaat A. Davem, 1997 "Mobile Data & Wireless LAN Technologies", Prentice Hall Inc.
- 3. TAN(Kian Lee), Franklin(Michael J), "Mobile Data Management", Springer.

### 9Hrs

9Hrs

## 9Hrs

### 9Hrs



Subject Code: BCS18E30	Su	ıbject I	Name : WE	CB ENG	GINEE	RING			Ty/ Lb/ ETL	]		Lr	P/R	C
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Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Sk	Soft Skills					
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BCS18E30	WEB ENGINEERING	Ту	3	0/0	0/0	3	
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## UNIT I WEB-BASED SYSTEMS

The Web-Web Applications-Web Engineering-The Components of Web Engineering

## UNIT II WEB ENGINEERING PROCESS

Defining the Framework-Incremental Process Flow- Generic Actions and Tasks for the Web Framework-Umbrella Activities

## UNIT III COMMUNICATION

The Communication Activity - Formulation - Elicitation- Identifying Web App Increments- Negotiation

## UNIT IV PLANNING

Refining Framework Activities-Building a Web Team - Managing Risk - Developing a Schedule

### UNIT V THE MODELING ACTIVITY

Modelling as a Concept - Modelling Frameworks - Modelling Languages - Existing Modelling Approaches

## **Total Hours: 45**

## **TEXT BOOK:**

1. Web Engineering: A Practitioner's Approach by Roger Pressman and David Lowe, McGraw-Hill, 2009.

### **REFERENCE BOOKS:**

- 1. Denise M. Woods and William J. Dorin 2012 HTML and CSS: Comprehensive 7th edition,. Publisher: Cengage Learning; ISBN-10: 1133526144
- 2. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, 2012 Internet & World Wide Web How to Program, 5/e Pearson Education.

9 Hrs

9 Hrs

9 Hrs

9 Hrs



Subject Code: BCS18E31	Su	bject N	ame : 4	G NET	WORI	KS			$\begin{array}{c c} Ty/\\ Lb/\\ ETL \end{array} L \begin{array}{c} T/\\ S.Lr \end{array} P/R C$						
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CO3	Able to a	lesign n	ew air	interfac	e for ef	fective	commu	inicatio	on in m	obil	e techn	ology			
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BCS18E31	4G NETWORKS	Ту	3	0/0	0/0	3	
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## UNIT ILTE NETWORK ARCHITECTURE AND PROTOCOLS9 Hrs

Evolution of 3GPP Standards-Radio Interface Techniques in 3GPP Systems-Radio Access Mode Operations-Spectrum Allocation in UMTS and LTE-EPS Interfaces-EPS Protocols and Planes-EPS Procedures.

## UNIT IILTE AIR INTERFACE AND PROCEDURES9 Hrs

LTE Protocol Stack - SDU and PDU - LTE Radio Resource Control (RRC) - LTE Packet Data Convergence Protocol Layer (PDCP)- LTE Radio Link Control (RLC)- LTE Medium Access Control (MAC) - LTE Physical Layer (PHY)- Channel Mapping of Protocol Layers- LTE Air Interface

## UNIT III ANALYSIS AND OPTIMIZATION OF LTE SYSTEM PERFORMANCE 9Hrs

Deployment Optimization Processes - LTE Performance Analysis Based on Field Measurements - LTE Case Studies and Troubleshooting- LTE Inter-RAT Cell Reselection- Inter-RAT Cell Reselection Optimization Considerations- LTE to LTE Inter-frequency Cell Reselection- LTE Connected Mode Discontinuous Reception - Circuit Switch Fallback (CSFB) for LTE Voice Calls- Multiple-Input, Multiple-Output (MIMO) Techniques.

UNIT IVCOVERAGE AND CAPACITY PLANNING OF 4G NETWORKS9 HrsLTE SystemFoundation- PCI and TA Planning- PRACH Planning- Coverage Planning- LTE Throughput<br/>and Capacity Analysis.9 Hrs

# UNIT VVOICE EVOLUTION IN 4G NETWORKS9 HrsVoice over IP Basics- Voice Options for LTE- IMS Single Radio Voice Call Continuity-<br/>VoLTE Features- Deployment Considerations for VoLTE. Carrier Aggregation- Enhanced MIMO.9 Hrs

**Total Hours: 45** 

## **TEXT BOOK:**

1. Design, Deployment and Performance of 4G-LTE Networks- A Practical Approach- Ayman Elnashar Emirates Integrated Telecomms Co., UAE- Mohamed A. El-saidny QUALCOMM Technologies, Inc., USA- Mahmoud R. Sherif Emirates Integrated Telecomms Co., UAE. Wiley Publication.

## **REFERENCE BOOK:**

1. Clint Smith, P.E., Daniel Collins, Wireless Networks: Design and Integration for TE, EVDO, HSPA and WiMax Third Generation.



Subject Code:	Su	bject N ENT	ame : ERPRIS	E RES	OURC	E PLA	NNING	, F	Ty/ Lb/	L	T/ S Lr	P/R	С
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B.Tech – Computer Science and Engineering (Part Time) – 2018 Regulation



BCS18E32	ENTERPRISE RESOURCE PLANNING	Ту	3	0/0	0/0	3

## UNIT I INTRODUCTION

Overview of enterprise systems – Evolution - Risks and benefits - Fundamental technology - Issues to be consider in planning design and implementation of cross functional integrated ERP systems - Case studies.

## UNIT IIERP SOLUTIONS AND FUNCTIONAL MODULES9 Hrs

Overview of ERP software solutions- Small medium and large enterprise vendor solutions, BPR, Business Engineering and best Business practices - Business process Management. Overview of ERP modules -sales and Marketing, Accounting and Finance, Materials and Production management etc. -Case studies.

## UNIT III ERP IMPLEMENTATION

Planning Evaluation and selection of ERP systems-Implementation life cycle - ERP implementation, Methodology and Frame work- Training – Data Migration. People Organization in implementation-Consultants, Vendors and Employees-Case studies.

## UNIT IV POST IMPLEMENTATION

Maintenance of ERP- Organizational and Industrial impact; Success and Failure factors of and ERP Implementation -case studies.

## UNIT V EMERGING TRENDS ON ERP

Extended ERP systems and ERP bolt -on -CRM, SCM, Business analytics etc- Future trends in ERP systems-web enabled, Wireless technologies so on-Case studies.

**Total Hours: 45** 

## **TEXT BOOK:**

1. Alexis Leon, 2006 ERP demystified, second Edition Tata McGraw-Hill.

## **REFERENCE BOOKS:**

- 1. Jagan Nathan Vaman, 2008 ERP in Practice, Tata McGraw-Hill.
- 2. Alexis Leon, 2008 Enterprise Resource Planning, second edition, Tata McGraw-Hill.
- 3. Mahadeo Jaiswal and Ganesh Vanapalli, 2006 ERP Macmillan India.
- 4. Vinod Kumar Grag and N.K. Venkitakrishnan, 2006, ERP- Concepts and Practice, Prentice Hall of India.
- 5. Summer, 2008 ERP, Pearson Education.

## 9 Hrs

## 9 Hrs

9 Hrs



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OBJECTIV	ES :														
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BCS18E33	SUPPLY CHAIN MANAGEMENT	Ту	3	0/0	0/0	3	
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#### UNIT I **INTRODUCTION**

Defining Supply Chain management and logistics management. Evolution. Supply Chain -Fundamentals, , and Importance. Supply chain strategy, Enablers/ Drivers of Supply Chain Performance. Supply Chain relationships.

#### LOGISTICS MANAGEMENT UNIT II

Logistics - functions, objectives, solution. Customer Service. Warehousing and Material Storage, Material Handling, Transportation and Packaging – 3PL and 4PL.

#### UNIT III **NETWORK DESIGN**

Distribution Network Design – Role, Factors Influencing, Options, Value Additions. Models for Facility Location and Capacity allocation. Impact of uncertainty on Network Design. Network Design decisions using Decision trees.

#### UNIT IV SOURCING AND INVENTORY MANAGEMENT

Sourcing – Make vs buy decision, Creating World Class Supply base, World Wide Sourcing Inventory Management - managing cycle inventory, safety inventory. Value of information, Bullwhip effect, Coordination in supply chain, Analysing impact of supply chain redesign on the inventory.

### UNIT V **CURRENT TRENDS**

E-Business – Framework and Role of Supply Chain in e- business and b2b practices. Supply Chain IT Framework.E-Supply Chains, E - Logistics- eSRM, eLRM, eSCM, Agile Supply Chains. Reverse Logistics, Global Logistics.

## **Total Hours: 45**

## **TEXT BOOKS:**

- 1. Bowersox Donald J, 2000 Logistical Management The Integrated Supply Chain Process" Tata McGraw Hill
- Sunil Chopra and Peter Meindl, 2007 Supply Chain Management-Strategy Planning and Operation, 2. Prentice Hall.

## **REFERENCE BOOKS:**

- 1. Donald J. Bowersox, David J. Closs and M. Bixby Cooper, 2008 "Supply Chain Logistics Management", Tata McGraw Hill.
- 2. Altekar Rahul V, 2005 Supply Chain Management-Concept and Cases, Prentice Hall India.

### 9 Hrs

9 Hrs

9 Hrs

## 9 Hrs



Subject Code: BCS18E34	Su	bject N N	lame : IAIN F	RAMI	E COM	PUTI	NG		Ty/ Lb/ ETL	L	T/ S.Lr	P/R	С
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OBJECTIVES	:												
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BCS18E34	MAINFRAME COMPUTING	Ту	3	0/0	0/0	3	
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## UNIT I MVS CONCEPTS

Main frame in Todays Business -Introduction to Z series H/W , Z/OS .- MVS overview-system initialization-storage management-job management ISPF Editor ISPF Data Utility Functions -managing work-data management-I/O processing-termination and recovery.TSO commands-general syntax of JCL statements

### UNIT II JCL AND VSAM

Explanation of job statements-explanation of EXEC statements-explanation of DD statements-additional parameters on JOB,EXEC,DD statements-classification-instream and catalog procedures-utilities-abend codes.VSAM data set organization structure-IDCAMS commands-JCL for VSAM-buffering-alternative index-repro-backup and recovery-export and import.

## UNIT III COBOL/370

Structured programming constructs-fundamentals of COBOL-data definition-conditional statements-perform statements-compiler option-table definition-COBOL call and parameter passing-file handling.

## UNIT IV DB2

RDBMS concepts-structural query language-normalisation-DB2 architecture-DB2 objects-locks-program preparation-cursors-null indicators-optimisation - utilities.

## UNIT V CICS

CICS introduction-terminal control-application house keeping-EXEC, interface locks-supply transactions –CESM, CESF, CEMT, CEDF-NMDS-BMS-abend codes-file control-program control-TSQ-TDQ-pseudo conversation-recovery and roll back.

## **Total Hours: 45**

## **TEXT BOOKS:**

- 1. Mike Ebbers, John Kettner, WayneO'Brien, Bill Ogden, (2011) Introduction to the New Mainframe: z/OSBasics, IBM Redbooks(SG24-6366-01)
- 2. Alexis Leon, IBM Mainframe Handbook, vikas Publishing, 2014

## **REFERNCE BOOKS:**

- 1. M.K. Roy and D.GoshDastidar, (2006) COBOL PROGRAMMING, John Wiley And Sons
- 2. Stern & Stern (2007) STRUCTURED COBOL PROGRAMMING,(8th ed.), JOHN Wiley India
- 3. Grant Allen(2008) Beginning DB2 : from Novice to Professional, Apress
- 4. Mary Lovelace, Jose Dovidauskas, Alvaro Salo, Valerio Sokai, (2012) VSAM Demystified (SG246105)IBM Red Books
- 5. Doug Lowe ,(1994) MVS JCL,(2nd ed.),MIKE MURACH ASSOCIATE Saba Zamir, ChandanRanade , (2007) MVS JCLPrimer,McGrawhil

### 9 Hrs

9 Hrs

## 9Hrs

9Hrs



Subject Cod	le: Su	ıbject N I	ame : NEURO	FUZZ	Y CON	IPUTI	NG		Ty/ Lb/ FT L T/ P/ C							
BCS18E35									ET L		S.Lr	R	-			
	Pr	erequisi	te: BCS1	8E06					Ty	3	0/0	0/0	3			
L : Lecture T	: Tuto	rial S.	Lr : Supe	ervised	Learnir	ng P:P	roject	R : Res	search	C: Cre	dits	•				
Ty/Lb/ETL :	Theory	y/Lab/E	mbedded	Theory	and L	ab	-									
OBJECTIV	E :															
• The sunde	student rstand	s will be Neural l	e able to Network.	design	and dev	elop ne	uro fuz	zy moo	deling	and wi	ill have	the abi	lity to			
COURSE O	UTCO	MES (	C <b>Os</b> ) : ( 1	3- 5)												
CO1	Г	o know	about th	e basics	s of soft	t compu	ting tec	chnique	es and	also th	eir use	in som	e real			
	li	fe situa	tions													
CO2	Г	o solve	the prob	lems us	ing neu	ral netv	vorks te	echniqu	ies.							
CO3	Т	`o find t	he soluti	on using	g differ	ent fuzz	y logic	techni	ques							
Mapping of	Cours	e Outco	mes witl	h Progr	am Ou	tcomes	s (POs)	1		1						
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	Р	PO1	0	PO11	PO12			
									0 9							
CO1	Н	Н	Μ	Н	Η	Μ	Н	Н	Μ	L		Η	Н			
CO2	H	Н	Μ	Η	H	Μ	Η	Η	Μ	Μ		H	Н			
CO3	Н	Η	Μ	Η	Μ	Μ	Μ	Η	Μ	L		Η	Н			
COs /	PS	601	PSC	02	PS	03	PS	04		PSO5	5	PS	506			
PSOs	ļ,					-										
<u>CO1</u>		H	H	[	N	<u>/</u>				H			H T			
<u>CO2</u>	1		N	L r		1			-							
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BCS18E35	NEURO FUZZY COMPUTING	Ту	3	0/0	0/0	3	
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## UNIT INEURO – FUZZY AND SOFT COMPUTING FUZZY SYSTEMS9 Hrs

Introduction to Fuzzy Sets – Fuzzy Rules and - - Fuzzy Reasoning and - Inference-Fuzzy Inference Systems - Compositional Rules of Inference in Fuzzy System – Defuzzification Strategies , Fuzzy Models– System Identification – Several Least Square Methods – Optimization Techniques- Derivative-based Optimization, Derivative and Free Optimization.

## UNIT II REGRESSION AND OPTIMIZATION

System Identification – Several Least Square Methods – Optimization Techniques- Derivative-based and Derivative Free Optimization.

## UNIT III NEURAL NETWORK

Neural Network Architecture -Network Inputs and Outputs – Feed back Inter Connections and Network Stability – Feed Forward Networks –Back Propagation Networks- Learning Methods- Adaptive Networks – Supervised Learning Neural Networks –RBFN – Unsupervised Learning Networks - Self Organizing maps, Adaptive Resonance Architectures, Radial Basis Networks- LVQM, Principle Component Anlaysis.

## UNIT IV NEURO FUZZY MODELLING

Neural Component of a Fuzzy System – Fuzzy neural Network Controllers – Adaptive Neuro Fuzzy Inference System(ANFIS) – CANFIS – Neural Networks based Fuzzy Inference System - Classification and Regression Tests – Data Clustering Techniques and Algorithms – Rule base Structure Identification

## UNIT V ARTIFICIAL NEURAL NETWORKS HARDWARE

Implementation Issues – Evaluation of Neural network Architectures – Hardware Realization – VLSI approach – Optical techniques.

## **Total Hours: 45**

## **TEXT BOOK:**

1. Jyh-shing roger Jang, Chnesy-tasi sur, Eiji Miziltazui," *Neuro and Soft Computing: A Computational Approach to Learning and machine Intelligence*", Pearson Education 2004, Digitized in 2007 ISBN 0132610663, 9780132610667

## **REFERENCE BOOKS:**

- 1. Timothy J.rass (2011), "Fuzzy Logic with Engineering Application", (3rd ed.)Wiley India,
- 2. S.Rajasekaran, G.A.Vijayalakshmi Pai, Neural N/Ws, Fuzzy Logic and Genetic Algorithm Systems and Applications, PHI (2004)

## 9 Hrs

9 Hrs

## 9 Hrs



Subject Code:	Su	bject Na	ame :					Т	y/		Τ/		
BCS18F36		WEB (	CONTI	ENT M	IANA(	<b>JEME</b>	NT		b/ FT	L	S.Lr	P/R	C
DESIGLSU	Pr	erequisi	te: BC	S18E0	9			1 1	y y	3	0/0	0/0	3
L : Lecture T : Tu	torial	S.Lr :	Superv	ised Le	earning	P:Pr	oject F	R : Res	earch	C: (	Credits	1	
T / L/ ETL : Theorem	ry/Lab	/Embed	lded Th	eory a	nd Lab								
<b>OBJECTIVES</b> :													
To Lean t	he bas	ics of C	Content	Manag	gement	System	n						
To Learn	the To	ols and	technic	ques									
To Learn	the use	e of web	browse	er,navig	gate to a	a web p	age						
To Learn	the CM	AS tools	for ba	ckup ai	nd custo	omizati	on						
COURSE OUTC	OME	S (COs)	):(3-:	5)									
CO1		Explori	ng CM	S termi	nology	, inclu	ling op	en sou	irce, F	PHP,	etc.,		
<u>CO2</u>		Capable	e of des	igning	person	alized t	emplat	e for c	conten	it pul	olishing.		
<u>CO3</u>		Implem	enting	API co	de for t	ext edi	$\frac{\text{tor.}}{(\mathbf{D}\mathbf{O})}$						
Mapping of Cour	rse Ou	tcomes	with P	rogra	m Outo	comes (	(POs)	DO			<b>DO1</b>	<b>D</b> O1	<b>DO1</b>
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CO1		H	N	<u>02</u> /		<u>оз</u> Л		<u>н</u>		10	H	- IS F	1 1
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CO3		H	N	<u> </u>	N	<u>/</u>		M		]	H	N	1
H/M/L indicates	Streng	gth of C	Correla	tion	H- Hig	<b>h, M-</b>	Mediu	m, L-l	Low				
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	<ul> <li>Program Electives</li> </ul>	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills				



BCS18E36	WEB CONTENT MANAGEMENT	Ту	3	0/0	0/0	3
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## UNIT IINTRODUCTION TO CONTENT MANAGEMENT9 Hrs

CMS – Types of CMS –Create Content –System Versus implementation – Platform versus product – Open source versus commercial – management versus delivery – Content model manageability

## UNIT II EDITORIAL TOOLS AND WORKFLOW

Shape of Content – Aggregation Models: Implicit and Explicit – URL Addressability of Aggregations – Content Lifecycle – workflow and approvals – Content File Management - Permissions

## UNIT III OUTPUT AND PUBLICATION MANAGEMENT

### UNIT IV IMPLEMENTATION

APIs and Extensibility: Code API-Event Models-Customizing Rich Text Editors – CMS implementation – Types of implementation – Implementation process

## UNIT V WORKING WITH EXTERNAL INTEGRATORS

Engagement models - Sales and scoping - costs -Written agreements - Production - Training and support

### **Total Hours: 45**

9 Hrs

9 Hrs

9 Hrs

9 Hrs

## **TEXT BOOK:**

1. Deane Barker,2016, Web content Management systems, Features and Best Practices, O'Reilly Publications



Subject Code: BCS18E37		Subje M	ect Nan ACHIN	ne : NE LE	ARNIN	١G	Ty/ Lb/ ETI		L	T/ S.Lr	P/R	С
		Preree	quisite:	BCS18	3E06		Ту		3	0/0	0/0	3
L : Lecture T : Tut	torial	S.Lr : \$	Supervi	sed Lea	arning	P:Pro	ject R :	Resea	rch C: (	Credits		
Ty/Lb/ETL : Theo	ry/Lab	/Embec	lded Th	eory ar	nd Lab							
<b>OBJECTIVE :</b>	To lear	n mach	ine lear	ming te	echniqu	es, to a	cquire l	cnowle	dge abo	out cluste	ering and	1
nonparametric me	thods a	nd to de	esign ar	<u>id anal</u>	yze ma	chine le	earning	experii	nents.			
COURSE OUTC	OMES	<u>(COs)</u>	<u>:(3-5</u>	<u>)</u>		-						
COI	Unde	rstand t	he conc	cept of	Machir	ne Lear	nıng					
CO2	Reco	gnize th	ie impo	rtance	and rele	evance	of Mac	hine Le	earning	Models		
CO3	Desig	in the e	fficient	Machi	ne Lear	ning A	pplicati	on.				
Mapping of Cour	se Out	comes	with P	rogran	1 Outco	omes (l	POs)		•			
COs/POs	PO	PO	PO	PO	PO	PO	PO7	PO	PO	PO1	PO1	PO1
003/103	1	2	3	4	5	6	10/	8	9	0	1	2
CO1	H	H	Μ	H	H	Μ	Μ	Μ	H	Μ	H	H
CO2	Μ	H	Μ	H	H	Μ	Μ	H	M	H	M	H
CO3	H	H	Μ	H	H	Μ	H	M	H	Μ	H	Μ
COs / PSOs	PS	01	PS	02	PS	03	PSO	4	PSC	)5	PS	06
<u>CO1</u>	]	H	N	<u>/</u>	N	Λ	H		M		N	1
<u>CO2</u>	Γ	M	N	1	I	H	M		H		H	I
<u>CO3</u>		H A A	ł	<u> </u>		1	M		Μ		N	1
H/M/L indicates	Streng	<u>th of C</u>	orrelat	ion H	I- High	n, M- N	ledium	<u>, L-Lo</u>	W			
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	▲ Program Electives	Open Electives	Practical / Project	Internships / Technical Skil	Soft Skills			
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BCS18E37	MACHINE LEARNING	Ту	3	0/0	0/0	3	
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## UNIT I INTRODUCTION TO MACHINE LEARNING

Machine Learning – Machine learning applications – learning association – supervised learning – learning a class from examples – learning multiple classes – regression – model selection and generation – Bayestan decision theory – losses and risk – discriminant functions – association rules.

## UNIT II PARAMETRIC AND MULTIVARIATE METHODS

Parametric methods – maximum likelihood estimation – Baye's estimator – parametric classification – regression – tuning model – multivariate methods – multivariate data – multivariate normal distribution – multivariate regression – dimensionality reduction – subset selection – factor analysis – multidimensional scaling – Isomap

### UNIT III CLUSTERING AND NONPARAMETRIC METHODS

Clustering - Mixtures densities - k mean clustering - special and hierarchal clustering - Nonparametric density estimation - generalization to multivariate data - nonparametric classification - outlier data - decision trees - univariate trees - pruning - rule extraction from trees - multivariate trees.

### UNIT IV LINEAR DISCRIMINATION AND MULTILAYER PERCEPTRONS 9Hrs

Linear discrimination – generalizing the linear model – pair wise separation – logistic discrimination – discrimination by regression – multilayer preceptrons – MLP – back propagation algorithms – training procedures – tuning – dimensionality reduction – deep learning – local models – competitive learning – radial basis – normalized basis – learning vector quantization - mixture of experts.

## UNIT V KERNEL MACHINES AND GRAPHICAL MODELS

Kernel machine – optimal separating hyper plane – v SVM – multiple kernel learning – large margin nearest neighbour classifier – graphical models – generative models – d Separation - belief propagation – Hidden morkov models – Bayesten estimation – combining multiple learners – reinforcement learning.

### **Total Hours: 45**

## **TEXT BOOKS:**

- 1. Ethem Alpaydin, 2014 "Introduction to Machine Learning" 3<sup>r.d</sup> Edition PHI
- 2. Snila Gollapudi, 2016 "Practical Machine Learning" PACKT.

## **REFERENCE BOOKS:**

- 1. Tom M Mitchell, 2013 "Machine Learning" McGraw-Hill.
- 2. David Barber, 2015 "Bayesian Reasoning and Machine Learning" Cambridge University Press.

## 9Hrs

9Hrs

9Hrs



Subject Code	e: Su	bject N	ame :					Ty/	T	Τ/	D/I	
BCS18E38			M - C	оммі	ERCE			LD/ ETL	L	S.Lr	P/h	
	Pre	erequisi	te: BIT18	BI02				Ty	3	0/0	0/0	) 3
L : Lecture T	: Tutori	ial S.I	Lr : Super	rvised I	Learning	g P:Pr	oject F	R : Resea	urch C: C	Credits		
Ty/Lb/ETL:	Theory/	/Lab/En	nbedded	Theory	and La	b	5					
OBJECT	<b>TIVES:</b>											
• To ur	nderstan	d the E	- comm	erce stra	ategies	and val	ue chai	ns				
• To ur	nderstan	d the M	I-comme	rce serv	vices							
• To ur	nderstan	d M - c	commerc	e infras	tructure	and ap	plicatio	ons.				
<ul> <li>To kr</li> </ul>	now the	availab	ility of la	atest tec	hnolog	y and a	plicati	ons of M	I- comm	erce in var	rious d	lomains.
• To ap	ply mo	bile cor	nmerce i	n busin	ess-to-b	usiness	applica	ation				
COURSE O	UTCON	MES (C	$(\mathbf{Os}): (3)$	- 5)								
CO1	V	arious f	forms of	wireless	s comm	unicatio	on and t	the stand	lards and	d architect	ure of	wireless LAN
CO2	C	oncepts	of mobi	le comr	nunicati	ions, th	eir arch	itecture	and pro	cedures; ar	nd	
CO3	N	lobile n	etworkin	g and a	pplicati	on laye	r includ	ling WA	P protoc	cols		
Mapping of	Course	Outcor	nes with	Progra	am Out	comes	(POs)					
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
CO1	Η	Н	Н	Η	Η	Η	Η	Μ	Н	Μ	Н	Μ
CO2	Η	Η	Η	Η	Η	Η	Η	Μ	Н	Η	Μ	Μ
CO3	Η	Η	Η	Η	Η	Μ	Μ	Μ	Μ	Μ	Μ	Μ
COs /	PS	01	PSC	02	PS	03	PS	<b>SO4</b>	P	SO5		PSO6
PSOs												
CO1	Η		Η		Η		Η		H		H	
CO2	H		H		H		H		H		H	
CO3	H		H		H				Η		Η	
H/M/L indic	ates Str	ength (	of Corre	lation	H- Hig	gn, M-	Nediu	m, L-L0	W			
Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	▲ Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
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BCS18E38	M- COMMERCE	Ту	3	0/0	0/0	3
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### UNIT I ELECTRONIC COMMERCE

Traditional commerce and E-commerce – Internet and WWW – Role of WWW – Value Chains – Strategic Business And Industry Value Chains – Role of E-commerce. Packet Switched Networks – TCP/IP Protocol Script – Internet Utility Programmes – SGML, HTML and XML – Web Client And Servers – Web Client/Server Architecture.

### UNIT II MOBILE COMMERCE

Introduction – Infrastructure of M–Commerce – Types Of Mobile Commerce Services – Technologies Of Wireless Business – Benefits And Limitations, Support, Mobile Marketing & Advertisement, Non– Internet Applications In M–Commerce – Wireless/Wired Commerce Comparisons.

## UNIT III MOBILE TECHNOLOGY

A Framework For The Study Of Mobile Commerce – NTT Docomo's I-Mode – Wireless Devices For Mobile Commerce – Towards A Classification Framework For Mobile Location Based Services – Wireless Personal And Local Area Networks .

## UNIT IV THEORY AND APPLICATIONS

The Ecology Of Mobile Commerce – The Wireless Application Protocol – Mobile Business Services – Mobile Portal – Factors Influencing The Adoption of Mobile Gaming Services – Mobile Data Technologies And Small Business Adoption And Diffusion – E–commerce in The Automotive Industry – Location– Based Services.

UNIT VBUSINESS- TO- BUSINESS MOBILE E- COMMERCE9HrsEnterprise Enablement – Email and Messaging – Field Force Automation (Insurance, Real Estate,<br/>Maintenance, Healthcare) – Field Sales Support (Content Access, Inventory) – Asset Tracking and<br/>Maintenance/Management – Remote IT Support – Customer Retention (B2C Services, Financial,<br/>Special Deals) – Warehouse Automation – Security.

### **Total Hours: 45**

## **TEXT BOOKS:**

- 1. E.BrianMennecke, J.TroyStrader, (2005) Mobile Commerce: Technology, Theory and Applications, Idea Group
- 2. Ravi Kalakota, B.AndrewWhinston, (2007) Frontiers of Electronic Commerce, Pearson Education

## **REFERENCE BOOKS:**

- 1. P. J. Louis (2009) M-Commerce Crash Course, McGraw- Hill Companies
- 2. Paul May (2006) Mobile Commerce: Opportunities, Applications, and Technologies Of Wireless Business,,Cambridge University Press.

B.Tech – Computer Science and Engineering (Part Time) – 2018 Regulation

## 9 Hrs

9 Hrs

## 9Hrs


Subject Code: S		Subj	Subject Name : <b>BEAL TIME SYSTEMS</b>							т	<b>T</b> /	<b>P</b> /	С
BCS18E39			KEAL HIVLE SI SI ENIS							L	S.Lr	R	C
		Prere	erequisite:BCS18006							3	0/0	0/0	3
L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits													
Ty/LbE	Ty/LbETL : Theory/Lab/Embedded Theory and Lab												
OBJECTIVES :													
•	Real-time scheduling and schedulability analysis												
•	<ul> <li>Formal specification and verification of timing constraints and properties</li> <li>Design methods for real time systems</li> </ul>												
	Design methods for real-time systems     COURSE OUTCOMES (COs) + (3-5)												
	OURSE OUTCOMED (COS): (3-5)         OI         An ability to understand advanced concepts in theory of computer science												
	An ability to understand advanced concepts in theory of computer science												
$CO_2$	An ability to understand advanced concepts in applications of computer science												
COS	An ability to apply knowledge of advanced computer science to formulate the analyze problems in computing and solve them												
Manni	I computing and solve them I anning of Course Outcomes with Program Outcomes (POs)												
COs/P	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PC	010	<b>PO1</b>	PO12
Os												1	
CO1	Н	Μ	Μ	Μ	Η	Μ	L	Μ	Μ	Μ		Н	Н
CO2	L	Μ	Μ	Η	Η	Μ	Μ	Η	Η	Η		L	Η
CO3	Н	Μ	L	Η	Μ	L	Η	Μ	L	L		Μ	Μ
COs / PSO		01	PSC	)2	PSO3		PSO4		PSO5		5	PSO6	
PSOs .		<b>T</b>		r	М		м						
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III III IIII IIIIIIII IIIIIIIIIIIIIIII													
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BCS18E39	REAL TIME SYSTEMS	Ту	3	0/0	0/0	3	
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# UNIT I INTRODUCTION

Architecture of real time systems/embedded systems-operating systems issues-performance measuresestimating program run times.

# UNIT II TASK ASSIGNMENT AND SCHEDULING

Uniprocessor scheduling-IRIS tasks-task assignment algorithms- mode changes -fault tolerance scheduling.

#### UNIT III PROGRAMMING LANGUAGES AND TOOLS

Desired characteristics based on ADA-data typing-control structures-packages-exception handling-overloading-multitasking-timing specification-task scheduling-just in time compilation-run time support.

# UNIT IV REAL TIME DATABASES

Basic definitions-main memory databases -transaction processing-concurrency control-disk scheduling algorithms-serialization and consistency-real time communication

# UNIT V FAULT TOLERANCE, RELIABILITY AND SYNCHORNIZATION 9 Hrs

Fault types-fault detection and containment-redundancy-data diversity-reversal checks-obtaining parameter values-reliability models for hardware redundancy-software error models-clocks-fault tolerance synchronization-synchronization and software.

# **Total Hours: 45**

# **TEXT BOOK:**

1. C.M.Krishna, Kang.G.Shin, 2010, Realtime Systems, McGraw Hill.

#### **REFERENCE BOOKS:**

- 1. Rajib Mall, 2007 "Real-time systems: theory and practice", Pearson Education.
- 2. Phillip A.Laplante 2011 Real Time System Design and Analysis, 4 th edition, Wiley.
- 3. Alan burns and andy wellings, 2009 "Real time systems and prog. Languages", 4 th edition, pearson.

#### 9 Hrs

9 Hrs

9 Hrs

#### 9 Hrs



Subject Code:		Subject Name :									Т/			
BCS18E40		DISTRIBUTED COMPUTING								L	S.Lr	P/R	C	
	P	Prerequisite: BIT18I01 & BCS18006								3	0/0	0/0	3	
L : Lecture	Γ : Tut	orial S	.Lr : Sup	ervised	Learni	ng P:	Project	R : Re	search	C: Cı	redits			
Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab														
OBJECTIVES :														
• The students will be able to understand the design of distributed systems														
To understand communication concepts of distributed systems														
• To apply the memory management design of distributed systems to design a new memory														
COURSE OUTCOMES (COs) : ( 3- 5)														
CO1		Understand the design of distributed computing systems												
CO2		Understand the communication concepts of distributed systems												
CO3		Design a new memory by applying the memory management design of distributed												
	;	systems												
CO4		Understand the distributed file system security												
Mapping of Course Outcomes with Program Outcomes (POs)														
COs/POs	PO1	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	PO9	P	010	PO11	PO12	
CO1	Η	Μ	Н	Μ	Μ	Н	H	Μ	H		Μ	Н	Н	
CO2	Н	Н	Н	Н	Μ	Н	H	Н	H		H	Н	Н	
CO3	Н	Μ	Н	Μ	М	Н	Μ	Μ	H		Μ	Н	Μ	
CO4	Η	Μ	Н	Μ	Μ	Н	Н	Н	H		Н	Н	Η	
Mapping of	Cour	se Outco	omes wit	th Prog	ram Sp	pecific (	Outcon	nes (PS	Os)	•				
COs /	P	SO1	PSC	02	PS	03	PS	<b>504</b>		<b>PSO</b> 5	5	PS	506	
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# UNIT I FUNDAMENTALS

Introduction to distributed computing system, Evolution, Different models, Gaining popularity, Definition, Issues in design, DCE, Message passing-Introduction, Desirable features of a good message passing system, Issues in IPC, Synchronization, Buffering, Multidatagram, Process addressing, Failure handling, Group communication.

#### UNIT II REMOTE PROCEDURE CALL

Introduction, RPC model, transparency of RPC, Implementing RPC mechanism, Stub generation, RPC messages, Marshalling arguments and results, Sever management, parameter-passing semantics, Call semantics, Communication protocols for RPCs, Complicated RPC, Client-server binding, exceptional handling, security, Lightweight RPC.

# UNIT III DISTRIBUTED SHARED MEMORY AND SYNCHRONIZATION 9 Hrs

Introduction, General architecture of DSM systems, Design and implementation issues of DSM,Granularity, Structure of shared memory space, Consistency model, Replacement strategy, Thrashing, Different approaches to DSM, Advantages of DSM, Clock synchronization, Event ordering, Mutual exclusion, Deadlock, Election algorithm.

# UNIT IV RESOURCE AND PROCESS MANAGEMENT

Introduction, Desirable features of a good global scheduling algorithm, Task assignment approach, Load balancing approach, Load sharing approach, Process migration, Threads.

# UNIT V DFS/DCE SECURITY

Desirable features of good DFS, File models, File accessing, models, File sharing semantics, File cachingschemes, File replication, Fault tolerance, Atomic Transaction, Design principles, Authentication, Access control, Digital signatures, DCE security service.

#### **Total Hours: 45**

# **TEXT BOOK:**

1. Pradeep K. Sinha (2012 Reprint), Distributed Operating System Concepts and Design PHI

#### **REFERENCE BOOKS:**

- 1. Andrew S. Tenenbaum (2012), Modern Operating System (3rd ed.) PHI
- 2. Ajay D. Kshemkalyani , Mukesh Singhal (2008), Distributed computing : principles, algorithms and systems Cambridge University Press
- 3. Andrew S. Tenenbaum & Maatren Vansteen (2012) Distributed systems: Principles & Paradigms (2nd ed.), PHI
- 4. Hagit Attiya And Jennifer Welch (2004) Distributed computing fundamentals, simulations and Advanced Topics (Digitized in 2007) (2nd ed.), Wiley
- 5. Jean Dollimore, Tim Kindberg, And George Coulouris (2005) Distributed Systems: Concepts and Design (4th ed.) Pearson Education

#### 9 Hrs

9 Hrs

# 9 Hrs

# 9 Hrs