



CURRICULUM AND SYLLABUS

REGULATION 2018

B.Tech- Computer Science and Business Systems

Semester | to VI







CURRICULUM AND SYLLABUS REGULATION 2018

Programme: B.Tech - Computer Science and Business Systems

Vision of the Department:

To produce competent industry relevant education, skilful research, technical and innovative computer science professionals acquaintance with managerial skills, human and social values.

Mission of the Department:

9

M1: To impart technical knowledge through innovative teaching, research, and consultancy.

M2: To develop and to promote student ability thereby to compete globally through excellence in education.

M3: To facilitate the development of academic-industry Collaboration.

M4: To produce competent engineers with professional ethics, technical competence and a spirit of innovation and managerial skills.

Programme Educational Objectives (PEOs):

PEO1: To acquire technical knowledge and proficiency required for the carrier advancement and higher education in the contemporary areas of computer science, business systems and various issues in the society.

PEO2: To apply their competency in design and development of innovative solutions to adapt various emerging technological challenges for real world problems.

PEO3: To demonstrate leadership qualities with high ethical standards and collaborated with other industries for the socio-economical growth of the country.

Mapping of Programme Educational Objectives with Mission of the Department:

PEOs / Department Mission Statements	M1	M2	-МЗ	M4
PEO1	3.	3	2	3
PEO2	3	2	2	2
PEO3	3	3	2	2

1: Slight (Low)

2: Moderate (Medium)

-3-Substantial (High)

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Programme Outcomes (POs):

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively of engineering community and with society at large, effective reports and design documentation, make tive preserving instructions.

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PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs):

PSO1: Ability to apply the analytical and business skills to provide sustainable solutions as an engineer/researcher for the real-time applications using Machine Learning, Internet of Things and Data analytics.

PSO2: Ability to practice ethical and human values with soft-skills qualities in computer science and business disciplines to emerge as an entrepreneur for the growth and development of the society.

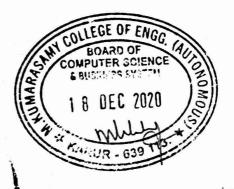
Mapping of Programme Educational Objectives with Programme Outcomes and Programme Specific Outcomes:

PEOs / POs & PSOs			PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PEO1	2	2	2	3	2	2	3	3	1	2	3	2	3	2
PEO2	2	2	3	2	2	3	3	2	2	3	2	3	3	1
PEO3	3	3	2	3	3	1	1	3	3	2	3	1	1	3

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)







Programme Articulation

Seme	Course Code						,.		POs						PS	01
ster	Course Code	Course Name	POI	PO2	POS	P04	ros	106	P07	POS	P09	PO10	POII	PO12	PSO1	P502
1	18MAB103T	Discrete Mathematics	1	~					A19/20	22525					1	
1	18MAB104T	Calculus, Statistics and Probability	1	1		1								1	1	
1	18PYB102J	Physics for Computing Science	1	1	1		town				1	1			1	
1	18EEB102J	Principles of Electrical Engineering	1	1	1		The transport of									
1	18CBB101J	Problem Solving and C Programming	1	1	1	1	1	1	4	1	1	1	1	1	1	1
1	18CBH101J	Business Communicatio n & Value Science – I		,	~		1	1	1	1	1	1	1	1		,
1	18LEM101T	Constitution of India							1	1	1	1	1	. 1		
1		Induction Program														
11	18MAB105T	Linear Algebra	1	1	1	1	×	V.					1	1	1	
11	18MAB106J	Statistical Methods	1	1	1	1	1	1					1	1	1	
11	18ECB101J	Principles of Electronics	1	1	1	1	1	1				1			1	
п	18CBC101J	Data Structures & Algorithms	1	1	1	1	1	1	1	1	1	1	~	1	1	1
11	18MBS101T	Fundamentals of Economics	1	1					1				1	1		
п	18CBH102J	Business Communicatio n & Value Science – II		1	1	1	ADM PACE NO. 1	~	1	*	~	*	1	1		4
II	18LEM102T	Value Education	1	1	1		1	1	1	1	1	~		1	1	
11	18GNM101L	Physical & Mental Health using Yoga					1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1		0	-			1	=	
111	18CBC201T	Formal Language and Automata Theory		1		1	1			-	1	1	1	1	~	
- 111	18CBC202T	Computer Organization & Architecture	Ź	. 1	1	1	1								1	1
111	18CBC203T	Object Oriented Programming		1	1	1								1	1	1
111	18CBC204J	Computational Statistics	1	1	1	1		سِر		4				1	1	1
ш	18CBC205J	Software Engineering	1	1		1	1/2	N.CC	BOA	E OF	ENGO	M	1	1	1	1
111	18MAB209T	Operations Research	1	1			100	2	USIN:	R SC	ENGO ENCE TEM	TO SERVICE SER		1	1	

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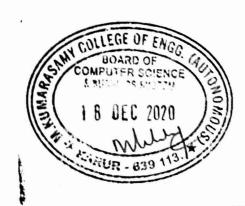
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Seme	Course Code							H	POI						PROM		
ster	Course Code	Course Name	POI	tox	ros	for	908	POS	907	PITE	POR	POSTA	POLY	POCI	Mot	MB	
m	18CBC206L	Object Oriented Programming Laboratory	4	v	V	/	1						,		,	1	
111	18MBM201L	Competencies in Social Skills	4								1	1					
III / IV	18CYM201T	Environmental Science		1		1		1	1	1							
tv	18CBC2077	Database Management Systems	~	1	~	-									1	1	
IV	18CBC208J	Operating Systems	~	4													
IV	18CBC209J	Software Design with UML	~	*	-	-	1	1	1	1	1	1	,	1	1	1	
IV	18CBH103J	Business Communication & Value Science - III										-					
tv -	18MBS201T	Fundamentals of Management	-	-					1				1	1		1	
IV	18MBS202T	Introduction to Innovation, IP Management & Entrepreneurs hip		,					•					,		-	
iv	18CBC210L	Database Management Systems Laboratory	,	-	1	~	~								-	*	
īv	18MBM202L	Critical and Creative Thinking Skills	1														
III /	18LEM103T	Indian Tradition and Heritage	1	1	1	1	1	1	~	1	1	-	-	-	and the second s	difference and the specific	

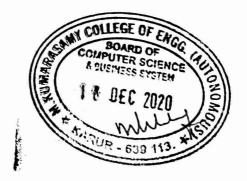






Structure of Curriculum

S.No.	Category	Credits
1	Humanities and Social Sciences courses (H)	11
2	Basic Science courses including basics of Electrical / Electronics / Computer courses (B)	32
3	Engineering Science courses including Management/Innovation & Entreprenurship course (S)	28
44	Professional core courses (C)	61
5	Professional Elective courses relevant to chosen specialization/branch (E)	22
6	Open Electives - Electives offered to other Departments (O)	•
7	Project work, Minor project, seminar and internship in industry or elsewhere (P)	7
8	Mandatory Courses (M) [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge]	4
	Total Credits	165







1. Humanities and Social Sciences courses (H)

	C G 1		Но	С		
S.No.	Course Code	Course Name	L	T	P	
1	18CBH101J	Business Communication & Value Science – I	2	0	2	3
2	18CBH102J	Business Communication & Value Science – II	2	0	2	3
3	18CBH103J	Business Communication & Value Science – III	1	0	2	2
4	18CBH104J	Business Communication & Value Science – IV	2	0	2	3
1- N				Total (Credits	11

L-Lecture

T-Tutorial

P-Practical

2. Basic Science courses including basics of Electrical / Electronics / Computer courses (B)

		Conses Name	Но	urs / W	eek	\Box c
S.No.	Course Code	Course Name	L	T	P	
1	18MAB103T	Discrete Mathematics	3	1	0	4_
2	18MAB104T	Calculus, Statistics and Probability	3	0	0	3
3	18MAB105T	Linear Algebra	3	1	0	4
4	18MAB106J	Statistical Methods	3	0	2	4
5	18PYB102J	Physics for Computing Science	3	0	2	4
6	18EEB102J	Principles of Electrical Engineering	2	0	2	. 3
7	18ECB101J	Principles of Electronics	2	0	2	3
8	18CBB101J	Problem Solving and C Programming	3	0	2	4
9	18MAB209T	Operations Research	3	0	0	3
	10			Total C	Credits	32

L-Lecture

T-Tutorial P-Practical

3. Engineering Science courses including Management/Innovation & Entreprenurship course **(S)**

			Ho	eek	C	
S.No.	Course Code	Course Name	L	Т	P	
1	18MBS101T	Fundamentals of Economics	2	0	0	2
-1	18MBS201T	Fundamentals of Management	2	0	0	2
3	18MBS202T	Introduction to Innovation, IP Management & Entrepreneurship	3	0	0	3
1	18MBS301T	Financial & Cost Accounting	2	0	0	2
5	18MBS302T	Business Strategy	2	0	0	2_
6	18MBS303J	Design Thinking	2	0	2	3
7	18MBS304T	Financial Management	TEGE O	FENCE	0	

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Curriculum

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			Ho	Hours / Week				
S.No.	Course Code	Course Name	L	T	P			
	101404047	Marketing Research & Marketing	2	0	0	2		
8	18MBS401T	Management	1 2	0	0	2		
9	18MBS402T	Human Resource Management			2	4		
10	18MBS403J	Services Science & Service Operational	3	0	2			
11	18MBS404J	Management IT Project Management	3	0	2	4		
	101/1034043	11 Project Management		Total C	Credits	28		

L-Lecture

T-Tutorial

P-Practical

4. Professional core courses (C)

			Hou	rs/We	С	
S.No.	Course Code	Course Name	L	T	P	
1	18CBC101J	Data Structures & Algorithms	3	0	2	4
2	18CBC201T	Formal Language and Automata Theory	3	1	0	4
$-\frac{2}{3}$	18CBC202T	Computer Organization & Architecture	3	0	0	3
4	18CBC203T	Object Oriented Programming	3	0	0	3
5	18CBC204J	Computational Statistics	3	0	2	4
6	18CBC205J	Software Engineering	3	0	2	4
$-\frac{3}{7}$	18CBC206L	Object Oriented Programming Laboratory	0	0	2	1
8	18CBC207T	Database Management Systems	3	0	0	3
9	18CBC208J	Operating Systems	3	0	2	4
10	18CBC209J	Software Design with UML	3	0	2	- 4
11	18CBC210L	Database Management Systems Laboratory	0	0	2	1
12	18CBC301T	Design and Analysis of Algorithms	3	0	0	3
13	18CBC302J	Compiler Design	3	0	2	4
14	18CBC303L	Design and Analysis of Algorithms Laboratory	0	0	2	1
15	18CBC304T	Computer Networks	3	0	0	3
16	18CBC305J	Information Security	3	0	2	4
17	18CBC306J	Artificial Intelligence	3	0	2	4
18	18CBC307L	Computer Networks Laboratory	0	0	2	1
19	18CBC401J	Usability Design of Software Applications	2	0	2	3
20	18CBC402J	IT Workshop Skylab / Matlab	2	0	2	3
		BOARD OF	18		Credits	

L-Lecture

T-Tutorial P-Practical

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5. Professional Elective Courses relevant to chosen specialization/branch (E) (Any 6 Courses)

		Q N	Ho	С		
S.No.	Course Code	Course Name	L	T	reek P 2 2 0 2 0 2 Credits	
1		Elective - 1	3	0	2 .	4
2		Elective – 2	3	0	2	4
3		Elective – 3	3	0	0	3
4		Elective – 4	3	0	2	4
5		Elective – 5	3	0	0	3
6		Elective - 6	3	0	2	4
				Total (Credits	22

			Ho	irs / W	eek	C
S.No	Course Code	Course Name	L	T	P	
		Elective – 1			A MEDICAL	
1	18CBE001J	Coversational Systems	3	0	2 /	. 4
2	18CBE002J	Cloud, Microservices and Application	3	0	2	4
3	19CBE003J	Machine Learning	3	0	2	4
		Elective - 2			1.7	
4	18CBE004J	Robotics and Embedded Systems	3	0	2	4
5%	18CBE005J	Modern Web Applications	3	0	2	4
68	18CBE006J	Data Mining and Analytics	3	0	2	4
		Elective - 3				1.50
7	18CBE007T	Cognitive Science and Analytics	3	0	0	3
8	18CBE008T	Introduction to IoT	3	0	0	3
9	18CBE009T	Cryptology	3	0	0	3
		Elective - 4		(5)		
10	18CBE010J	Quantum Computation and Quantum Information	3	0,	2	4
11	18CBE011J	Advanced Social, Text and Media Analytics	3	0	2	4
12	18CBE012J	Mobile Computing	3	0	2	4
		Elective - 5	ı			
13	18CBE013T	Behavioral Economics	3	0	0	3
14	18CBE014T	Computational Finance and Modelling	3	0	0	3
15	18CBE015T	Psychology	3	0	0	3
	and the second	Elective - 6				
16	18CBE016J	Enterprise Systems	3	0	2	4
17	18CBE017J	Advance Finance	3	0	2	4
18	18CBE018J	Image Processing and Pattern Recognition	3	0	2	4

L-Lecture

T-Tutorial

P-Practical

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6. Open Electives - Electives offered to other Departments (O)

			Hou	rs / We	æk	С
S.No.	Course Code	Course Name	L	T	P	•
1	18CBO001T	Usability Design of Software Applications	3	0	0	3
2	18CBO002T	IT Workshop Skylab / Matlab	3	0	0	3
3	18CBO003T	Software Design with UML	3	0	0	3
4	18CBO004T	Modern Web Applications	3	0	0	3
5	18CBO005T	Data Mining and Analytics	3	0	0	3
			1	Total Ci	redits	15

L-Lecture

T-Tutorial

P-Practical

7. Project work, minor project, seminar and internship in industry or elsewhere (P)

S.No.	Course Code		Hou	irs / We	æk	c
3.140.	Course Code	Course Name	L	T	P	٠
1 🔆	18CBP301L	Mini Project	0	0	2	1
2	18CBP401L	Project Evaluation I	0	0	4	2
3	18CBP402L	Project Evaluation II	0	0	8	4
				Fotal C	edits	7

L-Lecture

T-Tutorial

P-Practical







8. Mandatory Courses (M)

			Но	urs / W	eek	c
S.No.	Course Code	Course Name	L	Т	P	
1	18LEM101T	Constitution of India	1	0	0	Nil
2	18LEM102T	Value Education	1	0	0	Nil
3	18GNM101L	Physical & Mental Health using Yoga	0	0	2	Nil
4		Induction Program	2	0	0	Nil
5	18MBM201L	Competencies in Social Skills	0	0	2	1
6	18MBM202L	Critical and Creative Thinking Skills	0	0	2	1
7	18CYM201T	Environmental Science	1	0	0	Nil
8	18LEM103T	Indian Tradition and Heritage	1	0	0	Nil
9	18MBM301L	Analytical and Logical Thinking Skills	0	0	2	1
10	18MBM302L	Employability Skills and Practices	0	0	2	1
11	18LEM301T	Indian Art Forms	1	0	0	Nil
12	18LEM302T	Self Development and Entrepreneurship	1	0	0	Nil
		Total Credits			7	4

L-Lecture T-Tutorial P-Practical



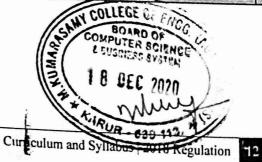




B.Tech. - Computer Science and Business Systems

			Semester I	Tran	/ 11	Zaali I	
S.No	Category	Course Code	Course Name	Hou	rs / W		C.
	Canegory	Course Coue		L	1	P	
1	В	18MAB103T	Discrete Mathematics	3	1	0	4
2	В	18MAB104T	Calculus, Statistics and Probability	3	0	0	3
3	В	18PYB102J	Physics for Computing Science	3	0	2	4
4	В	18EEB102J	Principles of Electrical Engineering	2	0	2	3
5	В	18CBB101J	Problem Solving and C Programming	3	0	2	4
6	,,	1000	Business Communication & Value	2		1	_
0	Н	18CBH101J	Science – I	2	0	2	3
			Mandatory Courses				
7	M	18LEM101T	Constitution of India	1	0	0	Nil
8	M		Induction Program	2	0	0	Nil
	1950 p. 100 k. 4.			To	tal C	redits	21

			Semester II	1			
S.No.	Category	Course Code	Course Name	Hou	rs / W	eek	6
国 經濟			Gourge Hame	L	T	P	C
1	В	18MAB105T	Linear Algebra	3	1	0	4
2	В	18MAB106J	Statistical Methods	3	0	2	4
3	В	18ECB101J	Principles of Electronics	2	0	2	$\frac{3}{3}$
4	C	18CBC101J	Data Structures & Algorithms	$\frac{2}{3}$	0	2	
5	S	18MBS101T	Fundamentals of Economics	$\frac{3}{2}$		-	4
6	Н	18CBH102J	Business Communication & Value Science – II	2	0	2	_23
			Mandatory Courses		MANAGEME		
7	M	18LEM102T	Value Education	1	0	Το	Nil
8	М	18GNM101L	Physical & Mental Health using Yoga	0	0	2	Nil
		bana.		To	tal C	redits	20







			Semester III				
C NI-				Hou	rs / W	eek	c
S.No.	Category	Course Code	Course Name	L	T	P	
1	С	18CBC201T	Formal Language and Automata Theory	3	1	0	4
2	С	18CBC202T	Computer Organization & Architecture	3	0	0	3
3	С	18CBC203T	Object Oriented Programming	3	0	0	3
4	С	18CBC204J	Computational Statistics	3	0	2.	4
5	С	18CBC205J	Software Engineering	3	0	2	4
6	В	18MAB209T	Operations Research	3	0	0	3
			Laboratory Course			15	
7	С	18CBC206L	Object Oriented Programming Laboratory	0	0	2	1
		K	Mandatory Courses				
8	M	18MBM201L-	Competencies in Social Skills	0	0	2	I
9	М	18CYM201T / 18LEM103T	Environmental Science / Indian Tradition and Heritage	1	0	0	Ni
				To	tal C	redits	22

			Semester IV	7.55 7.55			
				Hou	rs / W	eek	C
S.No.	Category	Course Code	Course Name	L.	T	P	
1	С	18CBC207T	Database Management Systems	3	0	0	3
2	C	18CBC208J	Operating Systems	3	0	2	4_
3	C	18CBC209J	Software Design with UML	3	0	. 2	4
4	Н	18CBH103J	Business Communication & Value Science – III	.1	0	2	2
5	S	18MBS201T	Fundamentals of Management	2	0	0	2
6	S	18MBS202T	Introduction to Innovation, IP Management & Entrepreneurship	3	0	0	3
			Laboratory Course				
7	С	18CBC210L	Database Management Systems Laboratory	0	0	2	1
			Mandatory Courses				
8	M	18MBM202L	Critical and Creative Thinking Skills	0	0	2	1
9	М	18LEM103T / 18CYM201T	Indian Tradition and Heritage / Environmental Science	1	0	0	Nil
				To	otal C	redits	20

Total Credits 20

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		7.77	Semester V	Hou	rs/V	/eek	Ċ
S.No.	Category	Course Code	Course Name	L	T	P 0	3
		1000001017	Design and Analysis of Algorithms	3	0	2	4
1	& C	18CBC301T	Design and Analysis et a 5	3		0	2
2	C	18CBC302J	Compiler Design	2	0		
3	S	18MBS301T	Financial & Cost Accounting	2	0	0	2
4	S	18MBS302T	Business Strategy	2	0	2	3
5	S	18MBS303J	Design Thinking	3	0	2	4
6	Е		Elective I - Professional Topes			7	
			Laboratory Course	T			
7	& C	18CBC303L	Design and Analysis of Algorithms	0	0	2	1
	3 0	100000000	Laboratory	0	0	2	1
8	P	18CBP301L	Mini Project	100 Feet g 5 k 2			
			Mandatory Courses			1	1
9	М	18MBM301L	Analytical and Logical Thinking Skills	0	0	2	1
10	М	18LEM301T /	Indian Art Forms / Self Development	1	0	0	Nil
10	IAI	18LEM302T	and Entrepreneurship		AND STATE	day with	271
				To	tal Cr	edits	21

			Semester VI				
				Hou	rs / W	eek	C
S.No.	Category	Course Code	Course Name	L	T	P	U
1	С	18CBC304T	Computer Networks	3	0	0	3
2	С	18CBC305J	Information Security	3	0	2	4
3	С	18CBC306J	Artificial Intelligence	3	0	2	4
4	S	18MBS304T	Financial Management	2	0	0	2
5	Н	18CBH104J /	Business Communication & Value Science – IV	2	0	2	3
6	E		Elective II - fragerical / open	3	0	2	4
			Laboratory Course				
7	С.	18CBC307L	Computer Networks Laboratory	T 9	0	2	1
			Mandatory Courses				
8	M	18MBM302L	Employability Skills and Practices	0	0	2	1
9	М	18LEM301T / 18LEM302T	Indian Art Forms / Self Development and Entrepreneurship	1	0	0	Nil
				To	tal Ci	edits	22





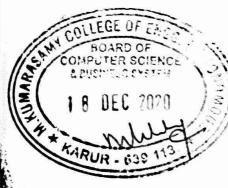
· ·	1000	4	Semester VII				提問
S.No	Category	Course Code		Hou	173 / V	reek	10
1	AND THE PROPERTY OF		Course Name	L	T	P	
2	C	18CBC401J	Usability Design of Software Applications	2	0	2	3
,	in the second	18CBC402J	IT Workshop Skylab / Matlab	2	0	2	3
3	S	18MBS401T	Marketing Research & Marketing Management	2	0	ø	2
5	$\frac{s}{s}$	18MBS402T	Human Resource Management	2	0	0	2
6	<u>t</u>		Elective III 4 Professional is open	3	0	0	3
	E		Elective IV	3	0	2	4
7 1	D		Laboratory Course				
SHE WAS	I'	18CBP401L	Project Evaluation I	0	0	4	2
				To	tal Cr	edits	19

		1	Semester VIII				
S.No.	Category	Course Code	Course Name	Hou	rs / V	Veek	C
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2	<u> </u>	18MBS404J	IT Project Management	3	0	2	4
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4	E		Elective VI	3	0	2	4
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L-Lecture T-Tutorial P-Practical

Total Credits

Semester	Credits
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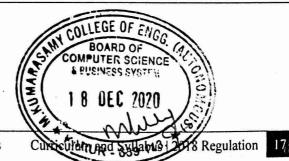
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	NIT I MATHEMATICAL LOGIC 9-3
Propo	sitional calculus - Propositions - Connectives, Syntax; Semantics - Truth assignments - Truth
former	- Validity and satisfiability - Tautology; Adequate set of connectives; Equivalence - Normal; Compactness - Resolution; Formal reducibility - Natural deduction system - Axiom system;
Sound	ness - Completeness.
AND COMME	NIT II BOOLEAN ALGEBRA 9+3
Introd	uction of Boolean algebra - Truth table - Basic logic gate - Basic postulates of Boolean algebra
	ciple of duality - Canonical form -Karnaugh map.
THE RESERVE	NIT III ABSTRACT ALGEBRA 9+3
Set - 7 Sub gr	Types of sets – Set operation; Relation - Equivalence Relation; Algebraic System - Groups – roups – Homomorphism – Cosets - Lagrange's theorem – Ring and Field (definition).
UI	NIT IV COMBINATORICS 9+3
	counting - Balls and bins problems - Generating functions - Recurrence relations. Proof ques - Principle of mathematical induction - Pigeonhole principle.
U	NIT V GRAPH THEORY 9+3
Graph	s and digraphs - Complement - Isomorphism - Connectedness - Reachability - Adjacency
matrix	c-Eulerian paths and circuits in graphs and digraphs - Hamiltonian paths and circuits in graphs
and to	ournaments - trees; Planar graphs - Euler's formula -Dual of a planer graph - Independence er and clique number - Chromatic number - Statement of Four-color theorem.
ALCOHOL:	Book (s)
1	C. L. Liu, Elements of Discrete Mathematics, Second Edition, McGraw Hill, New Delhi, 1985.
2	Lu Zhongwan, Mathematical Logic for Computer Science, 2 nd Edition, World Scientific, Singapore, 1998.
Refer	ence (s)
1	R. A. Brualdi, Introductory Combinatorics, 5 th Edition, North-Holland, New York, 2009.
2	N. Deo, Graph Theory with Applications to Engineering and Computer Science, Prentice Hall, Englewood Cliffs, 2016.
3	E. Mendelsohn, Introduction to Mathematical Logic, Second Edition, Van-Nostrand, London, 1979.
4	I. N. Herstein, Topics in Algebra, 2 nd Edition, John Wiley and Sons, 1975.
5	M. Morris Mano, Digital Logic & Computer Design, 1st Edition, Pearson, 2016.







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τ	NIT II	INTEGRAL CALCULUS 9+3
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ST 2565	NIT III	INTRODUCTION TO STATISTICS 9+3
exam Samp data,	ples. Collections, Representation	itistics - Basic objectives - Applications in various branches of science with ion of Data: Internal and external data, Primary and secondarydata. Population and native sample. Descriptive Statistics: Classification and tabulation of univariate representation, Frequency curves. Descriptive measures - Central tendency and
	NIT IV	PROBABILITY 9+3
Proba expect interp	ability, Baye ctation and it pretation, Mo	iments, sample space, event - Definition of Combinatorial Probability, Conditional es' Theorem (Statement only) - Expected values and moments: mathematical its properties (Statements only), Moments (including variance) and their properties, oment generating function – Two dimensional random variables: Joint distributions ditional distributions.
Ţ	JNIT V	PROBABILITY DISTRIBUTIONS 9+3
		ntinuous distributions:Binomial, Poisson and Geometric distributions, Uniform Normal distributions.
Text	Book (s)	
1	B.S.Grewa	al, Higher Engineering Mathematics, 44th Edition, Khanna Publication, Delhi, 2017.
2	_	. Montgomery, George C. Runger, Applied Statistics and Probability for Engineers, ion, John Wiley & Sons, 2003.
Refe	rence (s)	
1	S. M. Ross	s, A first course in Probability, 9 th Edition, Prentice Hall, 2012.
2	Pearson, 2	
3	Edition, M	od, F.A. Graybill and D.C. Boes, Introduction to the Theory of Statistics, 3 rd IcGraw Hill Education, 2001.
4	Press, 2013	, M.K. Gupta and B. Dasgupta, Fundamentals of Statistics, Vol. I & II, World 3 & 2017.
5	Peter V. O 2011.	'Neil, Advanced Engineering Mathematics, Seventh Edition, Thomson Learning,
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OSCILLATIONS **UNIT I** Oscillation: Periodic motion-simple harmonic motion-characteristics of simple harmonic motionvibration of simple spring mass system. Resonance-definition., damped harmonic oscillator - heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor

WAVE OPTICS UNIT II

Interference-principle of superposition-young's experiment: Theory of interference fringes-types of interference-Fresnel's prism-Newton's rings, Diffraction-Two kinds of diffraction-Difference between interference and diffraction- Fresnel's half period zone and zone plate - Fraunhofer diffraction at single slit-plane diffraction grating. Temporal and Spatial Coherence.

Polarization of light: Polarization - Concept of production of polarized beam of light from two SHM acting at right angle; plane, elliptical and circularly polarized light, Brewster's law, double refraction.

UNIT III

QUANTUM MECHANICS

Quantum Mechanics: Introduction- Planck's quantum theory- Matter waves, wavelength, Heisenberg's Uncertainty principle, Compton effect, time independent and time dependent Schrodinger's wave equation, Physical significance of wave function, Particle in a one dimensional potential box.

UNIT IV

CRYSTALLOGRAPHY & THERMODYNAMICS

Crystallography: Basic terms-types of crystal systems, Bravais lattices, miller indices, d spacing, Atomic packing factor for SC, BCC, FCC and HCP structures. Semiconductor Physics - conductor, semiconductor and Insulator; Basic concept of Band theory.

Thermodynamics: Zeroth law of thermodynamics, first law of thermodynamics, brief discussion on application of 1st law, second law of thermodynamics and concept of Engine, entropy, change in entropy in reversible and irreversible processes.

UNIT V

LASER AND FIBER OPTICS

Laser and Fiber optics: Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: Ruby Laser, CO2 and Neodymium lasers;, applications of lasers in engineering. Fiber optics, Acceptance angle and Numerical aperature, Types of optical fibers, Applications of fiber - Optical fiber communications system-Optical sensors.

For Further Reading: (not for Examinations)

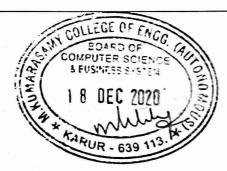
Basic Idea of Electromagnetisms: Continuity equation for current densities, Maxwell's equation in vacuum and non-conducting medium.

Curriculum an





15 LIST OF EXPERIMENTS 1. Magnetic field along the axis of current carrying coil - Stewart and Gee 2. Determination of Hall coefficient of semi-conductor 3. Determination of Plank constant 4. Determination of wave length of light by Laser diffraction method 5. Determination of wave length of light by Newton's Ring method 6. Determination of laser and optical fiber parameters 7. Determination of Stefan's Constant 8. Determination of band gap of a semiconductor 9. Determination of moment of interia of a wire using torisional pendulum Text books 1 Concepts of Modern Physics, (Fifth Edition) A Beiser, McGraw Hill International, 1995 2 Fundamentals of Physics, David Halliday, Robert Resnick and Jearl Walker, Wileyplus, 2013 References: Optics, (Fifth Edition) AjoyGhatak, Tata McGraw Hill, 2012 1. University Physics, Sears & Zemansky, Addison-Wesley. 1999 2. Fundamentals of Optics, (Third Edition) Jenkins and White, McGraw-Hill, 1957 3.









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UNIT 1 INTRODUCTION 6

Concept of Potential difference, voltage, current, Fundamental linear passive and active elements to their functional current-voltage relation, Terminology and symbols in order to describe electric networks, voltage source and current sources, ideal and practical sources, concept of dependent and independent sources, Kirchhoff's laws and applications to network solutions using mesh and nodal analysis, Concept of work, power, energy, and conversion of energy.

UNIT II DC CIRCUITS 6

Current-voltage relations of the electric network by mathematical equations to analyze the network (Thevenin's theorem, Norton's Theorem, Maximum Power Transfer theorem) Simplifications of networks using series-parallel, Star/Delta transformation. Superposition theorem.

UNIT III AC CIRCUITS 6

AC waveform definitions, form factor, peak factor, study of R-L, R-C,RLC series circuit, R-L-C parallel circuit, phasor representation in polar and rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, power factor, 3 phase Balanced AC Circuits (A-A&A-A).

UNIT IV ELECTROSTATICS AND ELECTRO-MECHANICS 6

Electrostatic field, electric field strength, concept of permittivity in dielectrics, capacitor composite, dielectric capacitors, capacitors in series and parallel, energy stored in capacitors, charging and discharging of capacitors, Electricity and Magnetism, magnetic field and Faraday's law, self and mutual inductance, Ampere's law, Magnetic circuit, Single phase transformer, principle of operation, EMF equation, voltage ratio, current ratio, KVA rating, efficiency and regulation, Electromechanical energy conversion.

UNIT V MEASUREMENTS AND SENSORS 6

Introduction to measuring devices/sensors and transducers (Piezoelectric and thermo-couple) related to electrical signals, Elementary methods for the measurement of electrical quantities in DC and AC systems (Current & Single-phase power). Electrical Wiring and Illumination system: Basic layout of the distribution system, Types of Wiring System & Wiring Accessories, Necessity of earthing, Types of earthing, Safety devices & system.

For Further Reading - Principle of batteries, types, construction and application, Magnetic material and B-H Curve, Basic concept of indicating and integrating instruments







LIST OF EXPERIMENTS

15

- 1. Familiarization of electrical Elements, sources, measuring devices and transducers related to electrical circuits
- 2. Determination of resistance temperature coefficient
- 3. Verification of Network Theorem (Superposition, Thevenin, Norton, Maximum Power Transfer theorem)
- 4. Simulation of R-L-C series circuits for XL>XC, XL< XC
- 5. Simulation of Time response of RC circuit
- 6. Verification of relation in between voltage and current in three phase balanced star and delta connected loads.
- 7. Demonstration of measurement of electrical quantities in DC and AC systems.

Text	Book (s)
1	A Textbook of Electrical Technology, (vol. I) (23 rd Edition), B. L. Theraja& A. K.Theraja, S.Chand and Company Ltd., New Delhi, 2012.
2	Basic Electrical Engineering (Revised Edition), V. K. Mehta, S. Chand and Company Ltd., New Delhi, 2012.
Refe	rence (s)
1	Electric Machinery (Seventh Edition), A. E. Fitzgerald, Kingsely Jr Charles, D. Umans Stephen, Tata McGraw Hill, 2020.
2	Theory and problems of Basic Electrical Engineering, (Second Edition), J. Nagrath and Kothari, Prentice Hall of India Pvt. Ltd., 2004.
3	Basic Electrical Engineering (Third Edition), T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2018.
1	Introduction to Electrodynamics (Fourth Edition), D. J. Griffiths, Cambridge University

Engineering Circuit Analysis (Eighth Edition), William H. Hayt, Jack E. Kemmerly & Steven

Fundamentals of Electrical and Electronics Engineering (Second Edition), Smarjith Ghosh,

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CO3	Use the	he con	cept of	arrays,	modul	es and	recursi	ve func	tions to	solve	real wo	orld pro	blems.	
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GENERAL PROBLEM SOLVING AND INTRODUCTION TO C **UNIT I**

Algorithm and Flowchart for problem solving with Sequential Logic Structure, Decisions and Loops-Imperative languages- Introduction to C- syntax and constructs of ANSI C - Variable Names, Data Type and Sizes (Little Endian, Big Endian), Constants, Declarations, proper variable naming and Hungarian Notation - Standard I/O, Formatted Output - printf, Variable length argument list, Formatted Input - scanf Statements

OPERATORS, EXPRESSIONS AND CONTROL FLOW UNIT II

Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion, Increment Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, if-else if, switch, Loops - while, do, for, break and continue, goto-structured and unstructured programming.

ARRAYS AND FUNCTIONS UNIT III

Arrays, Multi-dimensional array and Row/column major formats, Strings, Functions and Program Structures, Basics of functions, parameter passing and returning type, External, Auto, Local, Static, Register Variables, Scope Rules, Block structure, Initialisation, Recursion, C Pre-processors, Standard Library Functions and return types.

POINTERS UNIT IV

Pointers and address, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, Character Pointers and Functions, Pointer Arrays; Pointer to Pointer, Initialisation of Pointer Arrays, Command line arguments, Pointer to functions, Complicated declarations.

STRUCTURES AND FILES UNIT V

Basic Structures, Structures and Functions, Array of structures, Pointer of structures, Self-referral Structures, Table look up, Typedef, Unions, Bit-fields, File access, Error Handling- including exit, perror and error.h, Line Input and Output, Miscellaneous functions.

LIST OF EXPERIMENTS

15

- 1. Algorithm and flowcharts of small problems like GCD B
- 2. Structured code writing with:
 - Small but tricky codes i)
 - Proper parameter passing ii)
 - Command line Arguments iii)
 - Variable parameter iv)
 - Pointer to functions v)
 - User defined header vi)
 - Make file utility vii)
 - Multi file program and user defined libraries viii)
 - Interesting substring matching / searching programs ix)
 - Parsing related assignments x)

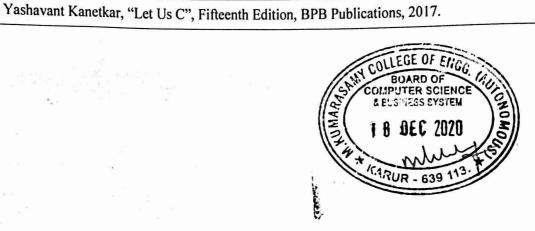




2



Unix system Interface: File Descriptor, Low level I/O – read and write, Open, create, close and unlink, Random access – Iseek, Discussions on Listing Directory, Storage allocator Programming Method: Debugging, Macro, User Defined Header, User Defined Library Function, makefile utility Text Book (s) 1 B. W. Kernighan and D. M. Ritchi, "The C Programming Language", Second Edition, Pearson Education, 2016. 2 B. Gottfried, "Programming in C", Fourth Edition, Schaum Outline Series, 2018. Reference (s) 1 Herbert Schildt, "C: The Complete Reference", Fourth Edition, McGraw Hill, 2017.







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B.Tech - Computer Science and Business Systems

BOARD OF COMPUTER SCIENCE Curriculum and Syllabus Regulation 29







UNIT I HUMAN VALUES AND BUSINESS COMMUNICATION

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Values – Self exploration – Values of individuals: Self Introduction-Presentation on favourite personality and the skills and values they demonstrate – Self-work with immersion(Interviewing Community Workers) and narrate what you think are the values that drive them – Writing: newspaper report– record conversation between a celebrity and an interviewer - Self-awareness; Stress management-Team Work

UNIT II

BASIC GRAMMAR AND COMMUNICATION

6

Parts of Speech - Applications of tenses - Sentence formation, sentence structure, Common Errors-Voices - Questioning-Barriers of Communication; Effective Communication; Verbal and Non - Verbal- Pronunciation- Toastmaster Speech -Importance of Listening Skills; Listening vs Hearing; Types of Listening; SWOT Analysis

UNIT III

VOCABULARY ENRICHMENT

6

Vocabulary Enrichment: Word formation: - Synonyms, antonyms, abbreviations - compound words -single word substitution- Exposure to words from General Service List (GSL) by West, Academic word list (AWL) technical specific terms related to the field of technology, phrases, idioms, significant abbreviations formal business vocabulary.

UNIT IV

READING AND WRITING SKILLS

6

Reading articles – Summary writing, Story writing - writing your comprehensive CV - Create a podcast on a topic. E-Mail Writing.

UNIT V

LIFE SKILL

6

Life Skills: Movie based learning – identifying skills and values - critical life skills - appreciation of diversity - Multiple Intelligences - Leadership Quality- Dealing with Ambiguity-Motivating the People - Community service – work with an NGO and make a presentation.

LAB ACTIVITIES

15

- 1. Presentation on the persona of any well-known person & Role-Play
- 2. Conversation between celebrity
- 3. Newspaper Report
- 4. Create a Podcast on a topic
- 5. Skit Based Communication
- 6. Listening Responding to audio
- 7. Working with an NGO and making a presentation
- 8. Join a trek -Values to be learned: Leadership, teamwork, dealing with ambiguity, managing stress, motivating people, creativity, result orientation

9. Create a musical using the learning from.

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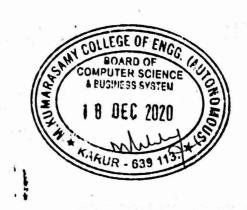
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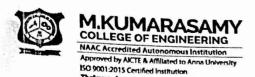
Curriculum and Syllahis | 2018 Pogulatio





	Book (s)
The	re are no prescribed texts for semester 1-there will be handouts and reference links shared.
Refe	rence (s)
1	Alan Mc'earthy and O'dell, "English vocabulary in use". Cambridge University Press,2017
2	APAART: Speak Well 1 (English language and communication)
3	APAART; Speak Well 2 (Soft Skills)
4	Dr.SarojHiremath, "Business Communication". Nirali Prakashan,2018
Web	References
1	Train your mind to perform under pressure- Simon sinck https://curiosity.com/videos/simon-sinck-on-training-your-mind-to-perform-under-pressure-capture-your-flag/
2	Brilliant way one CEO rallied his team in the middle of layoffs https://www.inc.com/video/simon-sinck-explains-why-you-should-put-people-before- numbers.html
3	Will Smith's Top Ten rules for success https://www.youtube.com/watch?v=bBsT9omTeh0
Onli	ne References
1	https://www.coursera.org/learn/learning-how-to-learn
2	https://www.coursera.org/specializations/effective-business-communication





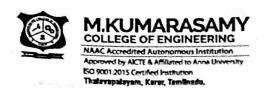


Thalavapalayam, Karur, Tamiinadu 15 **Total Hours** Regulation 2018 Semester I Hours / Week Course C Category Course Name P Code L M NIL 0 18LEM101T 0 1 **CONSTITUTION OF INDIA** Prerequisite Course (s) NIL Course Objective (s): The purpose of learning this course is to: CLR-1 Utilize the citizen's rights Utilize the basic citizen's fundamental rights of freedom of speech, expression, equality, CLR-2 religion and privacy Identify the Indian constitutional framework with union parliament, government and their CLR-3 functions and citizen's rights Utilize the States functionality and provisions for the betterment of the individual and CLR-4 society Identify the emergency provisions, the functions of election and public service CLR-5 commissions, identify the tax system Course Outcome (s) (COs): At the end of this course, learners will be able to: CO₁ Identify the basic provisions in the Indian constitution List the fundamental rights, rights to equality, freedom, religion, culture, education and the CO₂ right against exploitation Identify the fundamental duties of the Union of India, President, Vice-President, Union CO₃ Ministers and Parliament functions Identify the power of states, its legislature, Governors role and the state judiciary **CO4** List the special provisions and functionality of election commission, public service CO₅ commission, individual tax and GST CO-PO Mapping **POs PSOs** COs PO1 PO₂ PO₃ PO4 PO5 **PO6 PO7** PO8 PO9 PO10 PO11 PO12 PSO₁ PSO₂ COL 2 3 3 3 CO2 2 3 3 3 3 CO3 . 2 3 3 3 2 3 CO4 2 3 3 3 2 3 CO5 2 3 3 3 2 3 CO 3) LUEGE OF 2 3 (Avg)

2: Moderate (Medium)

1: Slight (Low)

3: Substantial (High)ce





UNIT I INDIAN CONSTITUTION Meaning of the Constitution law and Constitutionalism- Historical perspective of the Constitution of India- Salient features and characteristics of the Constitution of India Citizenship- Scheme of the fundamental rights- Scheme of the Fundamental Duties and its legal status UNIT II **FUNDAMENTAL RIGHTS** The Directive Principles of State Policy- Scheme of the Fundamental Right to Equality- Scheme of the Fundamental Right to certain Freedom under Article 19- Scope of the Right to Life and Personal Liberty under Article 21- Union Government, Union Legislature (Parliament)- Lok Sabha and Rajya Sabha (with Powers and Functions), Union Executive POWERS AND FUNCTIONS OF CENTRAL GOVERNMENT UNIT III President of India (with Powers and Functions)- Prime Minister of India (with Powers and Functions) - Union Judiciary (Supreme Court)- Jurisdiction of the Supreme Court - State Government, Legislature, Legislative Assembly, Legislative Council- Powers and Functions of the State Legislature, State Executive- Governor of the State (with Powers and Functions) POWERS AND FUNCTIONS OF STATE GOVERNMENT **UNIT IV** The Chief Minister of the State (with Powers and Functions)- State Judiciary (High Courts) Union Territory, Panchayat, Municipality- Scheduled and Tribal Areas- Co-operative Societies Consumer Rights - Consumer Protection Act POWERS AND FUNCTIONS OF ELECTION AND SERVICE **UNIT V** COMMISSION Local Self Government - Constitutional Scheme in India-Emergency Provisions : National, President Rule, Financial Emergency - Election Commission of India (with Powers and Functions) -The Union Public Service Commission (with Powers and Functions) - Amendment of the Constitutional Powers and Procedure -Income Tax, Goods and Services Tax Text Book (s) NIL Reference (s) Durgadas Basu, Introduction to the Constitution of India, Lexis- Nexis, 2015 Subash C Kashyap, Our Parliament, National Books Trust, 2011 Kaushal Kumar Agarwal, India's No 1 book on Tax : Simple Language Advanced Problems: Income Tax, Kindle, 2017 Vivek K R Agarwal, GST Guide for students: Making GST - Good and Simple Tax, Neelam Book House, 2017 COLLEGE OF E BOARD OF COMPUTER SCIENCE & BUSINESS SYSTEM 1 8 DEC 2020





Regula	ation 2018	Semester I	To	otal Hou	rs	30
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Category	Course Code	Course Name	L	T	P	C
М		INDUCTION PROGRAM	2	0	0	Nil
		MODULE - MATHS				10

Set Theory, Relations and Functions - Differential and Integral Calculus - Matrices and Determinants - Complex Numbers - Differential Equations - Analytical Geometry & Vector Algebra - Trigonometry - Probability - Statistics

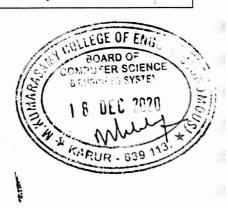
MODULE - PHYSICS 10

Mechanics - Mechanical Properties of Solids and Fluids - Waves and Oscillations - Electricity and Magnetism - Electromagnetic Signal - Optics - Semiconductor Electronics - Modern Physics - Atomic and Nuclear Physics

MODULE - UNIVERSAL HUMAN VALUES

10

Understanding the Need, Basic Guidelines, Content & Process for Value Education- Process of Self-Exploration-Happiness-Understanding the Human being as Co-existence of the Self and the Body-The Body as an Instrument of the Self-Understanding Harmony in the Self-Understanding Prosperity and Health-Harmony in the Family-Trust-Respect- Justice-Harmony in society







Category Course Code B 18MAB105T LINEAR ALGEBRA 3 1 0 Prerequisite Course (s) NIL Course Objective (s): The purpose of learning this course is to: 1 Analyze and solve a linear system of equations using Matrix Algebra techniques 2 Understand the concepts of independence, basis and dimensions in vectorspaces 3 Have well founded knowledge in inner product spaces and orthogonality 4 Compute and apply Eigen values and Eigen vectors 5 Apply the concepts of linear algebra in the field of computer science Course Outcome (s) (Cos): At the end of this course, learners will be able to: CO1 Implement the various matrix techniques in solving the system of linear equations CO2 Use the concept of vector spaces to predict an orthonormal basis CO3 Orthonormalize a set of vectors in an inner product space using Gram-Schmidt orthogonalisation and decompose a given matrix using QR decomposition CO4 Solve the problems of linear transformations using Eigen values and Eigen vectors CO5 Perform dimensionally reduction on the given data using Singular value decomposition and principal component analysis CO6 PO7 Mapping CO6 PO7 PO8 PO9 PO1	Ţ	Regula	tion 20	018			Se	meste	, 11			Tota	l Hour	8	60
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ntroc	duction to Matrices and Determinants - Solution of system of linear equations by Cramer's rule -
nver	se of a Matrix (using determinant)
ĮĮ	UNIT 1 MATRICES 9+3
Vecto Gauss	ors and Linear combinations - Rank of a matrix - Solution of system of linear equations by sian Elimination, Gauss Jordan and LU Decomposition methods.
ן	INIT II VECTOR SPACE 9+3
Vecto	or Space: Linear combination – Linear independence – Basis – Dimension - Simple problems
ับ	NIT III INNER PRODUCT SPACE 9+3
19 America	product – Norm – Angle - Orthogonality: Definition and simple problems - Projections – Gramidt orthogonalization and QR decomposition (theorems not included).
U	NIT IV EIGENVALUE PROBLEMS 9+3
Linea and U	Ir transformations – Range, Kernel and problems - Eigenvalues and Eigenvectors - Hermitian Jnitary matrices (simple problems).
	JNIT V PRINCIPAL COMPONENT ANALYSIS 9+3
Proce	onent analysis using the covariance method - Introduction to their applications in Image essing and Machine Learning (problems not included).
[ext	Book (s)
1	B.S.Grewal, Higher Engineering Mathematics, 44th Edition, Khanna Publication, Delhi, 2017.
2	Howard Anton, Chris Rorres, Elementary Linear Algebra – Applications version, Ninth Edition, John Wiley & Sons, 2005.
Refe	rence (s)
1	Michael. D. Greenberg, Advanced Engineering Mathematics, Second Edition, Pearson Education, 2002.
2	Gilbert Strang, Introduction to Linear Algebra, 5 th Edition, Wellesley Publishers, 2016.
3	R. C. Gonzalez & R. E. Woods, Digital Image Processing, 4 th Edition, Pearson Education, 2018.
4	https://machinelearningmastery.com/introduction-matrices-machine-learning/
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Random sampling – Sampling from finite and infinite populations – Estimates and standard error (sampling with replacement and sampling without replacement) – Sampling distribution of sample (sampling with replacement and sampling without replacement) – Criteria for good estimates (unmean – Stratified random sampling. Estimation: Point estimation – Criteria for good estimates (unbiasedness, consistency) – Methods of estimation including maximum likelihood estimation. Sufficient Statistic: Concept and examples – Complete sufficiency, their application in estimation – Central limit theorem (Excluding proof).

UNIT II

TESTING OF HYPOTHESIS

9

Concept and formulation – Type I and Type II errors – Procedures of Testing: Large Samples: Tests

Concept and formulation – Type I and Type II errors – Procedures of Testing. Large Samples. Tests for single mean, difference of means and single proportion - Small samples – Student's t test: Tests for single mean and difference of means - F test: Test for equality of variances - Chi-Square test: Tests for Goodness of fit and Independence of attributes.

UNIT III NON PARAMETRIC INFERENCE 9

Comparison with parametric inference – Use of order statistics – Sign test – Wilcoxon signed rank test – Mann-Whitney test – Run test – Kolmogorov-Smirnov test – Spearman's and Kendall's test – Tolerance region (Simple problems only).

UNIT IV DESIGN OF EXPERIMENTS AND LINEAR STATISTICAL 9
MODELS

Analysis of variance: Completely Randomized Design – Randomized Block Design. Simple Linear regression and correlation –Least Squares method – Rank correlation.

UNIT V BASICS OF TIME SERIES ANALYSIS AND FORECASTING 9

Stationary – ARIMA Models: Least Square method and maximum likelihood Identification – Estimation – Forecasting.

R STATISTICAL PROGRAMMING LANGUAGE: LIST OF EXPERIMENTS 15

- 1. Introduction to R, Functions, Control flow and Loops
- 2. Working with Vectors and Matrices
- Reading in and Writing Data
- 4. Working with Data
- 5. Manipulating Data
- 6. Simulation
- 7. Linear Model
- 8. Data Frame
- 9. Graphics in R

FOR FURTHER READING:

Multiple regression and multiple correlation, Neyman Pearson lemma, Procedures of Testing: Large samples – Variance.

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Text	Book (s)
1	Douglas C. Montgomery, George C. Runger, Applied Statistics and Probability for Engineers, Third Edition, John Wiley & Sons, 2003.
2	Chris Chatfield, The Analysis of Time Series: An Introduction, 6 th Edition, Chapman and Hall/CRC, 2003.
3	Garrett Grolemund, Hands-on Programming with R, 1st Edition, O'Reilly, 2014.
Refe	Prence (s)
1	D.C.Montgomery & E.A.Peck & G.G.Vining, Introduction to Linear Regression Analysis, 5 th Edition, Wiley, 2012.
2	A.M.Mood, F.A.Graybill & D.C.Boes, Introduction to the Theory of Statistics, 3 rd Edition, McGraw Hill, 2001.
3	N.Draper & H.Smith, Applied Regression Analysis, 3 rd Edition, Wiley, 1998.
4	Jared P.Lander, R for Everyone: Advanced Analytics and Graphics, 2 nd Edition, Addison-Wesley Professional, 2017.







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Regula	tion 2018	Semester II	H	eek	C	
Category	Course Code	Course Name	L	T	<u>P</u>	3
В	18ECB101J	PRINCIPLES OF ELECTRONICS	2	0	2	

Prerequisite Course (s)

Discrete Mathematics

Statistics, Probability and Calculus

Fundamentals of Physics

Principles of Electrical Engineering

Course Objective (s): The purpose of learning this course is to

- Study the operation of semiconductor diodes and their characteristics.
- Acquire knowledge about the operation and characteristics of BJT under various 2 configurations.
- Introduce the structure and terminal characteristics of FET and MOSFET. 3
- Understand the concepts of feedback and operational amplifiers with its applications 4
- 5 Gain knowledge about digital logic circuits

Course Outcome (s) (COs):

- Demonstrate the characteristics of the diode. CO₁
- Analyse the BJT terminal characteristics and its utilization. CO₂
- Develop a high degree of familiarity with the FET and MOSFET CO₃
- Design suitable amplifiers for any specific applications CO₄
- CO₅ Construct simple digital logic circuits

CO-PO Mapping

	POs													
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UNIT I

SEMICONDUCTORS DIODES AND CIRCUITS

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Semiconductors: Crystalline material: Mechanical properties, Energy band theory, Fermi levels; Conductors, Semiconductors & Insulators: electrical properties, band diagrams. Semiconductors: intrinsic & extrinsic, energy band diagram, P&N-type semiconductors, drift & diffusion carriers Diodes and Diode Circuits: Formation of P-N junction, energy band diagram, built-in-potential, forward and reverse biased P-N junction, formation of depletion zone, V-I characteristics, Zener breakdown, Avalanche breakdown and its reverse characteristics; Junction capacitance and Varactor diode. Simple diode circuits, load line, linear piecewise model; Rectifier circuits: half wave, full wave, PIV, DC voltage and current, ripple factor, efficiency, idea of regulation.

UNIT II

BIPOLAR JUNCTION TRANSISTORS

6

Formation of PNP / NPN junctions, transistor mechanism and principle of transistors, CE, CB, CC configuration, transistor characteristics: cut-off active and saturation mode, transistor action, injection efficiency, base transport factor. Biasing and Bias stability: calculation of stability factor.

UNIT III

FIELD EFFECT TRANSISTORS

6

Concept of Field Effect Transistors (channel width modulation), Gate isolation types, JFET Structure and characteristics, MOSFET Structure and characteristics, depletion and enhancement type; CS, CG, CD configurations

UNIT IV

FEED BACK AMPLIFIER AND OPERATIONAL AMPLIFIERS

6

Concept (Block diagram), properties, positive and negative feedback, loop gain, open loop gain, feedback factors; topologies of feedback amplifier; effect of feedback on gain, output impedance, input impedance, sensitivities (qualitative), bandwidth stability; effect of positive feedback: instability and oscillation, condition of oscillation, Barkhausen criteria. Introduction to integrated circuits, operational amplifier and its terminal properties.

UNIT V

DIGITAL ELECTRONICS FUNDAMENTALS

6

Difference between analog and digital signals, Logic ICs, half and full adder/subtractor, multiplexers, demultiplexers.

CASE STUDY

Bipolar Junction Transistors: Energy band diagram, current amplification factors for CB and CE modes

Field Effect Transistors: CMOS: Basic Principles

Feed Back Amplifier, Oscillators and Operational Amplifiers: Application of operational amplifier; inverting and non-inverting mode of operation, Adders, Subtractors, Constant-gain multiplier, Voltage follower, Comparator, Integrator, Differentiator.

Digital Electronics Fundamentals: Flip-flops, Shift register

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15 LIST OF EXPERIMENTS 1. Characteristics of PN junction diode and Zener diode. 2. Design of DC voltage regulator using zener diode. 3. Design of Rectifier with and without filter. 4. Characteristics of BJT, FET. 5. Design of CE amplifier. 6. Study of OP-AMP circuits: Inverting and Non-inverting Amplifier. 7. Implementation of basic logic functions using combinational circuits. Text Book(s) Adel S. Sedra and Kenneth C. Smith, "Microelectronic Circuits: Theory and Application", 7th Edition, Oxford University Press, 2017. Jacob millman, Christos halkias, Chetan parikh, "Millman's Integrated Electronics "McGraw 2 Hill education (India) Private Limited, 2010 M. Morris Mano, "Digital Logic & Computer Design", Pearson India Education Services, 3 Reference(s) Robert L. Boylestad, Louis Nashelsky. "Electronic Devices and Circuit Theory", 8th Edition, 1 Pearson Education Limited, 2002. 2 Ben Streetman, Sanjay Banerjee, "Solid State Electronic Devices", 6th Edition, 2002. Albert Paul Malvino and David J.Bates, "Electronic Principle", 7th Edition, Tata McGraw-3 Hill, 2008. D Schilling, C Belove, T Apelewicz, R Saccardi, "Electronics Circuits: Discrete & 4 Integrated", 3rd Edition, Tata McGraw-Hill, 2008. Jacob Millman and Arvin Grabel, "Microelectronics", 2nd Edition, Tata McGraw-Hill, 2009. 5 S. Salivahanan, N. Suresh Kumar and A. Vallavaraj, "Electronics Devices & Circuits", 2nd 6 Edition, Tata McGraw-Hill, 2007 Robert L. Boylestad and Louis Nashelsky, "Electronic Devices & Circuit Theory", 7 10thEdition, Pearson Education Limited, 2009.

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UNITI	BASIC TERMINOLOGIES AND INTRODUCTION TO ALGORITHM	9
Algorithm specifica and Theta notation Data Abstraction.	tion, Recursion, Performance analysis, Asymptotic Notation - The Big-C , Programming Style, Refinement of Coding - Time-Space Trade Off	O, Omega , Testing,
UNIT II	LINEAR DATA STRUCTURE	9
Array, Stack, Queu of Linear Data Stru	e, Linked-list and its types, Various Representations, Operations and Ap	plications
UNIT III	NON-LINEAR DATA STRUCTURE - TREES	9
Trees, Binary Tree,	Threaded Binary Tree, Binary Search Tree, B & B+ Tree, AVL Tree, S	play Tree.
UNIT IV	NON-LINEAR DATA STRUCTURE - GRAPHS	9
Depth First Search	Representations, Directed, Undirected GraphOperations, Breadth Fig., Minimum Spanning Tree, Prims and Kruskals Algorithm, complexion-linear Data Structures.	
UNIT V	SEARCHING, SORTING AND HASHING	9
	Binary Search, Insertion Sort, Selection Sort, Shell Sort, Divide and Co Sort, Heap Sort, Introduction to Hashing.	onquer Sort
	LIST OF EXPERIMENTS	15
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1	E. Horowitz and S. Sahni, Fundamentals of Data Structures, Second Edition, Universities Press, 2008.
2	V. Aho, J.E. Hopcroft and J. D. Ullman, "Data Structures and Algorithms", 1st Edition, Pearson India, 2002.
Refe	rence (s)
1	Donald E. Knuth, "The Art of Computer Programming: Volume 1: Fundamental Algorithms", 3rd edition, Addison Wesley, 2008.
2	Thomas, H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms", 3rd edition, MIT Press, 2010
3	Algorithms", 3rd edition, MIT Press, 2010 Pat Morin, "Open Data Structures: An Introduction (Open Paths to Enriched Learning)", 31st ed. Edition, UBC Press, 2013.







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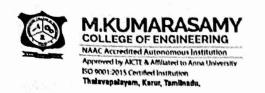


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Ţ	NIT II	MICROECONOMICS - CONSUMER BEHAVIOUR 6
Equil	ibrium - Eff	for - Axioms of Choice - Budget Constraints and Indifference Curves - Consumer's Sects of a Price Change, Income and Substitution Effects - Derivation of a Demand ons - Tax and Subsidies - Intertemporal Consumption - Suppliers' Income Effect.
U	NIT III	MICROECONOMICS - THEORY OF PRODUCTION 6
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- Sim	iple Keynes	and its Components - GNP, NNP, GDP, NDP - Consumption Function – Investment ian Model of Income Determination and the Keynesian Multiplier - Government d Subsidies - External Sector - Exports and Imports
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Text	Book (s)	
1	Pindyck, F	Robert S., and Daniel L. Rubinfeld, Microeconomics, Eighth Edition, Pearson.
2	Macroeco	nomics, by Rudiger Dornbusch, ,StanleyFischer and Startz 12 th Edition Sep 7 2017.
3	Economic	s, Paul Anthony Samuelson, William D. Nordhaus. 19th Edition 2018
Refe	rence (s)	
1	Intermedia	ate Microeconomics: A Modern Approach, Hal R, Varian 9 th Edition 2014. ton Company.
2	Principles	of Macroeconomics, N. Gregory Mankiw 9th Edition.
		of Macroeconomics, N. Gregory Mankiw 9th Edition. COLLEGE OF ENGO BOARD OF COMPUTER SCIENCE PRISORS CONTENT DEC 2020





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UNIT 1 LAUNCHING E MAGAZINE

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Writing: Good and bad writing - Common errors, punctuation rules, use of words - writing techniques of Catherine Morris and Joanie McMahon's - Creating and launching E-magazine. Speaking: leebreaker - Participating in 'Join Hands Movement' - Individual identification of social issues - addressing social issues - Reading: Sharing the learning points from GD - SATORI -Report writing on Discussion.

UNIT II FORMULATING AN ORGANIZATIONAL STRUCTURE

6

Each group forming an NGO - create vision, mission, value statement, and tagline and design a logo. Introduction to basic presentation skills & ORAI app - Groups to present their NGOs - Presentation recording and sharing the findings from recording. Writing: individual write up for E- magazine and evaluation - preparation and publication of second episode of E Magazine. Speed Reading session: Introduction to skimming and scanning; SATORI - Join the dots

UNIT III TEAM PLAY

6

Ad campaign - Brain storming session - discussing and exploring the means of articulating and amplifying the social issue their NGOs are working for - Designing skits: write the script articulating the message of their respective NGOs - Promote the play through a social media and gather audience - Enact the play - reviews. Group Activity: Prepare and publish the third episode of the E Magazine. Berbin's 8 Team roles and Lindgren's big 5 personality traits - SATORI joining dots.

UNIT IV DIVERSITY AND INCLUSION

6

Learn from movies - film on diversity – discussion on key take away of the film - Theory to connect and concept of empathy. Create story – Group activity – a person's life affected by the social issue – narration of story in first person - Feedbacks by other groups. Research on a book, incident or film based on the topic of your respective NGO - Write a review in a blog on the topics they are covering in their research. Diversity & Inclusion - Different forms of Diversity in our society - Debate on diversity with an angle of ethics, morality and respect for individual. Prepared speech - Every student will narrate the challenges faced by a member of a diverse group. Video recording interviews of people from diverse groups with 5 questions. Touch the target, film: 'The Fish and I' by BabakHabibifar. Discussion on TCS values, Respect for Individual and Integrity. Preparation of final episode of the E Magazine. Revisit your resume: Include your recent achievements in your resume. SATORI.

UNIT V

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ORGANIZING AWARENESS CAMPAIGN

SCARD OF COMPUTER SCIENCE 6

Project- 1) Each team to look for an NGO/ social group in the city which is working on the issue their college group is supporting. 2) Spend a day with the NGO/ social group to understand exactly how they work and the challenges they face. 3) Render voluntary service to the group for one day 4) Invite the NGO/ social group to address their university students for couple of hours. Plan the entire event, decide a suitable venue in the university, gather audience, invite faculty members etc. (they need to get their plan ratified their professor). Outcome-- Host an interactive session with the NGO spokesperson 5) The groups to present their experience of a day with the NGO and inspire students to work for the cause.

B.Tech - Computer Science and Business Systems

Regulation

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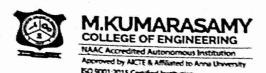




15 LAB ACTIVITIES 1. Group Discussion 2. Create the magazine 3. Launching an E Magazine 4. Prepare and Publish the Second Episode of the E Magazine 5. Enact and Read out the Script of a Skit 6. Promote the Play in Social Media 7. Presentation 8. Prepare and Publish the Third Episode of the E Magazine 9. Narrating a Story 10. Writing a Review in a Blog 11. Debate 12. Giving Persuasive Speech 13. A day with NGO and Share the Experience Text Book (s) There are no prescribed texts for semester 2 - there will be handouts and reference links shared Reference (s) Abundance: The Future is Better Than You Think; Peter H. Diamandis and Steven Kotler; 1 Published: 21 Feb, 2012; Publisher: Free Press Advertising & IMC: Principles and Practice; Sandra Moriarty, Nancy D. Mitchell, William D. 2 Wells; Published: 15 June 2016; Publisher: Pearson Education India Forge Your Future: Candid, Forthright, Inspiring ; Dr. A.P.J Abdul Kalam; Publishing year: 3 2014 Guiding Souls: Dialogues on the purpose of life; Dr. A.P.J Abdul Kalam; Publishing Year-4 2005; Co-author--Arun Tiwari Start With Why: How Great Leaders Inspire Everyone to Take Action; Simon Sinek; 5 Published: 6 October 2011; Publisher: Penguin The Family and the Nation; Dr. A.P.J Abdul Kalam; Publishing year: 2015; Co-author: 6 Acharya Mahapragya The Scientific India: A twenty First Century Guide to the World around Us; Dr. A.P.J Abdul 7 Kalam; Publishing year: 2011; Co-author- Y.S.Rajan

BOARD OF OMPUTER SCIENCE

DEC 2020





Web	References
ı	ETHICS FUNDAMENTALS AND APPROACHES TO ETHICS https://www.eolss.net/Sample-Chapters/C14/E1-37-01-00.pdf
2	A Framework for Making Ethical Decisions https://www.brown.edu/academics/science-and-technology-studies/framework-making-ethical-decisions
3	Five Basic Approaches to Ethical Decision http://faculty.winthrop.edu/meelerd/docs/rolos/5 Ethical Approaches.pdf
Onli	ne References
1	https://youtu.be/CsaTslhSDI
2	https://m.youtube.com/watch?feature=youtu.be&v=IIKvV8_T95M
3	https://m.youtube.com/watch?feature=youtu.be&v=e80BbX05D7Y
4	https://m.youtube.com/watch?v=dT_D68RJ5T8&feature=youtu.be
5	https://m.youtube.com/watch?v=7sLLEdBgYYY&feature=youtu.be







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UNITI

VISIONS FOR YOUTH

Introduction (Quiz) - Two speeches by great personalities (Oral presentations) - Quotes, proverbs relating to the power and potential of youth, Excerpts: Wings of Fire (Collecting proverbs highlighting the potential of youth) - Two news articles highlighting the initiatives for social causes by youth (Role play in a similar context) - One song exhibiting the positive energy of youth (Discussion on the song)

UNIT II

YOUTH AND EDUCATION

Meaning and the significance of education (Brainstorming) - Overview of different (traditional, modern) educational systems (Debate) - Role of youth in education, Urban and Rural set up, dissemination (Student presentations) - Designing and framing educational curriculum and materials (Students' Presentation based on write ups) -The pressing challenges in current educational system (Collage Design)

UNIT III

YOUTH AND SOCIETY

Need for social values in the present context (Poem - "Where the mind is without fear", Write up on various instances from real life) - Individual and group behaviour, respect for others (Case study on recent happenings) - Civic sense, bullying-substance abuse, uses of expletives (Case study on recent happenings) - Hero worship, gender insensitivity moral policing (Case study on recent happenings) -Positive contribution by youth in promoting social welfare (Short videos followed by discussions)

YOUTH AS PROFESSIONALS

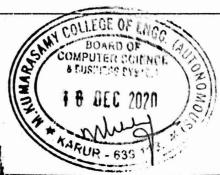
Introduction to professional values (Brainstorming through visual cues) - Engineering societies in India (Quiz) - Challenges to be addressed by Engineers in India (Case Study) - Challenges in different sectors: agriculture (Case Study) - Challenges in different sectors: urban development, environment (Group activity (oral and written)) - Challenges in different sectors: sustainable development, cyber security (Case Study – from Newspapers)

UNIT V

YOUTH IN PLURALISTIC SOCIETY

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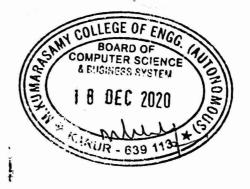
Introduction to pluralistic society, forces of globalization (Group Discussion) - Science and technology intercultural proximity (Narration of stories from various religions to illustrate the oneness of humanity) - Positive, Negative impact: religion, politics, gender, economic status, aesthetics (Discussion on "To Kill a Mocking Bird") - Values required to live in a global society (Poster presentation on festivals of various religions) - Learning the etiquettes of various societies (Poster presentation on festivals of various religions) - Success of pluralistic society, enliven the society, religious harmony through literary (Writing the aspects of pluralistic society based on the text).







	Book (s)
Nil	
Refe	rence (s)
1	Kalam, APJ Abdul, Wings of Fire: AN Autobiography of APJ Abdul Kalam. Ed. Sangam Books Ltd., 1999
2	"Banaras Hindu University Speech" and "To Students". The Voice of Truth. General Editor Shriman Narayan. Navajivan Publishing House. pp. 3-13 and pp. 425-30. www.mkgandhi.org
3	Piroda, Sam. "Challenges in Science and Technology". www.nfdindia.org/loc19.htm
4	Thomas A Address to VTU Students by Narayana Murthy. https://www.karnataka.com/personalities/narayana-murthy/vtu-address-2006/
. 5	World Economic forum. "India's top 7 challenges from skills to water scarcity"







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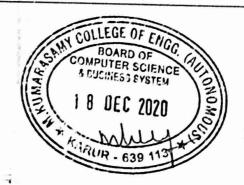
B.Tech - Computer Science and Business Systems





Introduction Human Body - Meaning and its Importance in Yoga Definition of Anatomy and Physiology Cell: Structure & Function General Information, Different parts, Structure, Function and Effect 24 of Yogic Practices. Tissues: Types, Structure & Function Musculo-Skeletal System Digestive System **Excretory System** Respiratory System Circulatory System Nervous System **Endocrinal System** Text/Reference (s) Books Shirley Telles - A Glimpse of the Human Body The structure and Functions, Swami Vivekananda Yoga Prakashana, Bangalore. Makarand Madhukar Gore - Anatomy and Physiology of Yogic Practices, motilal 2 Banarsidass, New Delhi, 2007.

Anne Waugh, Allison Grant - Iross and Wilson Anatomy and Physiology in Health & Illness,



Churchill Livingstone; 2010.

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Regulation 2018 Total Hours (4) Semester III Hours / Week Category Course Code Course Name V 1 1, FORMAL LANGUAGE AND C4 0 1 18CBC201T 3 AUTOMATA THEORY

Prerequisite Course (s)

Basics of Discrete Mathematics- Sets and Relations

Course Objective (s):

The purpose of learning this course is to:

- 1 Know the fundamental concepts of formal language and expressions.
- 2 Understand the relation between regular expression and finite automata.
- 3 Learn the languages for pushdown automata for recognizing a language.
- 4 Know the concept of linear bound automata, Turing machine and their computational capability.
- 5 Understand the basics of undecidable problems and complexity theory.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Explain the concepts in formal language and automata theory.
- CO2 Explain regular expression and its equivalence with finite automata.
- CO3 Utilize the push down automata to recognize a given language.
- CO4 Explain the capability of linear bound automata and Turing machine in solving a recursive problem.
- CO5 Elucidate the undecidability of various problems and concepts of complexity theory.

CO-PO Mapping

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B.Tech - Computer Science and Business Systems

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UNIT I

INTRODUCTION TO FINITE AUTOMATA

9 + 3

Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of languages, deterministic finite automata (DFA), nondeterministic finite automata (NFA) and equivalence with DFA, Finite Automata with Epsilon Transitions.

UNIT II

REGULAR EXPRESSIONS AND LANGUAGES

9 + 3

Regular expressions and languages, finite automata and equivalence with regular expressions, regular grammars and equivalence with finite automata, properties of regular languages, Kleene's theorem, pumping lemma for regular languages, Myhill-Nerode theorem and its uses, minimization of finite automata.

UNIT III

CONTEXT-FREE LANGUAGES, PUSHDOWN AUTOMATA,

9 + 3

Context-free grammars (CFG) and languages (CFL), Chomsky and Greibach normal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages, deterministic pushdown automata, closure properties of CFLs.

UNIT IV

LINEAR BOUNDED AUTOMATA AND TURING MACHINES

9+3

Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG. The basic model for Turing machines (TM), Turing recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, Nondeterministic TMs and equivalence with deterministic TMs.

UNIT V

UNDECIDABILITY

9 + 3

Church-Turing thesis, universal Turing machine, the universal and diagonalization languages, reduction between languages and Rice's theorem, undecidable problems about languages, P and NP, NP-completeness

Contents for Further Reading

Unrestricted grammars and equivalence with Turing machines, TMs as enumerators.

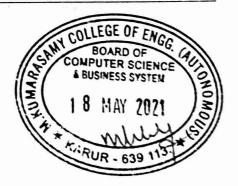
Basic Introduction to Complexity: Introductory ideas on Time complexity of deterministic and nondeterministic Turing machines, Cook's Theorem, other NP -Complete problems.







Text	Book (s)
1 /	John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, "Introduction to Automata Theory, Languages and Computation", Third Edition, Pearson Education, 2009.
2	Peter Linz, "An Introduction to formal Languages and Automata", 6th Edition, Jones & Bartlett Pub, 2016.
Refer	ence (s)
1	John C.Martin, "Introduction to Languages and the Theory of Computation", Fourth Edition. McGraw Hill Education, 2010.
2	Harry R.Lewis, Christos U.Papadimitriou, Elements of the Theory of Computation, Prentice Hall India Learning Private Limited; Second edition, 2002.
Web	Resource (s)
1	http://gaia.cs.umass.edu/ntu_socket
2	http://www.cs.bilgi.edu.tr/~mgencer/coursemat/NP-LectureNotes.pdf
3	www.jflap.org/
4	automatonsimulator.com/
5	http://www.jflap.org/tutorial/grammar/bruteforceCFG/index.html
6	https://turingmachinesimulator.com/
7	http://weitz.de/pump/
8	https://nptel.ac.in/courses/106104028/
9	https://nptel.ac.in/courses/106103070/









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INTRODUCTION TO COMPUTER ARCHITECTURE **UNIT I** Functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU: Registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Outlining instruction sets of some common CPUs. Data representation: Signed number representation, fixed and floating-point representations, character representation. COMPUTER ARITHMETIC **UNIT II** Integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication shift-and- add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic, IEEE 754 format. CONTROL UNIT AND PIPELINING **UNIT III** Introduction to x86 architecture. CPU control unit design: Hardwired and micro-programmed design approaches, design of a simple hypothetical CPU. Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards. Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency. PERIPHERAL DEVICES AND THEIR CHARACTERISTICS UNIT IV Input-output subsystems, I/O device interface, I/O transfers - program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes - role of interrupts in process state transitions, I/O device interfaces - SCII, USB. MEMORY ORGANIZATION AND SYSTEM DESIGN **UNIT V** Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies. Memory system design: Semiconductor memory technologies, memory organization. Morris Mano, "Computer System Architecture" 3rd Edition, Prentice Hall of India, New Text Book (s) Delhi, 2014. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Reference (s) Hardware/Software Interface", Elsevier, 5th Edition 2013. i Carl Hamacher, Zvonko Vranesic, SafwatZaky, Naraig Manjikian, "Computer Organization and Embedded Systems" McGraw-Hill, 6th Edition 2014. 2 John P. Hayes, Computer Architecture and Organization, McGraw-Hill ,3rd Edition,2013. William Stallings, "Computer Organization and Architecture - Designing for Performance", 3 10th Edition, Pearson Education, 2015. Vincent P. Heuring and Harry F. Jordan," Computer System Design and Architecture", 4 Prentice Hall, 2 nd Edition, 2004. 5





Regula	tion 2018	Semester III	Т	otal Hou	rs	45
Category	Course Code		Ho	ek		
	Course Code	Course Name	L	Т	P	C
С	18CBC203T	OBJECT ORIENTED PROGRAMMING	3	0	0	3
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The purpose of learning this course is to:

- To explain the difference between object oriented programming and procedural programming.
- 2 To build C++ classes using appropriate encapsulation and design principles.
- To introduce advanced C++ features such as composition of objects, operator overloads, 3 dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc.
- 4 To apply object oriented concepts to solve bigger computing problems.
- 5 Develop C++ applications using OOP concepts, files, templates and exceptions.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO₁ Understand the concepts and relative merits of C++.
- Implement programs using object oriented concepts such as encapsulation, inheritance and CO₂ polymorphism.
- Implement stream I/O, templates and operator overloading. CO₃
- Develop applications with concepts of files, templates and exceptions. CO4
- CO₅ Understand Object Oriented Design and Modeling.

CO-PO Mapping

COs						P	Os						PSOs		
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2: Moderate (Medium)

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9

UNIT I PROCEDURAL PROGRAMMING 9

An Overview of C: Types Operator and Expressions, Scope and Lifetime, Constants, Pointers, Arrays, and References, Control Flow, Functions and Program Structure, Namespaces, error handling, Input and Output (C-way), Library Functions (string, math, stdlib), Command line arguments, Pre-processor directive - Some difference between C and C++: Single line comments, Local variable declaration within function scope, function declaration, function overloading, stronger type checking. Reference variable, parameter passing – value vs reference, passing pointer by value or reference, Operator new and delete, the typecasting operator, Inline Functions in contrast to macro, default arguments

UNIT II CONCEPTS OF OBJECT ORIENTED PROGRAMMING

Necessity for OOP, Data Hiding, Data Abstraction, Encapsulation, Procedural Abstraction, Class and Object - More extensions to C in C++ to provide OOP Facilities: Scope of Class and Scope Resolution Operator, Member Function of a Class, private, protected and public Access Specifier, this Keyword, Constructors and Destructors, friend class, error handling (exception)

UNIT III ESSENTIALS OF OBJECT ORIENTED PROGRAMMING 9

Operator overloading – Inheritance: Single and Multiple, Class Hierarchy, Pointers to Objects, Assignment of an Object to another Object, Polymorphism through dynamic binding, Virtual Functions, Overloading, overriding and hiding, Error Handling

UNIT IV GENERIC PROGRAMMING 9

Template concept, class template, function template, template specialization - Input and Output: Streams, Files, Library functions, formatted output.

UNIT V OBJECT ORIENTED DESIGN AND MODELLING 9

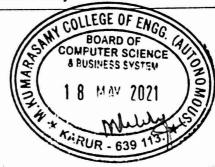
UML concept, Use case for requirement capturing, Class diagram, Activity diagram and Sequence Diagram for design, Corresponding C++ code from design

Text Book (s)

- The C++ Programming Language, Bjarne Stroustrup, Addison Wesley.
- 2 / C++ and Object-Oriented Programming Paradigm, Debasish Jana, PHI Learning Pvt. Ltd.

Reference (s)

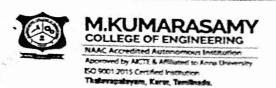
- 1 Programming Principles and Practice Using C++, Bjarne Stroustrup, Addison Wesley.
- The Design and Evolution of C++, Bjarne Stroustrup, Addison Wesley.







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PYTHON CONCEPTS AND DATA VISUALIZATION UNIT I Python Concepts, Data Structures, Classes: Interpreter, Program Execution, Statements, Expressions, Flow Controls, Functions, Numeric Types, Sequences and Class Constructors, Text & Binary Files -Reading and Writing. Visualization in Python: Matplotlib package, Plotting Graphs, Controlling Graph, Adding Text, More Graph Types, Getting and setting values, Patches. MULTIVARIATE NORMAL DISTRIBUTION AND UNIT II MULTIVARIATE REGRESSION Multivariate Normal Distribution: Multivariate Normal Distribution, Conditional Distribution, Estimation of parameters. Multiple Linear Regression Model: Standard multiple regression models collinearity, outliers, non-normality and autocorrelation, Multivariate Regression: Parameter estimation, Multivariate Analysis of variance and covariance. DISCRIMINANT ANALYSIS AND PRINCIPAL 4 UNIT III COMPONENT ANALYSIS Discriminant Analysis: Statistical background, linear discriminant function analysis, Estimating linear discriminant functions and their properties. Principal Component Analysis: Principal components, Algorithm for conducting principal component analysis, H-plot. **FACTOR ANALYSIS** UNIT IV Factor Analysis: Factor analysis model, Extracting common factors, determining number of factors, Transformation of factor analysis solutions, Factor scores. **CLUSTER ANALYSIS** UNITY Clustering and Segmentation Analysis: Introduction, Types of clustering, Correlations and distances, clustering by partitioning methods, hierarchical clustering, overlapping clustering. K-Means Clustering. 15 LIST OF EXPERIMENTS 1. Basic Python Programs 2. Program using String Operations 3. Program on python Data structures 4. Perform various numpy operations and special functions 5. Draw statistical graphics using seaborn 6. Implement k-means, logistic and time series algorithm using Scikit-learn

10. Visualization in python using Altair

8. Factor analysis with python

Data Aggregation in python

7. Multi Variable analysis with regression in python

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A BUSINESS SYSTEM

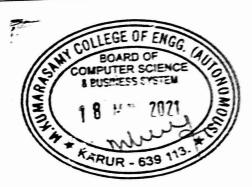
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Curriculum and Sylleting





Pook (s)
An Introduction to Multivariate Statistical Analysis, T.W. Anderson, Wiley Series in Probability and Statistics (Third Edition), 2003.
Applied Multivariate Data Analysis, Vol I & II, J.D. Jobson, Springer, 1991.
Beginning Python: From Novice to Professional, Magnus Lie Hetland. Edition, 2005
rence (s)
The Foundations of Factor Analysis, A.S. Mulaik, Chapman and Hall/CRC, 2009
Introduction to Linear Regression Analysis, D.C. Montgomery and E.A. Peck.
Python for Data Analysis, Wes Mc Kinney.
Programming Python, Mark Lutz.
Python 3 for Absolute Beginners, Tim Hall and J-P Stacey.





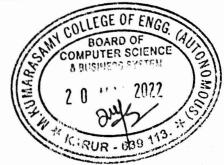
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1: Slight (Low)

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2: Moderate (Medium)

3: Substantial (High)



Introduction

Introduction: Programming in the small vs. programming in the large; software project failures and importance of software quality and timely availability; of software engineering towards successful execution of large software projects; emergence of software engineering as a discipline, Software Engineering Historical Development from Jackson Structured Programming to Agile

Development. UNIT 2

Software Project Management and Agile Software Engineering

Basic concepts of life cycle models - different models and milestones; software project planning identification of activities and resources; concepts of feasibility study; techniques for estimation of schedule and effort; software cost estimation models and concepts of software engineering economics; techniques of software project control and reporting; introduction to measurement of software size; introduction to the concepts of risk and its mitigation; configuration management.

Agile Software Engineering: Concepts of Agile Methods, Extreme Programming; Agile Process

Model - Scrum, Feature; Scenarios and Stories.

UNIT 3

Software Quality Management and Software Requirements Analysis

Software quality; Garvin's quality dimensions, McCall's quality factor, ISO 9126 quality factor; Software Quality Dilemma; Introduction to Capability Maturity Models (CMM and CMMI); Introduction to software reliability, reliability models and estimation.

Software Requirements Introduction to Software Requirements Specifications (SRS) and requirement elicitation techniques; techniques for requirement modelling - decision tables, event tables, state transition tables, Petri nets; requirements documentation through use cases; introduction to UML, introduction to software metrics and metrics-based control methods; measures of code and design quality.

UNIT 4

·Object Oriented Analysis, Design and Construction

9

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

Software Testing

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

LIST OF EXPERIMENTS

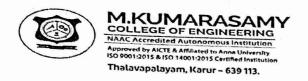
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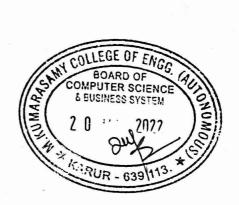
Development of requirement specification, function oriented design using SA/SD, object-oriented design using UML, test case design, implementation using c++ and testing use of appropriate CASE tools and other tools such as configuration management tools, program analysis tools in the software life cycle.

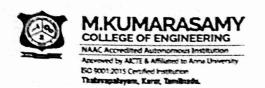
B. Tech - Computer Science and Business Systems

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Text B	Book (s)
1	Ian Sommerville, Software Engineering, Tenth edition, pearson education, 2017
2	Roger S.Pressman and Bruce Maxim, Software Engineering – A Practitioner's Approach, Ninth Edition, Mc Graw-Hill Education, 2019
Refer	rence (s)
1	Ivar Jacobson, Object Oriented Software Engineering: A Use Case Driven Approach, First Edition, 2007
2	Shari Lawrence Pfleeger and Joanne M. Atlee, Software Engineering: Theory and Practice, Fourth Edition, Pearson Education India, 2011.
3	D. E. Knuth, "The Art of Computer Programming, Vol. 1, Vol. 2 and Vol. 3", Third Edition, Mathematical Science Publishers, 1997.
4	Michael A. Nielsen and Isaac L. Chuang, "Quantum Computation and Quantum Information", 2006







Regulation 2018					Semester III							Total Hours			
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2	Gain knowledge about the various phases in a software development life cycle. Understand the basic of software requirements, project management and cost estimation.														
3	Learn the metrics and models used to estimate the software quality and reliability.														
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5	Understand the various methodologies in software design using case tools. Learn various testing strategies used to identify faults and failures in software development.														
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CO2	Elucidate the software requirement specification and cost estimation for a project management.														
CO3	Utilize the metrics and models for estimating the software quality and reliability.														
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CO5	Expl	ain va	rious t	esting	technic	iues us	sed in v	verifica	ation a	nd vali	dation	of a so	ftware.		
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INTRODUCTION

Programming in the small vs. programming in the large; software project failures and importance of software quality and timely availability; engineering approach to software development; role of software engineering towards successful execution of large software projects; emergence of software engineering as a discipline, Basic concepts of life cycle models – different models and milestones.

UNIT II

SOFTWARE PROJECT MANAGEMENT AND COST **ESTIMATION**

9

Software project planning - identification of activities and resources; concepts of feasibility study; techniques for estimation of schedule and effort, Introduction to Software Requirements Specifications (SRS) and requirement elicitation techniques; techniques for requirement modelling – decision tables, event tables, state transition tables, Petri nets, requirements documentation through use cases. Software cost estimation models and concepts of software engineering economics; techniques of software project control and reporting, introduction to measurement of software size; introduction to the concepts of risk and its mitigation; configuration management.

SOFTWARE QUALITY AND RELIABILITY

9

Internal and external qualities; process and product quality; principles to achieve software quality; introduction to different software quality models like McCall, Boehm model. Introduction to software reliability, reliability models and estimation, introduction to software metrics and metrics based control methods, measures of code and design quality.

UNIT IV

OBJECT ORIENTED ANALYSIS, DESIGN AND CONSTRUCTION

9

Introduction to UML, Concepts -- the principles of abstraction, modularity, specification, encapsulation and information hiding; concepts of abstract data type; Class Responsibility Collaborator (CRC) model; quality of design; design measurements; concepts of design patterns; Refactoring; object oriented construction principles, object oriented metrics.

UNIT V

SOFTWARE TESTING

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

Contents for Further Reading

Software quality models like FURPS / FURPS+, Dromey, ISO - 9126; introduction to Capability Maturity Models (CMM and CMMI).

LIST OF EXPERIMENTS

15

7071

Development of requirements specification, function oriented design using SA/SD, object-oriented design using UML, test case design, implementation using C++ and testing. Use of appropriate CASE tools and other tools such as configuration management tools, program analysis tools in the software life cycle! Develop the software using software engineering methodology and for each experiment prepare the following documents

Problem Analysis and Project Planning.

Software Requirement Analysis.

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M.KUMARASAMY COLLEGE OF ENGINEERING NAAC Accredited Autonomous Institution



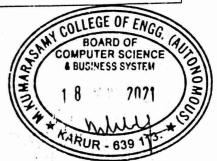
- Approved to ARTE & Affiliated to Anna (hiversity INO 0001-2018 Certified Institution Thelevapalayem, Kerur, Temilhadu.
- Data Modelling.
- Software Development and Debugging
- Software Testing.
- 1. Course Registration System
- 2. Student marks analysing system
- 3. Online ticket reservation system
- 4. ATM system
- 5. Stock maintenance
- 6. Quiz System
- 7. Expert system to prescribe the medicines for the given symptoms

8. Remote computer monitoring

Text	Book (s)
1	lan Sommerville, Software Engineering, Tenth Edition, Pearson Education, 2017
2	Roger S. Pressman and Bruce Maxim, Software Engineering – A Practitioner's Approach, Ninth Edition, Mc Graw-Hill Education, 2019.
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Reference (s)

- l Var Jacobson, Object Oriented Software Engineering: A Use Case Driven Approach, First Edition, 2007.
- Shari Lawrence Pfleeger and Joanne M. Atlee, Software Engineering: Theory and Practice, Fourth Edition, Pearson Education India, 2011.
- lvar Jacobson, Grady Booch, James Rumbaugh, The Unified Development Process, First Edition, Addison-Wesley, 2012.







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UNIT I LINEAR PROGRAMMING 9

Linear programming – Examples from industrial cases, formulation & definitions, Matrix form. Basic concepts, Special cases – infeasibility, unboundedness, redundancy and degeneracy, Sensitivity analysis. Simplex Algorithm – slack, surplus & artificial variables, computational details, big-M method, identification and resolution of special cases through simplex iterations. Duality – formulation, results, fundamental theorem of duality, dual-simplex and primal-dual algorithms.

UNIT II TRANSPORTATION AND ASSIGNMENT PROBLEMS 9

TP - Examples, Definitions – decision variables, supply & demand constraints, formulation, Balanced & unbalanced situations, Solution methods – NWCR, minimum cost and VAM, test for optimality (MODI method), degeneracy and its resolution.

AP - Examples, Definitions – decision variables, constraints, formulation, Balanced &unbalanced situations, Solution method – Hungarian, test for optimality (MODI method), degeneracy & its resolution.

UNIT III PERT - CPM AND INVENTORY CONTROL 9

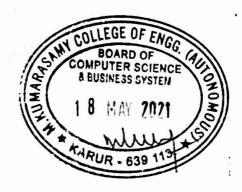
Project definition, Project scheduling techniques – Gantt chart, PERT & CPM, Determination of critical paths, Estimation of Project time and its variance in PERT using statistical principles, Concept of project crashing/time-cost trade-off. Inventory Control: Functions of inventory and its disadvantages, ABC analysis, Concept of inventory costs, Basics of inventory policy (order, lead time, types), Fixed orderquantity models – EOQ, POQ & Quantity discount models. EOQ models for discrete units, sensitivity analysis and Robustness.

UNIT IV QUEUING THEORY 9

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

UNIT V SIMULATION METHODOLOGY 9

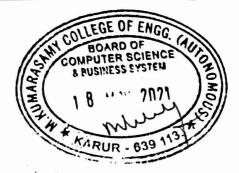
Definition and steps of simulation, random number, random number generator, Discrete Event System Simulation – clock, event list, Application in Scheduling, Queuing systems and Inventory systems.







A A SOURCE A SOURCE	
Text	Book (s)
1	Operations Research: An Introduction. H.A. Taha, Pearson, 10th Edition, 2017.
Refe	rence (s)
1	Linear Programming. K.G. Murthy.
2	Linear Programming. G. Hadley
3	Principles of OR with Application to Managerial Decisions. H.M. Wagner.
4	Introduction to Operations Research. F.S. Hiller and G.J. Lieberman.
5	Elements of Queuing Theory. Thomas L. Saaty.
6	Operations Research and Management Science, Hand Book: Edited By A. Ravi Ravindran
7	Management Guide to PERT/CPM. Wiest& Levy.
8	Modern Inventory Management. J.W. Prichard and R.H. Eagle







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B.Tech - Computer Science and Business Systems

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2: Moderate (Medium)



3: Substantial (High)

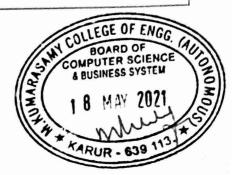




LIST OF EXPERIMENTS

30

- 1. Study of different UML diagrams
- 2. Programs on concept of classes and objects
- 3. Programs using friend functions
- 4. Programs using static polymorphism
- 5. Programs using constructors
- 6. Programs using inheritance
- 7. Programs on dynamic polymorphism
- 8. Programs on exception handling
- 9. Programs on generic programming using template function & template class
- 10. Programs on file handling







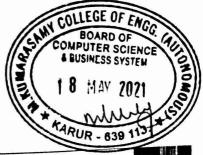
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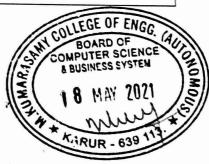
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UNITI	Module - 1	
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UNIT II	Module - 2 6	
Aptitude: Venn I Communication:	Diagrams - Data Interpretation. Phrasal verbs - Voice of Valluvar.	
UNIT III	Module - 3	
Aptitude: Average Communication:	ldioms and Phrases - Skits.	
UNIT IV	Module - 4	
Aptitude: Time a Communication:	and Distance - Problems on Trains. Prefix/Suffix - Root words - Adjectives - JAM (Extempore Speech).	
UNITV	Module - 5	
Aptitude: Clocks		
Communication	: Homophones - Frame Tales.	
Text Book (s)		
Dr.R.S.Ag	garwal, "Quantitative Aptitude", S. Chand & Company Limited, 2015	Weg No
br.R.S.Ag	garwal, "A Modern Approach to Verbal & Non - Verbal Reasoning", S. Chand & Limited, 2015	۲







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BOARD OF COMPUTER SCIENCE
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B.Tech - Computer Science and Business Systems

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ENVIRONMENT& BIODIVERSITY UNIT I Definition-types of environment, components of environment, scope-importance of environmental studies- Bio diversity-definition-value of biodiversity-Threats to biodiversity - India a mega diversity nation-endangered and endemic species of India-conservation of biodiversity. 3 **UNIT II ENERGY SOURCES** Energy resources- Growing energy needs- Renewable and Nonrenewable energy sources- Use of alternate energy sources - Nuclear Energy- Alternative energy fuels-power alcohol-Bio diesel (preparation, properties &uses) 3 UNIT III SOCIAL ISSUES AND ENVIRONMENT Environment ethics - Climate change - Global warming - Acid rain - Ozone layer depletion -Nuclear accidents-holocaust. Solid waste management - Rain water Harvesting-watershed management **UNIT IV ENVIRONMENTAL POLLUTION & ACTS** Source, types, effects & control- Air pollution -Water pollution - Soil pollution - Marine pollution and Plastic Pollution -The Environment (Protection) Act - Air (Prevention and control of pollution) Act - Water (Prevention and control of pollution) Act- Role of individual in prevention of pollution. **UNIT V HUMAN POPULATION AND ENVIRONMENT** Sustainable development – Urban Population growth and distribution – Population explosion – Family Welfare Program – Women and child welfare- Role of information technology in environment and human health- case studies Text Book (s) Dr.J.P.Sharma, "Environmental studies", Laxmi Publications(p) Ltd, New Delhi. Miller "Environmental Science" 11th Edition, Cengage Learning India Private Limited, New Delhi, (2006). Reference (s) Master. G.M., "Introduction to Environmental Engineering and Science", Pearson Education 1 Pvt Ltd., (2004) Dr.A.Ravikrishnan "Environmental Science and Engineering" Sri Krishna publications, 2 Chennai(2015) P.Anandan, R.Kumaravelan "Environmental Science and Engineering" Scitech Publication 3 (India) Pvt. Ltd, Chennai, Reprint 2009.





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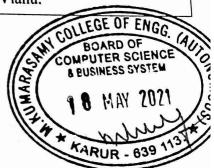
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UNIT I INTRODUCTION Introduction to Database: Hierarchical, Network and Relational Models - Database system architecture: Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML) UNIT II **DATA MODELS** Entity-relationship model, network model, relational and object oriented data models, integrity constraints, data manipulation operations - Relational query languages: Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS -MYSQL MongoDB, ORACLE, DB2, SQL server UNIT III RELATIONAL DATABASE DESIGN Domain and data dependency, Armstrong's axioms, Functional Dependencies, Normal forms, Dependency preservation, Lossless design - Query processing and optimization: Evaluation of relational algebra expressions, Queryequivalence, Join strategies, Query optimization algorithms **UNIT IV** STORAGE STRATEGIES Indices, B-trees, Hashing - Transaction processing: Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery **UNIT V** DATABASE SECURITY 9 Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection - Advanced topics: Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining. Text Book (s) Database System Concepts. Abraham Silberschatz, Henry F. Korth and S. Sudarshan. Principles of Database and Knowledge - Base Systems, Vol 1 by J. D. Ullman. Reference (s) Fundamentals of Database Systems. R. Elmasri and S. Navathe. 1 2 Foundations of Databases. Serge Abiteboul, Richard Hull, Victor Vianu,







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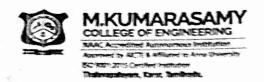
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UNITI

INTRODUCTION

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Concept of Operating Systems (OS), Generations of OS, Typesof OS, OS Services, Interrupt handling and System Calls, Basic architectural concepts of an OS, Concept of Virtual Machine, Resource Manager view, process view and hierarchical view of an OS

UNITII

PROCESSES, THREAD, PROCESS SCHEDULING

9

Processes: Definition. Process Relationship. Different states of a Process, Process Statetransitions, Process Control Block (PCB), Context switching - Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads - Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers - Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time - Scheduling algorithms: Pre-emptive and non-pre-emptive, PCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF

UNIT III

INTER-PROCESS COMMUNICATION

9

Concurrent processes, precedence graphs, Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Semaphores, Strict Alternation, Peterson's Solution, The Producer / Consumer Problem, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem, Barber's shop problem - Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery

UNITIV

CONCURRENT PROGRAMMING

9

Critical region, conditional critical region, monitors, concurrent languages, communicating sequential process (CSP); Deadlocks - prevention, avoidance, detection and recovery - Memory Management: Basic concept, Logical and Physical address maps, Memory allocation: Contiguous Memory allocation - Fixed and variable partition-Internal and External fragmentation and Compaction - Virtual Memory: Basics of Virtual Memory - Hardware and control structures - Locality of reference, Page allocation, Partitioning, Paging, Page fault, Working Set, Segmentation, Demand paging, PageReplacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Notrecently used (NRU) and Least Recently used (LRU)

UNIT V

UO HARDWARE, FILE AND DISK MANAGEMENT

9

I/O devices, Device controllers, Direct Memory Access, Principles of I/O - File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation(linear list, hash table), efficiency and performance - Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks.

Case study: UNIX OS file system, shell, filters, shell programming, programming

I/O, UNIX system calls.

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LIST OF EXPERIMENTS

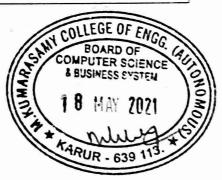
- 1. Analysis and Synthesis of Basic Linux Commands
- 2. Programs using Shell Programming
- 3. Implementation of Unix System Calls
- 4. Simulation and Analysis of Non pre-emptive and Pre-emptive CPU Scheduling Algorithms
- 5. Simulation of Producer Consumer Problem using Semaphores and Implementation of Dining Philosopher's Problem to demonstrate Process Synchronization
- 6. Simulation of Banker's Algorithm for Deadlock Avoidance
- 7. Analysis and Simulation of Memory Allocation and Management Techniques
- 8. Implementation of Page Replacement Techniques
- 9. Simulation of Disk Scheduling Algorithms
- 10. Implementation of File organization Techniques.

Text Book (s)

- Operating System Concepts Essentials. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne.
- Operating Systems: Internals and Design Principles. William Stallings 2

Reference (s)

- Operating System: A Design-oriented Approach. Charles Patrick Crowley.
- Operating Systems: A Modern Perspective. Gary J. Nutt. 2
- Design of the Unix Operating Systems. Maurice J. Bach. 3
- Understanding the Linux Kernel, Daniel Pierre Bovet, Marco Cesati. 4







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4	Unde	rstand	the desi	ign met	thods fo	or build	ling use	er interf	ace UN	/IL syst	em.			
5	Learn	to inte	erface th	ne UM	L desig	n with	a datab	ase app	olicatio	n syste	n.			
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UNIT I INTRODUCTION TO UML METHOD AND LANGUAGE

Software development process: The Waterfall Model vs. The Spiral Model -The Software Crisis, description of the real world using the Objects Model - Classes, inheritance and multiple configurations - Quality software characteristics - Description of the Object Oriented Analysis process vs. the Structure Analysis Model - Introduction to the UML Language; Standards, Elements of the language, General description of various models, The process of Object Oriented software development, Description of Design Patterns, Technological Description of Distributed Systems

UNIT II REQUIREMENTS ANALYSIS USING CASE MODELING 9

Analysis of system requirements, Actor definitions, Writing a case goal, Use Case Diagrams, Use Case Relationships - Transfer from Analysis to Design in the Characterization Stage: Interaction Diagrams- Description of goal, Defining UML Method, Operation, Object Interface, Class - Sequence Diagram, Finding objects from Flow of Events, Describing the process of finding objects using a Sequence Diagram, Describing the process of finding objects using a Collaboration Diagram

UNIT III THE LOGICAL VIEW DESIGN STAGE 9

Static Structure Diagrams: The Class Diagram Model, Attributes descriptions, Operations descriptions, Connections descriptions in the Static Model, Association, Generalization, Aggregation, Dependency, Interfacing, Multiplicity - Package Diagram Model: Description of the model, White box, black box, Connections between packagers, Interfaces, Create Package Diagram, Drill Down

UNIT IV DYNAMIC MODEL 9

State Diagram / Activity Diagram: Description of the State Diagram, Events Handling, Description of the Activity Diagram, Exercise in State Machines - Component Diagram Model: Physical Aspect, Logical Aspect, Connections and Dependencies, User face, Initial DB design in a UML environment

UNIT V DEPLOYMENT MODEL 9

Processors, Connections, Components, Tasks, Threads, Signals and Events

LIST OF EXPERIMENTS

To develop a mini-project by following the 9 exercises listed below.

- 1. To develop a problem statement.
- 2. Identify Use Cases and develop the Use Case model.
- 3. Identify the conceptual classes and develop a domain model with UML Class diagram.
- 4. Using the identified scenarios find the interaction between objects and represent them using UML Sequence diagrams.
- 5. Draw relevant state charts and activity diagrams.
- 6. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
- 7. Develop and test the Technical services layer.
- 8. Develop and test the Domain objects layer.
- 9. Develop and test the User interface layer.

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Suggested domains for Mini-Project:

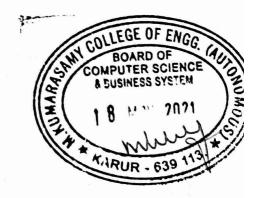
- 1. Passport automation system.
- 2. Book bank
- 3. Exam Registration
- 4. Stock maintenance system.
- 5. Online course reservation system
- 6. E-ticketing
- 7. Software personnel management system
- 8. Credit card processing
- 9. e-book management system
- 10. Recruitment system

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- Bernd Bruegge and Allen H. Dutoit, "Object-Oriented Software Engineering: using UML, Patterns, and Java", Pearson, 3rd Edition, 2013
 - Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Pearson Education, 3rd Edition, 2005

Reference (s)

- Erich Gamma, Richard Helm, Ralph Johnson, John M. Vlissides, "Design Patterns: Elements of Reusable Object-Oriented Software", Pearson, 2012
- Roger. S. Pressman and Bruce R. Maxim, "Software Engineering A Practitioner's Approach", 7th Edition, Tata McGraw Hill, 2015
- Martin Fowler, Kendall Scott, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Addison Wesley, 3rd Edition, 2003
- Grady Booch, Robert A. Maksimchuk, Michael W. Engle, Bobbi J. Young, Ph.D., Jim Conallen Kelli A. Houston, "Object Oriented Analysis and Design with Applications", Addision Wesely, 3rd Edition, 2007
- 5 Freeman, Eric & Robson, Elisabeth, "Head First Design Patterns" 1st Edition, O'Reilly, 2004



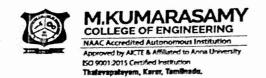




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UNIT I SWOT AND TOWS 6

REUNION – Recap activity on the earlier learning - Summarize the basic principles of SWOT and Life Positions – Apply SWOT in real life scenarios - Pat your back activity – strength will be written by others – Create your SWOT – SWOT Vs. TOWS The Balancing Act- Group Presentations on what are the strengths they have identified to survive in the VUCA World- Recognize how motivation helps real life – Motivation Stories - Maslow's Theory – Leverage motivation in real life scenarios – Scenario based activity on identifying and leveraging motivation.

UNIT II PLURALISM, CROSS CULTURE AND GENDER AWARENESS 6

Identifying Pluralism in cultural spaces - Rivers of India - Awareness and respect for pluralism in cultural spaces -Differentiate between the different cultures of India-Rhythms of India (Cultures in India) - Define the terms global, glocal and translocational-Differentiate between global, glocal and translocational culture- Debate on Global and global impacts- Cross - cultural communication - Recognize the implications of cross - cultural communication - Apply cross cultural communication - Identify the common mistakes made in cross - cultural communication- Gender awareness -Gender awareness campaign - Differentiate between the roles and relations of different genders - Quiz Time

UNIT III ROLE OF SCIENCE IN NATION BUILDING 6

Role of science in nation building - Introduce the topic and discuss the role of scientists and mathematicians from ancient India - Summarize the role of science in nation building - Role of science in pre and post - independence.

UNIT IV ARTIFICIAL INTELLIGENCE 6

Define AI (Artificial Intelligence) - "Voice of the Future" Activity- Recognize the importance of AI-AI in Everyday Life- -Design your college in the year 2090- Communicating with machines -debate related to Artificial Intelligence in the presence of an external moderator.

UNIT V TECHNICAL WRITING 6

Introduction to technical writing- Basic rules of technical writing through examples- Identify the best practices of technical writing- Practice activity on technical writing- Apply technical writing in real-life scenarios- Applying technical writing in profession-Assessment on technical writing on certain topic-Project- Visit rural area/ underprivileged parts of city to address some of the local issues; if relevant, suggest a practical technology solution to the issues

LAB ACTIVITIES

15

- 1. SWOT Vs TOWS
- 2. The Balancing act TED talks on Biomimicry and stories
- 3. You tube video on Maslow's Theory
- 4. Rhythms of India (Cultures in India)- Presentation
- 5. Cross-Cultural Communication (Debate & Group Discussion)
- 6. Role of Science in Nation Building
- 7. Role of Science in Nation Building (Post-Independence)
- 8. AI in everyday life (Presentation)
- 9. Design your college in the year 2090
- 10. Technical Article writing

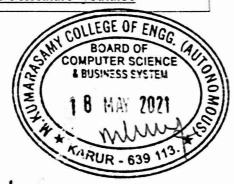
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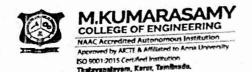
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Tex	Book (s)
The	re are no prescribed texts for semester 4-there will be handouts and reference links shared.
Refe	erence (s)
1	Raman, Meenakshi and Sangeeta Sharma, Fundamentals of Technical Communication.(2014)
2	Fine, Lawrence G. The SWOT Analysis: Using your strength to overcome Weakness, Using Opportunities to Overcome Threats.(2009)
3	Gerald.J.Alred, Charles T. Brusaw, Walter E.Oliu, Bedford/St.Martin's Boston, Newyork, Handbook of Technical Writing (2009)
4	Liz Hamp-Lyons and Ben Heasly, Study Writing, Cambridge University Pres. 2006
5	Sanjay Kumar and PushpLata, Communication Skills.OxfordUniversity Press. 2011.
6	Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. OxfordUniversity Press
Web	References
1	Examples of Technical Writing for Students https://freelance-writing.lovetoknow.com/kinds-technical-writing
2	11 Skills of a Good Technical Writer https://clickhelp.com/clickhelp-technical-writing-blog/11-skills-of-a-good-technical-writer/
3	13 benefits and challenges of cultural diversity in the workplace https://www.hult.edu/blog/benefits-challenges-cultural-diversity-workplace/
Onlin	ne References
1	https://youtu.be/CsaTslhSDI
2	https://m.youtube.com/watch?feature=youtu.be&v=IIKvV8_T95M
3	https://m.youtube.com/watch?feature=youtu.be&v=e80BbX05D7Y
4	https://m.youtube.com/watch?v=dT_D68RJ5T8&feature=youtu.be
5	https://www.youtube.com/watch?app=desktop&v=7sLLEdBgYYY&feature=youtu.be





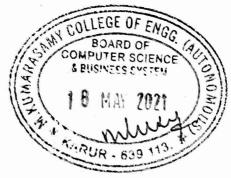


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UNIT I MANAGEMENT THEORIES
Concept and Foundations of Management-Evolution of Management Thoughts [Pre-Scientific Management Era (before 1880)-Classical management Era (1880-1930)-Neo-classical Management Era (1930-1950)-Modern Management era (1950-on word)-Contribution of Management Thinkers - Taylor, Fayol and Elton Mayo.
UNIT II FUNCTIONS OF MANAGEMENT 6
Importance of Management-Planning-Organizing-Staffing-Directing-Controlling
UNIT III ORGANIZATIONAL BEHAVIOUR AND DESIGN 6
Introduction-Personality, Perception-Learning and Reinforcement-Motivation-Group Dynamics, Power &Influence-Work Stress and Stress Management Classical- Neoclassical and Contingency approaches to organizational design-Organizational theory and design-Organizational structure (Simple Structure, Functional Structure, Divisional Structure, Matrix Structure)
UNIT IV MANAGERIAL ETHICS 6
Ethics and Business- Ethics of Marketing & advertising-Ethics of Finance & Accounting, Decision – making .Frameworks-Business and Social Responsibility-International Standards-Corporate Governance-Corporate Citizenship-Corporate Social Responsibility
LEADERSHIP 6
Concept-Nature-Importance-Attributes of a leader- Types of Leadership - developing leaders across the organization-Leadership Grid
Text Book (s)
1 / Stephen Robbins, Mary Coulter, David de Cenzo-Fundamentals of Management-9 th edition
Reference (s)
Richard L. Daft, Understanding the Theory and Design of Organizations 11 th Edition
Stephen P. Robbins, Timothy A. Judge, Neharika Vohra, Organizational Behavior 18 th edition







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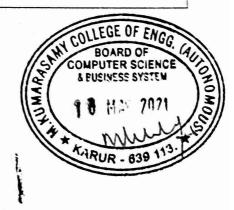
1: Slight (Low)

2: Moderate (Medium)





2	UNIT I	INTRODUCTION TO INNOVATION 9
Unde	erstanding Invation Assess	novation- Nature of Innovation -Types of Innovation - Lifecycle of Innovation- ment - Challenges in Innovation-Co innovation and Open Innovation
Ţ	UNIT II	INTELLECTUAL PROPERTY 9
		rty-Intellectual Property Rights – Types of IPR – Lifecycle of IP– Balancing IP - IP valuation- Measurement of Operational Risk
U	NIT III	INTRODUCTION TO TECHNOLOGY ENTREPRENEURSHIP 3
Entre	preneurship -	Technology Entrepreneurship-Opportunity Identification in Technology - Technology-driven Social Innovation and Entrepreneurship- Types of Technology Technology Innovation: Two Case Studies
U	NIT IV	FORECASTING 9
		asting – Types of Forecasting – Forecasting Method – Forecasting Costs – Approaches
Ĭ	UNIT V	INNOVATION, IP MANAGEMENT AND ENTREPRENEURSHIP: PRACTISING PRINCIPLES
Strate	et Research,	Segmentation and Sizing -Product Positioning, Pricing, and Go-To-Market
Com		Business Models-Innovation, Incubation and Entrepreneurship in Corporate Innovation, IP and Entrepreneurship Programs – Processes, Governance and Tools
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	Book (s) Innovation	
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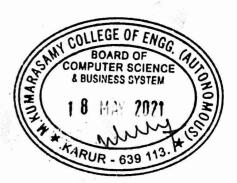




LIST OF EXPERIMENTS

3

- 1. Conceptual Database design using E-R DIAGRAM
- 2. Implementation of SQL commands DDL, DML, DCL and TCL
- 3. Queries to demonstrate implementation of Integrity Constraints
- 4. Practice of Inbuilt functions
- 5. Implementation of Join and Nested Queries AND Set operators
- 6. Implementation of virtual tables using Views
- 7. Practice of Procedural extensions (Procedure, Function, Cursors, Triggers)
- 8. Application Development using front end tools
- 9. Document Database creation using MongoDB
- 10. Study of Cloud Storage
 - i)IT Training Group Database
 - ii) Blood Donation System
 - iii)Salary Management System
 - iv)Traffic Light Information System







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2: Moderate (Medium)

3: Substantial (High)

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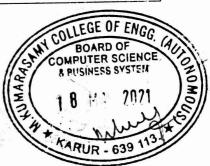
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		ns on Ages - Probability Analogies - Biography.	
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Text B	ook (s)		· · · · · · · · · · · · · · · · · · ·
X	Dr.R.S.Agg	garwal, "Quantitative Aptitude"	', S. Chand & Company Limited, 2015
2/	Dr.R.S.Agg		o Verbal & Non - Verbal Reasoning", S. Chand &







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B.Tech - Computer Science and Business Systems

1: Slight (Low)

Curriculum and Syllabus

Regulation R - 639

BOARD OF COMPUTER SCIENCE & BUSINESS SYSTEM





UNIT I

HISTORY OF INDIAN CULTURE

2

Characteristics of Indian Culture - Significance of Geography on Indian Culture - Society in India through ages- Ancient Period - Varna and Jati, family and marriage in India - Position of women in ancient India- Contemporary period; Caste system and communalism.

UNIT II

LITERATURE AND EDUCATION

4

Evolution of script and languages in India: Harappan Script and Brahmi Script, Short History of the Sanskrit Literature: The Vedas, The Brahmanas and Upanishads and Sutras, Epics: Ramayana and Mahabharata & Puranas - History of Buddhist and Jain Literature in Pali, Prakrit and Sanskrit, Sangam Literature and Odia Literature.

UNIT III

RELIGION AND PHILOSOPHY

4

Religion and Philosophy in India: Ancient Period: Pre-Vedic and Vedic Religion, Buddhism and Jainisim, Indian Philosophy - Vedanta and Mimansa school of Philosophy.

UNIT IV

ART AND ARCHITECTURE

2

Indian Art & Architecture: Gandhara School and Mathura School of Art; Hindu Temple Architecture, Budhhist Architecture, Medieval Architecture and Colonial Architecture, Indian Painting Tradition, Performing Arts: Divisions of Indian classical music: Hindustani and Carnatic, Dances of India, Rise of modern theatre and Indian cinema.

UNIT V

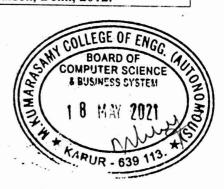
SPREAD OF INDIAN CULTURE ABROAD

Causes, Significance and Modes of Cultural Exchange - Through Traders, Teachers, Emissaries, Missionaries and Gypsies, Indian Culture in South East Asia, India, Central Asia and Western World through ages.

Reference (s)

1

Chakravarti, Ranabir: Merchants, Merchandise & Merchantmen, in: Prakash, Om (ed.): The Trading World of the Indian Ocean, 1500-1800 (History of Science, Philosophy and Culture in Indian Civilization, ed. by D.P. Chattopadhyaya, vol. III, 7), Pearson, Delhi, 2012.





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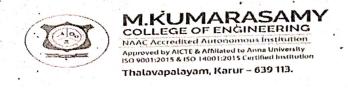
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. 2: Moderate (Medium)

3: Substantial (High)

Curriculum and Syllabus 2018 Regulation





UNIT 1	INTRODUCTION	9
Characteristic	es of Algorithm. Analysis of Algorithm: Performance Measurements of Algorithm, Offs, Asymptotic analysis of Complexity Bounds – Best, Average and Worst-Case	behavior
100 to 1	Recursive Algorithms through Recurrence Relations: Substitution Method, Recur- Masters' Theorem.	Sion Tree
UNIT 2	FUNDAMENTALS OF ALGORITHMIC STRATEGIES	9
Brute-Force, methodologie Salesman Pro	Heuristics, Greedy, Dynamic Programming, Branch and Bound and Bas; Illustrations of these techniques for Problem Solving, Bin Packing, Knapsack, blem.	Travellin
UNIT 3	GRAPH AND TREE ALGORITHMS	9
Traversal algo Transitive clo	orithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algor sure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm.	rithms;
UNIT 4	TRACTABLE, INTRACTABLE PROBLEMS	9
Standard NP-	y of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Cook's complete problems and Reduction techniques.	, thousand
UNIT 5	ADVANCED TOPICS	9
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1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

B.Tech - Computer Science and Business Systems

Curriculum and Syllabus 2018 Regulation

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UNI	T 2	SYNTAX ANALYSIS	9
top-do	wn parsing, of	ser): Context-free languages and grammars, push-down automata, LL (1) gramperator grammars, LR (O), SLR (1), LR (1), LALR (1) grammars and bottom-ursing, LALR (1) parser generator (yacc, bison).	mars and
UNI	T 3	SEMANTIC ANALYSIS	9
		Attribute grammars, syntax directed definition, evaluation and flow of attributes Basic structure, symbol attributes and management.	bute in a
· UNI	Т4	RUN-TIME ENVIRONMENT AND CODE GENERATION	9
Scope.	Intermediate	nt-Procedure activation, parameter passing, value return, memory allocation, Code Generation: Translation of different language features, different Register allocation and target code generation.	types of
UNI	T 5	CODE OPTIMIZATION	9
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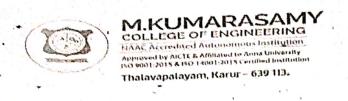


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-		Understand the importance of financial and cost accounting in organization financial statements Explain the corporate financial under different conditions and describe the financial statements in different manner.													
3	. 1	Describe the main elements of Financial Accounting information – assets, liabilities, revenue and expenses													
4	F	Fabricate Awareness about cost accounting, different types costing and cost management													
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1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





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UNIT	CASH FLOW AND FUND FLOW TECHNIQUES	6
Introduction-	How to prepare, Difference between them (cash flow and fund flow techniques)	
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Company on the Control of the Contro	Total Periods	30 .
Text Book (s		
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-1 Cases	McGraw-Hill", 13 th edition, 2017.	
- 2 John	Wiley & sons," Accounting Principles", published, 2007.	
Reference (s)		Sec. Sec.
1 Textl	pook of Financial Cost and Management Accounting by Periasami P,2010	
	Accounting For Dummies – By Kenneth W. Boyd, 2013	
3 Fund	amentals Of Cost Accounting – By William Lanen, Shannon Anderson Et.A1,2012	1. 2
·4 Cost	Accounting Made Simple – By Mike Piper,2008	







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2: Moderate (Medium)

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UNT	T4	- CORPORATE STRATEGY AND GROWTH STRATEGIES	6
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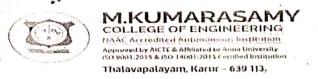


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2: Moderate (Medium)

3: Substantial (High)







UNI	TI 📗	INTRODUCTION	6
Recogn - Desig	nize the in n thinking	nportance of Design Thinking - Design thinking and business – Design Thinking a g process.	nd produc
UNI	T 2	CREATE PEĀRSONAS	6
Recogn	ize the ste	personas creation - Create personas in design phase - Importance of problem st eps to create problem statements.	atements
-UNI		PROTOTYPĘ PHASES	6
Explana	ntion on d	rototype phase in design thinking - How to create prototype - Examples on pevelopment of prototype.	prototype
UNI	1'4	TESTING PHASE	6
Introdu Recogn	ction to to	esting phase - Recognize the best practices of the testing phase — Define Function lesign thinking can help in function work.	nal work
UNI		TECHNOLOGY CREATIVITY	6
Lechno	logy Crea	politics of civic engagement - Managing Gridlocked Debates — Implementing attivity in the Culinary Arts - Empathy as a means to innovate in a pharmaceuticaling and diagramming at a university.	a Strategi company
	£	- Total Periods	30
LIST O		RIMENTS	15
1	steps in t design th	ental activity on the products they like and dislike based on their experience - Id he Design thinking process - Explanation of Stanford Model D -Steps in empathiz inking - Explanation on target activity	æ phase ο
2	Target ac -Steps in	tivity related to empathy - Steps in immersion activity - Explanation on Moccasin immersion activity - Flow charts and handouts -	walk
3	Moccasir	walk activity on stepping in to the shoes of another person	
4 -	Immersio Recogniz	on activity by groups - Define the problem statements - Define the key problem sta se the steps in the ideate phase of Design thinking - Idea on Six thinking hats	tements -
5	Creating help to ex	person a based on the immersion activity using A4 pages - Recognize how decorpress ideas - Learn doodle - Importance of Storytelling- Importance of presenting	oding can ideas
6	Peer revie	ew activity	
7	problem	ing hats game - Combining immersion and persona creation to create prototype - D statement and ideating to create prototypes - Define service value proposition value proposition	efining *
8	Million d	ollar idea game - Visualization of the personnel - Understand Lean AEIOU - Kno space - Know what is solution space	w what is
. 9	Activity of	on doodling	
10	Deline Pi	ing activity - Agile thinking definition - Define customer perception and expectation roduct and customer satisfaction - How design thinking and agile thinking complements to customer satisfaction	ons - nent
[1]	Review,	on prototyping - Learn the elements of systems thinking, Actual level and desire gap and corrective action - Working of systems thinking & mindset of a system iate system thinking and design thinking	ed level - thinker -
12.		prototype · Called Or (1) Co	
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Curriculum and Syllabus | 2018 Regula



M.KUMARASAMY COLLEGE OF ENGINEERING NAAC Accredited Automotive Institution Approved by AICTE & Affiliated to Anna University ISO 9001:3015 & ISO 14001-2018 Certified Institution Thalavapalayam, Karur – 639 113.



T3	Apply design thinking to create a prototype to improve any existing product or service - Problem definition - Groups need to complete all phases of Stanford design thinking model.
Textl	poolcs(s)
1	Michael Lewrick, Patrick Link, Larry Leifer, "The Design Thinking Toolbox", April 2020.
. 2	Falk-uebernickel, Li jiang Walter Brenner, Britta Pukall, Therese Naef, Bern hard Schindlholzer "Design Thinking: The Handbook", publication August 2020
WEB	RESOURCES -
1	Eyal - "Hooked by" - URL https://www.youtube.com/watch?v=iw1x0zos8Jo
2	Rod Judkins (2015) – "The Art of Creative Thinking" - Hachette Book Publishing
3	Senor and Saul singer (2011) – "Start-up Nation" - Twelve; Reprint edition
4	Simon Sinek - "Start with why" - URL https://www.youtube.com/watch?v=u4ZoJKF_VuA
5	laude Diderich (2020) – "Design Thinking for Strategy Innovation Towards Competitive Advantage" – Springer International Publishing
6	Kumar, DivyaZindani and J.PauloDavim (2020) – "Design Thinking to Digital Thinking" – Springer International Publishing
7	Michael Lewrick, Patrick Link and Larry Liefer (2018) – "The Design Thinking Playbook: Mindful Digital Transformation of Teams, Products, Services, Businesses and Ecosystems" – Wiley
8	Pressman (2018) – "Design Thinking: A.Guide to Creative Problem Solving for Everyone"–Routledge
9	Walter Brenner and Falk Uebernickel (2016) – "Design thinking for Innovation: Research and Practice" – Springer International Publishing
10	The Field Guide to Human Centered Design" – IDEO.org – First Edition, 2015
11	Roger L Martin (2009) – "The Design of Business: Why Design Thinking is the Next Competitive Advantage" – Harward Business School Press Web References







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2: Moderate (Medium)

· 3: Substantial (High)

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Curriculum and Syllabus 12018 Regulation





I	IST O	F EXPERIMENTS . 15
-	1	Program to implement N-queens problem using backtrack method.
-	2	Program for finding shortest path for multistage graph using dynamic programming.
+	3	Implementation of Optimal merges patterns.
	4	Program to implement job sequencing with deadlines using greedy method
Spirit Grind Michigan	5	Program to implement knapsack problem using greedy method
A STATE OF THE PROPERTY OF THE	6	Find a subset of a given set $S = \{s1, s2, \dots, sn\}$ of n positive integers whose sum is equal to a given positive integer d. For example, if $S = \{1, 2, 5, 6, 8\}$ and $d = 9$ there are two solutions $\{1, 2, 6\}$ and $\{1, 8\}$. A suitable message is to be displayed if the given problem instance doesn't have a solution.
	7	Implement All-Pairs Shortest Paths Problem using Floyd's algorithm.
	8	Implement any scheme to find the optimal solution for the Traveling Sales Person problem and then solve the same problem instance using any approximation algorithm and determine the error in the approximation.
	9	Compute the transitive closure of a given directed graph using Warshall's algorithm.
	10	Print all the nodes reachable from a given starting node in a digraph using BFS method.



Thalavapalayam, Karur - 639 113.



30 **Total Hours** Semester V Regulation 2018 Hours / Week C Course Name Course Code

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· p	18CBP301L	· MINI PROJECT	0	0	2
COLUMN TO THE REAL PROPERTY.	A. Carlotte and the American Marketing				

Prerequisite course

NIL

Course Objective (s):

The purpose of learning this course is to:

- Develop their own innovative prototype of ideas.
- Train the students in preparing mini project reports and examination.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

	Identify and formulate a technical p	problem to reach substantiated conclusion using basic
CO 1	technical knowledge.	•
		' 1 1 - 1 laine the basic engineering knowl

- Design/Develop prototype /model for societal needs applying the basic engineering knowledge. CO₂
- Evaluate the performance of the developed solution using appropriate techniques and tools. CO3
- Apply management principles to function as a team. CO4
- Communicate the technical information effectively. 'CO 5

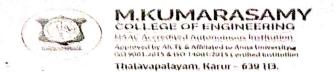
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1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)







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Course Object The purpose of	tive (s); Yearning this course	ls to:			
1 Sharp	en problem solving	skills and to improve thinking capability of the	e students		
2 Drive	the students to use	language with great commitment and cooperat	ion		-
		nking and presentation skills to meet the compa		-	
Course Outco	me (s) (COs);			opisk	green and to Mily Comme
At the end of the	nis course, learners v	vill be able to:			
CQ 1 Solve	both analytical and	logical problems in a fruitful manner			
		information in such an incomparable way			11.7
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Curriculum and Sylinbus | 2218 Regulation 22





UNIT	- INDIAN ARTS 3
Introduc propagai	on to art (aesthetics, taste)- fine arts - applied arts - Terminology - Subject matter - Art as la Purposes/uses of art.
UNII	THEATRE & DRAMA 3
History of different	Theatre and Drama- Traditional Theatre forms- Modern Theatre and its characteristics- Puppetr forms and elements of drama.
UNIT	MUSICS AND DANCES OF INDIA 3
	Music and Dance- Classical music and Carnatic Music- Regional Music – Musical ats-Regional Classical Dances.
UNII	ARCHITECTURE, SCULPTURE, PAINTING 3
History typęs of	of architecture, sculpture, painting -Indo-Islamic Architecture- Temple Architecture- different Sculptures and its characteristics-Painting and its different styles.
UNI	5 - LITERARY ARTS 3
Ancien Literati	Indian Literature- Early Dravidian Literature- Medieval Literature- Modern Indian e-Contemporary Literature.
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Text B	ok(s)
-	artha Mitter ,"Indian Art",2001
2	ratima Sheh, "Dictionary of Indian Art and Artists",2007
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1	Ohar, Parul Pandya, ed., "Indian Art History Changing Perspectives", New Delhi: D.K. Print world and National Museum Institute (Introduction), 2011,
2	Guha-Thakurta, Tapati, "The making of a new modern Indian art: Aesthetics and nationalism n Bengal", 1850-1920, Cambridge University Press, 1992
3	Huntington, Susan, "The Art of Ancient India: Hindu, Buddhist, Jain, Weatherhill", 1985 Mitter, Partha, "Indian Art, Oxford History of Art series", Oxford University Press, 2001
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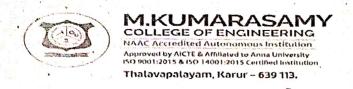


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2: Moderate (Medium)

3: Substantial (High)

Curriculum and Syllaburs: 2018 Regulation





UNIT,	INTRODUCTION TO SELF-EMPLOYMENT AND ENTREPRENEURSHIP DEVELOPMENT	3
entréprend personal c	on of self-employment — Characteristics- Creativity. Entrepreneurship development-Qur and Characteristics of Diploma holder as a self-employer like developing netwo ontacts, importance of productivity, quality, cost consciousness and customers' satisfaction nterprise-Sole partnership -Partnership firm-Joint stock company- Co-operative society.	rking and
UNIT	ENTREPRENEURIAL SUPPORT AGENCIES	3
agencies-l	Micro, small and medium industries-Registration process of an enterprise with Governmame, type and role of state and national-level support agencies. Current state & National al Schemes for establishment of new.	
UNIT 3	PROJECT SET UP PLANNING	3
selection -	election: importance- Product development stages. Process Selection: Factors affecting Technology lifecycle. Process Conversion-Capacity Planning: Basic method to assess / esclection of location and layouts: Factors affecting selection of location - Objectives and the contraction of location in the contraction in the	stimate
UNIT 4	PROJECT PROPOSAL PLANNING	3
report pre	rces- Marketing- definition, need for enterprise, 4Ps channels- Market survey. Methods -Foundation for mechanical feature based product: Meaning of project planning and report: Featls required for preparing project plan. Project cost estimation.	Project asibility
UNIT	ENTERPRISE AND RISK MANAGEMENT	3
Concept of making unanalysis.	of risk in the context of enterprise/ project-Uncertainty and certainty of project elements- onder risk-Methods of risk management-Strength, Weakness, Opportunity and Threat	Decision (SWOT)
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Thalavapalayam, Karur = 039 113,

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	ninaries of layered network structures. Data communication Components: Representation of	
	ow, Various Connection Topology, Protocols and Standards, OSI model, Transmission Media.	
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UN	LAN AND BANDWIDTH UTILIZATION	9
LÁN	: Wired LAN, Wireless LAN, Virtual LAN. Techniques for Bandwidth utilization: Multi	iplexing.
	nency division, Time division and Wave division, Concepts on spread spectrum.	
UN	IT III DATA LINK LAYER	9
Data	Link Layer and Medium Access Sub Layer: Fundamentals of Error Detection and Error C	orrection
	coding-Hamming Distance, CRC; Flow Control and Error control protocols - Stop and V	,
	N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multip	
	cols - PureALOHA, Slotted ALOHA, CSMA/CD,CDMA/CA	
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UNITI

INTRODUCTION TO ARTIFICIAL INTELLIGENCE & PROBLEM SOLVING

9

Problems of Al, Al technique, Tie -Tae - Toe problem. Intelligent Agents, Agents & environment, nature of environment, structure of agents, goal based agents, utility based agents, learning agents. Defining the problem as state space search- production system-problem characteristics-issues in the design of search programs.

UNIT II

SEARCH TECHNIQUES

9

Problem solving agents, searching for solutions; uniform search strategies: breadth first search-depth first search-depth limited search-bidirectional search-comparing uniform search strategies. Heuristic search strategies Greedy best-first search- A* search, AO* search, memory bounded heuristic search: local search algorithms & optimization problems: Hill climbing search, simulated annealing search, local beam search.

UNIT HI

CONSTRAINT SATISFACTION PROBLEMS

9

Local search for constraint satisfaction problems. Adversarial search, Games, optimal decisions & strategies in games, the minimax search procedure, alpha-beta pruning, additional refinements, iterative deepening.

UNIT IV

KNOWLEDGE & REASONING

9

Knowledge representation issues, representation & mapping, approaches to knowledge representation. Using predicate logic, representing simple fact in logic, representing instant & ISA relationship, computable functions & predicates, resolution, natural deduction. Representing knowledge using rules, Procedural verses declarative knowledge, logic programming, forward verses backward reasoning, matching, control knowledge

UNIT V

PROBABILISTIC REASONING & EXPERT SYSTEMS

9

Representing knowledge in an uncertain domain, the semantics of Bayesian networks, Dempster-Shafer theory, Planning Overview, components of a planning system, Goal stack planning, Hierarchical planning, other planning techniques. Representing and using domain knowledge, expert system shells, and knowledge Acquisition.

LIST OF EXPERIMENTS

15

- 1. Implement Water-Jug problem
- 2. Implement Monkey Banana Problem
- 3. Implement Hill Climbing algorithm.
- 4. Implementation of Constraint Satisfaction Problems.
- 5. Implementation of Greedy heuristic search algorithm
- 6: Implementation of Simulated Annealing Heuristic Search
- 7. Implementation of KNN for an application.
- 8. Implementation of SVM for an application.
- 9. Implementation of Decision Tree for an application
- 10. Implementation of simple chatbot for an application.

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B. Tech - Computer Science and Business Systems

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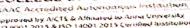




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Overv	rview of Security Parameters: Confidentiality-integrity a threat; Security policy and procedure; Assumptions	and availability; Secu	rity violation
Imple	ementation and Operational Issues; Security Life Cycle.	and Trust, Securit	, Abbarance
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System	ems Design: Design principles, representing identity, contr	rol of access and info	rmation
flow,	, Confinement problem. Assurance: Building systems with	assurance, formal n	nethods,
evalua	uating systems.		
	UNIT V LOGIC BASED SYSTEM	《大学工艺》中,其他的大学	9
Logic-	e-based System: Malicious logic, vulnerability analysis	s, auditing, intrusion	detection.
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	ications:-Network security, operating system security, a		
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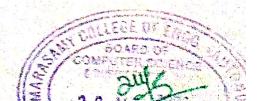


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1	Street Breadly "Artificial Intelligence - A Modern Approach", 3 Edition. 2010
. 2	John D Kelleher, Brian Mac Namee, "Fundamentals of Machine Learning for Predictive Data Analytics: Algorithms, Worked Examples, and Case Studies", 2015
Refer	rence (s)
1	Giarranto "Expert Systems", VIKAS,2001
2	Patterson, "Introduction to artificial intelligence and Expert system", PHI,1997
3	Russell pearson, "Artificial intelligence", 1998
4	Russell & peter norvig, "Artificial intelligence : A modern approach", 2005
4	Russell & peter norvig, Artificial intelligence. A modern approach







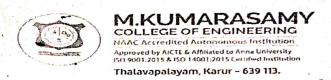
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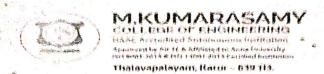
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UNI	T II Valuation of Securities and Risk & Return 6
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Capita	al: Concept, Computation of Specific Cost of Capital for Equity - Preference – Debt, Weighted ge Cost of Capital – Factors affecting Cost of Capital 4L
UNI	T IV Capital Budgeting and Working Capital Management 6
Capita	Budgeting: The Capital Budgeting Concept & Process - An Overview, Generating Investment
_	Proposals, Estimating Project, After Tax Incremental Operating Cash Flows, Capital Budgeting
	ques, Project Evaluation and Selection - Alternative Methods. Working Capital Management:
	ew, Working Capital Issues, Financing-Current Assets (Short Term and Long Term- Mix),
	ning Liability Structures and Current Asset Decisions, Estimation of Working Capital.
UNI	The second secon
	Management: Motives for Holding cash, Speeding Up Cash Receipts, Slowing Down Cash Payouts,
	onic Commerce, Outsourcing, Cash Balances to maintain, Factoring. Accounts Receivable
	gement: Credit & Collection Policies, Analyzing the Credit Applicant, Credit References, Selecting
	-
оршии	ım Credit period. 4L Total Periods 30
	Total Periods 30
Text B	Book (s)
1-	Chandra, Prasanna, "Financial Management - Theory & Practice", 1 November 2007
2	Tata McGraw Hill, "Financial Management: Theory & Practice", 15th Edition, 2015
Refere	ence (s)
- 1 T	Srivastava, Misra, "Financial Management". OUP, Apr 26, 2012
	Van Horne and Wachowicz, "Fundamentals of Financial Management", Prentice Hall/ Pearson
2 .	Education.1998
3	Eugene F. Brigham, "Fundamentals of Financial Management",2016
4	Taxmann, "Fundamentals of Financial Management: Concise Edition", 9th edition, 2017







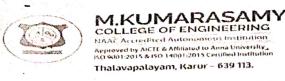
a Re	egulation 2018	Semester VI	Te	ital He	nits	60
Arrent State (W.	And the second of the second s	Ha	urs/V	Veck	
Cat	egory Course Code	Course Name				G
. 11	18CB11104J	BUSINESS COMMUNICATION ANDVALUE SCIENCE – IV	2	0	2	3
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Course	Objective (s):	The control of the co				
The purp	pose of learning this cou	rse is to:				
.1	Recognize the best pra	ctices of communicative writing	The state of the state of			haring and the
2	Understand the import	nnce of emotional intelligence in personal and profes	sional	lives		ere in the second
3		of corporate social responsibility (CSR)				Alexander
4		ress impacts life and work	a Complete Constant Section (Sec			And the Control of th
S	The second secon	to manage stress & Public Speaking.		Older on Various Print - State Co.		Arts and arts
Course	Outcome (s) (Cos):					
	nd of this course, learner	rs will be able to:		1		1
COT	Recognize the best pra	etices of communicative writing	and the second			All the same of
CO 2-	The same of the sa	ligence in real life scenarios	and the same of th			
CO 3	and the second s	es needed to function and grow in a corporate enviro	nment		-late and the late of	Maria de la compansión de
CO 4	Identify the best practi	ces to manage stress				of the second
CO 5	Identify the best practi	ces of public speaking				
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Cos	4						Pos				4		PS	Os
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1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

> 20 11 Curriculum and Syllabus | 2018 Regulation

> > MUR - 639 119





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13	UNIT 1 COMMUNICATIVE WRITING	9
W	riting: Principles of Communicative Writing - Formal and Business letters - Writing Proposals -	- Use of
CI	narts and graphs in Communicative Writing – Intelligence: Understand what emotional intelligence	gence -
lin	aportance of Public Speaking - To apply public speaking in real life scenarios. Activity: identif	y topics
rel	ated to the key words - Introduce the concept of Diversity in corporate environments through an	activity
-A	sk students to write a business Proposals in group - Ask students to note down the names of	at least
two	o movies in their Satori slam book, in which the characters display Emotional Intelligence.	
	UNIT IT CORPORATE SOCIAL RESPONSIBILITY (CSR)	9
Co	rporate Social Responsibility (CSR): Recognize the importance of corporate social responsibili	ty – Hear
CS	R stories - Tell a CSR story - Attributes required for work and life - Recognize the attributes	needed to
fun	ection and grow in a corporate environment - Activity: Activity - Groups will research in class	s, prepare
and	I present CSR activity of Tata Steel, Microsoft, Google, TCS, Starbucks, Titan, Tata Chem	icals and
TO	MS Shoes.	
	NIT III EMOTIONAL INTELLIGENCE	9
Cor	ncepts: Concepts of Emotional Intelligence - Its importance in human life and professional	al life –
	erence between emotional quotients and intelligent quotients - Corporate Etiquette activity - A	
Abu	ıbhaav activities – 10 ways to build emotional intelligence by Daniel Golonem – Mock Interview	w.
Ű	NIT IV CONFLICT MANAGEMENT	9
Con	cepts conflicts - Corporate and work place conflicts - Reason and impact of conflicts - guid	elines for
	flicts Teams - Role of team players - Stress - Stress Management - Importance of Feedback	
	nagement – Activity – Creating Posters with Stress Management Tips – Open House Discus	
	llenges of Time Management – Tracking Time Activity.	9
	NIT V DESIGN THINKING AND PUBLIC SPEAKING	The search and and and
	cepts: Design Thinking – Importance of Startups – Proof of Concepts for Startups – Best Prace	
	of Public Speaking Activity: Pitch in Startup Idea – Listening Videos of Public Speaking – I	
	larifies among World famous speeches – Listening Swami Vivekananda's Speech – Martin	Lumer
Ling	s's My Dream Speech – Dr. Abdul Kalam's Speech.	
	Total Periods	45
ST	OF EXPERIMENTS	15
1.	Introduce the concept of Diversity in corporate environments through an activity	
2.	Ask students to write a business Proposals in group	4 .
3	Ask students to note down the names of at least two movies in their Satori slam book, in wh	. 1 .1
3	·	ich the
	characters display Emotional Intelligence.	ich the
		A Sar C
4	Groups will research in class, prepare and present CSR activity of Tata Steel, Microsoft, Go	A Sar C
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5	Groups will research in class, prepare and present CSR activity of Tata Steel, Microsoft, Go TCS, Starbucks, Titan, Tata Chemicals and TOMS Shoes. Creating Posters with Stress Management Tips	A Sar C
5	Groups will research in class, prepare and present CSR activity of Tata Steel, Microsoft, Go TCS, Starbucks, Titan, Tata Chemicals and TOMS Shoes. Creating Posters with Stress Management Tips Open House Discussions on Challenges of Time Management	A Car
5 5 · 7	Groups will research in class, prepare and present CSR activity of Tata Steel, Microsoft, Go TCS, Starbucks, Titan, Tata Chemicals and TOMS Shoes. Creating Posters with Stress Management Tips Open House Discussions on Challenges of Time Management Tracking Time Activity.	A Car
5 6 · 7 8	Groups will research in class, prepare and present CSR activity of Tata Steel, Microsoft, Go TCS, Starbucks, Titan, Tata Chemicals and TOMS Shoes. Creating Posters with Stress Management Tips Open House Discussions on Challenges of Time Management Tracking Time Activity. Watching Videos of Public Speaking	A Car
5 6. 7 8	Groups will research in class, prepare and present CSR activity of Tata Steel, Microsoft, Go TCS, Starbucks, Titan, Tata Chemicals and TOMS Shoes. Creating Posters with Stress Management Tips Open House Discussions on Challenges of Time Management Tracking Time Activity. Watching Videos of Public Speaking Finding Similarities among World famous speeches	A Sar C
4 5 6. 7 8 9 0	Groups will research in class, prepare and present CSR activity of Tata Steel, Microsoft, Go TCS, Starbucks, Titan, Tata Chemicals and TOMS Shoes. Creating Posters with Stress Management Tips Open House Discussions on Challenges of Time Management Tracking Time Activity. Watching Videos of Public Speaking	A Sar C





Ref	carace (s)
1	Emotional Intelligence: Why it Can Matter More Than IQ by Daniel Goleman, 1995
2	Learning Emonoral Intelligence To Work by Ryback David 1998
3	Persuasion by Dale Carnegie 2018
4	TED Talks: The official TED guide to public speaking: Tips and tricks for giving unforgettable speeches and presentations. 2016
Neb	References:
1	https://www.tata.com/about-us/tata-group-our-heritage
7	hap e reconomictimes indiatimes com/tata-success-story-is-based-on-humanity-philanthropy-and- ethics articleshow/41766592.cms
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2	https://outu.he/Wx9v_J34Fvo
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1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)







	LIST OF EXPERIMENTS 15
1.1	Study of system administration and network administration
2	Implementation of Sliding window protocol and stop and wait protocol
3	Write a code simulating PING and TRACEROUTE commands
4	Applications using TCP Sockets like File transfer Remote command execution Chat
Non-Adjournment	o Concurrent services
3	Create a socket for HTTP for webpage upload and download
6	Implementation of Sub netting Applications a. DNS b. SNMP
7	Study of PUTTY (NETWORK FILE TRANSFER APPLICATION
8.	Perform a case study about ETTERCAP (NETWORK SECURITY TOOL).





Upgrade their communication quality in near future



Reg	gulation 2018	Semester VI	To	30		
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Cate	gory Course Code	_ Course Name	LITP			
M	18MBM302L	- EMPLOYABILITY SKILLS AND PRACTICES	0	0	2	1
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Course O	bjective (s):					
The purpo	ose of learning this course	e is to:				2 14 2
1 1	Learn the application of r	nathematical or statistical models to different rea	ıl-world	contex	ts	
2	Focus on writing & speak	king skills through vigorous practices.				
3 1	Enhance soft skills and a	nalytical ability of students				
-4 I	Defeat the fear while con	nmunicating in group and to master the effective	commu	nicatio	n	
Course O	utcome (s) (Cos):			表演	S. There's	He C
At the end	of this course, learners	will be able to:				
COL	Solve both analytical and	logical problems in a productive manner				
CO 2	Launch their ability of co	omprising and delivering the information				







the tree-blank game	NTT 1 Module -1	Ú
Apt	titude: Time and Distance (Speed, Streams) - Problems on Trains - Arrangements and Blood Remanication: Job Application - Cover letter, Bio-data, Resume & CV building.	elations
U	NIT II Module - 2	6
Con	titude: Time and Work - Pipes & Cisterns - Situation Reaction Test & Data Interpretations. nmunication: Writing practices on circulars, notices, memos, Agenda preparation and Minting.	nutes o
D:	NIT III Module – 3	6
Apti	itude: Ages - Averages - Probability - Profit and Loss. Communication: Email Etiquette	-Essay
Ui	NIT IV Module -4	Ó
Apti Con	itude: Mensuration - SI & CI - Cause and Effect Analysis - Statement, Assumptions & Conclus numerication: Group Discussion and guidelines.	ions.
U	NII V Module - 5	6
	itude: Permutation and Combinations - Partnership - Alligations or Mixtures.	
Con	nmunication: Interview skills - General instructions, Review of interview questions, Mock Interview	rviews.
Con	nmunication: Interview skills - General instructions, Review of interview questions, Mock Interview Total Periods	rviews.
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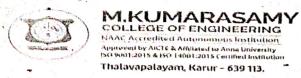
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3	Explore the working knowledge of a chat bot and the prerequisite knowledge																			
4	Study	the fu	ndamen	tal role	of mag	chine le	earning	in build	ling'co	nversatio	onal syst	ems	TO THE SECURITY HAS A SECURITY	problem seed						
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		Understand the basic technologies required for building a conversational system.																		
CO 2	Cont	er the l	NLTK t	ool kit	and the	pre-pr	Confer the NLTK tool kit and the pre-processing techniques of natural language processing. Expound basic concepts and architecture of chat bots and build a chat bot for any application and													
CO 2	Expo	ound ba	sic con	cepts a	nd arch	itecture	of cha	t b <u>o</u> ts a	nd buil	d a chat	bot for a	ny appl	iention	AND DESCRIPTION OF THE PERSON						
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1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





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UNIT I FUNDAMENTALS OF CONVERSATIONAL SYSTEMS	ė ė
Introduction: Overview, Case studies, Explanation about different modes of engagement for a	human
being, History and impact of Al. Underlying technologies: Natural Language Processing, A	rtificial
Intelligence and Machine Learning, NLG, Speech-To-Text; Text-To-Speech, Computer Vis	ion etc.
Introduction to Top players in Market - Google, MS, Amazon & Market trends. Messaging Players	latforms
(Facebook, WhatsApp) and Smart speakers - Alexa, Google Home and other new channels. Eth	ical and
Legal Considerations in Al Overview.	2
UNIT II NATURAL LANGUAGE PROCESSING	9,
Introduction: Brief history, Basic Concepts, Phases of NLP, Application of chatbots etc. General	chatbot
architecture, Basic concepts in chatbots: Intents, Entities, Utterances, Variables and Slots, Fu	lfilment
Lexical Knowledge Networks (WordNet, Verbnet, PropBank, etc). Lexical Analysis, Part-of-	-Speech
Tagging, Parsing/Syntactic analysis, Semantic Analysis, Word Sense Disambiguation. Info	rmation
Extraction, Sentiment Analysis, NLP using Python - libraries like NLTK, spaCy, Stanford Affective NLG.	d NLP,
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UNIT III BUILDING A CHATBOT/CONVERSATIONAL AI SYSTEMS	9 4 4
Fundamentals of Conversational Systems (NLU, DM and NLG), Chatbot framework & Archi	tecture,
Conversational Flow & Design, Intent Classification (ML and DL based techniques), D	ialogue
Management Strategies, Natural Language Generation UX design, APIs and SDKs, Us	age of
Conversational Design Tools, Introduction to popular chatbot frameworks – Google Dialog	g flow,
Microsoft Bot Framework, Amazon Lex, RASA Channels: Facebook Messenger, Google Home,	Alexa,
WhatsApp, Custom Apps. Overview of CE Testing techniques, A/B Testing, Introduction to	Testing
Frameworks Botium / Mocha, Chai. Security & Compliance – Data Management, Storage, GDPR, UNIT IV ROLE OF ML/ALIN CONVERSATIONAL TECHNOLOGIES	PCI
	9 11
Understanding on how Conversational Systems uses ML technologies in ASR, NLP, Advanced management, Language Translation, Emotion/Sentiment Analysis, Information extraction, e	Dialog
effectively converse.	etc. to
CONVERGATIONAL	-
CONVERSATIONAL SYSTEMS	9
Contact Centers: Introduction to Contact centers – Impact & Terminologies, Case studies & Trends	s. How
does a Virtual Agent/Assistant fit in here? Overview on Conversational Applytics, Conversational	
Authorities: The need of It, Introduction to Conversational Metrics Future Where	1 10
Summary, Robots and Sensory Applications overview XR Technologies in Conversational Se	stems
XR-Commerce, What to expect next? – Future technologies and market innovations overview.	otomo,
Total periods	45
LAB LIST OF EXPERIMENTS	
Develop the code for the following:	15
1. To identify morphological features of a word by analyzing it.	
2. To generate word forms from root and suffix information.	
3. To perform morphological analysis of a word by the use of Add-Delete table.	
4. To do sentiment analysis for the given dataset and to classify sentences based on their categor	ies.

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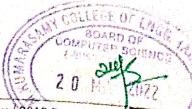
M.KUMARASAMY COLLEGE OF ENGINEERING HAAC Accredited Autonomous Institution Approved by AICITE & Affiliated to Annia University

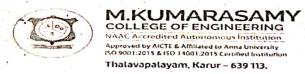


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- 6. To find Parts Of Speech tags of words in a sentence.
- 7. To detect the entities from the dataset and tag them based on their categories.
- 8. To build a chatbot for an application that proves its importance from a social perspective

and the same of	Book (s)
1	McTear, Michael. "Conversational AI: dialogue systems, conversational agents, and chatbots." Synthesis Lectures on Human Language Technologies 13, no. 3 (2020): 1-251.
. 2	Hands-On Chatbots and Conversational UI Development: Build chatbots and voice user interfaces with Chatfuel, Dialogflow, Microsoft Bot Framework, Twilio, and Alexa Skills Paperback – I January 2017 by Srini Janarthanam
Refe	rence (s)
Ĺ	Pearl, Cathy. Designing voice user interfaces: Principles of conversational experiences. "O'Reilly Media, Inc.", 2016.
2	https://www.tcs.com/content/dam/tcs/pdf/discover-tcs/research- book/ Conversational% 20Systems% 20in% 20Enterprises% 20dps.pdf
3 .	https://www.morganclaypoolpublishers.com/catalog_Orig/samples/9781636390321_sample.pdf
4 .	https://www.mdpi.com/2073-8994/13/7/1187/pdf







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2: Moderate (Medium)

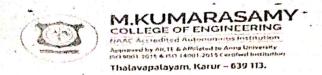
3: Substantial (High)

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Curriculum and Syllabus 2018 Regulation

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UNITI	CLOUD FUNDAMENTALS	9
Cloud Service respect utilize their usage.	ce Components, Cloud service/Deployment Models. Cloud Components Guiding Printention / Security/ Pricing and the applications of Cloud. Public Cloud Platforms over	ciple with
, UNIT II	APPLICATION ARCHITECTURE	9
Native appli Fundamental	architectures-Monolithic & Distributed ,Micro service fundamental and design approach cations, 12 Factors App, Application integration Process / APIFICATION Process.	
UNITIN	MICRO SERVICE.	9
***	te / API management, Spring boot Fundamental and design of micro service, A portal. Applications of Micro service and APIFICATION.	PI Tools
UNIT IV	DEVELOPMENT FUNDAMENTALS	9
Tools and Ar	oplications Containerization Process and application.	
UNITV	PYTHON	9
Introduction development	- Programming Concepts - Beyond the Basics - Use cases .Cloud A /Deployment/ Execution steps, Cloud Security and Monitoring Tools.	pplication
	Total Periods	45
LAB	LIST OF EXPERIMENTS	15
Students can deployment to	select the project work/ thesis in any one of the Cloud application development / use cases.	on fig.
Text Book (s		
proce	ng, Kai, Jack-Dongarra, and Geoffrey C. Fox. Distributed and cloud computing: from essing to the internet of things. Morgan kaufmann, 2013.	
2 Reese cloud	e, George. Cloud application architectures: building applications and infrastructure in l. "O'Reilly Media, Inc.", 2009.	the
Reference (s		
1 Raj K	umar Buyya ,Christian Vecchio la , S. ThamaraiSelvi," MasteringinCloud",MHI,201	3
John	W. Ritting house and James F. Ran some, "Cloud Computing: Implementation, Mana ecurity", CRC Press, 2010	gement,
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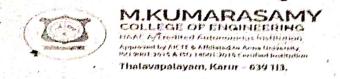
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1: Slight (Low) 2: Moderate (Medium)

3: Substantial (High)

- B.Tech - Computer Science and Business Systems

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UNIT I INTRODUCTION AND CLASSIFICATION	9
Introduction to Machine Learning (ML); Relationship between ML and human learning; Aick sumajor models of how machines learn; Example applications of ML classification; Supervised Learning and testing classification; Feature engineering; Training and testing classifier models Cross – validated evaluation (precision, recall, F1- measure, accuracy, area under curve); Statistical decision including discriminant functions and decision surfaces;	rvey of earning; dation;
UNIT II CLASSIFICATION ALGORITHM	97
Naive Bayes classification; Bayesian networks; Decision Tree and Random Forests; k- Nearest classification; Support Vector Machines; Artificial neural networks including back proparapplications of classifications; Ensembles of classifiers including bagging and boosting.	igation ;
UNIT III PROBABLITISTIC GRAPHICAL MODELS	9
Hidden Markov Models (HMM) with forward-backward and Viterbi algorithms; Sequence class using HMM Conditional random fields; Applications of sequence classification such as part-otagging.	
UNIT IV - REGRESSION	9
Regression: Multi-variable regression; Model evaluation; Least squares regression; Regulari LASSO: Applications of regression. Association rule mining algorithms Including apriori. Expe Maximization (EM) algorithm forum supervised learning UNIT V CLUSTERING	ctation-
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	9
Clustering :average linkage ;Ward's algorithm; Minimum spanning tree clustering; K nearest Neig clustering; BIRCH;CURE; DBSCAN .Anomaly and outlier detection methods.	hbors
- Total Periods	45
LAB LIST OF EXPERIMENTS	15
1. Introduction to WEKA and R	
2. Classification of some public domain datasets in UCI ML repository	
3. Implement Decision Tree learning & Logistic Regression.	,
4. Implement association rule mining using apriori	•
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Curriculum and Syllabus 12018 Regulation



M.KUMARASAMY COLLEGE OF ENGINEERING NAC Accredited Autonomous Institution Approved by AICTE & Artifated to Anna University 859 9601 (2013 A 180 1 4001 (2013 Certified Institution



Thalavapalayam, Karut - 639 113.

	Regul	ntion 2	018				Sen	nester '	VI	Y. A. S. W.	le Viris	Total	Hours	→ 60
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CO 2	Knt	ow abo	ut comp	outer vi	sion an	nd the a	pplicati	on of vi	ision sy	stem in	Robotics	S		
CO 3	Unc	lerstan	d mode	rn day ı	robotic	s and th	neir indu	ıstrial a	pplicat	ions.			. = 10·	
CO 4	App	oly the ootics.	concep	t of AI,	Data S	Science	and Çlo	oud-Cor	nputing	g in the c	ontext o	f Cogni	tive	
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1: Slight (Low)

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2: Moderate (Medium)

3: Substantial (High)

B.Tech - Computer Science and Business Systems

Curriculum and Syllabus 2048 Regulation

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UNIT 2	TECHNOLOGIES 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	9
day robotics. computer vis	essential for Cognitive Robotics: Computer systems and Technologies relevant to Introduction to computer vision and application of Vision Systems in Robotics: Concion and the how vision systems are becoming essential part of Robotics. Examply vision systems.	ples of
UNIT 3	ARTIFICIAL INTELLIGENCE AND DATA SCIENCE PLATFORM	9
Robots behave context of Cor	ntext of Cognitive Robotics and Role of AI in Robotics; Artificial Intelligence males like human beings, Applications of AI in Robotics. Data Science and Big Dat gnitive Robotics: Role of Data Science and Big Data in maximizing the availability of Leveraging Data Science in predicting the potential failure of the Robots.	a in the Robots
UNIT 4	CLOUD COMPUTING AND OPERATING SYSTEM PLATFORM	9,
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Curriculum and Syllabus J 2018 Regulation



M.KUMARASAMY COLLEGE OF ENGINEERING MAC Accordated Automorphisms Institution Approved by ANCE & Athleted to Anna University 50 9001-2015 & 150 14601-2015 Constitution

Thalavapalayam, Karur - 639 113.



Total Hours Regulation 2018 60 Semester VI Hours / Week Category Course Code Course Name C P T 18CBE005J Elective 3 0 2 FULL STACK WEB DEVELOPMENT 4 Prerequisite course

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Course Objective (s):

The purpose of learning this course is to:

- Enable students to develop modern web application by leveraging latest technologies.
- Build strong foundation in students making them job ready as per industry requirements.
- Enable them to learn new technologies by applying foundation paradigms
- Build strong expertise to develop end to end application web frontend and backend development
- 5 Perform database manipulation using MySQL and authenticate data.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- _CO 1 Construct a basic website using HTML and Cascading Style Sheets.
- CO 2 Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
- CO 3 Create simple web pages in PHP and to represent data in XML format.
- CO 4 Design and implement server side programs using PHP.
- CO 5 | Perform database manipulation using MySQL and authenticate data.

CO-PO Mapping

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1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

B.Tech - Computer Science and Business Systems

Curriculum and Syllabus | 2018 Regulation

7UR - 639 113





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o HT? Progra	ML, XN mming	ebsite, its need and purpose, Types of websites: Static and dynamic website, Introdu ML, JSON, Web Browsers, -Web Servers, Uniform Resource Locator, Tools and Languages. Web Standards, Tiered Architecture: Client Server Model, Three Tier M ed Architectures, REST services.	11 60
UNI	1 2	HYPERTEXT MARKUP LANGUAGE (HTML)	9
Langua Embed	ages use	ed for website development, HTML5: basic tags, formatting tags, Adding image altimedia in Web pages, Inserting tables, Internal and External Linking, Frames, Form	s, Lists, 1s.
UNI	7	CASCADING STYLE SHEETS (CSS)	9
Basics style sl	of Case	cading Style sheets, Advantages of CSS, External Style sheet, Internal style sheet, SS Syntax, color, background, Font, images.	Inline
ÚNI	-	JAVA SCRIPT	9
Docun	nent Ob	va Script, extension of JavaScript, Syntax of Java Script: data types, operators, varia bject Model_(DOM) with JavaScript, Selection Statement using if and Switch, for/in, while, do while, break and continue.	bles, tag, Iterative
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1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

B.Tech - Computer Science and Business Systems

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- UNIT 1	INTRODUCTION TO DATA MINING.	9
Introduction : Statistics, Sta Applications.	to Data Mining: What is data mining? Related technologies - Machine Learning, DBM ges of the Data Mining Process, Data Mining Techniques, Knowledge Representation	S, OLAP, Methods,
UNIT 2	DATAPREPROCESSING	9.74
concept hiera Representing	ressing: Data cleaning, Data transformation, Data reduction, Discretization and gurchies. Data mining knowledge representation: Task relevant data, Background knowledge, Visualization techniques. Attribute-oriented eralization, Attribute relevance, Class comparison, Statistical measures.	nowledge,
UNIT 3	ASSOCIATION AND CLASSIFICATION ALGORITHMS	9
Generating its Inferring rudi	rules: Motivation and terminology, Example: mining weather data, Basic idea: iem sets and rules efficiently, Correlation analysis. Classification: Basic learning/min mentary rules: IR, algorithm, Decision trees, covering rules. Prediction: The predictagesian) classification, Bayesian networks, Instance-based methods (nearest neighbories)	ing tasks, ction task,
-UNIT 4	REGRESSION-ANALYSIS	9 -
Interpreting R such as Poiss Linearization procedures fo	degression Models, Implementing Predictive Models. Generalized Linear model: link son, binomial, inverse binomial, inverse Gaussian, Gamma. Non Linear Regression transforms, their uses & limitations, examination of non-linearity, initial estimates r NLS, grid search, Newton-Raphson, steepest descent, Marquardt's methods. Introduction models, additive regression models. Introduction to nonparametric in	functions on (NLS): , iterative duction to
UNIT 5	TIME SERIES ANALYSIS	9
analysis, Test smoothing, fo Autoregressive ARMA model estimation for	Analysis: Auto-Covariance, Auto- correlation and their properties. Exploratory till for trend and seasonality, Exponential and moving average smoothing, Holt recasting based on smoothing. Linear time series models: Autoregressive, Moving e Moving Average and Autoregressive Integrated Moving Average models; Estimated as Yule- Walker estimation for AR Processes, Maximum likelihood and least ARMA Processes, Forecasting using ARIMA models. Prescriptive Analytics: Mat Networks modeling-Multi-objective optimization-Stochastic modeling, Decision sion trees.	- Winter Average, nation of st squares hematical
	- Total periods	45
LAB	LIST OF EXPERIMENTS	15
I. Installi	ng Weka and exploring a dataset.	
2. Loadin	g a dataset and visualizing the Data	
Charles and the Contract of th	A Committee of the Comm	

Preprocessing a dataset from a real domain(Medical/Retail/Banking)

4. Building a classifier- Run Decision Tree, Naïve Bayesian Classifier, NN classifier and SYM



Jason Brownlee "Machine Learning Mastery with Weka",2020.

http://garfield.library.upenn.edu/classics1989/A1989AV48500001.pdf



Mining Association Rules- Run Apriori Algorithm. Building a statistical model using a sample dataset - preprocessing, hypothesis building, model fitting, 6. model validation and interpretation of results. Implementation of linear regression technique for statistical model building. Ŧ. Implementation of Non-linear regression technique for statistical model building. 8. Text Book (s) Jiawei Han and Micheline Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufmann 1-Publishers, 3rd ed, 2010. LiorRokach and Oded Maimon, "Data Mining and Knowledge Discovery Handbook", Springer, 2nd edition, 2010 Box, G.E.P and Jenkins G.M. Time Series Analysis, Forecasting and Control, Holden-Day, 1970 Reference (s) -Draper, N. R. and Smith, H. (1998). Applied Regression Analysis (John Wiley) Third Edition. Hosmer, D. W. and Lemeshow, S. (1989). Applied Logistic Regression (Wiley). Hosmer, D. W. and Lemeshow, S., "Applied Logistic Regression", Third Edition, Wiley, 2003. Daniel T.Larose, "Data Mining Methods and Models", Wiley-Inter Science, 2006.

4

Regul	ation 2018	Semester VII	- T	otal Hou	rs =	45
			Н	ours / We	eek	
Category	Course Code	Course Name	L	Т	P	С
C	18CBC401J	USABILITY DESIGN OF SOFTWARE APPLICATIONS	2	0	2	3

NIL

Course Objective (s):

The purpose of learning this course is to:

- To create a learning system through which management students can enhance their innovation and creative thinking skills
- 2 To acquaint themselves with the special challenges of starting new ventures
- To use IPR as an effective tool to protect their innovations and intangible assets from Exploitation.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Understand the user-cantered design process to evaluate the different Assignments.
- CO2 Apply heuristic evaluation techniques to evaluate the website and application
- CO3 Implement ideas for developing and testing innovation through an assignment presentation
- CO4 Design UX research techniques for analysing the application
- CO5 Analyse the personal technique for different projects

CO-PO Mapping

00		POs												Os
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3	2	2	2	-	=		(#)	-	-	1.85	-	2
CO2	3	2	2	1	1	4 8	2		142	-	+	: 4:	(#:	3
CO3	2	3	3	3	3	-		: 4	(#)	-	+	(14)	2	3
CO4	2	1	2	3	2	-	-	-	:#:	-	+	*	1	2
CO5	2	2	1	2	1	-	-	2	=	-	-	;e∈	2	2
CO (Avg)	3	3	3	3	3		-	5		-		72	2	3

1: Slight (Low)

2: Moderate (Medium)



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UNITI	INTRODUCTION TO USER CENTRED DESIGN	7
	entered design- Aspects of User Centered Design - Product Appreciation Approduct from user centered design aspects such as functionality, ease of hetics.	
UNITH	HEURISTIC EVALUATION	6
	tion-10 Heuristic Principles-Examples-Heuristic Evaluation-Group Assign te and App- Evaluation for key tasks of the app or website for heuristic mendations.	
UNIT III	PROJECT DESIGN LIFE CYCLE	4
Redesign project Prototype) -Usab	through the design lifecycle- Discovery -Define-Design-Implement (Designity Testing.	gn
UNITIV	UX RESEARCH	5
_	isers, their goals, context of use and environment of use. Research Tiry, User Interviews, Competitive Analysis for UX.	echniques:
UNIT V	PRODUCT DEVELOPMENT	8
C	oncept Development-Task flow detailing for the Project-Prototyping Te-Prototyping Tools.	
	Total Periods	30
1 Product Apr	Lab Experiments oreciation Assignment – Evaluating the product from User Centred Design aspect	15
Heuristic Evor website forIdentify a vAnalysis of	valuation: Group Assignment initiation (Website and App) Evaluation for key tas or heuristic principles, severity, recommendations, vebsite or an App to redesign, with justification the mobile app or the website through the design life cycle	ks of the ap
	Personas and Scenarios for the App or the website	
	velopment and task flow detailing levelopment with Iterations and justification	
	esting and demonstration	
Text Book (s)		
Jenny Pree	ce, Helen Sharp and Yvonne Rogers, Interaction Design: Beyond Human, 4th Edition, , 2015, Wiley publications.	-Compute
2 Jonny Schn	eider, "Understanding Design Thinking, Lean, and Agile", 1 st Edition, 2	020.
Reference (s)		4
1 Alan Coope	er and Robert Reimann, "About Face", John Wiley Thorus (1987)	lications
	Goodman, Mike Kuniavsky, Andrea Moed, When the House Sound Special Control of the	duce: A
	s duide to Oser Research, 2nd Edition, 2011	
3 Jesse Jame	s Garrett, The Elements of User Experience: (Son Central Mes 2013 or the definition, 2021) and Edition, 2021	e Web an

Regulation 2018		Semester VII	T	45		
			Но	ours / W	eek	
Category	Course Code	Course Name	L	T	P	С
С	18CBC402J	IT WORKSHOP SKYLAB/ MAT LAB	2	0	2	3

NIL

Course Objective (s):

The purpose of learning this course is to:

- Introduce the students with the basic features of MATLAB for problem solving.
- 2 Introduce the students about the Mathematical functions like matrix generation
- 3 Multiple data sets, line styles and colors
- 4 Introduce the students about the Array operations and solving Linear equations in MATLAB.
- 5 Introduce the students about the control flow and operators using if-end structures and loops.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Formulate the basic principles of MATLAB operations.
- CO2 Design the working session and multiple statements per line in MATLAB.
- CO3 Design the application based on the concepts of sub matrix and its operation.
- CO4 Apply the language of graphs and trees to the real world problems.
- CO5 Apply formalized arguments based on conditional looping statements.

CO-PO Mapping

		POs												SOs
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		1	_	1	=	-	-	1	2	/.=	1	-	14
CO2	2	2	1	ä	2	±)+:	-	1	2		1		ě
CO3	2	1	1	-	1	÷	+	(#)	2	2	2	1	1	1
CO4	2	1	1	-	1	-	-	; ⇒):	1	2		1	= =	÷
CO5	2	1	1	-	1	-	IS#E	**	2	2	2	1	7	-
CO (Avg)	2	2	1		2	-	4	S	2	2	2/3		E OF E	VGG.

1: Slight (Low)

2: Moderate (Medium)

Curriculum and Syllabus | 2018 Regulation

UNIT I

INTRODUCTION TO MATLAB

0

History, basic features, strengths and weaknesses, good programming practices and plan your code. Creating MATLAB variables, overwriting variable, error messages, making corrections, controlling the hierarchy of operations or precedence, controlling the appearance of floating point number, managing the workspace, keeping track of your work session, entering multiple statements per line, miscellaneous commands

UNIT II

MATRIX, ARRAY AND BASIC MATHEMATICAL FUNCTIONS

6

Matrix generation, entering a vector, entering a matrix, matrix indexing, colon operator, linear spacing, creating a sub-matrix, dimension, matrix operations and functions matrix generators, special matrices, array and array operations, solving linear equations, other mathematical functions.

UNIT III

BASIC PLOTTING

6

Overview, creating simple plots, adding titles, axis labels and annotations, multiple data sets in one plot, specifying line styles and colours.

UNIT IV

INTRODUCTION TO PROGRAMMING

6

Introduction, M-File Scripts, script side-effects, M-File functions, anatomy of a M-File function, input and output arguments, input to a script file, output commands. Control flow and Operators "if ... end structure", relational and logical operators, "for ... end" loop, "while ... end" loop, other flow structures, operator precedence, saving output to a file.

UNIT V

DEBUGGING M-FILES

6

Debugging process, preparing for debugging, setting breakpoints, running with breakpoints, examining values, correcting and ending debugging, correcting an M-file.

	Total Periods	30
	Lab Experiments	15
1	Programs using mathematical, relational expressions and the operators.	
2	Vectors and Matrices: Programs using array operations and matrix operations (such multiplication).	as matrix
3	Programs on input and output of values.	
4	Selection Statements: Experiments on if statements, with else and elseif clauses a statements.	nd switch
5	Loop Statements and Vectorising Code: Programs based on the concepts of counted (conditional (while) loops.	for) and
6	Programs based on scripts and user-defined functions.	
7	Programs on Built-in text manipulation functions and conversion between string ar types.	nd number



Tex	t Book (s)
1	Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, "Digital Image Processing using MATLAB", Pearson Education, Inc., 2004.
2	Stormy Attaway, Butterworth-Heinemann, "MATLAB: A Practical Introduction to Programming and Problem Solving", 5th Edition, 2018.
Ref	erence (s)
1	https://www.mathworks.com/content/dam/mathworks/mathworks-dot com/moler/exm/book.pdf
2	https://www.mathworks.com/help/releases/R2014b/pdf_doc/matlab/getstart.pdf
3	Digital Image Processing using MATLAB. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, Pearson Education, Inc., 2004.
4	MATLAB: A Practical Introduction to Programming and Problem Solving. Stormy Attaway, Butterworth-Heinemann, 2017.



Regul	ation 2018	Semester VII	3	otal Hou	TS .	30	
Category			Hours / Week				
	Course Code	Course Name	L	Т	P	C	
S	18MBS401T	MARKETING RESEARCH & MARKETING MANAGEMENT	2	0	0	2	

NIL

Course Objective (s):

The purpose of learning this course is to:

- To outline key marketing concepts and its application to different markets
- 2 To identify factors and processes essential for designing marketing strategy
- To analyse and examine the implementation of marketing concepts and strategy to firms
- Communicate and defend your recommendations and critically examine and build upon the recommendations of your classmates both quantitatively and qualitatively.
- To provide you with opportunities to analyze marketing activities within the firm;

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Relate the functioning of elasticity of demand in micro economics.
- CO2 Design the dynamics of marketing and analyse how its various components interact with each other in the real world
- CO3 Apply marketing concepts for effective decision making
- CO4 Apply the basic concepts, principles, statistical tools of marketing research
- CO5 | Analyze various strategies of Internet Marketing

CO-PO Mapping

						P	Os						PS	Os
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	y e :	-	1	1		1		Ē	ž	2	ne.	2
CO2	1	-	1		2	2	354	1	-	±	-	2	-	3
CO3	2	-	Н.		1	-	1	.₹.	2	=	=	1	1.55	1
CO4	1	I E	2		2	2	1	5 <u>5</u> 2	1	i ii	-	_ 6	Œ	2
CO5	1		1	-	1	=	2	.	2	-		2	1	2
CO (Avg)	2	rei	2	V -	2	2	2	1	2	(AH	COLLE	GE OF E	NGG] (A)	3

1: Slight (Low)

MARKETING CONCEPTS AND APPLICATIONS

6

Introduction to marketing & Core concept, Marketing of Services, importance of marketing in service sector -Marketing planning and Environment; Elements of marketing mix; analysing the needs and trends in Environment- Macro, Economic, Political, Technical and Social-Understanding the Consumers - Determinants of consumer behaviour and factors influencing consumer behaviour - Market Segmentation - Meaning and concept; Basis of segmentation, selection of segments. Segmentation strategies, Target marketing, Product Positioning.

UNIT II

PRODUCT MANAGEMENT

6

Product Life cycle concept, New Product development & strategy, Stages in New Product development, Product decision and strategies, Branding & packaging.

UNIT III

PRICING, PROMOTION AND DISTRIBUTION STRATEGY

6

Policies & Practices - Pricing Methods & Price determination Policies. Marketing Communication - The promotion mix, Advertising & Publicity, 5 M's of Advertising Management. Marketing Channels, Retailing, Marketing Communication, Advertising

UNIT IV

MARKETING RESEARCH

6

Introduction, Type of Market Research, Scope, Objectives & Limitations - Marketing Research Techniques, Survey Questionnaire design & drafting, Pricing Research, Media Research, Qualitative Research. Data Analysis: Use of various statistical tools - Descriptive & Inference Statistics, Statistical Hypothesis Testing, Multivariate Analysis - Discriminant Analysis, Cluster Analysis, Segmenting and Positioning, Factor Analysis.

UNIT V

INTERNET MARKETING

6

Introduction to Internet Marketing. Mapping fundamental concepts of Marketing (7Ps, STP); Strategy and Planning for Internet Marketing. Business to Business Marketing: Fundamental of business markets. Organizational buying process. Business buyer needs. Market and sales potential. Product in business markets. Price in business markets. Place in business markets. Promotion in business markets. Relationship, networks and customer relationship management. Business to Business marketing strategy

Total Periods

30

Text Book (s)

- Philip Kotler and Kevin Lane Keller, "Marketing Management", PHI 14th Edition, 2012.
- Donald R. Cooper, Pamela S. Schindler and J K Sharma, "Business Research Methods", 11th Edition, Tata

Reference (s)

- Paul Baines, Chris Fill and Kelly Page, "Marketing", Oxford University Press, 2nd Edition, 2011.
- 2 Uma Sekaran and Roger Bougie, "Research methods for Business", 5th Edition, Wiley India, New Delhi, 2012.
- Rajan Saxena, Marketing Management, McGraw Hill Education,6th

William G Zikmund, Barry J Babin, Jon C.Carr, Atanu Adhikari, Wall Griding Bussiess

4 Research methods, A

South Asian Perspective", 8th Edition, Cengage Learning, New Della

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ON 2012.6 MAY 2023

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Regul	ation 2018	Semester VII	T	otal Hou	rs	30
			H			
Category Course Code		Course Name	L	T	Р	C
S	18MBS402T	HUMAN RESOURCE MANAGEMENT	2	0	0	2
Prerequisi	te Course (s)					
NIL	equisite Course (s)					

Course Objective (s):

The purpose of learning this course is to:

- To familiarize the students with Policies, Procedures and Practices, techniques of HRM

 To enable the students to understand the HR Management and system at various levels in
- 2 general and in certain specific industries or organizations.
- To help the students focus on and analyse the issues and strategies required to select and develop manpower resources
- 4 To develop relevant skills necessary for application in HR related issues
- To Enable the students to integrate the understanding of various HR concepts along with the domain concept in order to take correct business decisions

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Recognize the basic principles of Human Resource Management.
- CO2 Relate the system design of Human Resource Management.
- CO3 Apply the concepts, roles, functional areas and activities of HR.
- CO4 Assess organization's employee, their interest, motivation, satisfaction belief of fair treatment.
- CO5 Analyze actual impact on the firm's current performance and sustainability in the long run.

CO-PO Mapping

600						Pe	Os						PS	Os
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	=		40	2	1	1	2	1	1941	a	2	-	2
CO2	1	-	2	+:	1	1	2	4.	-		-	÷	e e	1
CO3	2	1	2		2	240	1		3	y 44	يسند	2	4	2
CO4	2	-	1	-	1	2	1	-	3	//			NGG	2
CO5	1	2	-	-	1	1	2		1	18 A	COMPU	TEROSCII	ENCE	S
CO (Avg)	2	2	2	-	2	2	2	2	3	NA (26	MAY ² 20	73 -	NOMO

1: Slight (Low)

υ	INITI	HUMAN RESOURCE MANAGEMENT	6
Con	cept and (Challenges, HR Philosophy, Policies, Procedures and Practices.	
U	NIT II	HUMAN RESOURCE SYSTEM DESIGN	6
		on, and HR Department, Line Management Responsibility in HRM, Merces accounting and audit; Human resource Information System.	asuring HR
	NIT III	FUNCTIONAL AREAS OF HRM	6
Orga	ruitment anizationa Payroll.	and Staffing, Benefits, Compensation, Employee Relations, HR al design, Training and Development, Human Resource Information System	compliance ns (H.R.I.S.
U	NIT IV	HUMAN RESOURCE PLANNING	6
	nand Fore	casting, Action Plans – Retention, Training, Redeployment & Staffing, Suc	ecession
I ICILI			
	NIT V	STRATEGIC MANAGEMENT OF HUMAN RESOURCES	6
U SHF	RM, Relat	ionship between HR strategy and overall corporate strategy, HR as a	
U SHF	RM, Relat		
U SHF Con	RM, Relat	ionship between HR strategy and overall corporate strategy, HR as a Advantage, Managing Diversity in the Workplace. Total Periods	a Factor of
U SHF Con	RM, Relate Appetitive A	ionship between HR strategy and overall corporate strategy, HR as a Advantage, Managing Diversity in the Workplace. Total Periods	Factor of
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U SHF Com Tex 1	RM, Relate Appetitive Appetitive Appetitive Appetitive Appetition Prof. Garage	Advantage, Managing Diversity in the Workplace. Total Periods Total Periods Pary Dessler, Human Resources Management, Pearson, 16th Edition, 2020. In M.Ivancevich, "Human Resource Management", Tata McGraw Hill Publications.	a Factor of
U SHF Com Tex 1	RM, Relating Annual Relation Annual Relation,	Advantage, Managing Diversity in the Workplace. Total Periods ary Dessler, Human Resources Management, Pearson, 16th Edition, 2020. In M.Ivancevich, "Human Resource Management", Tata McGraw Hill Publ. 2003. Gupta, "Human Resource Management", Sultan Chand & Sons, New Dessler, Sultan Chand & Sons, New Dessler, Sultan Chand & Sons, New Dessler, "Sultan Chand & Sons, New Dessler, "Sultan Chand & Sons, New Dessler, "Human Resource Management", Sultan Chand & Sons, New Dessler, "Human Resource Management", Sultan Chand & Sons, New Dessler, "Human Resource Management", Sultan Chand & Sons, New Dessler, "Human Resource Management", Sultan Chand & Sons, New Dessler, "Human Resource Management", Sultan Chand & Sons, New Dessler, "Human Resource Management", Sultan Chand & Sons, New Dessler, "Human Resource Management", Sultan Chand & Sons, New Dessler, "Human Resource Management", Sultan Chand & Sons, New Dessler, "Human Resource Management", Sultan Chand & Sons, New Dessler, "Human Resource Management", Sultan Chand & Sons, New Dessler, "Human Resource Management", Sultan Chand & Sons, New Dessler, "Human Resource Management", Sultan Chand & Sons, New Dessler, "Human Resource Management", "Sultan Chand & Sons, New Dessler, "Human Resource Management", "Sultan Chand & Sons, New Dessler, "Human Resource Management", "Sultan Chand & Sons, New Dessler, "Human Resource Management", "Sultan Chand & Sons, New Dessler, "Human Resource Management", "Sultan Chand & Sons, New Dessler, "Human Resource Management", "Sultan Chand & Sons, New Dessler, "Human Resource Management", "Human Resource Management", "Sultan Chand & Sons, New Dessler, "Human Resource Management", "Human Resource M	a Factor of 30 lication, 12th
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R	.eguiat	ion 20	18				semest	er VII				iotari		36
Cato	gory	Co	urse Co	ode		(ourse	Name				Hours /	T -	
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P		180	CBP401	IL	P	ROJEC	T EV	ALUA"	LION I		0	0	4	2
Prereq	uisite c	ourse												
NIL														
Course The pur				course	is to:									
1	Dev	elop tl	neir ow	n inno	vative	prototy	ype of	ideas.						
2	Trai	n the s	tudents	s in pre	eparing	g proje	ct repo	orts and	d exam	ination.				
Course At the e					vill be a	able to:			14-	- 1			14.8	
CO 1											of differe g proble			
CO 2			stainab lth, saf					_	gineerir	ng probl	em with	consid	eration	for
CO 3										with en	vironme es	ntal cor	nsidera	tions
CO 4			effectiv on on n	•				er or le	eader in	n a tean	and ma	ike clea	ır	
CO 5			nageme		nciples	s to fun	ction e	effectiv	ely in	multidis	sciplinar	y envir	onmen	for
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CO-PO	_				l'uni						THE W			9
	- 1						POs						PS	Os
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO
CO1	3	3			#	-	=0	-			-	- 5		30
CO2	7	70	0.	9.	=	3	3		1.8	1 100	-	77	-	-
CO3	3	7	3		-	÷	3	-	ķe.	140	E .		1.5.	547
CO4	÷	#	-	*	H	*		-	3	3	-	я		
CO5	÷		:=:		*	* -	97	-	3	-	3	e e	-	- 12
CO6		-	-		-	-	*	-	.#:	3	-	##.	-	_
CO (Avg)	3	3	3	u s	-	3	3	a.	3	3	3	-	÷ 2	

1: Slight (Low)



F	Regul	ation 20	18			Seme	ster Vl	Π			Tota	Hour	S	60
											Hour	s / Wee	ek	-
Categ	gory	Cours	e Code			Cour	se Nan	ne		L		Т	P	С
S		18ME	3S403J			VICE		NCES & ATION ENT		3		0	2	4
Prere	quisi	te Cour	se (s)											4, 4
NIL														
Cour	se Ob	jective	(s):							1/4				
The p	urpos	e of lear	ming th	is cour	se is to							n 35		
1	Und	derstand	the ser	vices a	nd serv	ice ope	rations	manag	gement	concep	ts.			
2	Cor	mprehen	d the te	chniqu	es of se	rvice o	peratio	ns.					- 1	
3	Und	derstand	the ser	vice qu	ality ar	nd serv	ice desi	ign asp	ects.					
4	Und	derstand	the ser	vice in	novatic	n aspec	cts.							
5	То	analyse	how se	rvices a	re diffe	erent fr	om pro	ducts b	y its cł	naracter	istics.			
Cour	se Ou	itcome ((s) (CO	s):			JE . 58							
At the	e end	of this c	ourse, 1	earners	will be	e able t	o:							
CO1	Une	derstand	the con	ncept of	f servic	e opera	ition sy	stem.						
CO2	Des	sign of s	ervice d	levelop	ment a	nd deli	very sy	stem						
CO3	Des	sign the	service	design	and qu	ality								
CO4	App	oly the f	orecasti	ing den	nand of	servic	es							
CO5	Ana	alyse the	strateg	ies for	manag	ing ser	vice su	pply re	lations	hip				
CO-P	ОМ	apping								Spart!				
COs						P	Os		1				PS	Os
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO
CO1	1	1	-1	1	11	1	1	1	1	1	3	1	1	1
CO2	1	1	1	1	1	1	1	1	1	1	2	1	1	1
CO3	1	1	1	2	1	3	1	2	1	1	2	1	2	2
CO4	1	2	1	1	1	1	1	1	1	1	3	2	1	1
CO5	1	1	1	1	1	1	1	1	1	1/4	COLLE	GE QF E	NGG.	1
CO (Avg)	1-	2	1	2	1	3	1	2	1	1/5	COMPU	ER SCIE	NCE	11/2

2: Moderate (Medium)

KARUR - 639 113

1: Slight (Low)

Introduction to the course, Introduction to service operations. Role of service in economy and society, Introduction to Indian service sector. Nature of Services and Service Encounters: Differences between services and operations, Service package, characteristics, various frameworks to design service operation system, Kind of service encounter, importance of encounters. Service-Dominant Logic: From Goods-Dominant logic to Service-Dominant logic, Value co-creation.

UNIT II

SERVICE STRATEGY AND COMPETITIVENES

9

Development of Strategic Service Vision (SSV). Data Envelopment Analysis-New Service Development: NSD cycle, Service Blueprinting, Elements of service delivery system - Service Design: Customer Journey and Service Design, Design Thinking methods to aid Service Design Locating facilities and designing their layout: models of facility locations (Huff's retail model), Role of service-scape in layout design - Service Quality: SERVQUAL, Walk through Audit, Dimensions of Service quality & other quality tools.

UNIT III

SERVICE GUARANTEE & SERVICE RECOVERY

9

Service quality GAP analysis, Service guarantee-recover from service failure

UNIT IV

FORECASTING DEMAND FOR SERVICES

9

Types of demand forecasting methods for Managing Capacity and Demand: Strategies for matching capacity and demand, managing waiting line in services. Managing Facilitating Goods: inventory models, Role of inventory in services - Managing service supply relationship: Understanding the supply chain / hub of services, Strategies for managing suppliers of service - Vehicle Routing Problem: Managing after sales service-understanding services that involve transportation of people and vehicle. Techniques for optimizing vehicle routes

UNIT V

SERVICE INNOVATION

9

Services Productivity, Need for Services Innovation, service innovation in different service sector – educational, health and hospitality sectors.

Lab Experiments

Total Periods 45

15

- Option 1: Choose any service organization around and present it from the perspective of: nature of service, classification of service, blueprint or service design analysis, service quality, and any additional perspective you would like to add.
- 2 Option 2: Choose any latest research paper in services and explain your understanding and feedback on the same.

Text Book (s)

- Fitzsimmons & Fitzsimmons, "Service Management: Operations, Strategy, Information Technology", McGraw Hill publications, 7th Edition, 2017.
- 2 Christopher H.Lovelock and JochenWirtz, "Services Marketing", Pearson Education, New Delhi, 7th Edition, 2011.

Reference (s)

- Wilson, A., Zeithaml, V. A., Bitner, M. J., & Gremler, D. D., "Integrating customer focus across the firm", McGraw Hill, 2012
- 2 Lovelock, C, Services, "Marketing", Pearson Education India, 7 t

BOARD OF COMPANIES SCIENCE

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BO

- Robert Johnson, Graham clark, "Service Operations Management", Pearson Education, 2nd Edition, 2005
- Reason, Ben, and Lovlie, Lavrans, "Service Design for Business: A Practical Guide to Optimizing the Customer Experience", Pan Macmillan India, 2016.





Regul	ation 2018	Semester VIII	T	IFS =	60	
			Н			
Category Course Code		Course Name	L	Ţ	P	С
S	18MBS404J	IT PROJECT MANAGEMENT	3	0	2	4
Prerequisi	te Course (s)					
NIL		The second secon				
Course Ob	jective (s):					
The purpos	e of learning this co	ourse is to:				
1 Ga	in knowledge on fi	undamental concepts of project and proje	ct schedu	ıling.		

Course Outcome (s) (COs):

3

4

5

At the end of this course, learners will be able to:

Obtain knowledge on Agile Project Management.

Obtain knowledge on DevOps and its related concepts.

Know about the Scrum framework in detail.

CO1	Relate the concept of project management.
CO2	Apply the concept of project management scheduling
CO3	Analyse the features of project management with respect to AGILE model.
CO4	Design the services of SCRUM
CO5	Analyze the concept of Devops in project management.

CO-PO Mapping

						P	os						PS	Os
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1		-	-	-	3	2			1	2
CO2	1	2	2	2	(#	-	-	*	5.	-	-	-		
CO3	2	2	2	1	.96		-	-	3	2	*	-	1	2
CO4	2	2	2	2	2	2	2	2	2	F-2-	2	-2	2	2
CO5	2	2	2	1	040	741	-	#	3	2/		EGE OF	ENGG.	2
CO (Avg)	2	2	2	2	2	2	2	2	3	MARKE	COMP 28 BU	UTER SO	PIENCE 2	S COMO!

1: Slight (Low)

9 PROJECT OVERVIEW AND PROJECT SCHEDULING UNITI Project Overview and Feasibility Studies: Identification, Market and Demand Analysis, Project Cost Estimate, Financial Appraisal. Project Scheduling: Project Scheduling, Introduction to PERT and CPM. Critical Path Calculation. Precedence Relationship, Difference between PERT and CPM, Float Calculation and its importance, Cost reduction by Crashing of activity. 9 COST CONTROL, SCHEDULING AND MANAGEMENT UNIT II **FEATURES** Cost Control and Scheduling: Project Cost Control (PERT/Cost), Resource Scheduling & Resource Leveling. Project Management Features: Risk Analysis, Project Control, Project Audit and Project Termination. 9 AGILE PROJECT MANAGEMENT UNIT III Agile Project Management: Introduction, Agile Principles, Agile methodologies, Relationship between Agile Scrum, Lean, DevOps and IT Service Management (ITIL). Other Agile Methodologies: Introduction to XP, FDD, DSDM, Crystal. 9 **SCRUM UNIT IV** Scrum: Various terminologies used in Scrum (Sprint, product backlog, sprint backlog, sprint review, retro perspective), various roles (Roles in Scrum), Best practices of Scrum, Case Study. 9 DEVOPS UNIT V DevOps: Overview and its Components, Containerization Using Docker, Managing Source Code and Automating Builds, Automated Testing and Test Driven Development, Continuous Integration, Configuration Management, Continuous Deployment, Automated Monitoring, Case Study. **Total Periods** 45 15 LIST OF EXPERIMENTS Estimation of project cost and control activity using open-source tools. Scheduling of project with PERT and CPM techniques to estimate the completion time. 2 Assessment of IT Project Risk Analysis using open-source tools. Perform IT Project Audit and generate a report using open-source tools. 4 Study of Agile project management tools 5 Application of Scrum practices in the project. 6 Design and perform automated testing. Text Book (s) Mike Cohn, "Succeeding with Agile: Software Development Using Scrum", Addison-Wesley Professional Publisher, 1st Edition, 2009. Burke, R 2017, Fundamentals of project management, 2nd edn, Burke Publishing. 2 Reference (s) Roman Pichler, "Agile Product Management with Scrum", Addis 1 Edition, 2010. Ken Schwaber, "Agile Project Management with Scrum (Microsoft Profe 2 Press US publisher, 1st Edition, 2004. Argyris, Chris. Overcoming Organizational Defenses: Facilitating nizational Le 3 Boston: Allyn and Bacon, 1990.



	legulat	ion 20	18			Se	mester	VIII				Total l	lours	60
Cate	egory	Co	urse Co	ode			Cours	e Namo					/ Week	-
	gorj		_/								1		ГР	
P			CBP402	L L		PROJ	ECT E	EVALU	ATIO	N II	(0	8	4
Prereq NIL	uisite c	ourse					_						-	-
Course	Objec	tive (s	١٠											7
			ng this	course	is to:									
1	Dev	elop tl	neir ow	n inno	vative	prototy	pe of	ideas.						
2	Train	n the s	tudents	in pre	paring	projec	et repo	rts and	exami	nation.				
->	1		(COs):				T.	B. T				R DIN		щ
	end of t	his cou	irse, lea	rners v								100		
CO 1											vironme	ntal		
CO 2			ions ap								ethods in	ncludin	a desig	m of
CO 2			its to pr					ymmesi	120 1030	aren m	Zinous n	iteratin	ig ucsig	511 01
CO 3	1							s to pr	ovide v	valid co	nclusion	follow	ving the	
			nginee											
00.4	Test	and F	lvaluate	e the p	erform	ance o	f the de	evelop	ed solu	tion usi	ng appr	opriate	technic	ques
CO 4														
	and	tools		-										
CO 5	and App	tools ly mai	nageme	ent prii	nciples	to fun	ction e	ffectiv	ely in t	he proje	ect team	for pro	ject	
CO 5	App exec	tools ly mar cution												
	App exec Eng	tools ly man cution age in	learnin	ng for (effecti	ve proj	ect im	plemen	ntation	in the b	roadest	contex	t of	
CO 5	App exec Eng	tools ly man cution age in nologi	learnin	ng for (effecti	ve proj	ect im	plemen	ntation	in the b		contex	t of	
CO 5	App exect Eng tech need Write	tools bly man cution age in nologi ds. te effe	learnin	ng for o	effectivith con	ve proj isiderat	ect imprion for	plemer public	ntation c healtl	in the b	roadest	contex al and s	t of societal	
CO 5 CO6	App exect Eng tech need Writ soci	tools ly man cution age in nologi ls. te effe	learnin	ng for o	effectivith con	ve proj isiderat	ect imprion for	plemer public	ntation c healtl	in the b	roadest	contex al and s	t of societal	
CO 5	App exect Eng tech need Writ soci	tools ly man cution age in nologi ls. te effe	learnin	ng for o	effectivith con	ve proj siderat	ect impion for	plemer public	ntation c healtl	in the b	roadest	contex al and s	t of societal	
CO 5 CO6	App exect Eng tech need Writ soci	tools ly man cution age in nologi ls. te effeety bing	learnin cal cha	ng for one was exports a	effectivith con	ve proj isiderat ike clea	ect impion for	plemen public	ntation c health n to the	in the bh, safety	roadest	contex al and s	t of societal	6Os
CO 5 CO6 CO7 CO-PO	and App exect Eng tech need Writ soci	tools ly man cution age in nologids. te effecty bing	learning cal charter ctive re	ng for one was eports a	effectivith com	ve proj asiderat ake clea	ect impion for ar preso	plemer public entatio	ntation c healtl n to the	in the bh, safety	roadest	contexal and some	t of societal	SOs PSO
CO 5 CO6 CO7 CO-PO COs CO1	and Appp exect Eng tech need Writ soci Mapp	tools ly man cution age in nologi ls. te effe ety ping ro2	learning cal charactive response	eports a	effectivith con	ve proj isiderat ike clea	ect impion for	plemen public	ntation c health n to the	in the b	roadest	contexal and sommun	t of societal aity and PS	GOs PSO
CO 5 CO6 CO7 CO-PO COs CO1 CO2	and App exect Eng tech need Writ soci	tools ly man cution age in nologids. te effecty bing	learning cal charter ctive re	ng for one was eports a	effectivith com	ve proj asiderat ake clea	ect impion for ar preso	plemer public entatio	ntation c healtl n to the	in the bh, safety	roadest	contexal and some	rof societal rity and PS	SOs PSO
CO 5 CO6 CO7 CO-PO COs CO1	and Appp exect Eng tech need Writ soci Mapp	tools ly man cution age in nologi ls. te effe ety ping ro2 3	learning cal charactive response	eports a	effectivith command ma	ve proj isiderat ike clea	ect imprion for ar preso	plemer public entatio	ntation c health n to the	in the b	roadest	contexal and sommun	t of societal aity and PS	GOs PSO
CO 5 CO6 CO7 CO-PO COs CO1 CO2	and Apprexed Eng tech need Writ soci	tools ly man cution age in nologi ls. te effe ety ping PO2	learning cal charactive responses	ports a	effectivith com	ve proj isiderat ike clea	POs PO7 3	plemer public entatio	ntation c health n to the	in the bh, safety	roadest	contextal and some	rof societal rity and PS	SOs PSO
CO 5 CO6 CO7 CO-PO COs CO1 CO2 CO3	and Apprexect Eng tech need Writ soci. Mapp	tools ly man cution age in nologi ls. te effe ety ping ro2 3	learning cal charactive responses	ports a	effectivith com	ve proj nsiderat nke clea	ect impion for ar prese	PO8	ntation c health n to the	in the b	roadest	contextal and some	r of societal rity and PS	SOs PSO
CO 5 CO6 CO7 CO-PO COs CO1 CO2 CO3 CO4	and Apprexect Eng tech need Writ soci	tools ly man cution age in nologi ls. te effe ety ing ro2 - 3	learning cal charactive research	ports a	POS 3 3	ve proj isiderat ake clea	ect imprion for ar preso	polement public entatio	ntation c health n to the	in the bh, safety	roadest	contextal and some	rity and	SOs PSO
CO 5 CO6 CO7 CO-PO COs CO1 CO2 CO3 CO4 CO5	and App exect Eng tech need Writ soci	tools ly man cution age in nologi ls. te effe ety ping 702 - 3	learning cal charactive research	PO4	POS 3 3	ve proj nsiderat nke clea	ect impion for ar prese	PO8	pos	in the bh, safety	PO11	contextal and some	PS PSO1	SOs PSO
CO 5 CO6 CO7 CO-PO COs CO1 CO2 CO3 CO4 CO5 CO6	and App exect Eng tech need Writ soci	tools ly man cution age in nologi ls. te effe ety ping 702 - 3	learning cal charactive residence and the reside	PO4	POS 3 3	ve proj nsiderat nke clea	POs PO7 3	PO8	PO9	in the b	PO11	PO12	PS PSO1	SOs PSO

2: Moderate (Medium)

Curriculum and Sylmbus | 2018 Regulation

1: Slight (Low)

Regui	ation 2018	Semester VII	3	otal Hou	rs	45
			H	ours / Wo	eek	
Category	Course Code	Course Name	i.	T	P	C
E	18CBE007T	COGNITIVE SCIENCE & ANALYTICS	3	0	()	3

NII.

Course Objective (s):

The purpose of learning this course is to:

- 1 Introduction to cognitive science, psychology, nervous system and brain
- 2 Understand brain and sensory motor information, representation of sensory information.
- 3 Learn Data Theory and Taxonomy of Data.
- 4 Perform Multivariate Data Analytics & Cognitive Analytics
- 5 Learn fundamentals of Artificial Intelligence and Machine Learning.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Recognize the basic concepts in Neural network model.
- CO2 Apply the machine learning models and analyze the relationship between ML and Cognitive Science
- CO3 Design the information processing models using brain imaging.
- CO4 Apply the weka tool for information processing
- CO5 Analyze the usage of various mathematical models in neuroscience

CO-PO Mapping

						P	Os						PS	Os
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	0	2	-	-	7=	1	±;	2	1	2	1
CO2	2	2	1	0	2	4.	-	· **	-	-	2	2	I	1
CO3	3	2	1	0	2	*	-	2)#:	(#)	-	2	1	2	2
CO4	2	2	0	0	2	-	=	100	=	**	2	2	2	2
CO5	2	2	2	2	2	197	-	Ne.	(#)	*:	2	2	2	2
CO (Avg)	3	3	1	-1	2	-	4	-	1	=:	SAL C	OLLEGE	OF ENG	6

1: Slight (Low)

2: Moderate (Medium)

BOARD OF COMPUTER SCIENCE SPISION STANTIAL (HIGH

INTRODUCTION TO THE STUDY OF COGNITIVE UNIT I SCIENCES Introduction to the study of cognitive sciences - A brief history of cognitive science - Methodological concerns in philosophy - Artificial intelligence and psychology - Structure and constituents of the brain - Brief history of neuroscience - Mathematical models - Looking at brain signals - Processing of sensory information in the brain. COGNITIVE MODELS UNIT II Brain Imaging - FMRI, MEG - PET, EEG - Multisensory integration in cortex - Information fusion - From sensation to cognition - Cybernetics - From physics to meaning, Analog vs. Digital: Code duality. LINGUISTIC KNOWLEDGE UNIT III Linguistic knowledge: Syntax, semantics, (and pragmatics) - Generative linguistic - Brain and language -Language disorders - Lateralization - The great past tense debate - Cognitivist and emergent stand points - A robotic perspective. 9 AFFORDANCES **UNIT IV** Direct perception - Ecological Psychology - Affordance learning in robotics - Child and robotic development -Attention and related concepts - Human visual attention - Computational models of attention - Applications of computational models of attention. 9 CATEGORIES AND CONCEPTS **UNIT V** Logic; Machine learning - Constructing memories - Explicit vs. implicit memory - Information processing (three-boxes) model of memory - Sensory memory; Short term memory - Long term memory; Rationality -Bounded rationality; Prospect theory; Heuristics and biases - Reasoning in computers - Key points in social cognition - Context and social judgment; Schemas; Social signals. **Total Periods** 45 Text Book (s) Pradeep Kumar Mallick, Samarjeet Borah," Emerging Trends and Applications in Cognitive Computing", 1 IGI Global Publishers, 2019. Cryptography, Theory and Practice. D. R. Stinson, CRC Press, 2018. 2 Reference (s) Jose Luis Bermudez, "Cognitive Science: An Introduction to the Science of the Mind", Cambridge University Press, New York, 2020. Handbook of Applied Cryptography. A. J. Menezes, P. C. van Oorschot, and S. A. Vanstone, 2 CRC Press, 2014. Basic Vision: An Introduction to Visual Perception" by Robert Snowden and Peter Thompson 3 "An Introduction to Cognitive Behaviour Therapy: Skills and Applications" by Joan Kirk and 4 Helen Kennerley. BOARD OF COMPUTER SCIENCE

Regul	ation 2018	Semester VII	· T	otal Hou	ns	45
			Не			
Category	Course Code	Course Name	L	T	P	C
E	18CBE008T	INTRODUCTION TO IOT	3	0	0	3

NII.

Course Objective (s):

The purpose of learning this course is to:

- To understand about the fundamentals of Internet of Things and its building blocks along with their characteristics
- 2 To gain knowledge about IoT Architecture.
- 3 To understand and learn about Sensors and industrial systems.
- To understand the other associated technologies like networking and communication in the domain of IoT.
- To understand the data processing and standards designed for IoT and the current research on it.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Identify the fundamental building blocks and use cases of IoT.
- CO2 | Recognize the Reference Architecture in IoT
- CO3 Design and develop IoT based sensor systems
- CO4 Design the networking and communication protocols used in IoT
- CO5 Analyze the data processing and storage in IoT

CO-PO Mapping

						PC	Os						PSC	Os
Cos	POI	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSOI	PSO2
CO1	3	2	3	2		3	1	2	2	2		2	2	2
CO2	3	2	3	2		3	2	2	3	2	-	3	2	2
CO3	3	2	3	2		3	2	2	2	2	-	2	2	2
CO4	3	2	3	2	.5	2	2	2	2	3		3	2	2
CO5	2	2	2	2	-50	3	2	2	3	3	35	3	2	2
CO (Avg)	3	2	3	2		3	2	2	3	3	11 C	LLEGE	OF ENG	

1: Slight (Low)

2: Moderate (Medium)

2 6 MAY 2023

	UNIT I	INTRODUCTION TO IOT AND USE CASES	9
		sic concepts of IoT, Consumer IoT vs Industrial Internet, Fundamental ts of IoT in various industry domains.	ouilding
1	UNIT II	ARCHITECTURE	9
		chitectures. Industrial Internet Reference Architecture, Edge Computingestion and Data Processing Pipelines, Data Stream Processing.	ng. IoT
Į	INIT III	SENSORS AND INDUSTRIAL SYSTEMS	9
		ensors and transducers, integrating sensors to sensor processing boad dustrial data acquisition systems, industrial control systems and their fundamental control systems.	
τ	INIT IV	NETWORKING AND COMMUNICATION FOR IOT	9
netw (Mo	orking techndbus, CANb	layer architecture and mapping to IoT architecture, Introduction to ologies (ZigBee, Bluetooth, Serial Communication), Industrial network as), Communicating with cloud applications - web services, REST, To	protocols
UDF	P/IP sockets, l	MQTT, WebSockets, protocols. Message encoding (JSON, Protocol But	ieis).
	P/IP sockets, I U NIT V	IOT DATA PROCESSING AND STORAGE	9
Time	UNIT V e series data a	IOT DATA PROCESSING AND STORAGE and their characteristics, time series databases, basic time series analytical sketching, dealing with noisy and missing data, anomaly and outlier of	9 es, data detection.
Time sumi	UNIT V e series data a	IOT DATA PROCESSING AND STORAGE and their characteristics, time series databases, basic time series analytic	9 es, data detection.
Time sumi	UNIT V e series data a marization an t Book (s)	IOT DATA PROCESSING AND STORAGE and their characteristics, time series databases, basic time series analytic dasketching, dealing with noisy and missing data, anomaly and outlier of Total Period reengard, "The Internet of Things-Essential Knowledge Series", MIT 1	9 es, data detection.
Time sum	e series data a marization and Book (s) Samuel Gr Edition, 20 Ben Fry, "	IOT DATA PROCESSING AND STORAGE and their characteristics, time series databases, basic time series analytic dasketching, dealing with noisy and missing data, anomaly and outlier of Total Period reengard, "The Internet of Things-Essential Knowledge Series", MIT 1	9 es, data detection.
Time sumi	e series data a marization and Book (s) Samuel Gr Edition, 20 Ben Fry, "	IOT DATA PROCESSING AND STORAGE and their characteristics, time series databases, basic time series analytic data sketching, dealing with noisy and missing data, anomaly and outlier of Total Period eengard, "The Internet of Things-Essential Knowledge Series", MIT 1915. Visualizing Data-Exploring and Explaining Data with the Processing	9 es, data detection.
Time sumi	e series data a marization and Book (s) Samuel Gredition, 20 Ben Fry, "Environme erence (s) Ben Fry,	IOT DATA PROCESSING AND STORAGE and their characteristics, time series databases, basic time series analytic dasketching, dealing with noisy and missing data, anomaly and outlier of Total Period reengard, "The Internet of Things-Essential Knowledge Series", MIT 1015. Visualizing Data-Exploring and Explaining Data with the Processing ent", O'Reilly Media, 2007.	es, data detection. s 45 Press, 1 st
Time sumi	e series data a marization and the Book (s) Samuel Grange Edition, 20 Ben Fry, "Environme erence (s) Ben Fry, Environme	IOT DATA PROCESSING AND STORAGE and their characteristics, time series databases, basic time series analytic dasketching, dealing with noisy and missing data, anomaly and outlier of Total Period reengard, "The Internet of Things-Essential Knowledge Series", MIT 1915. Visualizing Data-Exploring and Explaining Data with the Processing ent", O'Reilly Media, 2007. "Visualizing Data-Exploring and Explaining Data with the Processing Pata Series", O'Reilly Media, 2007.	9 es, data detection. s 45
Time sum: Text 1 2 Refe	e series data a marization and Book (s) Samuel Gr Edition, 20 Ben Fry, "Environme erence (s) Ben Fry, Environme Andrew K	and their characteristics, time series databases, basic time series analytic dasketching, dealing with noisy and missing data, anomaly and outlier of Total Period eengard, "The Internet of Things-Essential Knowledge Series", MIT 1015. Visualizing Data-Exploring and Explaining Data with the Processing ent", O'Reilly Media, 2007. "Visualizing Data-Exploring and Explaining Data with the Pent", O'Reilly Media, 2007.	es, data detection. s 45 Press, 1 st



Regul	ation 2018	Semester VII	T	Total Hours				
			Hours / Week					
Category	Course Code	Course Name	L	T	Р	С		
E	18CBE009T	CRYPTOLOGY	- 3	0	0	3		

NII.

Course Objective (s):

The purpose of learning this course is to:

- To understand the Basics of Number Theory
- To be able to secure a message over an insecure channel by various means.
- To use a variety of public key cryptosystems and authentication methods.
- 4 To gain a better understanding of the different security applications
- 5 To acquire a deeper insight of quantum computing on cryptography and security.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 | Recognize the elementary cryptosystem mechanisms
- CO2 Apply the working principles of basic security services
- CO3 Implement the types of symmetric and public ciphers in security services.
- CO4 Analyze the privacy issues and use the appropriate security measures.
- CO5 | Analyze the implications of quantum computing on cryptography and security.

CO-PO Mapping

						PC	Os						PS	Os
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2		-	=7	=	=	1	1	2	-
CO2	-2	2	2	2	2	=	-	20	1	-	1	1	2	1
CO3	2	2	2	2	2	75	-	720	1	1	1	1	2	2
CO4	2	2	2	2	2	II &	-	20	1	_	1	1	2	2
CO5	2	2	2	2	2	4	=	20		-	1	1	2	i :=:
CO (Avg)	3	2	2	2	2	Jac.		(4)	1	-	30	LLEGE	OF ENO	2

1: Slight (Low)



UNIT 1 INTRODUCTION									
Eleme		Cryptography: Elementary number theory, Pseudo-random bit generation ptosystems. Basic security services: confidentiality, integrity, availability, vacy							
UNI	ITH	SYMMETRIC KEY CRYPTOSYSTEMS	9						
promir	nent ciph	Basic Ideas, Hardware and Software Implementations, Examples with some ers: A5/1, Grain family, RC4, Salsa and ChaCha, HC128, SNOW famil DES, AES and Modes of Operation.							
UNI	ТШ	PUBLIC KEY CRYPTOSYSTEM & AUTHENTICATION	9						
Public Key Cryptosystems: RSA, ECC; Digital signatures; Hash Functions; Authentic									
UNIT IV SECURITY APPLICATIONS									
		merce (anonymous cash, micro-payments), Key management, Zero-knowle tology in Contact Tracing Applications.	edge						
Quantı Quantı	um Cry	QUANTUM CRYPTANALYSIS & POST-QUANTUM CRYPTOGRAPHY Ography, quantum encryption, Issues related to Quantum Cryptanalysis. Post ptography: Lattice-based cryptography: NTRU, Hash-based cryptography: Painbow Time series data and their characteristic	tography						
Quantı Quantı :SPHII series (um crypto um Cry NCS, Mu databases	CRYPTOGRAPHY Degraphy, quantum encryption, Issues related to Quantum Cryptanalysis. Post ptography: Lattice-based cryptography: NTRU, Hash-based cryptography: Rainbow. Time series data and their characteristics, basic time series analytics, data summarization and sketching, dealing with an anomaly and outlier detection.	st- otography ics, time						
Quantı Quantı SPHII series (and mi	um crypto um Cry NCS, Mu databases	cryptography, quantum encryption, Issues related to Quantum Cryptanalysis. Posptography: Lattice-based cryptography: NTRU, Hash-based cryptography: Rainbow.Time series data and their characteristics, basic time series analytics, data summarization and sketching, dealing with	et- otography ics, time ith noisy						
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Quanto Quanto SPHIN series of and mi	um crypto um Cry NCS, Mu databases issing dat Book (s) Samuel G Edition, 2	CRYPTOGRAPHY Ography, quantum encryption, Issues related to Quantum Cryptanalysis. Post ptography: Lattice-based cryptography: NTRU, Hash-based cryptography: Rainbow.Time series data and their characteristics, basic time series analytics, data summarization and sketching, dealing with an anomaly and outlier detection. Total Periods Greengard, "The Internet of Things-Essential Knowledge Series", MIT Press	otography ics, time ith noisy						
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Regul	ation 2018	Semester VII	T	60			
			Hours / Week				
Category	Course Code	Course Name	L	T	P	C	
Е	18GBE010T	QUANTUM COMPUTATION AND QUANTUM INFORMATION	3	1	0	4	

NIL

Course Objective (s):

The purpose of learning this course is to:

- 1 To learn about Quantum information.
- 2 To gain knowledge about Quantum algorithms.
- 3 To understand and learn about Quantum random number generators.
- 4 To understand and learn about Quantum key distribution.
- 5 To study the basis of Post-Quantum cryptography.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Apply quantum gates and circuits using quantum information.
- CO2 Apply quantum algorithms in cryptosystems
- CO3 Relate the importance of Quantum random number generator.
- CO4 Understand the importance of Quantum key distribution.
- CO5 | Apply the concept of post-quantum cryptography

CO-PO Mapping

						PC	Os						PS	Os
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	2	1 H.				2	2	3	3
CO2	3	3	3	3	2	1	(e)	-	*	160	2	2	3	3
CO3	3	3	2	2	2	1			-		1	1	3	3
CO4	3	3	2	3	2	- 1	-	-	-		1	1	3	3
CO5	3	-3	2	2	2	1	7-6	-	*		1	and a section	3	3
CO (Avg)	3	3	2	3	2	1	*		-	1/3	M.	BOARD (ENGG.	33

1: Slight (Low)

UNIT	FI	INTRODUCTION TO QUANTUM INFORMATION	12
		ors, Measurements, Quantum Entanglement: Quantum Teleportation, Super-do Game, Quantum gates and circuits	ense
UNIT	11	QUANTUM ALGORITHMS	12
classical	symn.	Simon, Grover, Shor, Implication of Grover's and Simon's algorithms to tetric key cryptosystems, Implication of Shor's algorithm towards factorization ithm based classical public key cryptosystems	
UNIT	Ш	QUANTUM TRUE RANDOM NUMBER GENERATORS (QTRNG)	12
Detailed	design	and issues of quantum ness, Commercial products and applications	
UNIT	IV	QUANTUM KEY DISTRIBUTION (QKD)	12
BB84, E		Semi-Quantum QKD protocols and their variations, Issues of Device Indeper oducts	idence,
		INTRODUCTORY TOPICS IN POST-QUANTUM	
	https:/	CRYPTOGRAPHY //csrc.nist.gov/projects/post-quantum-cryptography. May discuss any two ciphe	
Refer to this list	https:/ Time s nmariza	CRYPTOGRAPHY //csrc.nist.gov/projects/post-quantum-cryptography. May discuss any two cipheseries data and their characteristics, time series databases, basic time series are ation and sketching, dealing with noisy and missing data, anomaly and outlier	ers from
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Refer to this list a data sum detection Text Boot Quantum 2 Pre Reference An United An Unite	https://Time shamarizan. ok (s) nantum niversit esskil L ce (s) n Introd	CRYPTOGRAPHY //csrc.nist.gov/projects/post-quantum-cryptography. May discuss any two cipheseries data and their characteristics, time series databases, basic time series are ation and sketching, dealing with noisy and missing data, anomaly and outlier Total Periods Computation and Quantum Information. M. A. Nielsen and I. L. Chuang, Can y Press. Lecture notes: Available online: http://www.theory.caltech.edu/~preskill/ph229/	ers from nalytics,
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Regul	ation 2018	Semester VII	Т	60		
			He			
Category	Course Code	Course Name	L	T	P	C
E	18CBE011J	ADVANCED SOCIAL, TEXT AND MEDIA ANALYTICS	2	4		
Prerequisi	te Course (s)					
NIL						
Course Oh	jective (s):			+0.0		

To learn the fundamentals of text mining analysis.

- To be able to use various tools for text mining and carry out pattern discovery, predictive modelling
- Explore the use of social network analysis to understand the growing connectivity and complexity
- 4 Perform social network analysis to identify important network properties in social media sites.
- Analysing interactions between people, and determine structural patterns in such interactions in real time application

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Recognize the trends in recent years on online social networks.
- CO2 Apply the graphical relation between the community.
- CO3 Design various social network algorithms related to predictive modelling and pattern Discovery.
- CO4 Analyze the relation between the participants of various social media.
- CO5 | Apply Social Network Mining Tools and apply in real time problems

CO-PO Mapping

00						Pe	Os						PS	Os
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSOI	PSO2
COI	2	2	3	2	2	2	2	-	ē	3.5		1	3	2
CO2	2	2	3	2	2	2	2	2			*	1	3	2
CO3	3	3	3	2	2	2	2	-	36	(E)	2	_1_	_ 3	2
CO4	2	2	3	2	2	2	2	2		-//	Y GOL	EGĘ OF	ENGG	2
CO5	3	3	3	2	2	2	2	-	п	13	COMP	BOARD (UTER S	SIENDE	12
CO (Avg)	3	3	3	2	2	2	2	2	-	UMAR)	2 6	MAY	2023) NOMO

1: Slight (Low)

INTRODUCTION TO TEXT MINING

9

Introduction- Defining text mining, general architecture of text mining systems. Core text mining operations- Using background knowledge for text mining, Text mining query languages. Preprocessing techniques-Task oriented approaches. Categorization-Applications of text categorizations, Definition of the problem, Document representations, Knowledge engineering approach to TC, Using unlabeled evaluation of text classifiers.

UNIT II

INFORMATION EXTRACTION

9

Information extraction —Introduction, Historical evolution, Examples, Architecture of IE systems, Anaphora Resolution, Inductive algorithms, Structural IE. Probabilistic models for information extraction- Hidden Markov Models, Stochastic Context Free Grammars, Maximal entropy modeling, Maximal entropy Markov Models, Conditional Random Fields. Text mining applications.

UNIT III

CLUSTERING, TEXT MINING METHODS & APPROACHES

9

Content Analysis; Natural Language Processing; Clustering & Topic Detection; Simple Predictive Modelling; Sentiment Analysis; Sentiment Prediction.

UNIT IV

WEB ANALYTICS

9

Web analytics tools, Clickstream analysis, A/B testing, online surveys; Web search and retrieval, Search engine optimization, Web crawling and Indexing, Ranking algorithms, Web traffic models.

UNIT V

SOCIAL MEDIA ANALYTICS

9

Social network and web data and methods. Graphs and Matrices-Why Graphs? Graphs, Directed Graphs, Signed Graphs, Valued Graphs, Multigraphs, Hypergraphs, Relations, Matrices. Basic measures for individuals and networks. Information visualization: Architectural considerations, common visualization approaches for text mining, visualization technique in link analysis; Making connections: Link analysis. Random graphs and network evolution. Social contexts: Affiliation and identity; Social network analysis.

Total Periods 45 15 LIST OF EXPERIMENTS Installation of NLTK and perform simple tokenize on any web page. 1. Find the frequency distribution of words for the given web page. 2. Perform word stemming using NLTK. 3. Perform an experiment for text summarization applying Deep Learning. 4. Collect the Tweets of a particular Movie and interpret the influence of the Movie providing the 5. Positive/Negative Comments. Analyze emoticons feedbacks of consumable product and conclude whether to buy a product 6. or not from e-newspaper. Based upon the counts of share, like, comments for a post in Facebook, analyze and comment 7. Consider the role of a marketing manager for an apparel software company and develop a

8. campaign for LinkedIn target audience.9. Use Tableau to derive decision for knowledge worker from available previous data

10. Create an ontology for news article in English contents that are good/

2 6 MAY 2023

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1	Avinash Kaushik, "Web Analytics 2.0: The Art of Online Accountability", Edition 1, 2009.
2	Ronen Feldman and James Sanger, "The Text Mining Handbook: Advanced Approaches in Analyzing Unstructured Data", Cambridge University Press, Edition 1, 2006.
Ref	erence (s)
1	Wasserman, S. & Faust, K "Social Network Analysis: Methods and Applications", New York: Cambridge University Press, 1994.
2	Monge, P. R. & Contractor, N. S., "Theories of Communication Networks", New York: Oxford University Press, 2003.
3	http://nosh.northwestern.edu/vita.html
4	Hansen, Derek, Ben Sheiderman, Marc Smith, "Analyzing Social Media Networks with NodeXL: Insights from a Connected World", Morgan Kaufmann, 2011.



Regul	ation 2018	Semester VII	Т	Total Hours				
			Н					
Category	Course Code	Course Name	L	T	P	С		
E	18CBE012J	MOBILE COMPUTING	3	0	2	4		

NIL

Course Objective (s):

The purpose of learning this course is to:

- To learn about the mobile infrastructure, radio resource management, overview of generation 1G to 5G.
- 2 To illustrate the location management involved in GSM, Mobile IP.
- To illustrate the transmission, transaction technology involved in mobile.
- 4 To explore the wireless network in mobile.
- 5 To discover the cognitive radio networks in mobile

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Relate and apply the various concepts of Basics of Number Theory
- CO2 Implement a message over an insecure channel by numerous symmetric key cryptosystem
- CO3 Apply diverse Public Key Cryptosystem & Authentication
- CO4 Implement varied Security Applications
- CO5 Summarize the implications of quantum computing on cryptography and security

CO-PO Mapping

	POs													PSOs	
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CO1	3	3	3	3	3	3	3	2	3	-	1	3	3	2	
CO2	2	3	3	3	3	16	-	12/	2	V.	1	1	3	2	
CO3	270	2	3	3	3	*	2	2	2	12	2	2	2	3	
CO4	3	3	3	3	3	-	-	-	2	2	2	3	3	3	
CO5	2	3	3	3	3	3	3_	2	-	-	3	3	3	3	
CO (Avg)	3	3	3	3	3	3	3	2	M3 C	LLEGE	OF ENG	all	3	3	

1: Slight (Low)

2: Moderate (Medium)

2 6 MAY 2023

UNIT I

INTRODUCTION

Overview of wireless and mobile infrastructure, Preliminary concepts on cellular architecture, and path loss models, Channel interference and frequency reuse, Cell splitting, Channel assignment strategies, Overview of generations: - 1G to 5G.

UNIT II

LOCATION AND HANDOFF MANAGEMENT

9

Introduction to location management (HLR and VLR), Mobility models characterizing individual node movement (Random walk, Fluid flow, Markovian, Activity based), Mobility models characterizing the movement of groups of nodes (Reference point based group mobility model, Community based group mobility model), Static (Always vs. Never update, Reporting Cells, Location Areas) and Dynamic location management schemes (Time, Movement, Distance, Profile Based), Terminal Paging (Simultaneous paging, Sequential paging), Location management and Mobile IP, Overview of handoff process, Factors affecting handoffs and performance evaluation metrics, Handoff strategies, Different types of handoffs (soft, hard, horizontal, vertical).

UNIT III

WIRELESS TRANSMISSION FUNDAMENTALS

Introduction to narrow and wideband systems, Spread spectrum, Frequency hopping, Introduction to MIMO, MIMO Channel Capacity and diversity gain, Introduction to OFDM, MIMO-OFDM system, Multiple access control (FDMA, TDMA, CDMA, SDMA), Wireless local area network, Wireless personal area network (Bluetooth and zigbee).

UNIT IV

WIRELESS NETWORKS

Mobile Ad-hoc networks - Characteristics and applications; Coverage and connectivity problems, Routing in MANETs, Wireless sensor networks - Concepts, basic architecture, design objectives and applications; Sensing and communication range, Coverage and connectivity, Sensor placement, Data relaying and aggregation, Energy consumption, Clustering of sensors, Energy efficient Routing (LEACH).

UNIT V

2

COGNITIVE RADIO NETWORKS

Fixed and dynamic spectrum access, Direct and indirect spectrum sensing, Spectrum sharing, Interoperability and co-existence issues, Applications of cognitive radio networks, Introduction to D2D communications-High level requirements for 5G architecture, Introduction to the radio resource management, power control and mode selection problems, Millimeter wave

	Total Periods	45
	LIST OF EXPERIMENTS	15
	Design and Development of different wireless network protocols using network simu such as NS-3/ OMNET++	lators
1.	MAC Protocol	
2.	Routing Protocol	
3.	Transport Protocol	
4.	Congestion Control Protocol	
5.	Application Protocol	
6.	Security Protocol	
Tex	t Book (s)	a
1	Jochen Schiller, "Mobile Communications", Second Edition, Prason, 2001415	10

Andrea Goldsmith, "Wireless Communications", Cambridge University Press, 20002

1	Lingyang Song, Dusit Niyato, Zhu Han, and Ekram Hossain, "Principles of Mobile Communication", Springer, 2017.
2	Theodore Rappaport, "Wireless Communications: Principles and Practice", Pearson Education, 2014.
3	Travis Keshav, Location Management in Wireless Cellular Networks. 2006. https://www.cse.wustl.edu/~jain/cse574-06/ftp/cellular_location.pdf.
4	Edgar H. Callaway, Jr. and Edgar H. Callaway, "Wireless Sensor Networks: Architectures and Protocols", CRC Press, 2003.



Regul	ation 2018	Semester VIII	-T	45		
			Н	ours / W	eek	
Category	Course Code	Course Name	L	Т	P	C
E	18CBE013T	BEHAVIORAL ECONOMICS	3	0	0	3

NIL

Course Objective (s):

The purpose of learning this course is to:

- 1 Understand the concept and theory of economics
- Acquire knowledge on the choices and behavior of firms, households and other economics entities.
- 3 Learn the behavioral science perspective in economics.
- 4 Know the current ideas and concepts regarding decision making in economics.
- 5 Study the inter temporal choice in economics.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Interpret and apply various concepts in traditional and modern Microeconomics.
- CO2 Analyze decision making, and develop a holistic understanding of these concepts and their interconnections.
- CO3 Apply knowledge on behavioral science perspective in Economics
- CO4 Analyze current ideas and concepts regarding decision making in Economics.
- CO5 Relate the inter temporal choice in Economics.

CO-PO Mapping

						P	Os						PS	Os
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	POII	PO12	PSO1	PSO2
COI	1	1	1	2	3	1	-		2	2	2	1	1	1
CO2	2	1	1	2	2	1	3	-	1	1	2	1	74	1
CO3	1	/#:	1	2	2	2	2	¥	-	1	1	1	745	1
CO4	1	1	0	3	3	2	9.	Ä		1	1	1	722	1
CO5	1	2	0	3	3	3	9	¥ 1	ě	1	1	OLLEG	05.50	1
CO (Avg)	2	2	1	3	3	3		-	2	2	SAMY	BOA	RD OF	G. YA

1: Slight (Low)

2: Moderate (Medium)

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INTRODUCTION

9

The neoclassical/standard model and behavioral economics in contrast; historical background; behavioral economics and other social sciences; theory and evidence in the social sciences and in behavioral economics; applications—gains and losses, money illusion, charitable donation.

UNIT II

BASICS OF CHOICE THEORY

9

Revisiting the neoclassical model; utility in economics and psychology; models of rationality; connections with evolutionary biology and cognitive neuroscience; policy analysis – consumption and addiction, environmental protection, retail therapy; applications – pricing, valuation, public goods, choice anomalies.

UNIT III

BELIEFS, HEURISTICS AND BIASES

9

Revisiting rationality; causal aspects of irrationality; different kinds of biases and beliefs; self-evaluation and self projection; inconsistent and biased beliefs; probability estimation; trading applications – trade in counterfeit goods, financial trading behavior, trade in memorabilia, policy analysis – norms and markets, labor markets, market clearing, public goods; applications – logic and knowledge, voluntary contribution, compensation design.

UNIT IV

CHOICE UNDER UNCERTAINTY

9

Background and expected utility theory; prospect theory and other theories; reference points; loss aversion; marginal utility; decision and probability weighting; applications – ownership and trade, income and consumption, performance in sports. Strategic choice-Review of game theory and Nash equilibrium – strategies, information, equilibrium in pure and mixed strategies, iterated games, bargaining, signalling, learning; applications – competitive sports, bargaining and negotiation, monopoly and market entry.

UNIT V

INTERTEMPORAL CHOICE

G

Geometric discounting; preferences over time; anomalies of inter-temporal decisions; hyperbolic discounting; instantaneous utility; alternative concepts – future projection, mental accounts, heterogeneous selves, procedural choice; policy analysis – mobile calls, credit cards, organization of government; applications – consumption and savings, clubs and membership, consumption planning. Individual preferences; choice anomalies and inconsistencies; social preferences; altruism; fairness; reciprocity; trust; learning; communication; intention; demographic and cultural aspects; social norms; compliance and punishment; inequity aversion.

Total Periods 45

Text Book (s)

- N. Wilkinson and M. Klaes, "An Introduction to Behavioral Economics", 2017.
- Paul A. Samuelson, William D. Nordhaus, Sudip Chaudhuri and AnindyaSen, "Economics", 19th edition, Tata McGraw Hill, 2010.

Reference (s)

- William Boyes and Michael Melvin, "Textbook of Economics", DT
- N. Gregory Mankiw, "Principles of Economics", Thomson learning,

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- Edgar H. Callaway, Jr. and Edgar H. Callaway, "Wireless Sensor Networks: Architectures and Protocols", CRC Press, 2003.
- 4 Lingyang Song, Dusit Niyato, Zhu Han, and Ekram Hossain, "Principles of Mobile Communication", Springer, 2017.



Regul	ation 2018	Semester VIII	Т	45			
			He	Hours / Week			
Category	Course Code	Course Name	L	Т	P	C	
E	18CBE014T	COMPUTATIONAL FINANCE AND MODELLING	3	0	0	3	

NIL

Course Objective (s):

The purpose of learning this course is to:

- To understand existing financial models in a quantitative and mathematical way.

 To obtain the knowledge of quantitative tools to solve complex problems in the areas of Portfolio management, risk management and financial engineering.
- To clarify the approaches required to calculate the price of options and identify the methodsrequired to analyze information from financial data and trading systems.
- 4 To acquire the Option products appropriately and construct portfolios of options.
- 5 To examine the financial data using for statistical techniques.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Construct financial models in a quantitative and mathematical way.
- CO2 Apply quantitative tools in Financial Engineering.
- CO3 Analyze appropriate products from financial markets to hedge the risk.
- CO4 Identify the option products appropriately and construct portfolios of options.
- CO5 Recognize statistical analysis of financial returns.

CO-PO Mapping

						P	Os						PS	Os
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	3	0	2	2	**	-	2		1	1
CO2	3	2	3	2	3	1	2	3		-	2	-	2	2
CO3	2	2	2	3	2	2	1	3	:#7	-	2	-	2	2
CO4	3	3	2	2	3	2	2	3	-	-	3)T:	2	2
CO5	1	3	1	2	2	3	2	F	Ψ.		3		3	2
CO (Avg)	3	3	3	3	3	3	2	3	VW.	BOAR	DOF	(4.1	2	2

1: Slight (Low)

2: Moderate (Medium)

2 6 Mm 2023

UNIT I

NUMERICAL METHODS FOR FINANCE

9

Numerical methods relevant to integration-differentiation and solving the partial differential equations of mathematical finance-examples of exact solutions including Black Scholes and its relatives-finite difference methods including algorithms and question of stability and convergence-treatment of near and far boundary conditions-the connection with binomial models-interest rate models-early exercise and the corresponding free boundary problems-and a brief introduction to numerical methods for solving multi-factor models

UNIT II

BLACK SCHOLES FRAMEWORK

9

Black-Scholes framework: Black-Scholes PDE: simple European calls and puts - put call parity - The PDE for pricing commodity and currency options - Discontinuous payoffs - Binary and Digital options The Greeks: theta - delta - gamma - vega& rho and their role in hedging - The mathematics of early exercise - American options: perpetual calls and puts - optimal exercise strategy and the smoothpasting condition - Volatility considerations - actual - historical - and implied volatility - local vol

and volatility surfaces.

UNIT III

FINANCIAL PRODUCTS AND MARKETS

9

Financial Products and Markets: Introduction to the financial markets and the products: Equities - indices - foreign exchange and commodities - Options contracts and strategies for speculation and Hedging

UNIT IV

APPLICATION AREAS

9

The pricing of American options - pricing interest rate dependent claims and credit risk - The use of importance sampling for Monte Carlo simulation of VaR for portfolios of options - Copulas - hedging in incomplete markets - American Options - Exotic options - Electronic trading, Jump Diffusion Processes - High-dimensional covariance matrices - Extreme value theory, Statistical Arbitrage.

UNIT V

STATISTICAL ANALYSIS

9

Statistical Analysis of Financial Returns: Fat - tailed and skewed distributions - outliers - stylized facts of volatility - implied volatility surface and volatility estimation using high frequency data

Total Periods 4

45

Text Book (s)

- R. Seydel, Tools for Computational Finance, 2nd edition, Springer-Verlag, New York, 2019
- P. Glasserman, Monte Carlo Methods in Financial Engineering, Springer-Verlag, New York, 2003

Reference (s)

- A. Lewis, Option Valuation under Stochastic Volatility, Finance Press, Newport Beach, California, 2016
- A. Pelsser, Efficient Methods for Valuing Interest York, 2000

OTTERARDOFS PRIVATE Verlag, New & BUSINESS

2 6 MAY 2023

Curriculum and Syllabus | 2018 Regulation

3	Lingvang Song, Dusit Nivato, Zhu Han, and Ekram Hossein, "Principles of Mobile Communication", Springer, 2017.
4	Travis Keshav, Location Management in Wireless Cellular Networks. 2006.

https://www.cse.wustl.edu/~jain/cse574-06/ftp/cellular_location.pdf

Regula	ation 2018	Semester VIII	- T	otal Hou	ırs	45
			H	eek		
Category	Course Code	Course Name	L	Т	P	C
E	18CBE015T	PSYCHOLOGY	3	0	0	. 3

NII

Course Objective (s):

The purpose of learning this course is to:

- Students will demonstrate familiarity with the major concepts, theoretical perspectives, empirical findings, and historical trends in psychology.
- Students will understand basic methodological approaches used in psychology, including 2 research design, analysis, and interpretation
- To make students familiar with employee performance 3
- To familiarize the students with employee motivation and satisfaction 4
- Students will understand and be able to apply psychological principles to individual, 5 interpersonal, group, leadership and societal issue

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO₁ Understand the major content areas of Industrial Psychology.
- Identify comfort with statistical concepts in the context of making personnel decisions. CO₂
- Apply practical experience by completing a series of hands-on projects involving job analysis, CO₃ selection decisions, training programs, and employee well-being.
- Analyze your understanding of tests and measurements so that you can collect accurate CO4 information and make sound data-based decisions.
- Relate other focused seminar courses in Industrial/Organizational Psychology or Human CO₅ Resource Management.

CO-PO Mapping

	POs													
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	-	18.1	2	1	-	1	1	•	2	Ĭ	3
CO2	1	1	2	-		2		1	3	1	250	1	- 4	2
CO3	2	-	3	-	*	3	1	1		2		1	-	2
CO4	2	1	-		(#)	*	2	3	7	1		2	- 3	1
CO5	2	2	2		-	3	1	1	1	1/	M COL	EGE 0/		1
CO (Avg)	2	2	2	14:	×1	3	1	3	3	ARAGE	COMI	PUTER S		(Sel

1: Slight (Low)

	UNIT I	INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY	9
Intro	duction & Leg	tional Psychology: Research Methods, Statistics, and Evidence-based Pra al Context of Industrial Psychology, Job Analysis & Competency Mode pensation, Job Design & Employee Well-Being, Recruitment.	
- 1	UNITH	TEST VALIDATION	9
Ident	tifying Criteria	& Validating Tests and Measures, Screening Methods, Intensive Method.	S.
Į	INIT III	PERFORMANCE EVALUATION	9
	ormance Goals	and Feedback, Performance Coaching and Evaluation, Evaluating E	mployee
τ	JNIT IV	MOTIVATION AND COMMITMENT	9
Emp	loyee Motivation	on, Satisfaction and Commitment, Fairness and Diversity.	
	UNIT V	LEADERSHIP AND TEAMS	9
		zational Climate, Culture, and Development, Teams in Organizations, Tork Behaviour, Stress Management: Demands of Life and Work.	The
		Total Periods	45
Text	Book (s)		
1	Learning, 9th	antowitz, B., & Roediger, H, "Research methods in psychology", Cengagn Edition, 2011.	
2	Landy, F. J. Edition, 2013	and Conte, J. M, "Work in the 21st Century", Oxford: Blackwell Publis 3.	hing, 4t
Refe	erence (s)		
1	Edition, 2012		
2	2016.	erformance Management towards Organizational Excellence", Sage, 2nd	
	C. 1 D.1		1.041.
3	Edition, 2019	bins, Tim Judge, Neharika Vohra, "Organizational Behaviour", Pearson, 9. val, Alok Chakrawal, "Stress Management", Studera Press, 1st Edition, 2	



Regulation 2018		Semester VIII	T	60		
			He	ours / W	eck	
Category	Course Code	Course Name	Į,	T	P	C
E	18CBE016J	ENTERPRISE SYSTEMS	3	0	2	4

NIL

Course Objective (s):

The purpose of learning this course is to:

- Understand the concept of Simple Web Applications using MVC. 1
- Be exposed to different models in SOA and ERP. 2
- 3 Be exposed to CRM models.
- Be exposed to interactive networks and applications, 4
- 5 Be familiar with configuration of networking.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO₁ Design and deploy Simple Web Applications using MVC.
- CO₂ Analyze SOA and ERP models.
- CO3 Design of CRM models.
- CO4 Design interactive network and application.
- CO₅ Manage, Maintain and configuration of Networking.

CO-PO Mapping

						P	Os						PSOs	
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1	1				ł	2	2	1	2	2
CO2	1	1	1	.5	1	Ď	5		-	1	1	-2	1	1
CO3	1	1	Ē	. 9.	1	ê			1	2		1	1	2
CO4	1	1	-		1	-		36	1	÷	4	1	2	2
CO5	2	2	2	1	i,		i š	30	1	1	col	LEGE O	FENGO	2
CO (Avg)	1	1	1	1	1	-	2		1 10	13	ООМ	BOARD PUTERS	OF	4

1: Slight (Low)

UNITI

WEB APPLICATIONS USING MVC

8

Overview of Database Management Systems; Overview of Model - View - Control (MVC); Control (MVC) method of software development in a 3 tier environment - Tools and Technologies; Brief overview of the following: Java server pages; Related Java Technologies; Microsoft .NET framework; PHP; Ruby on Rails; JavaScript; Ajax; Angular/React JS

UNIT II

SOA AND ERP MODELS

8

Service Oriented Architecture (SOA); Principles of loose coupling, encapsulation; Inter-operability; Web Services as the implementation vehicle protocols, usage; Enterprise Resource Planning (ERP); systems and their architecture; Overview of SAP and Oracle Applications; Generic ERP Modules: Finance; HR; Materials Management; Investment, etc.; Examples of Domain Specific Modules.

UNIT III

CRM MODELS

9

Electronic Data Exchange; Customer Relationship Management (CRM); Customer Relationship Management (CRM); Supplier Relationship Management (SRM); Security Issues - Authentication, Authorisation, Access control; Roles; single-sign-on; Directory servers, Audit trails; Digital signatures; Encryption: review of IPSec, SSL and other technologies; Simple Applications Demo; Case study.

UNIT IV

INTERACTIVE NETWORK AND APPLICATION

12

Overview of: MPLS; Virtual Private Networks (VPN); Firewalls; Network monitoring and enforcement of policies; Software Acquisition Process; Tendering; conditions of contract; Commercial off the shelf software (COTS) versus Bespoke Implementations; Total cost of ownership; Issues on using Open source software or free software; Licensed software; Case study.

UNIT V

1

CONFIGURATION OF NETWORKING

8

Hardware Architectures for Enterprise Systems; Servers; Clustering; Storage area networks; Storage units; Back-up strategies; Local Area Network (LAN) technologies and products; Data Centres; Disaster recovery site design and implementation issues; Hardware Acquisition Issues; Case study.

	Total Periods	45
	LIST OF EXPERIMENTS	15
1	Create a Movie Database Application using MVC.	
2	Creating an ASP.NET MVC Web Application Project	
3	Explore the client/server architecture of SAP. Learn how to use the user interface	
4	Create customer, material master data. Execute the sales process in SAP.	
5	Create vendor, material master data for purchasing. Execute the Purchasing process in	SAP.
6	A model of customer relationship management and business intelligence systems for	catalogue
	and online retailers.	
7	A model of customer relationship management and business intelligence systems for	catalogue
	and online retailers with access control.	
8	Configure firewall settings for an interactive network	
9	Configure and Implement a COTS	ENGG.
10	Mini project & Business SC	IENCE
Tex	t Book (s)	023

ARUR - 639 11

Alexis Leon, "Enterprise Resource Planning", Tata McGraw Hill,

2	Alexis Leon, "Enterprise Resource Planning – Diversified", TMH, 2 nd Edition.
Ref	erence (s)
P	Ravi Shankar & S. Jaiswal, Galgotia, "Enterprise Resource Planning", 1 st Edition, 1999.
2	Dr. Ravi Kalakota, "E-Business Network Resource planning using SAP R/3 Baan and Peoples soft: A Practical Roadmap For Success", Pearson, 2nd Edition, 2001.
3	Enterprise Resource Planning-RaviShankar and S.Jaiswal, Galgotia, 1st Ed, 1999
4	Enterprise Resource Planning - Alexis Leon, Tata McGraw Hill, 2008.



Regul	ation 2018	Semester VIII	T	60		
Category			Но			
	Course Code	Course Name	L	Т	P	C
E	18CBE017T	ADVANCE FINANCE	3	1	0	4

NIL

Course Objective (s):

The purpose of learning this course is to:

- To review and understand the six sequential steps in financial statement analysis.
- To effectively analyze, interpret, and use financial statements.
- To employ financial analysis tools, methods, and techniques to analyze a company's profitability.
- To utilize financial analysis tools, methods, and techniques to analyze a company's risk, including unexpected changes in commodity prices, exchange rates, and interest rates.
- 5 To examine the quality of income statement and balance sheet information.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Recognize the sources of funds including regulatory framework.
- CO2 Understand the Corporate Restructuring.
- CO3 Develop skills for the interpretation of business information and application of financial theory in corporate investment decisions.
- CO4 Predict the working capital requirements of a concern.
- CO5 | Summarize Basics of Derivatives.

CO-PO Mapping

COs	POs												PSOs	
	POI	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	-	12:	(2)	-	-	:=:	2	-	-	· ·	2	
CO2	3	2	1	-	45	-	2	18-5	-	e	1	-	1	2-1
CO3	1	1	3	*	-	¥	74	2	1	*	2	Э.	-	1
CO4	1	2	1	5 2	2	÷	(8)	949	_1			941	2	
CO5	*	-	74	4	+	÷	2	1	1		LEGE 0	E CO	-	
CO (Avg)	3	2	3		2	2	2	2	1/3	W.	BOARD PUTER,S	OF.	ALA	1

1: Slight (Low)

UNIT I

SOURCES OF FUNDS

12

Sources of Funds (including regulatory framework) Types of securities- Issuing the capital in market-Pricing of issue -Valuation of Stocks and bonds. Dividend Decisions: Traditional Approach, Dividend Relevance Model, Miller and Modigliani Model, Stability of Dividends, Forms of Dividends, Issue of bonus shares, Stock Split.

UNIT II

CORPORATE RESTRUCTURING

12

Corporate Restructuring: Mergers and Acquisitions- Types of Mergers, Evaluation of Merger Proposal-Take-over-Amalgamation-Leverage buy-out-Management buy-out-Corporate Failure and Liquidation. Evaluation of Lease Contracts.

UNIT III

FINANCIAL RESTRUCTURING

12

Share Split - Consolidation - Cancellation of Paid-up Capital - Other Mechanisms.

UNIT IV

WORKING CAPITAL MANAGEMENT

12

Working Capital Planning- Monitoring and Control of Working Capital-Working Capital Financing - Managing the Components of Working Capital- Cash Management- Receivable Management - Inventory Management.

UNIT V

INTRODUCTION TO DERIVATIVES

12

Basics of Futures, Forwards, Options, Swaps -Interest rate Payoff Diagrams, Pricing of Futures, Put Call Parity, Option Pricing using Binomial Model and Black Scholes Model -Use of Derivatives for Risk Return Management- Credit Default Swaps.

Total Periods

60

Text Book (s)

- John.C.Hull, Options, "Futures and other Derivative Securities", PHI Learning, 9th Edition, 2012.
- Fred Weston, Kwang S Chung, Susan E Hoag Mergers, "Restructuring And Corporate Control", Pearson Education,
 4th Edition.

Reference (s)

- 1 Stulz, "Risk Management and Derivatives", Cengage Learning, 2nd Edition, 2011.
- Rajinder S. Aurora, Kavita Shetty and Sharad R. Kale, "Mergers and Acquisitions", Oxford University Press, 2011.
- M.Y.Khan and P.K.Jain, "Financial Management, Text, Problems and Cases", Tata McGrawHill,5th edition, 2008.
- John.C.Hull, Options, "Futures and other Derivative Securities", PHI Learning, 9th Edition, 2012.



Regul	ation 2018	Semester VIII	Semester VIII Total Hours					
Category Cours			Hours / Week					
	Course Code	Course Name	L	Т	P	С		
E	18CBE018J	IMAGE PROCESSING AND PATTERN RECOGNITION	3	0	2	4		

NIL

Course Objective (s):

The purpose of learning this course is to:

- 1 To study the fundamentals of image formation and formats
- 2 To recognize the intensity transformations and filtering techniques
- 3 To obtain knowledge on image segmentation operations
- 4 To discover the feature extraction and image registration process
- 5 To understand the components of colour image processing

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Recognize the fundamentals of image formation and formats
- CO2 | Implement image transformation functions and filtering operations
- CO3 | Apply the segmentation techniques on the images
- CO4 Extract the features of an image and perform image registration
- CO5 Apply colour image processing and conversion operations

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	1	1	¥	-		-		/ê:	1	2	-
CO2	3	3	3	3	3	1	1	1	2	4	/æ	1	3	196
CO3	3	3	3	3	3	1	1	1	2	=	94	1	3	100
CO4	3	3	3	3	3	1	1	1	J	-		1	3	-
CO5	3	3	3	3	3	1	1	1	-	OLLE	GE OF E	NO	- 3	
CO (Avg)	3	3	3	3	3	1	1	1	34 3 A	COMPU	ARD OF	INCE A	To Part	-

1: Slight (Low)

9 **UNIT I** INTRODUCTION AND IMAGE FORMATION Introduction - Image processing systems and its applications - Basic image file formats. Image formation: Geometric and photometric models; Digitization - sampling, quantization; Image definition and its representation, neighborhood metrics INTENSITY TRANSFORMATIONS AND 9 **UNIT II** SPATIAL FILTERING Enhancement, contrast stretching, histogram specification, local contrast enhancement; Smoothing, linear and order statistic filtering, sharpening, spatial convolution, Gaussian smoothing, DoG, LoG-Morphological Filtering Basics - Dilation and Erosion Operators, Top Hat Filters. 9 **IMAGE SEGMENTATION UNIT III** Pixel classification; Grey level thresholding, global/local thresholding; Optimum thresholding -Bayes analysis, Otsu method; Derivative based edge detection operators, edge detection/linking, Canny edge detector; Region growing, split/merge techniques, line detection, Hough transform. 9 **UNIT IV** FEATURE EXTRACTION AND IMAGE REGISTRATION Textural features - gray level co-occurrence matrix; Moments; Connected component analysis; Convex hull: Distance transform, medial axis transform, skeletonization/thinning, shape properties. Mono-modal/multimodal image registration; Global/local registration; Transform and similarity measures for registration; Intensity/pixel interpolation. **UNIT V COLOUR IMAGE PROCESSING** Fundamentals of different Colour models - RGB, CMY, HSI, YCbCr, Lab; False Colour; Pseudo Colour; Enhancement. **Total Periods** 45 LIST OF EXPERIMENTS 15 Implementation of Histogram Mapping and Equalization. Implementation of Image Smoothening and Sharpening. 2 Implementation of Morphological Operations on Binary Images. 3 Implementation of Edge Detection using Sobel, Prewitt and Roberts Operators 4 5 Implementation of Canny Edge Detector, Implement the calculation of the GLCM of the given image 6 7 Implementation of image registration of the given images. 8 Implementation of colour model conversion. Implementation of pseudo-colour operation on the given image. 9 Implementation of Image Intensity slicing technique for image enhancement 10 Analyze the given set of camera captured images and identify the nature of the image. 11 Write a program to detect the face from the given set of images and determine the type of 12 animal. Text Book (s) th Edition, 2018. R. C. Gonzalez and R. E. Woods, "Digital Image Processing LEGE OF ENGLISH Maria Petrou and Panagiota Bosdogianni, "Image Processing Honey ", John Wiley 2 & Sons, Ltd, 2 nd Edition, 2010.

Refe	rence (s)
1	A. Blake and A. Zisserman, "Visual Reconstruction", MIT Press, Cambridge. https://doi.org/10.7551/mitpress/7132.001.0001
2	A. N. Netravali and B. G. Haskell, "Digital Pictures", Plenum Press, 2nd Edition, 1995
3	A. B. Watson, "Digital Images and Human Vision", MIT Press, Cambridge, 1993.
4	K. R. Castleman, "Digital Image Processing", Prentice Hall, Englewood Cliffs, 1 st Edition, 1995.



