#### RV Educational Institutions <sup>®</sup> RV College of Engineering



Autonomous Institution Affiliated to Visvesvaraya Technological University, Belagavi Approved by AICTE, New Delhi



## Scheme and Syllabus of I – IV semester (Autonomous System of 2022 Scheme) Master of Technology (M. Tech.) in INFORMATION TECHNOLOGY (MIT)

# DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING

Academic Year 2022-23



**RV-Mercedes Benz Centre for Automotive Mechatronics** 

RV Educational Institutions <sup>®</sup> RV College of Engineering <sup>®</sup>



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### **Glossary of Abbreviations**

1.	AS	Aerospace Engineering
2.	BS	Basic Sciences
3.	BT	Biotechnology
4.	СН	Chemical Engineering
5.	CHY	Chemistry
6.	CIE	Continuous Internal Evaluation
7.	CS	Computer Science & Engineering
8.	CV	Civil Engineering
9.	EC	Electronics & Communication Engineering
10.	EE	Electrical & Electronics Engineering
11.	EI	Electronics & Instrumentation Engineering
12.	ET	Electronics & Telecommunication Engineering
13.	GE	Global Elective
14.	HSS	Humanities and Social Sciences
15.	IM	Industrial Engineering & Management
16.	IS	Information Science & Engineering
17.	L	Laboratory
18.	MA	Mathematics
19.	MBT	M. Tech in Biotechnology
20.	MCE	M. Tech. in Computer Science & Engineering
21.	MCN	M. Tech. in Computer Network Engineering
22.	MCS	M. Tech. in Communication Systems
23.	MDC	M. Tech. in Digital Communication
24.	ME	Mechanical Engineering
25.	MHT	M. Tech. in Highway Technology
26.	MIT	M. Tech. in Information Technology
27.	MMD	M. Tech. in Machine Design
28.	MPD	M. Tech in Product Design & Manufacturing
29.	MPE	M. Tech. in Power Electronics
30.	MSE	M. Tech. in Software Engineering
31.	MST	M. Tech. in Structural Engineering
32.	MVE	M. Tech. in VLSI Design & Embedded Systems
33.	N	Internship
34.	Р	Projects (Minor / Major)
35.	PHY	Physics
36.	SDA	Skill Development Activity
37.	SEE	Semester End Examination
38.	Т	Theory
39.	TL	Theory Integrated with Laboratory
40.	VTU	Visvesvaraya Technological University

#### **POSTGRADUATE PROGRAMS**

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Sl. No	Core Department	Program	Code
1.	BT	M. Tech in Biotechnology	MBT
2.	CS	M. Tech in Computer Science & Engineering	MCE
3.	CS	M. Tech in Computer Network Engineering	MCN
4.	CV	M. Tech in Structural Engineering	MST
5.	CV	M. Tech in Highway Technology	MHT
6.	EC	M. Tech in VLSI Design & Embedded Systems	MVE
7.	EC	M. Tech in Communication Systems	MCS
8.	EE	M. Tech in Power Electronics	MPE
9.	ET	M. Tech in Digital Communication	MDC
10.	IS	M. Tech in Software Engineering	MSE
11.	IS	M. Tech in Information Te <mark>ch</mark> nology	MIT
12.	ME	M. Tech in Product Design & Manufacturing	MPD
13.	ME	M. Tech in Machine Desig <mark>n</mark>	MMD



## **DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING**

#### VISION

To be the hub for innovation in Information Science & Engineering through Teaching, Research, Development and Consultancy; thus make the department a global resource center in advanced, sustainable and inclusive

#### MISSION

1. To enable students to become responsible professionals, strong in fundamentals of information science and engineering through experiential learning

2. To bring research and entrepreneurship into classrooms by continuous design of innovative solutions through research publications and dynamic development-oriented curriculum.

3. To facilitate continuous interaction with the outside world through student internship, faculty consultancy, workshops, faculty development programs, industry collaboration and association with the professional societies.

4. To create a new generation of entrepreneurial problem solvers for a sustainable future through green technology with an emphasis on ethical practices, inclusive societal concerns, and environment

5. To promote teamwork through interdisciplinary projects, co-curricular and social activities.

#### **PROGRAMME OUTCOMES (PO)**

M. Tech in **Information Technology** graduates will be able to:

- PO1: An ability to independently carry out research /investigation and development work to solve practical problems.
- PO2: An ability to write and present a substantial technical report/document.
- PO3: Acquire in-depth knowledge of information technology with global perspective, analyse & synthesize with existing and new knowledge to enhance the skills.
- PO4: Apply appropriate techniques to use modern engineering & IT tools by analysing its limitations.
- PO5: Recognise opportunities and contribute positively to collaborative multidisciplinary scientific research in Information Technology, demonstrate a capacity for self-management and teamwork.
- PO6: Demonstrate knowledge and understanding of Information Technology principles & apply the same to one's own work, as a member and leader in a team, manage projects efficiently.

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_	22MCN1A2T	Block Chain Technologies	19 – 20
Э	22MIT1A3T	Mobile Application Development	21 – 22
	22MIT1A4T	Multicore Architecture	23 – 24
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#### M.Tech in Information Technology: MIT

I SE	EMESTER M.Te	ch										
<b>Q1</b>			Cr	edit A	lloc	ation			CIE	Max	SEE	Max
No.	Course Code	Course Title	т	T/	D	Toto1	BoS	Category	Duration	Marks	Duration	Marks
110.		11.0	г	SDA	Р	Total		a	(H)	CIE	(H)	SEE
1	22MAT11CT	Linear Algebra and Probability Theory	3	1	0	4	MA	Theory	1.5	100	3	100
2	22MIT12TL	Advanced Algorithms and Applications	3	0	1	4	IS	Theory+Lab	1.5	100	3	100
3	22MIT13T	Enterprise Application Development	3	1	0	4	IS	Theory	1.5	100	3	100
4	22MIT14L	Full Stack Development Lab	1	0	1	2	IS	Lab	1.5	50	3	50
5	22MIT1AXT	Elective A (Professional Elective)	3	0	0	3	IS/CS	Theory	1.5	100	3	100
6	22MIT1BXT	Elective B (Professional Elective)	3	0	0	3	IS/CS	Theory	1.5	100	3	100
Note	e: For the course	code 22HSS42, Students need to select one ONLINE	MO	OC co	urs	e as <mark>re</mark>	<mark>com</mark> mende	d by HSS BoS	5. This cour	rse can	be selected	d
any	time between I t	o III semester and it will be evalu <mark>ated during IV seme</mark>	este	r.								

		20	
Code	Elective A (Professional Elective)	Code	Elective B (Professional Elective)
22MCE1A1T	Artificial Intelligence & Machine Learning	22MCN1B1T	Social Network Analysis
22MCN1A2T	Block Chain Technologies	22MIT1B2T	Networks and Cryptography
22MIT1A3T	Mobile Application Development	22MIT1B3T	IOT and Applications
22MIT1A4T	Multicore Architecture	22MIT1B4T	Computer Systems Performance Analysis

II S	EMESTER M.T	ech			/			/				
<b>Q1</b>			Cr	edit A	lloc	ation	21	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$				
No.	Course Code	Course Title	т	Τ/	Б	Totol	BoS	Category	Duration	Marks	Duration	Marks
110.			L	SDA	г	Total	~/		(H)	CIE	(H)	SEE
1	22IM21T	Research Methodology	3	0	0	3	IM	Theory	1.5	100	3	100
2	22MSE22TL	Cloud Native Devops	3	0	1	4	IS	Theory+Lab	1.5	100	3	100
3	22MIT23T	Cyber Security & Digital Forensics	3	0	0	3	IS	Theory	1.5	100	3	100
4	22XXX2CXT	Elective C (Professional Elective)	3	0	0	3	IS	Theory	1.5	100	3	100
5	22XXX2DXT	Elective D (Global Elective)	3	0	0	3	Res. BoS	Theory	1.5	100	3	100
6	22MIT24L	API Development and Integration Lab	1	0	1	2	IS	Lab	1.5	50	3	50
7	22HSS25T	Professional Skills Development-I	0	0	2	2	HSS	Theory*	1.5	50	2	50
* Fv	ternal Agency	will be conducting the classes and both CIF and SEF 1	10111	ho on		ted hu	the Agenci	1				

\* External Agency will be conducting the classes and both CIE and SEE will be evaluated by the Agency.

		20
Code	Elective C (Professional Elective)	
22MSE2C1T	Robotic Process Automation	
22MSE2C2T	Software Project Management	
22MM2C3M. Tech	Cloud Computing 2022 SCHEME	
22MIT2C4T	Data Engineering	

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Elective D (Global E	Elective D (Global Elective)									
22BT2D01T	Bioinspired Engineering	22ET2D08T	Tracking and Navigation Systems							
22BT2D02T	Health Informatics	22IM2D09T	Project Management							
22CS2D03T	Business Analytics	22IS2D10T	Database and Information Systems							
22CV2D04T	Industrial and Occupational Health and Safety	22IS2D11T	Management Information Systems							
22CV2D05T	Intelligent Transportation Systems	22MAT2D12T	Statistical and Optimization Methods							
22EC2D06T	Electronic System Design	22ME2D13T	Industry 4.0							
22EC2D07T	Evolution of Wireless Technologies	10.								

III S	SEMESTER M.1	Yech Contract of the second					25					
01			Cr	edit A	lloc	ation		N	CIE	Max	SEE	Max
No.	Course Code	Course Title	T	Τ/	Б	Tete 1	BoS	Category	Duration	Marks	Duration	Marks
10.		60		SDA	Р	Total			(H)	CIE	(H)	SEE
1	22MIT31T	Big Data Analytics	3	1	0	4	IS	Theory	1.5	100	3	100
2	22XXX3EXT	Elective E (Professional Elective)	3	1	0	4	IS	Theory	1.5	100	3	100
3	22MIT32N	Internship	0	0	6	6	IS	Project	1.5	50	3	50
4	22MIT33P	Minor Project	0	0	6	6	IS	Project	1.5	50	3	50
						20						

Code	Elective E (Professional Elective)	
22MIT3E1T	Augmented Reality & Virtual Reality	
22MIT3E2T	Natural Language Processing	
22MIT3E3T	Information Retrieval	
22MIT3E4T	Fintech Applications	1

IV S	SEMESTER M.T	`ech					/		_	_		
01			Cr	edit A	lloc	ation			CIE	Max	SEE	Max
SI.	Course Code	Course Title	т	Τ/	D	Toto1	BoS	Category	Duration	Marks	Duration	Marks
110.			L	SDA	Р	Total			(H)	CIE	(H)	SEE
1	22MIT41P	Major Project	0	0	18	18	IS	Project	1.5	100	3	100
2	22HSS42	Professional Skills Development-II	0	0	2	2	HSS	NPTEL		50	ONLINE	50

Student need to submit the certificate for the evaluation of Course code 22HSS42

20

University, B	elagav	ri				
			SEMESTER: I			
Course Code	:	22MAT11CT		CIE Marks	:	100
Credits L-T-P	:	3-1-0	LINEAR ALGEBRA AND PROBABILITY THEORY	SEE Marks	•	100
Hours	:	42L+28T	Common Course (MDC, MIT, MSE)	SEE Durations	•	3 Hrs
Facu	11tx	Coordinator	Dr. Sowmya M		•	
1 dec	iity	coordinator.	IINIT - I			9 Hrs
Matrices and	Vo	ctor snaces. (	Geometry of system of linear equations vector space	and subspaces	111	<u>2 1113</u>
independence	he	sis and dimer	usion four fundamental subspaces change of basis	Rank-nullity the	111 2176	m
(without proof)	11	near transform	nations, representation of transformations by matric	Nank-numity unce	510	/111
(without proof)	, п					0 Ure
Orthogonality		nd least squar	re approximations: Inner product, orthogonal vecto			otions
orthogonal has	<b>a</b> .	Fourier owner	neion Figon subanacos Grom Schmidt orthogonali	ration process. OF	) JC	cuons,
factorisation 1	e do E do	, Fourier expa	lems, application to linear models (least square lines	actor process. Qr	∖ ∍fi	tting of
other curves)	cai	si square prob	ients, application to intear models fleast square inte	s and least square	7 11	tung or
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Marth 1 - David				· · · · · · · · · · · · · · · · · · ·		8 HIS
Multiple Rand	lor	<b>n variables:</b> J	oint probability mass functions and probability dens	sity functions, mai	rg	inai
	n,	conditioning of	of random variables, statistical independence, correl	ation and covariar	nc	e 1
incultures, cove	4118	ance and corre	tion Multivariate normal density and its properties	, Markov and Che	SD	/snev
mequanties, G	au	ssian distribu	tion-mutivariate normal density and its properties.		-	0.11
Den le m Due e			UNII - V			5 HIS
Random Proc		ses:	1			
Introduction, c		ssification of ra	andom processes, stationary and independence, aut	o correlation lunc		n and
Mortrow choir	55	correlation, cr	oss covariance functions. Markov processes, transit	ion and state prot	Ja	Juity III
	er	goule processe				
After going th	me	es: ugh this cour	as the student will be able to:			
		Illustrate the	se the student will be able to:		-	
	•	distributions	and random process origing in verious fields engine	y, joint probability	/	
		Derive the sel	and random process arising in various helds engined	of linear		
	•	Derive the sol	bility (aptimization techniques to galve problems of	01 IIIItal probability diatrib		iona
		lineer electro	and random process	probability distrib	u	10118,
		Evoluate the	and fandom process.	abra statistical a		mandama
	•	Evaluate the s	iques to the real world problems origing in many pro-	edia, statistical al	na	Tandom
CO4		Compile the or	iques to the real world problems ansing in many pra	tiona linear algob	***	and
04	ŀ	complie the o	as methods gained to angage in life long loarning	lions, intear algebi	ra	and
Defenence De	1-1-1		ss methods gamed to engage in me – long learning.			
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1. Alberto Leor	1-C	arcia, "Probat	Dility, Statistics, and Random Processes for Electrica	I Engineering", Pe	ear	son
Prentice Hall, C	STC	Edition, 2008	5, ISBN: 978-0-13-147122-1.	(C. 1.) D.1.		10
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3. Gilbert Stra	ng	, "Linear Algeb	ra and its Applications", Cengage Learning, 4th Edit	tion, 2006, ISBN:		
97809802327.	-	_				
4. Hwei P. Hsu	I, S	Schaum's Outl	ine of Theory and Problems of Probability, Random V	Variables, and Rar	nd	om
Processes, Mc	Gra	aw Hill Educat	ion, 2017, ISBN-10: 978-0070589506.	·		
5. T. Veeraraja	n,	Probability, St	tatistics and Random Processes, Tata McGraw Hill E	ducation Private J	Liı	nited,
3rd Edition, 20	00	3, ISBN:978-0-	-07-066925-3.			
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#### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 Marks. Final test marks will be reduced to 40 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based seminar/presentation/demonstration (25) adding upto 40 marks.

	RUBRIC for CIE			RUBRIC for SEE	
SLNo	Content	Marks	Q. No	Contents	Marks
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks	each. Answer FIVE
2	Tests - T1 & T2	40		full questions selecting ONE from each un	nit (1 to 5).
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20
			5&6	Unit-3: Question 5 or 6	20
			7 & 8	Unit-4: Question 7 or 8	20
			9 & 10	Unit-5: Question 9 or 10	20
					otal Marks 100



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University,	Belaga	avi					
			SEMEST	ER: I		-	
Course Code	:	22MIT12TL	Advanced Algorithm	is and Applications	CIE Marks	:	100
Credits L-T-P	:	3-0-1	(Theory &	Practice)	SEE Marks	:	100
Hours	:	42L + 28P	(Profession	al Core - 1)	SEE Durations	:	3 Hrs
Fact	ult	y Coordinator:	Dr. B M Sagar				•
	-		UNIT - I				9 Hrs
Analysis Tecl	nni	iques: Growth	of Functions: Asymptotic	notations, Recurrence	s relations and solu	tic	ons
Amortized Ana	aly	sis: Aggregate,	Accounting and Potential I	Methods. Advanced Dat	ta structures: Abstr	ac	t data
types (ADTs),	Gra	aph, Directed A	cyclic Graph; Trees: 2-3-4	tree, Red Black tree. F	leaps: Binary Heap,	P	riority
Queues							
			UNIT - II				9 Hrs
Leftist Heap, S	Ske	ew Heap, Binor	iial Heap, Fibonacci Heap.	Shortest Path Algorith	ims: Bellman - Ford	Α	lgorithm
Shortest path	s ir	n a DAG, Dijks	ra's algorithm, Johnson's	Algorithm for sparse gr	raphs, Flow network	s	and For
Fulkerson me	the	od, Maximum b	ipartite matching.				
			UNIT - III				8 Hrs
Tries: Suffix, '	Teı	rnary search. S	tring-Matching Algorithms	: Naïve string Matching	g, Rabin - Karp algo	rit	hm,
String matchin	ng	with finite aut	mata, Number Theoretic A	lgoritms: Elementary I	Notions, Chinese Re	m	ainder
Theorem, RSA	. Pı	ublic-Key Cryp	osystems	02.			
		/	UNIT - IV	Th.			8 Hrs
Dynamic Pro	gra	mming: Matri	k-Chain Multiplication,Lon	<mark>gest Co</mark> mmon Subsequ	lence. Greedy Algori	itł	nms: An
Activity Select	ior	n Problem, A ta	sk Scheduling Problem, Co	mputational Geometry	7: Line-Segment-Prop	pe	rties and
Intersection; H	rin	ding closest po	nts and Convex-Hull				
		1-5-	UNIT - V		4.		8 Hrs
<b>Decision</b> Prol	ole	m -Problem C	<b>asses:</b> P, NP;Polynomial ti:	me verifica <mark>tion;</mark> NP-Cor	mpleteness; Problem	ı F	Reduction
Definition and	l E	xamples- 3-CN	F-SAT to CLIQUE and CLI	QUE to Ve <mark>rtex-Co</mark> ver; A	Approximation Algor	itł	nms:
Definition, Ap	pro	oximation Ratio	<mark>, Verte</mark> x-Cover Problem, TS	SP	0		
	_		LABORATORY		and the second sec		28 Hrs
Laboratory Pr	ogr	ams The follow	ing programs will be execu	ated on Java/C/C++/P	ython any equivaler	ıt	
tool/language	by	adapting exce	ption handling technique v	wherever i <mark>t is suit</mark> able I	Part-A 1. Design, de	ve	lop, and
write a progra	m	to implement i	sertion and search operat	ion in a <mark>2-3-4 tre</mark> e. Det	termine its complexi	ity	· -
2.Design, deve	elo	p, and write a p	program to implement the 1	Dijkstra's algorithm us	ing Binary heap.	Ū	
Determine its	co	mplexity. 3 Des	ign, develop, and write a p	program to implement t	to solve string match	niı	ıg
problem using	g na	aive approach	and the Rabin Karp algorit	hm and compare their	complexity. 4. Desig	gn	, develor
and write a pr	ogi	ram to implem	ent to solve matrix chain m	ultiplication problem 5	5. Design and imple	m	ent RSA
public key to	dec	rypt ciphertex	Part-B Design and Impler	nent Realtime applicati	ions using the availa	аb	le data
structures		51 1			0		
			VITIL				
Course Outco	m	es:					
After going th	rou	igh this course	the student will be able to	:			
COI	1:	Understand th	e fundamentals of differen	t Data Structures and	their applications		
CO2	2 :	Evaluate adva	nced data structures and a	algorithms with an emp	phasis on persistenc	e.	
CO3	3:	Analvze the in	pact of Data Structures or	algorithms with efficid	ency as a parameter		
CO4	$\frac{1}{1}$	Design and in	plement efficient solutions	to real world problems	s or Prove NP-Comp	le <sup>.</sup>	te
00	.  .	otherwise	prement emelent solutions	to rear worke problems		10	
Reference Bo	0ŀ	S					
1 Introduction	n t	o algorithms (	ormen Thomas H Leiser	son Charles F Rivest	Ronald L and Cliff	for	d Stein
3rd Edition	ጠ በጥ	Press 2000 1	SRN_13. 978_0262023849	son, Charles E., MVCSL	, itoliaiu L. aliu Ulli	.01	
Data Strat	111 114	11000, 2009, I	$me \text{ Analysis in } C^{\pm\pm} \text{ Marthematical}$	Allan Weiss Ath Edition	on 2011 Dearson I	<u>C1</u>	2N_12.
2. Data Struct	ur 77	Lovo 2rd Edit	ino Allalysis III $C^{++}$ , Walk	507_0 / 078012057607	יוו, 2014, רכמו 1011, 1 77	51	-10.
$\frac{27001320473}{2}$ Data atmost	11	oava, Jiu Eull	Abo Honoroft and 1111	non 1st Edition Doors	1. Con Education India		2002
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+ INPAIGONNTH	ım	Design Manua	i, Sieven S Skiena, Spring	er. 2008. ISBN: 97818	40000/04.9/81848	טנ	00098.

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#### Scheme of Continuous Internal Evaluation (CIE): 10 + 30 + 30 + 30 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The average of two quizzes will be the Final Quiz marks.

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 Marks. Final test marks will be reduced to 30 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (10), Video based seminar /presentation /demonstration (20) adding upto 30 marks.

**Laboratory:** Conduction of laboratory exercises, Lab report & observation & analysis (30 Marks), Lab Test (10 Marks) & Innovative Experiment/Concept Design & Implementation (10 Marks) adding up to 50 Marks. The final marks will be reduced to 30 Marks.

**Scheme of Semester End Examination (SEE) for 100 marks:** Each unit consists of TWO Questions of 16 Marks each. Answer FIVE full questions selecting one from each unit (from 1 to 5). Question No. 11 is compulsory (Laboratory component) for 20 Marks.

	RUBRIC of CIE			RUBRIC of SEE	
SLNo	Content	Marks	Q. No	Contents	Marks
1	Quizzes - Q1 & Q2	10	Each u	nit consists of TWO questions of 16 Marks each. Answ	er FIVE
2	Tests - T1 & T2	30	Questi	full questions selecting ONE from each unit (1 to 5). on No. 11 is compulsory (Laboratory component) for 20	Marks.
3	Experiential Learning - EL1 & EL2	30	1&2	Unit-1: Question 1 or 2	16
4	Laboratory	30	3&4	Unit-2: Question 3 or 4	16
	To <mark>tal Mar</mark> ks	100	5&6	Unit-3: Question 5 or 6	16
			7 & 8	Unit-4: Question 7 or 8	16
			9 & 10	Unit-5: Quest <mark>ion 9 or</mark> 10	16
	NO SEE IOF LADORATORY		11	Laboratory Component (Compulsory)	20
				Total Marks	100



University, B	elaga	avi			-	
	_		SEMESTER: I		—	
Course Code	:	22MIT13T	Enterprise Application Development	CIE Marks	:	100
Credits L-T-P	:	3 - 1 - 0		SEE Marks	:	100
Hours	:	42L + 28T	(Professional Core - 2)	SEE Durations	:	3 Hrs
Facu	lt	y Coordinator:	Prof. Rashmi R			
			UNIT - I			9 Hrs
<b>Overview of E</b> Introduction, A	nt	terprise Applie chitecture, Ent	eations : erprise Applications,Kinds of Enterprise Applications	on,Thinking About		
in Enterprise A	a p a	plications, The Str plications, The Choice Service	Three Principal Layers, Choosing Where to Run L	ayers. Organizing D	n )o:	of Layers main
Logic, maning	<u> </u>		UNIT - II			9 Hrs
Mapping to Ro Structural Map Database Conr	ela op	<b>ational Databa</b> ing Patterns, M ctions, Web Pr	<b>ses:</b> Architectural Patterns, The Behavioral Proble Iapping, Inheritance, Building the Mapping, Doub esentation: View Patterns, Input control patterns.	em, Reading in Data le Mapping, Using M	і, Мс	etadata,
			UNIT - III			8 Hrs
Immutability, ( Transactions A System Transa <b>Session state:</b>	C C C L C L C L C L C L C L C L C L C L	ID, Transaction Tons, Patterns Value of stateles	essimistic Concurrency Control. Preventing Inconstant Resources, Reducing Transaction Isolation for for Offline Concurrency Control, Application Serverses, Session state, Ways to store session state.	sistent Reads, Dead. Liveness, Business er Concurrency.	lo a:	cks, nd
		1 402	UNIT - IV	<u> </u>		8 Hrs
Distribute, Wo Layer, Data So Domain Model	rk uı , 1	ing with the D rce Layer, Data The Presentatio	stribution Boundary, Interfaces for Distribution, I Source for Transaction Script, Data Source Table n Layer, Other Layering schemes.	Layers all together: Module, Data Sour	Do Teo	omain e for <b>8 Hrs</b>
Constructing	E	nternrise Annl	ications :			•
Construction F Development e services layer,	Re nv Pi	adiness: Defini vironment Defin resentation layo	ng construction plan, package structure, Setting uning software construction Map. Constructing Solution, Business layer, Data access layer, Integration 1	ip Configuration pla ution layers: Infrast ayer component.	an .ru	ı, ıcture
Course Outco	m	<b>es</b> .	<u> </u>	/		
After going thr	01	igh this course	the student will be able to:			
C01	:	Comprehend t world problem	he concepts of prime layers in Enterprise applicat s.	ion development to	s	olve real
CO2	:	Design the arc concurrency.	hitecture of EA through mapping of patterns to da	atabase and implem	ie	nting
CO3	:	Develop Enter state attribute	prise Application with appropriate web presentations.	on techniques and S	3e	ssion
CO4	:	Plan and defir	e software construction map for building layers fo	r enterprise applica	ıti	ons.
Deference Dec	. 1.					
1 Montin Four	)K	With Contribu	tions from David Dies Motthew Formeral Edward	d Haatt Dahart Ma	_	and
Randy Stafford	l, i n ·	Patterns of Ent - 2016 ISBN 0	erprise Application Architecture, 1st Edition, Addi	son-Wesley Publica	e ti	on,
2. Satheesha E Enterprise App 978812651946	3. 50	Nanjappa, Sen cations: A Soft	thil K. Nallasamy, Veerakumar Esakimuthu Anub ware Engineering Perspective, 1st Edition, 2010, W	hav Pradhan, Raisin Viley-India Publicati	ng io:	g n, ISBN:
3. Eric A. Mark Business and 7	cs Γe	, Michael Bell, chnology, 1st I	Service-Oriented Architecture: A Planning and Imp Edition, Wiley Publication, 2008, ISBN: 978-0-471	olementation Guide -76894-4	fo	or
4. Pallab Saha 2013 ISBN 97	, <i>F</i> 8'	A systematic pe	rspective to managing complexity with enterprise	architecture, 1st Ed	lit	tion,

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#### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 Marks. Final test marks will be reduced to 40 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based seminar/presentation/demonstration (25) adding upto 40 marks.

	RUBRIC for CIE			RUBRIC for SEE	
SLNo	Content	Marks	Q. No	Contents	Marks
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks	each. Answer FIVE
2	Tests - T1 & T2	40		full questions selecting ONE from each u	mit (1 to 5).
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20
			5&6	Unit-3: Question 5 or 6	20
			7 & 8	Unit-4: Question 7 or 8	20
			9 & 10	Unit-5: Question 9 or 10	20
					Total Marks 100





SEMESTER: I : 22MIT14L Course Code CIE Marks : 50 **Full Stack Development Lab** : 50 Credits L-T-P |: |1 - 0 - 1 SEE Marks SEE Durations 14L + 28P 3 Hrs Hours : (Coding / Skill Laboratory) : Faculty Coordinator: Prof. Rashmi R Content **Prerequisites:** Fundamentals of Java programming and object-oriented concepts HTML + CSS + JavaScript Knowledge. Objective: The course aims at enhancing skills required for frontend (JavaScript) development, backend development using java and database management using MongoDB. Syllabus: Introduction: React ES6, React Render HTML, React JSX, React Components, React Class, React Props, React Events, React Conditionals, React Lists, React Forms, React Router, React Memo, React CSS Styling, React Sass Styling. React Hooks: What is a Hook?, useState, useEffect, useContext, useRef, useReducer, useCallback, useMemo, Custom Hooks. React Components, React State Management, React Event Handling, Routing in React, React Application Testing, React Native. Creating a Spring Boot Web Application: Creating a simple Spring Boot web application, Implementing a simple REST service, Understanding the Spring Boot application context, Understanding application properties. Spring Boot Components, Beans, and Autowiring: Defining components, Accessing beans, Autowiring beans together, Injecting property values. Configuration classes: Defining a configuration class and beans, Initializing bean properties, Autowiring dependencies. Integrating with Data Sources: Orview of Spring Data, Defining entity classes, Defining a repository Integrating the repository into the application. MongoDB: Overview, Advantages, Environment, Data Modeling, Create Database, Drop Database, Create Collection, Drop Collection, Data Types, Insert Document, Query Document, Update Document, Delete Document, Projection, Limiting Records, Sorting Records, Indexing, Aggregation, Replication, Sharding, Create Backup, Deployment. **Course Outcomes:** After going through this course the student will be able to: CO1 : Comprehend the concepts of react JS elements and components. CO2 : Apply knowledge of hooks, events, state managements and routing in web and mobile application development.

#### **Reference Books**

1. Nathan Hull, ReactJS: Ultimate Beginners Guide, 1st Edition, CreateSpace Independent Publishing Platform, 2022, ISBN 9781537659510.

2. Bonnie Eisenman, Learning React Native: Building Native Mobile Apps With Javascript, 1st Edition, Shroff Publishers & Distributors, 2016, ISBN 9789352132980.

3. Shannon Bradshaw, Kristina Chodorow, Mongodb: The Definitive Guide: Powerful and Scalable Data Storage, 1st Edition, O'Reilly Media, 2019, ISBN 9781491954461.

CO3 : Design and develop queries in MongoDB.

CO4 : Develop and test applications using specific tools.

4. Eric Bush, Node.Js, Mongodb, React, React Native Full-Stack Fundamentals and Beyond, 1st Edition, Zaccheus Entertainment, 2018, ISBN 0997196688

**Scheme of Continuous Internal Evaluation (CIE- Laboratory) : Only LAB Course** 30 + 10 + 10 = 50. The Laboratory session is held every week as per the timetable and the performance of the student is evaluated in every session. The average of marks over number of experiments conducted over the weeks is considered for 30 Marks i.e (Lab Report, Observation & Analysis). The students are encouraged to implement additional innovative experiments in the lab (10 marks). At the end of the semester a test is conducted for 10 Marks (Lab Test). This adds to 50 Marks.



**Scheme of Semester End Examination (SEE- Laboratory) : Only LAB Course** 40 + 10 =50. Students will be evaluated for Write-up, Experimental Setup, Experiment Conduction with Results, Analysis & Discussions for 40 Marks and Viva will be conducted for 10 Marks adding to 50 Marks.

	Only LAB	Courses	s with 50 Marks		
	RUBRIC FOR CIE		RUBRIC FOR SEE		
S1.No	Content	Marks	Content	Marks	
1	Write Up, Setup, Conduction Results, Analysis & Discussions	30	1. Write Up, Setup, Conduction	40	
2	Innovative Experiment/Concept Design & Implementation	10	2. Results, Analysis & Discussions	40	
3	Laboratory Internal	10	Viva Voce	10	
	Total Marks	50	Total Marks	50	



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to Visvesvaray Technological	a			
University, Bela	agavi	SEMESTER: I	- •	
Course Code	: 22MCE1A1T	ARTIFICIAL INTELLIGENCE & MACHINE	CIE Marks	: 100
Credits L-T-P	: 3 - 0 - 0	LEARNING	SEE Marks	: 100
Hours	: 42L	Elective A (Professional Elective)	SEE Durations	: 3 Hrs
Facul	ltv Coordinator:	Dr. Shanta Rangaswamy and Dr. Soumya A		
	5	UNIT - I		9 Hrs
Introduction:	Intelligent agent	s, searching: Basics of AI, Intelligent Agents: Agen	ts and environment	-,
Rationality; the	nature of envir	onments; the structure of agents. Problem-solving:	Problem-solving ag	gents;
Searching for se	olution; Uninfor	med search strategies; Informed search strategies,	Heuristic Function	IS
		UNIT - II		9 Hrs
Adversarial sea Alpha-Beta Pru agents	<b>arch, constrain</b> ning, Defining (	<b>It satisfaction problems, logical agents:</b> Games, Constraint satisfaction problems; Backtracking sea	Optimal decision in rch for CSPs;Know!	l games, ledge-based
Probabilistic re	easoning: Repre	esenting knowledge in an uncertain domain; Sema	ntics of Bayesian N	etworks;
Efficient repres	entation of cond	litional distributions; Exact inference in Bayesian I	Networks; Approxin	nate
inference in Bay	yesian Networks	8		- i
		UNIT - III		8 Hrs
<b>Introduction</b> , Perspectives an bias – Decision	<b>Concept Learni</b> Id Issues – Conc Tree learning– l	a <b>ng and Decision Trees</b> Learning Problems – Designer tept Learning –Version Spaces and Candidate Elim Representation – Algorithm – Heuristic Space Search	;ning Learning syst ination Algorithm – ch.	ems, Inductive
	1.8	UNIT - IV		8 Hrs
Bayesian And	Computational	Learning Bayes Theorem - Concept Learning - Ma	aximum Likelihood	_
Minimum Desc Bayesian Belief Infinite Hypothe	ription Length F Network – EM A esis Spaces – Mi	Prin <mark>ciple – Bayes Optimal Classifier – Gibb</mark> s Algorith Algorithm – Probably Learning – Sample Complexit istake Bound Model	nm – Naïve Bayes C y for Finite and	Classifier –
	23	UNIT - V		8 Hrs
Instant Based	Learning K- Ne	arest Neighbor Learning, Locally Weighted Regress	ion, Radial Basis F	unctions,
Case-Based Rea	asoning <b>Reinfor</b>	<b>cement Learning:</b> The Learning Tas <mark>k, Q-Le</mark> arning	g, Temporal Differer	nce
Learning				

#### **Course Outcomes:**

After going through this course the student will be able to:

<u> </u>		
CO1	:	Explore the fundamentals of Artificial intelligence technology and Machine learning algorithms
CO2	:	Apply the working of various searching algorithms, games, pruning, inferencing, etc. with suital
CO3	:	Analyze and determine appropriate algorithms and techniques for AI and ML applications.
CO4	:	Evaluate AI and ML based solutions for classical problems.

#### **Reference Books**

1 AI - A Modern Approach, Stuart Russel, Peter Norvig, 3rd Edition, 2010, Pearson, ISBN-13: 978-0136042594. 2. Tom M. Mitchell, "Machine Learning", McGraw-Hill Education, July 2017, McGraw Hill Education, 1st Edition, ISBN-10 1259096955, ISBN-13 978-1259096952

3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar: Introduction to Data Mining, Pearson Education, 2007, ISBN 9788131714720

4. T. Hastie, R. Tibshirani, J. H. Friedman, "The Elements of Statistical Learning", Springer; 1st edition, 2001

#### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 Marks. Final test marks will be reduced to 40 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based seminar/presentation/demonstration (25) adding upto 40 marks.

Autonomous Institution Affiliated University, Belagavi

	RUBRIC for CIE			RUBRIC for SEE				
SLNo	Content	Marks	Q. No	Contents	Marks			
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks each. Answ	er FIVE			
2	Tests - T1 & T2	40	1	full questions selecting ONE from each unit (1 to 5).				
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20			
	Total Marks	100	38⊾4	Unit-2: Question 3 or 4	20			
			5&6	Unit-3: Question 5 or 6	20			
			7&8	Unit-4: Question 7 or 8	20			
			9 & 10	Unit-5: Question 9 or 10	20			
				Total Marks	100			





University, E	Selaç	gavi				
			SEMESTER: I			
Course Code	:	22MCN1A2T			CIE Marks	: 100
Credits L-T-P	1:	3 - 0 - 0	BLOCKCHAIN TECHNOLO	GIES	SEE Marks	: 100
Hours	1	42L	Elective A (Professional Ele	ctive)	SEE Durations	: 3 Hrs
Faci	111	v Coordinator	Dr. Ramakanth Kumar P and Dr. Sh	arvani G S		
1 400	11					9 Hrs
Blockchain.	)ic	stributed system	History of blockchain Introductio	n to blockch	ain Types of blocks	bain CAP
theorem and h		ockchain Benef	ts and limitations of blockchain	II to DIOCKCII	am, Types of blocke	main, Chi
	10	Jenemann, Demer				9 Hrs
Decentralizat	in	n and Crypton	<b>anhy</b> : Decentralization using block	hain Metho	ds of decentralizatio	n Routes
to decentraliza	ati	on Decentraliz	d organizations Cryptography and	Technical Fo	undations. Cryptogr	aphic
primitives. Asy	zm	metric cryptog	aphy. Public and private keys	. cermicar r o	unuutons. eryptogr	apine
<u>primitives</u> , 1103	,	meene eryptog	UNIT - III			8 Hrs
Bitcoin and A	1+	ernative Coins	A: Bitcoin Transactions Blockchait	 Bitcoin na	vments R. Alternativ	ve Coins
Theoretical for	111	dations Bitcoi	limitations Namecoin Litecoin Pri	mecoin Zcas	sh	ve coms,
Theoretical lot		dations, Ditcon	IINIT - IV	inceoin, zeut		8 Hrs
Smart Contra		s and Etheren	m. Smart Contracts: Definition Rica	rdian contra	cts Ethereum: Intro	duction
Ethereum bloc	·k	chain Element	of the Ethereum blockchain Precor	nniled contra	acts	Juuction,
Ethereum bloc	<u>, IX</u>	chani, Diement	IINIT - V	iipiicu contra	acts.	8 Hrs
Alternative B	10	akahains: Blog	zahaina Blockshain Outside of Curre	noies. Inter	net of Things Cover	nment
Health Finance	-0	Media	chains blockchain-Outside of Curre	incres. interr	liet of fillings, dover	liiieiit,
	<u>_</u>	, wicula			1	
Course Outee						
After going thr		ies:	the student will be able to:			
	T.	Apply fundam	ine student will be able to.	altabain		
001		Apply lundari	intais, technologies and models of bi		1. 1. 1. 1	
02		implement the	Block chain Application	contracts a	nd Etherum platforr	n to
CO3	; :	Design secure	decentralization algorithm using blo	<mark>ck chai</mark> ns for	r real time use cases	\$
CO4	-   :	Analyze the fu	nction of Blockchain as a method of	<mark>securin</mark> g dis <sup>.</sup>	tributed ledgers in d	lifferent cas
<b>Reference Bo</b>	ol	KS		-		
1. Mastering E	31c	ockchain - Distr	buted ledgers, decentralization and	smart contra	acts explained, Auth	or- Imran
Bashir, Packt	Pι	ublishing Ltd, 2	nd Edition, 2017, ISBN 978-1-78712	2-544-5.	1 ,	
2. Bitcoin and	С	ryptocurrency '	echnologies, Author- Arvind Naraya	nan, Joseph	Bonneau,Edward F	elten,
Andrew Miller,	, S	Steven Goldfede	, Princeton University, 2016, ISBN:	9780691171	692	,
3. Blockchain	В	asics: A Non-Te	chnical Introduction in 25 Steps, Au	thor- Daniel	Drescher, Apress, F	irst
Edition, 2017,	I	SBN-13:978-14	34226032			
4. Mastering E	Bit	coin: Unlocking	Digital Cryptocurrencies, Andreas M	I. Antonopou	ulos,O'Reilly Media, I	First
Edition, 2014,	I	SBN-13: 978-14	49374044	-	· · · ·	
Scheme of Co	n	tinuous Intern	al Evaluation (CIE): 20 + 40 + 40 =	100		
<b>QUIZZES:</b> Qui	zz	es will be cond	acted in online/offline mode. Two qui	izzes will be	conducted & Each Q	Duiz will be
evaluated for 1	10	Marks. The su	n of two quizzes will be the Final Qu	iz marks.		-
TESTS: Stude	nt	ts will be evalua	ted in test, descriptive questions with	n different co	omplexity levels (Rev	rised
Bloom's Taxon	101	my Levels: Rem	embering, Understanding, Applying,	Analyzing, E	valuating, and Crea	ting). Two
tests will be co	n	ducted. Each te	st will be evaluated for 50 Marks, ad	ding upto 10	00 Marks. Final test	marks will
be reduced to	4(	) Marks.				
EXPERIENTIA	۱L	, <b>LEARNING:</b> S	udents will be evaluated for their cre	ativity and p	practical implementa	ation of the
problem. Case	s	tudy-based tea	hing learning and Program specific r	requirements	s (15), Video based	
seminar/prese	en	tation/demons	ration (25) adding upto 40 marks.			

**Scheme of Semester End Examination (SEE) for 100 marks:** The question paper will have FIVE questions with internal choice from each unit. Each question will carry 20 marks. Student will have to answer one full question from each unit.

#### **Rubric for CIE & SEE Theory courses**

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	RUBRIC for CIE			RUBRIC for SEE		
SLNo	Content	Marks	Q. No	Contents	Marks	
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks each. Answ	er FIVE	
2	Tests - T1 & T2	40		full questions selecting ONE from each unit (1 to 5).		
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20	
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20	
			5&6	Unit-3: Question 5 or 6	20	
			7&8	Unit-4: Question 7 or 8	20	
			9 & 10	Unit-5: Question 9 or 10	20	
				Total Marks	100	





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Technological University, Be	lagavi				
	-	SEMES'	TER: I		
Course Code	: 22MIT1A3T			CIE Marks	: 100
Credits L-T-P	: 3-0-0	MOBILE APPLICAT	ION DEVELOPMENT	SEE Marks	: 100
Hours	· 42L	Elective A (Profe	essional Elective)	SEE Durations	· 3 Hrs
Facul	Ity Coordinator:	Prof Sharadadevi K		old D urationic	<u> </u>
I deu	ity coordinator.				9 Hrs
Essentials For	Mobile Applic	tion Development :			
Background ah	out mobile tech	pologies Overview of Andr	roid Android architectur	e Android for mobi	le
application dev	elonment Andr	hologics, overview of Andri oid development Framewor	rk – Android SDK Emul	ators / Android AVI	) Android
Project Framew	ork Setting ur	development environment	t Running android app	Dalvik Virtual Mac	hine & ank
file extension.	android debug b	ridge. Fundamentals: Basi	c Building blocks - Activ	vities. Services. Broz	adcast
Receivers & Co	ntent providers.	UI Components - Views &	notifications, Compone	nts for communicat	ion
-Intents & Inter	nt Filters, Andro	id API levels (versions & ve	ersion names)		
		UNIT - II	,		9 Hrs
Android UI Are	chitecture & Ul	Widgets :			
Application con	itext, Intents, A	tivity life cycle, Supporting	g different devices, mult	iple screen sizes, Fu	ndamental
Android UI des	ign – Layouts, D	rawable resources, UI wid	gets, Notification, Toasts	s, Menu, Dialogs, Li	sts &
Adapters, Build	ling dynamic UI	with fragments.		, , , ,	
		UNIT - III	4 AV		8 Hrs
Data Storage,	Services & Con	tent Providers :	1/2		
Saving Data, In	teracting with o	ther Applications, Working	g with system permission	ns, Applications wit	h content
sharing, Share	d Preferences, P	references activity, Files ad	ccess, SQLi <mark>te d</mark> atabase, '	Threads, Overview o	of services
in Android, Imp	plementing a Se	vi <mark>ce, S</mark> ervice lifecycle, Inte	er Process Communication	on.	
		UNIT - IV			8 Hrs
Advanced And	roid :				
Building apps v	with Multimedia	<mark>, Buildi</mark> ng apps with Grapl	hics & Anim <mark>ations</mark> , Build	ding apps with Loca	tion Based
Services and G	oogle maps, Bui	ding apps with Connectiv	ity & Cloud <mark>, Senso</mark> rs, Bl	uetooth, Camera, Te	elephony
Services.					
		UNIT - V			8 Hrs
Testing, Debu	gging & Deploy	ment of Android Applicat	tion:		
Role and use of	f Dalvik Debug I	Ionitor Server (DDMS), ad	b tool, How to debug An	droid application, U	se of Step
Filters, Breakp	oints, Suspend	and Resume, How to use L	ogCat, Preparing for pul	blishing – Signing &	Versioning
of apps, Using	Google Play to d	istribute & Monetize, Best	practices for security &	privacy.	
<b>a</b>					
Course Outcor	nes:				
After going thro	bugh this course	the student will be able to		1' /' D 1	D
001	Comprehend	the basic leatures of Andro	and Platform and the App	Distion Developme	nt Process.
000	Acquire famili	arity with basic building b	locks of Android Applica	ation and its archite	cture.
C02	: Apply and exp	lore the basic framework,	usage of SDK to build a	pps incorporating A	naroia
	Demonstrate		IIS.	the management	ad Andraid
003	toohnologion 1	to multimodia involving the	the concerts and hardwar	re features of the ph	
<u> </u>	· Domonstrate	reficiency in testing deby	aging and doployment	of Android application	.0110.
004		bioliciency in testing, debt	agging and deployment of	of Android application	<u></u>
	1				
Reference Boo	• <b>KS</b>				<u> </u>
1. Android Prog	gramming, Philli	ps, Stewart, Hardy and Ma	arsicano, 2nd edition, 20	J15; Big Nerd Ranch	i Guide;
ISBN-13 978-0	134171494		M : 1 / D !!!! 0010		JODN 10
2. Professional	Android 2 Appli	cation Development; Reto	Meier; 1st Edition; 2012	2, Wiley India Pvt.Itd;	ISBN-13:
9/8812052589		(mahan 1-+ D-1:+: 0011	A magaz Orania and Tar 1'	Det I tal - IODN 10	
[3. Beginning Ai	nurola 3; Mark I	nurphy; 1st Edition; 2011	; A press Springer India	PVt Lta. ; ISBN-13:	
710-1-4302-32	y/-1	aing the limits her IIaller	· Frie Hellmone Wilson O	012. ICDN 12.	
+. AHUTOIA Prog	granning – PUS 70	ing the mills by Helman	, Enc neminan; whey; 2	013, ISBN 13:	
910-1110/1/3	10				

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#### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 Marks. Final test marks will be reduced to 40 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based seminar/presentation/demonstration (25) adding upto 40 marks.

RUBRIC for CIE			RUBRIC for SEE			
SLNo	Content	Marks	Q. No	Contents	Marks	
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks	each. Answer FIVE	
2	Tests - T1 & T2	40		full questions selecting ONE from each un	nit (1 to 5).	
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20	
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20	
			5&6	Unit-3: Question 5 or 6	20	
			7 & 8	Unit-4: Question 7 or 8	20	
			9 & 10	Unit-5: Question 9 or 10	20	
				T	otal Marks 100	





University, D		SEMESTER: I	· · ·	-
Course Code	: 22MIT1A4T		CIE Marks :	100
Credits L-T-P	: 3-0-0	MULTI-CORE ARCHITECTURE	SEE Marks	100
Hours	: 42L	Elective A (Professional Elective)	SEE Durations :	3 Hrs
Facu	Ity Coordinator	Dr. Anala M.R.		10 1110
1 deu		IINIT - I		9 Hrs
Introduction	to Multi-Core A	<b>rchitecture:</b> Motivation for Concurrency in soft	ware. Parallel Computin	19 0 19
Platforms, Para Threading Tech Performance, A Threads, Syste inside the Haro Threading, Virt	allel Computing hnology, Multi-t Amdahl's Law, C em View of Thre dware, What Ha tual Environme	in Microprocessors, Differentiating Multi-core A hreading on Single-Core versus Multi-Core Platf crowing Returns: Gustafson's Law. System Over- ads, Threading above the Operating System, Thr ppens When a Thread Is Created, Application Pr nt: VMs and Platforms, Runtime Virtualization, S UNIT - II urallel Programming: Designing for Threads, Ta	rchitectures from Hyper forms Understanding view of Threading: Defin reads inside the OS, Thr rogramming Models and System Virtualization.	 ing eads 9 Hrs
Decomposition	, Data Flow De	composition, Implications of Different Decompos	itions, Challenges You'l	l Face,
Parallel Progra	mming Patterns	s, A Motivating Problem: Error Diffusion, Analysi	is of the Error Diffusion	
Algorithm, An APIs for Micros Threads, Mana Managing Thre	Alternate Appro soft Windows, W aging Threads, T eads, Thread Sy	ach: Parallel Error Diffusion, Other Alternatives Vin32/MFC Thread APIs, Threading APIs for Micr Thread Pools, Thread Synchronization, POSIX The nchronization, Signaling, Compilation and Linki	. <b>Threading APIs :</b> Threason of the termination of termination o	eading Creating s,
		UNIT - III		8 Hrs
Finding loop-ca sort, Odd-even dynamic and g locks, Using lo Cache Coherer	arried depender transposition s juided schedule cks in the mess nce, and False S	aces, Estimating $\pi$ , More on scope, More About I ort, Scheduling Loops, The schedule clause, The types, The runtime schedule type. The atomic d age-passing program, critical directives, atomic haring, Thread-Safety.	Loops in OpenMP: Sortir e static schedule type, T irective, Critical section directives, or locks, Cac	ng, Bubble he s and hes,
		UNIT - IV		8 Hrs
Compilation ar Comm rank, S argument, Sen Parallelizing th communication distributions, S Taking timings algorithms, Par	nd execution, M PMD programs, nantics of MPI S the trapezoidal ru n, MPI Reduce ( Scatter, Gather, s, Results, Spee rallel odd-even	PI programs, MPI Init and MPI Finalize, Commu Communication- MPI Send, MPI Recv, Message end and MPI Recv, The Trapezoidal Rule in MPI- ile, Dealing with I/O- Output, Input, Collective C Collective vs. point-to-point communications, MF Allgather, MPI Derived Datatypes, Performance edup and efficiency, Scalability, A Parallel Sortin transposition sort, Safety in MPI programs.	nicators- MPI Comm siz matching, The status_p - The trapezoidal rule, Communication-Tree-str PI Allreduce, Broadcast, Evaluation of MPI Progr g Algorithm- serial sorti	e and MPI Puctured Data rams- ng
<u> </u>		UNIT - V		8 Hrs
Parallel Progra OpenACC Synt Loops, Three L Characteristics Course Outco	amming in Ope tax, Compute C evels of Parallel s of Architecture mes:	enACC : constructs, Data environment, Loop level parallel ism, Other Loop Constructs, Programming Tools es, Compiling OpenACC Code.	ism- Kernels Versus Par s for OpenACC - Commo	rallel on
After going thr	ough this cours	e the student will be able to:		
CO1	: Explain the f	undamentals of multi-core architectures.		
CO2	: Apply the kn	owledge of parallel programming constructs		
CO3	: Analyze the parallel prog	performance of multi-core and many-core paralle camming solutions to common problems.	el programming and Des	sign
CO4	: Compare and processors.	l contrast programming for serial processors and	d programming for para	llel

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#### **Reference Books**

1. Shameem Akhter and Jason Roberts, Multi-core Programming, Intel Press, 2006, ISBN 0-976432-4-6

2. Peter Pacheco, An Introduction to parallel programming, Morgan Kaufmann, 2011, ISBN 978-0-12-374260-5

3. Sunita Chandrasekaran, Guido Juckeland, OpenACC for Programmers: Concepts and Strategies, 1st edition, Addison-Wesley, 2018, ISBN-978-0134694283.

4. Yan Solihin, Fundamentals of Parallel MULTICORE Architecture, Edition, Chapman & Hall/CRC Computational Science, 2015, ISBN - 978-1482211184

#### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

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SLNo	Content		Marks	Q. No	Contents	Marks
1	Quizzes - Q1 & Q2		20	Each u	nit consists of TWO questions of 20 Marks eac	h. Answer FIVE
2	Tests - T1 & T2		40	]	full questions selecting ONE from each unit (	1 to 5).
3	Experiential Learning	- EL1 & EL2	40	1 & 2	Unit-1: Question 1 or 2	20
		Total Marks	100	3&4	Unit-2: Questio <mark>n 3 or 4</mark>	20
				5&6	Unit-3: Question 5 or 6	20
				7 & 8	Unit-4: Question 7 or 8	20
				9 & 10	Unit-5: Que <mark>stion 9 or 1</mark> 0	20
					Tota	l Marks 100



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oniversity, be	olayav					
			SEMESTER: I			
Course Code	:	22MCN1B1T		CIE Marks	:	100
Credits L-T-P	:	3 - 0 - 0	SOCIAL NETWORK ANALYSIS	SEE Marks	:	100
Hours	:	42L	Elective B (Professional Elective)	SEE Durations	:	3 Hrs
Facu	ltv	Coordinator:	Dr. Deepamala N and Prof. Prapulla S B			
1 400		ecoramatori	UNIT - I		1	9 Hrs
<b>Overview:</b> Asp	ec	ts of Networks	Central Themes and Topics Graphs Basic Definition	ons Paths and Cor	_⊥ nn	ectivity
Distance and F	Rre	adth-First Sea	arch Network Datasets: An Overview			lectivity,
	510		UNIT - II			9 Hrs
Strong and We	eal	z Ties. Triadic	Closure The Strength of Weak Ties Tie Strength a	nd Network Struct		re in
Large-Scale Da	ta	Tie Strength	Social Media and Passive Engagement Closure S	tructural Holes ar	nd	Social
Capital Advan	ce	d Material <sup>.</sup> Be	tweenness Measures and Granh Partitioning	in detailar moles, an	Iu	oociai
Networks in T	'ne	eir Surroundir	<b>ng Contexts</b> Homophily. Mechanisms Underlying H	omophily: Selectio	n	and
Social Influenc	e.	Affiliation. Tra	cking Link Formation in On-Line Data. A Spatial M	odel of Segregation	 1	
	- 7 -	,,	UNIT - III			8 Hrs
Games: What i	is a	a Game? Reaso	oning about Behaviour in a Game Rest Responses	and Dominant Str	 ate	egies
Nash Equilibri	10 C	n. Multiple Equ	ulibria: Coordination Games, Multiple Equilibria: T	he Hawk-Dove Gar	me	e. Mixed
Strategies, Mix	ed	Strategies: Ex	samples and Empirical Analysis. Pareto-Optimality	and Social Optima	lit	V.
Advanced Mate	eria	al: Dominated	Strategies and Dynamic Games			,
			UNIT - IV			8 Hrs
The Structure		f the Web. Th	e World Wide Web Information Networks Hypertex	t and Associative	M	emory
The Web as a I	) ir	ected Graph	The Bow-Tie Structure of the Web. The Emergence of	of Web 2.0 Link A	n	alveie
and Web Sear	ch	Searching th	<b>e Web:</b> The Problem of Ranking Link Analysis usin	g Hubs and Autho	rit	<b>ties</b>
PageRank Ann	vlari	ing Link Analy	resis in Modern Web Search Applications beyond the	Web Advanced M	/110 /[1	terial.
Spectral Analy	nyı sis	Random Wal	ks and Web Search	, web, nuvanceu m	Ia	teriai.
opectial mary	010	, italiaolii wa	IINIT - V	-		8 Hrs
Power Laws at	hd	Rich-Get-Ric	her Phenomena Popularity as a Network Phenome	non Power Laws		0 1113
Rich-Get-Riche	-r ]	Models The U	npredictability of Rich-Get-Richer Effects. The Long	Tail The Effect of	S	earch
Tools and Reco	om <sup>.</sup>	mendation Sv	stems Advanced Material: Analysis of Rich-Get-Rich	her Processes Ann	lic	ations
of Social Netw	701	ks Fraud Crit	me terrorism etc			actons
01 000101 11001				1		
Course Outcou	me	26.				
After going thr		gh this course	the student will be able to:			
		Explore notati	on and terminology used in Social Networks			
C01	·	Analyza basia	principles behind Social Network analysis algorithm			
CO2	·	Analyse Dasic	principles beining Social Network analysis algorithm	.18.		
03	l:∣	Design applica	ations like web search using algorithms of social net	IWOIKS		
CO4	:	Apply social n	etworks on real world applications			
Reference Boo	oks	5				
1. David Easley	y a	nd John Klein	berg. "Networks, Crowds, and Markets: Reasoning A	About a Highly Co	nn	nected
World." Cambr	id٤	ge University F	Press 2010. ISBN: 978-05211953311.			
2. Stanley Was	se	rman and Kat	herine Faust. "Social Network Analysis. Methods an	d Applications." C	an	nbridge
University Pres	ss,	1994. ISBN: 9	78-0521387071			
3. Eric Kolaczy	ĸ,	Gabor Csardi,	"Statistical Analysis of Network Data with R", Sprin	nger, 2014. ISBN:		
978-1-4939-09	983	3-4				
4. Newman, Ma	arl	k, "Networks",	Oxford university press, 2018. ISBN:978-01992066	50		

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RUBRIC for CIE			RUBRIC for SEE			
SLNo	Content	Marks	Q. No	Contents	Marks	
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks	each. Answer FIVE	
2	Tests - T1 & T2	40		full questions selecting ONE from each u	mit (1 to 5).	
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20	
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20	
			5&6	Unit-3: Question 5 or 6	20	
			7 & 8	Unit-4: Question 7 or 8	20	
			9 & 10	Unit-5: Question 9 or 10	20	
					Total Marks 100	





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Course Code		SEMESIEK: I	CIF Montro	. 100
Credite I T D	$\cdot 3_{-0}$	NETWORKS AND CRYPTOGRAPHY	SEE Marks	· 100
Uouro		Elective P (Professional Elective)	SEE Marks	. 100
Foot	1. 42L	Prof Sushmitha N	SEE DUIAUOUS	.   5 11 8
Facu	inty Coordinator:			0 11+6
Introduction: I	Ises of Compute	r Networks Types of Computer Networks Network	Technology from I	ocal to
Global, Examp Cryptography: Transposition	les of Networks, Introduction to Ciphers, One-Tit	Network Protocols, Reference Models Cryptography, Two Fundamental Cryptographic Property and States Network Protocols (Network), Network	inciples, Substituti	on Ciphers
Transposition	elpheis, one m	UNIT - II		9 Hrs
Symmetric Cip Advanced Encr	hers: Classical E Tyption Standard	Encryption Techniques, Block Ciphers and the Data	a Encryption Stand	ard,
	~ _	UNIT - III		8 Hrs
Asymmetric Ci	phers: Public-Ke	y Cryptography and RSA, Other Public-Key Crypto	osystems	
		UNIT - IV	D	8 Hrs
Cryptographic Requirements Message Author Requirements	Hash Functions and Security, Se entication Codes for Message Aut	: Applications of Cryptographic Hash Functions, To cure Hash Algorithm (SHA) : Message Authentication Requirements, Message A pentication Codes, Security of MACs	wo Simple Hash Fu Authentication Fun	nctions, ctions,
Requiremento	ior message ride	UNIT - V		8 Hrs
Security, Cloud Countermeasu Objectives	d Security: Cloud res, Internet of T	1 Computing, Cloud Security Concepts, Cloud Security Concepts, Ioud Security Concepts, Cloud Security: The Internet of Things, IoT Security: The Internet of Things, IoT Security	arity Risks and ecurity Concepts an	nd
	2			
Course Outco	mes:		e-	
After going th	rough this cour	se the student will be able to:		
C01	: Understand a	nd explore the needs and concepts of network tech	nology and cryptog	graphy
CO2	: Apply the kno	wledge of encryption and decryption to real time is	sues.	
CO3	: Comprehend	and analyse the need for security in wireless netwo	orks and cloud.	
CO4	: Apply the kno	wledge of cryptanalysis to design and develop algor	rithms to perform e	encryption.
Reference Boo	oks		C.1 11.1 000	
1. Andrew S. 1 ISBN 10: 1-292	anenbaum, Nick 2-37406-3, ISBN	13: 978-1-292-37406-2, eBook ISBN 13: 9781292	cs, 6th edition, 202 2374017	0, Pearson
2. William Stal	lings , Cryptogra 722-6	uphy and Network Security, 8th Edition, Pearson, 2	2020, ISBN:	
978-0-13-6707	~ ~			
978-0-13-6707 3. Behrouz A F ISBN-13: 978-	`orouzan, Crypto 0,07-066046-5, .	graphy and Network Security, Tata McGraw-Hill, S ISBN-10: 0-07-06.6046-8	Special Indian Editi	on, 2008,
978-0-13-6707 3. Behrouz A F ISBN-13: 978-0 4. Cryptograph 978-15848850	Yorouzan, Crypto 0,07-066046-5, Y ny Theory and Pr 85	graphy and Network Security, Tata McGraw-Hill, S ISBN-10: 0-07-06.6046-8 actice, Douglas Stinson, 2nd Edition, 2005, Chapr	Special Indian Editi nan & Hall/CRC, IS	on, 2008, SBN:
978-0-13-6707 3. Behrouz A F ISBN-13: 978-4 4. Cryptograph 978-15848850	Sorouzan, Crypto 0,07-066046-5, 2 ay Theory and Pr 85	graphy and Network Security, Tata McGraw-Hill, S ISBN-10: 0-07-06.6046-8 actice, Douglas Stinson, 2nd Edition, 2005, Chapr	Special Indian Editi nan & Hall/CRC, IS	on, 2008, SBN:
978-0-13-6707 3. Behrouz A F ISBN-13: 978-4 4. Cryptograph 978-15848850 Scheme of Co QUIZZES: Quiz evaluated for 1 TESTS: Studen Bloom's Taxon tests will be co be reduced to 4	Theory and Pr 0,07-066046-5, 2 ay Theory and Pr 85 <b>ntinuous Interr</b> zzes will be cond 0 Marks. The su nts will be evalua omy Levels: Rem nducted. Each to 40 Marks.	graphy and Network Security, Tata McGraw-Hill, S ISBN-10: 0-07-06.6046-8 actice, Douglas Stinson, 2nd Edition, 2005, Chapr <b>Pal Evaluation (CIE): 20 + 40 + 40 = 100</b> ucted in online/offline mode. Two quizzes will be c am of two quizzes will be the Final Quiz marks. ated in test, descriptive questions with different con membering, Understanding, Applying, Analyzing, Ev est will be evaluated for 50 Marks, adding upto 100	Special Indian Edition nan & Hall/CRC, IS conducted & Each ( mplexity levels (Rev valuating, and Crea O Marks. Final test	on, 2008, SBN: Quiz will be ised ting). Two marks will

Autonomous Institution Affiliated University, Belagavi

	RUBRIC for CIE			RUBRIC for SEE			
SLNo	Content	Marks	Q. No	Contents	Marks		
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks each. Answ	er FIVE		
2	Tests - T1 & T2	40	1	full questions selecting ONE from each unit (1 to 5).			
3	Experiential Learning - EL1 & EL2	40	1842	Unit-1: Question 1 or 2	20		
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20		
			5&6	Unit-3: Question 5 or 6	20		
			7&8	Unit-4: Question 7 or 8	20		
			9 & 10	Unit-5: Question 9 or 10	20		
				Total Marks	100		





University, B	elagavi						
			SE	MESTER: I	·		•
Course Code	: 2	22MIT1B3T			CIE Marks	1:	100
Credits L-T-P	: 3	3 - 0 - 0	IOT AN	D APPLICATIONS	SEE Marks	:	100
Hours	: 4	12L	Elective B	(Professional Elective)	SEE Durations	:	3 Hrs
Faculty Coordi	nat	or:	Prof. B K Srinivas	, , ,	I		4
			UNIT	- I			9 Hrs
What is IoT, Ge	ene	sis of IoT, IoT	and Digitization, IoT	<sup>•</sup> Impact, Convergence of I	T and IoT, IoT Challer	iter	s, IoT
Simplified IoT	Arc	hitecture, The	Core IoT Functional	l Stack, IoT Data Manager	ment and Compute St	acl	αμίες, Α ζ.
<b>r</b>	-		UNIT	- II			9 Hrs
Smart Objects	s: T	he "Things" ir	IoT. Sensors, Actua	tors, and Smart Objects.	Sensor Networks, Cor	ine	cting
Smart Objects.	, Co	mmunication	s Criteria, IoT Acces	s Technologies.			8
	,		UNIT	- III			8 Hrs
IP as the IoT N	etw	ork Laver. Th	e Business Case for	IP. The need for Optimiza	tion. Optimizing IP for	• Io	T. Profiles
and Compliand	ces.	Application I	rotocols for IoT. The	Transport Laver, IoT App	lication Transport Me	thc	ds.
F	,		UNIT	- IV			8 Hrs
Data and Anal	vtic	s for IoT, An	ntroduction to Data	Analytics for IoT, Machin	e Learning, Big Data A	\na	lytics
Tools and Tech	inol	logy, Edge Str	eaming Analytics, Ne	etwork Analytics, Securin	g IoT, A Brief History	of (	)Ť
Security, Com	mor	n Challenges i	n OT Security, How	T and OT Security Practi	ces and Systems Vary	, F	ormal
Risk Analysis S	Stru	actures: OCTA	VE and FAIR, The P	hased Application of Secu	rity in an Operational	Ĺ	
Environment							
		100	UNIT	- V			8 Hrs
Software, Fund Introduction to RaspberryPi, C	lan o Ra Conf	nentals of Ard aspberryPi, Ab figuring Rasp	uino Programming. I out the RaspberryPi erryPi, Programming	oT Physical Devices and H Board: Hardware Layout g RaspberryPi with Python	Endpoints - Raspberry , Operating Systems o n, Wireless Temperatu	Pi: n Ire	
Temperature fr Strategy for Sn Examples.	rom nar	DS18B20 se ter Cities, Sm	asors, Remote access art City IoT Architect	s to RaspberryPi, Smart a cure, Smart City Security	nd Connected Cities, According Architecture, Smart C	An An ity	IoT Use-Case
Course Outco	me	s:					
After going thr	oug	h this course	the <mark>student w</mark> ill be a	ble to:			
C01	: (	Compare and o network.	contrast the deploym	ent of smart objects and	the technologies to co	nn	ect them
CO2	: /	Appraise the r	ole of IoT protocols fo	or efficient network comm	unication.		
CO3	: I	Elaborate the	need for Data Analyt	ics and Security in IoT.			
CO4	: I	llustrate diffe	ent sensor technolog IoT in Industry.	gies for sensing real world	l entities and identify	the	
			5				
<b>Reference Boo</b>	oks						
1. David Hanes	s, G	onzalo Salgu	iro, Patrick Grossete	ete, Robert Barton, Jerom	e Henry, IoT Fundam	ent	als:
Networking Tee	chn	ologies, Proto	cols, and Use Cases	for the Internet of Things	", 1st Edition, 2017. F	'ear	son
Education (Cis	co	Press Indian l	eprint). (ISBN: 978-	9386873743)	. , , ,		
2. Srinivasa K	G, '	"Internet of T	ings",CENGAGE Lea	aning India, 2017			
3. Vijay Madise (ISBN: 978-817	etti 737	and Arshdeer	Bahga, "Internet of "	Things (A Hands-on-Appr	oach)", 1st Edition, VI	Ϋ́T,	2014.
4 Rai Kamal "	·Int	ernet of Thing	s. Architecture and	Design Principles" 1st Fo	lition McGraw Hill Ed	110	ation
2017. (ISBN: 9	78-	9352605224)				uu	

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			5&6	Unit-3: Question 5 or 6	20		
			7 & 8	Unit-4: Question 7 or 8	20		
			9 & 10	Unit-5: Question 9 or 10	20		
					Total Marks 100		



		SEMESTER	· · ·	· ]
Course Code	· 22MIT1B4T	COMPLITER SYSTEMS PERFORMANCE	CIF. Marks	100
Credits L-T-P	: 3-0-0	ANALYSIS	SEE Marks	100
Hours	$\cdot 42L$	Elective B (Professional Elective)	SEE Durations	3 Hrs
Faculty Coordi	nator:	Dr. Kavitha S N	BEE Burutions .	0 1110
Tacuny Coordi		IINIT - I		9 Hrs
Introduction: T Approach to Pe Commonly use Requirements.	The art of Performerformance Evalued Performance N	nance Evaluation; Common Mistakes in Performan uation, Selecting an Evaluation Technique, Selectir Metrics, Utility Classification of Performance Metric <b>UNIT - II</b>	ace Evaluation, A Sys ng Performance Metr s, Setting Performan	stematic ics, ice
Workloads, Wo mixes, Kernels Services exerci Work load chan Histograms, M	rkload Selection ; Synthetic prog sed, level of deta racterization Tec ulti Parameter H	and Characterization: Types of Workloads, addition rams, Application benchmarks, popular benchmark ail; Representativeness; Timeliness, Other considera chniques: Terminology; Averaging, Specifying disper listograms, Principle Component Analysis, Markov	on instructions, Instr ks. Work load Select ations in workload s rsion, Single Parame Models, Clustering.	ruction ion: election.
		UNIT - III	N.	8 Hrs
Software and h Distributed Sys Techniques for data, Using acc	ardware monito stem Monitors, I Improving Prog counting logs to	Program Execution Monitors and Accounting Logs: Monitors: Terminologies, Software versus hardware monitors, Firmware a Program Execution Monitors and Accounting Logs, ram Performance, Accounting Logs, Analysis and Imanswer commonly asked questions.	and hybrid monitors Program Execution nterpretation of Acco	, Monitors, punting log
	1-5-	UNIT - IV		8 Hrs
Emulation; Con Terminology, C Computation o Designs, Gener Queuing Model Process. Analys with finite buff Networks; Prod Law; Forced Fle Analysis; Mean Analysis; Appro Convolution Al Hierarchical De Decomposition	mponents of an common mistakes in common mistakes of effects, Sign ta ral full factorial of ls: Introduction: sis of Single Que cers; Results for luct form networ ow Law; Little's n Value Analysis oximate MVA; B gorithm for Com ecomposition of , Limitations of	RTE; Limitations of RTEs. Experimental Design and es in experiments, Types of experimental designs, 2 ble method for computing effects; Allocation of vari- designs with k factors: Model, Analysis of a Genera UNIT - V Queuing Notation; Rules for all Queues; Little's La eue: Birth-Death Processes; M/M/1 Queue; M/M/r other M/M/1 Queuing Systems. Queuing Networks rks, queuing Network models of Computer Systems Law; General Response Time Law; Interactive Resp and Related Techniques; Analysis of Open Queuin alanced Job Bounds; Convolution Algorithm, Distri- puting G(N), Computing Performance using G(N), 7 Large Queuing Networks: Load Dependent Service Queuing Theory.	d Analysis: Introduc k Factorial Designs, iance; General 2k Fa <u>l Design</u> , Informal M w, Types of Stochas m Queue; M/M/m/E s: Open and Closed G b. Operational Laws: onse Time Law; Bott g Networks; Mean V ibution of Jobs in a fimesharing Systems Centers, Hierarchica	tion: Concepts, actorial aethods. <b>8 Hrs</b> tic 3 Queue Queuing Utilization alue System, s, al
Course Outco	mes:			
After going thro CO1	ough this course : Comprehend	e the student will be able to: the need for performance evaluation and its system	natic approach.	
<u>CO2</u>	: Apply perform	nance measurement techniques to evaluate comput	ter systems.	
<u> </u>	: Design and a	nalyse various performance evaluation techniques.		
CO4	: Compare and	evaluate performance of computer systems using s	sophisticated models	8.
1. Measuring C ISBN: 9781107	oks Computer Perform 7439863.	mance: A Practitioner's Guide; David J. Lilja; 2005,	Cambridge Universi	ty Press,
2. The Art of C	omputer System	s Performance Analysis; Raj Jain; 2008, John Wile	ey; ISBN: 812651905	3.
3. Probability a S. Trivedi; 2nd	and Statistics wi Edition; 2008, c	th Reliability, Queuing and Computer Science Appl John Wiley; ISBN: 978-0-471-33341-8.	lications; Trivedi K S	, Kishor
4 Research Me	ethodology: R P	anneerselvam: 2004, Prentice Hall: ISBN - 9788120	)324527	



#### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 Marks. Final test marks will be reduced to 40 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based seminar/presentation/demonstration (25) adding upto 40 marks.

	RUBRIC for CIE			RUBRIC for SEE			
SLNo	Content	Marks	Q. No	Contents	Marks		
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks ea	ch. Answer FIVE		
2	Tests - T1 & T2	40		full questions selecting ONE from each unit	t (1 to 5).		
3	Experiential Learning - EL1 & EL2	40	1 & 2	Unit-1: Question 1 or 2	20		
	Total Marks	100	3 & 4	Unit-2: Question 3 or 4	20		
			5&6	Unit-3: Question 5 or 6	20		
			7 & 8	Unit-4: Question 7 or 8	20		
			9 & 10	Unit-5: Question 9 or 10	20		
				То	tal Marks 100		

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Autonomous Institution Affi to Visvesvara Technological	liated Approved by AICTE, New Delhi ya		
University, Be	lagavi	SEMESTER: II	
Course Code	· 22IM21T		CIF Marks · 100
Credits L-T-P	: 3-0-0	RESEARCH METHODOLOGY	SEE Marks : 100
Hours	: 42L	Common Course to all M.Tech Programs	SEE Durations : 3 Hrs
Facul	ty Coordinator:	Dr. Rajeswara Rao K V S	
	5	UNIT - I	8 Hrs
Research Probl Creative Appro- Problems – App Generation and	em: Problem So ach, Group Prol proaches to Rese 1 Formulation o	lving – General Problem Solving, Logical App blem Solving Techniques for Idea Generation earch Problem, Exploration for Problem Iden f the problem.	proach, Soft System Approach, . Formulation of Research tification, Hypothesis
		UNIT - II	9 Hrs
Research Desig	n: Experimenta	l Design – Principles of Experiment. Laborat	ory Experiment, Experimental
Design, Quasi Experiments. E Field Studies, S	Experimental D Expost Facto Re Survey Research	esign, Action. Research, Validity and Reliabi esearch – Exploratory Research, Historical Re a, Qualitative Research Methods.	lity of Experiment and Quasi esearch, Descriptive Research,
		UNIT - III	8 Hrs
Research Desig Validity and Re Data Collection Reliability of da	gn for Data Acqu eliability Measur 1 Procedures – S ata collection pr	aisition: Measurement Design – Primary type rement, Sample Design – Non-Probability Sar Sources of secondary data, Primary data colle ocedures.	s of Measurement scales, mpling, Probability Sampling. ection methods, Validity and
		UNIT - IV	9 Hrs
Data Analysis: Non-Parametrie	Exploratory Dates Tests, Multiple	ta Analysis, Statistical Estimation, Hypothes e Regression, Factor Analysis, Cluster Analys	is Testing, Parametric Tests, sis
	Ň	UNIT - V	8 Hrs
Research Propo	osal: Purpose, T	ypes, Development of Proposal, Evaluation o	f Research Proposal.
Report Writing:	Pre-writing cor	nsideration, Format of Reporting, Briefing, Be	est practices for Journal writing.
Course Outcon	nes: rough this cou	rse the student will be able to:	-
CO1	Recognize the	e principles and concepts of research types, of	lata types and analysis
	: procedures.	viste method for data callection and analyze	the data main a statistical
	: principles.	riale method for data collection and analyze	the data using statistical
CO3	Express reseat: standards.	arch output in a structured report as per the	technical and ethical
CO4	: Develop a res	earch design for the given engineering and n	nanagement problem context.
<b>Reference Boo</b>	oks:		
1. Krishnaswar Integration of F Pvt. Ltd, 2018.	ni, K.N., Sivaku Principles, Meth ISBN: 978-81-7	mar, A. I. and Mathirajan, M., Management ods and Techniques, 17th Impression, Pears 7758-563-6	Research Methodology, on India Education Services
2. William M. K Dog Publishing	K. Trochim, Jam <u>5, 2006, ISBN:</u> 9	es P. Donnelly, The Research Methods Know 78-1592602919	vledge Base, 3rd Edition, Atomic
3. Kothari C.R. Publishers, 202	, Research Meth 19, ISBN: 978-9	nodology Methods and Techniques, 4th Editi 3-86649-22-5.	on, New Age International
4. Levin, R.I. a. 2017, ISBN-13	nd Rubin, D.S., - 978-81849574	Statistics for Management, 8th Edition, Pear 195.	rson Education: New Delhi,

RV	RV Educational Ir RV College o	nstitutions <sup>®</sup> of Engineering <sup>®</sup>	Go, change the world
STITUTION!	Autonomous Institution Affiliated to Visvesvaraya Technological University, Belagavi	Approved by AICTE, New Delhi	

#### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

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**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based seminar/presentation/demonstration (25) adding upto 40 marks.

	RUBRIC for CIE		RUBRIC for SEE			
SLNo	Content	Marks	Q. No	Contents	Marks	
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks each. Answ	ver FIVE	
2	Tests - T1 & T2	40	1	full questions selecting ONE from each unit (1 to 5).		
3	Experiential Learning - EL1 & EL2	40	1 & 2	Unit-1: Question 1 or 2	20	
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20	
			5&6	Unit-3: Questio <mark>n 5 or</mark> 6	20	
			7 & 8	Unit-4: Question 7 or 8	20	
			9 & 10	Unit-5: Questio <mark>n 9 or 10</mark>	20	
				Total Marks	100	

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University, E	Belagavi	ODMEOTED. H		
0		SEMESTER: II		100
Course Code	: 22MSE221L	CLOUD NATIVE DEVOPS	CIE Marks	: 100
Credits L-I-P	: 3-0-1	(Theory & Practice)	SEE Marks	: 100
Hours	: 42L + 28P	(Professional Core - 3)	SEE Durations	: 3 Hrs
Facı	alty Coordinator:	Dr. G S Mamatha		
		UNIT - I		9 Hrs
Conducting th First Steps wi Container Reg Getting Kubes Services, Kube	e Container Orch <b>ith Kubernetes:</b> istries, Hello Kub <b>rnetes:</b> Cluster A ernetes Installers	estra, Kubernetes, Cloud Native,The Future of Op Running Your First Container, The Demo Applica ernetes, Minikube. rchitecture, The Costs of Self-Hosting Kubernetes Clusterless Container Services.	perations. tion, Building a Con s, Managed Kuberne	, itainer, ites
		UNIT - II		9 Hrs
Kubernetes Sc Managing Res Optimizing Ch	sheduler, Resources sources: Underst uster Costs.	unit - III	s Package Manager.	aces,
<b>Operating Clu</b> Kubernetes Po Namespaces, H	<b>isters:</b> Cluster Si wer Tools: Maste Kubernetes Shells	zing and Scaling, Conformance Checking, Chaos ring kubectl, Working with Resources, Working w and Tools Kubernetes IDEs.	Testing. vith Containers, Con	texts and
	/	UNIT - IV		8 Hrs
Managing Pod Controllers, In	<b>ls:</b> Labels, Node <i>A</i> gress, Service Me	UNIT - V	and Tolerations, Po	d 8 Hrs
Configuration	and Socratas C	onii - V	ont Stratagion Engr	Unting
Secrets with S Security, Back Security Scan	ops, Sealed Secre cups, and Cluster ning, Backups, M	Health: Access Control and Permissions, Cluster	Security Scanning,	Containe
1 Introduction	to Source Contr	al like (Git Gitlah Code Review Pull request etc	)	20 1113
<ol> <li>2. Docker Fun</li> <li>3. Kubernetes</li> <li>4. Continuous</li> <li>5. Hands on w</li> <li>6. Best industriated</li> <li>1. IBM Cloud A</li> <li>2. IBM Kubern</li> <li>3. Docker Desider</li> <li>4. IBM Cloud C</li> <li>5. Git (https://www.contenders//wwww.contenders//wwww.contenders//www.contenders//www.contenders/</li></ol>	damentals (Imag (Introduction, De Integration(CI) a rorking with IBM ry practices for D Account. (https:// hetes Cluster (http ktop (https://clou /git-scm.com) IBJ credly.com/org/il credly.com/org/il Applications	e, Container, volumes, networking) eployment platform) nd Continuous Deployment(CD). CI/CD Devops toolchains. evops on cloud. Pre-requisite (Must be completed /cloud.ibm.com/registration) ps://www.ibm.com/in-en/cloud/free/kubernetes w.docker.com/products/docker-desktop) for wind d.ibm.com/docs/cli?topic=cli-getting-started) M portals for hands-on lab study: Docker Essentia om/badge/docker-essentials-a-developer-introduc om/badge/operating-kubernetes-on-ibm-cloud	by students before ) dows/Mac als ction Kubernetes Es	start of th sentials
https://www.c https://develo	credly.com/org/il pper.ibm.com/tut	om/badge/building-cloud-native-and-multicloud- orials/build-a-cicd-tekton-pipeline-for-deploying-	·applications a-nodejs-applicatior	1/
<b>Course Outco</b>	mes:			
After going thr	ough this course	the student will be able to:		
CO1	: Apply the con	cept of cloud native DevOps to applications.		
CO2	: Analyse the us application.	sage of cloud, creating a docker image, kubernete	s deployment for a g	given
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Approved by AICTE, New Delhi

CO3: Design and implement cloud native applications and deployment.

CO4: Evaluate the building, deploying and scaling of applications in cloud.

#### **Reference Books**

1. Justin Domingus and John Arundel, Cloud Native DevOps with Kubertnetes, 2nd Edition, ORielly, 2022, ISBN: 9789355421944

2. Mitesh Soni, Agile, DevOps and Cloud Computing with Microsoft Azure, BPB Publications, 2019, ISBN: 978-93-88511-902

3. Nicole Forsgren, Jez Humble and Gene Kim, The Science of Lean Software and DevOps, ACCELERATE, IT Revolution Press, 2018, ISBN: 978-1942788331

4. IBM, IBM Cloud DevOps Field Guide, IBM Corporation, 2021, ISBN

#### Scheme of Continuous Internal Evaluation (CIE): 10 + 30 + 30 + 30 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The average of two quizzes will be the Final Quiz marks.

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 Marks. Final test marks will be reduced to 30 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (10), Video based seminar /presentation /demonstration (20) adding upto 30 marks.

Laboratory: Conduction of laboratory exercises, Lab report & observation & analysis (30 Marks), Lab Test (10 Marks) & Innovative Experiment/Concept Design & Implementation (10 Marks) adding up to 50 Marks. The final marks will be reduced to 30 Marks.

Scheme of Semester End Examination (SEE) for 100 marks: Each unit consists of TWO Questions of 16 Marks each. Answer FIVE full questions selecting one from each unit (from 1 to 5). Question No. 11 is compulsory (Laboratory component) for 20 Marks.

	RUBRIC of CIE		RUBRIC of SEE					
SLNo	Content	Marks	Q. No	Contents		Marks		
1	Quizzes - Q1 & Q2	10	Each u	nit consists of TWO questions o	f 16 Marks each. Answ	er FIVE		
2	Tests - T1 & T2	30	Questi	full questions selecting ONE b on No. 11 is compulsory (Labora	rom each unit (1 to 5). tory component) for 20	Marks.		
3	Experiential Learning - EL1 & EL2	30	1 & 2	Unit-1: Question 1 or 2		16		
4	Laboratory	30	3&4	Unit-2: Question 3 or 4		16		
	Total Marks	100	5&6	Unit-3: Question 5 or 6		16		
			7 & 8	Unit-4: Question 7 or 8		16		
	NO SPE for Laboratory		9 & 10	Unit-5: Question 9 or 10		16		
NO SEE IOI LABORATORY				Laboratory Component (Compu	lsory)	20		
					Total Marks	100		



Course Code         22MIT23T         Cyber Security And Digital Forensics         CIE Marks SEE Marks           Hours         : 42L         (Professional Core - 4)         SEE Durations           Faculty Coordinator:         Prof. Sushnitha N         SEE Durations           Faculty Coordinator:         Prof. Sushnitha N         SEE Durations           Security Objectives:         Cyber Security Magement Goals, Counting Vulnerat           Security Frameworks, Security Policy Objectives         Cyber Security Policy Catalog : Cyber Governan- Cyber User Issues, Cyber Conflict Issues, Cyber Management Issues, Cyber Infrastructure Issues,           WINT - I         UNIT - I           The Threat and Vulnerability Landscape : Protect What You Value, What is Privacy, Anonymity a           Pseudonymity, Security, Vulnerabilities, Threats and Adversaries, Threat Modeling and Risk Assess           Security vs Privacy vs Anonymity           The Current Threat and Vulnerability Landscape : Why You Need Security – The Value of a Hack           Things You Need To Stay Safe Online, Security Bugs and Vulnerabilities, Hackers, crackers and cyl           criminals, Malware, viruses, notkits and RATs, Spyware, Adware, Scareware, PUPs & Browser hija           is Phishing, Vishing and SMShing, Spamming & Doxing, Social engineering - Scams, cons, tricks a           Dark Markets and Exploit kits           Current Digital Investigations, Maintaining Professional Conduct , Preparing a Digital Forensics	:       100         :       100         :       3 Hrs         9 Hrs       9 Hrs         rsus Policy       9 Hrs         ilities,       9 Hrs         of subscription       9 Hrs         nd       ments,         , The Top 3         er       9 king, What         of fraud,       8 Hrs         nsics , s         'are Tools
Credits L-T-P       I: 3 - 0 - 0       Cyber Security And Digital Forensics       SEE Marks         Hours       I: 42L       (Professional Core - 4)       SEE Durations         Faculty Coordinator:       Prof. Sushmitha N       SEE Durations         UNIT - I         Introduction :       Cyber Security Objectives: Cyber Security Metrics, Security Management Goals, Counting Vulnerability         Security Frameworks, Security Policy Objectives: Cyber Security Policy Catalog : Cyber Governan-Cyber User Issues, Cyber Conflict Issues, Cyber Management Issues, Cyber Infrastructure Issues,         Cyber Vescurity, Vulnerability Landscape : Protect What You Value, What is Privacy, Anonymity a Pseudonymity, Security, Vulnerabilities, Threats and Adversaries, Threat Modeling and Risk Assess Security vs Privacy vs Anonymity         The Current Threat and Vulnerability Landscape : Why You Need Security – The Value of a Hack Things You Need To Stay Safe Online, Security Bugs and Vulnerabilities, Hackers, crackers and cyl criminals, Malware, viruses, rootkits and RATs, Syware, Adware, Scareware, PUPs & Browsen hija is Phishing, Vishing and SMShing, Spamming & Doxing, Social engineering - Scams, cons, tricks a Darknets, Dark Markets and Exploit kits         Understanding the Digital Forensics Profession and Investigations : An Overview of Digital Forensics Noftware, Conducting an Investigation.         Current Digital Forensics Tools : Evaluating Digital Forensics Tool Needs , Digital Forensics Software.         Unit - IV         Mobile Device Forensics : Understanding Mobile Device Forensics , Inderstanding Acquisition Pr M	:       100         :       3 Hrs         '' 9 Hrs         rsus Policy         ilities,         :       Issues,         '' 9 Hrs         nd         ments,         , The Top 3         er         :king, What         id fraud,         '' 8 Hrs         nsics ,         s
Hours       : 42L       (Professional Core - 4)       SEE Durations         Faculty Coordinator:       Prof. Sushmitha N       UNIT - 1         Introduction :       Cyber Security, Objectives: Cyber Security Metrics, Security Management Goals, Counting Vulneral Security Frameworks, Security Policy Objectives Cyber Security Policy Catalog : Cyber Governand Cyber User Issues, Cyber Conflict Issues, Cyber Management Issues, Cyber Infrastructure Issues, Cyber User Issues, Cyber Conflict Issues, Cyber Management Issues, Cyber Infrastructure Issues, Cyber Vulnerability Landscape : Protect What You Value, What is Privacy, Anonymity a Pseudonymity, Security, Vulnerability Landscape : Protect What You Value, What is Privacy, Anonymity The Current Threat and Yulnerability Landscape : Why You Need Security – The Value of a Hack Things You Need To Stay Safe Online, Security Bugs and Vulnerabilities, Hackers, crackers and cyl criminals, Malware, viruses, rootkits and RATs, Spyware, Adware, Scareware, PUPs & Browser hija is Phishing, Vishing and SMShing, Spamming & Doxing, Social engineering - Scams, cons, tricks a Darknets, Dark Markets and Exploit kits         Understanding the Digital Forensics Profession and Investigations : An Overview of Digital Forensic Investigation, Procedures for Private-Sector High-Tech Investigations, Understanding Data Recovery.         Workstations and Software, Conducting an Investigation.         Current Digital Forensics Tools : Evaluating Digital Forensics Software.         UNIT - IV         Mobile Devices Forensics : Understanding Mobile Device Forensics , Understanding Acquisition Pr Mobile Devices Cloud Forensics: An Overview of Cloud Computing , Legal Challenges in Cloud Forensics for Cloud Forensics: An Overview of Cloud Co	: 3 Hrs         9 Hrs         rsus Policy         ilities,         :e Issues,         9 Hrs         nd         ments,         , The Top 3         er         :king, What         id fraud,         8 Hrs         nsics ,         s
Faculty Coordinator: Prof. Sushmitha N         UNIT - I         Introduction : Cyber Security, Cyber Security Policy, Domains of Cyber Security Policy, Strategy w         Cyber Security Objectives: Cyber Security Management Goals, Counting Vulnerat         Security Frameworks, Security Policy Objectives Cyber Security Policy Catalog : Cyber Governan.         Cyber User Issues, Cyber Conflict Issues, Cyber Management Issues, Cyber Infrastructure Issues,         UNIT - II         The Threat and Vulnerability Landscape : Protect What You Value, What is Privacy, Anonymity a         Pseudonymity, Security, Vulnerabilities, Threats and Adversaries, Threat Modeling and Risk Assess         Security vs Privacy vs Anonymity         The Current Threat and Vulnerability Landscape : Why You Need Security – The Value of a Hack         Things You Need To Stay Safe Online, Security Bugs and Vulnerabilities, Hackers, crackers and cyl         criminals, Malware, viruses, rootkits and RATs, Spyware, Adware, Scareware, PUPs & Browser hija         is Phishing, Vishing and SMShing, Spamming & Doxing, Social engineering - Scams, cons, tricks a         Darknets, Dark Markets and Exploit kits         UNIT - III         Understanding the Digital Forensics Profession and Investigations : An Overview of Digital Forensic         Investigation, Procedures for Private-Sector High-Tech Investigations : An Overview of Digital Forensic         Workstations and Software, Conducting an Investigation. <t< td=""><td>9 Hrs ersus Policy ilities, ersus Policy ilities, ersus Policy <b>9 Hrs</b> nd ments, , The Top 3 er king, What d fraud, <b>8 Hrs</b> nsics , s</td></t<>	9 Hrs ersus Policy ilities, ersus Policy ilities, ersus Policy <b>9 Hrs</b> nd ments, , The Top 3 er king, What d fraud, <b>8 Hrs</b> nsics , s
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Introduction : Cyber Security, Cyber Security Policy, Domains of Cyber Security Policy, Strategy w Cyber Security Objectives: Cyber Security Metrics, Security Management Goals, Counting Vulnerat Security Frameworks, Security Policy Objectives <b>Cyber Security Policy Catalog</b> : Cyber Governam. Cyber User Issues, Cyber Conflict Issues, Cyber Management Issues, Cyber Infrastructure Issues, <b>UNIT - II</b> The Threat and Vulnerability Landscape : Protect What You Value, What is Privacy, Anonymity a Pseudonymity, Security, Vulnerabilities, Threats and Adversaries, Threat Modeling and Risk Assess Security vs Privacy vs Anonymity The Current Threat and Vulnerability Landscape : Why You Need Security – The Value of a Hack Things You Need To Stay Safe Online, Security Bugs and Vulnerabilities, Hackers, crackers and cyl criminals, Malware, viruses, rootkits and RATs, Spyware, Adware, Scareware, PUPs & Browser hija is Phishing, Vishing and SMShing, Spamming & Doxing, Social engineering - Scams, cons, tricks a Darknets, Dark Markets and Exploit kits <b>UNIT - III</b> Understanding the Digital Forensics Profession and Investigations : An Overview of Digital Forensic Investigation, Procedures for Private-Sector High-Tech Investigations, Understanding Data Recover: Workstations and Software, Conducting an Investigation. Current Digital Forensics Tools : Evaluating Digital Forensics Software. <b>UNIT - IV</b> Mobile Devices Forensics : Understanding Mobile Device Forensics , Understanding Acquisition Pr Mobile Devices Cloud Forensics : Acquisitions in the Cloud , Conducting a Cloud Investiga for Cloud Forensics <b>UNIT - V</b> Digital Forensics Mardy Statiang Data Investigations in the Collect and Analyze, Valid- Forensic Data , Addressing Data-Hiding Techniques Virtual Machine Forensics, Live Acquisitions, and Network Forensics: An Overview of Virtual Machin , Performing Live Acquisitions, Network Forensics Overview	rsus Policy ilities, re Issues, 9 Hrs nd ments, , The Top 3 rer king, What nd fraud, 8 Hrs nsics , s
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	ne Forensics
Course Outcomes:	
After going through this course the student will be able to:	
CO1 : Interpret the basic concepts of cyber security and digital forensics.	
CO2 : Compare different software and hardware tools used in validating forensic data.	
CO3 : Understand the current cybersecurity policy issues	
CO4 : Demonstrate through use of proper tools knowledge on the cyber security, Cyberc forensics.	ime and
Deference Deele	
Reference books	
1. Jenniier L. Bayuk , Jason Healey, Cyber Security Policy Guidebook, 2012, Wiley, ISBN: 978-1-11	
<ol> <li>Nathan House, The Complete Cyber Security Course, StationX, First edition, January 2017</li> <li>Bill Nelson, Amelia Phillips, Chris Steuart, Guide to Computer Forensics and Investigations, 5th 2015, ISBN: 978-1-285-06003-3</li> </ol>	8-02780-6
<ol> <li>Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives, Sunit and Nina Godbole, 2013, Wiley India Pvt Ltd, ISBN: 978-81-265-21791</li> </ol>	8-02780-6 Edition,

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# Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 Marks. Final test marks will be reduced to 40 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based seminar/presentation/demonstration (25) adding upto 40 marks.

	RUBRIC for CIE	1		RUBRIC for SEE					
SLNo	Content	Marks	Q. No	Contents	Marks				
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks each. A	nswer FIVE				
2 Tests - T1 & T2		40	110	full questions selecting ONE from each unit (1 to	5).				
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20				
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20				
	1.9		5&6	Unit-3: Question 5 or 6	20				
			78.8	Unit-4: Question 7 or 8	20				
			9 & 10	Unit-5: Question 9 or 10	20				
				Total Ma	rks 100				



University, B	elagavi	SEMESTER: II		- · · ·
Course Code	: 22MSE2C1T		CIE Marks	: 100
Credits L-T-P	: 3 - 0 - 0	<b>ROBOTIC PROCESS AUTOMATION</b>	SEE Marks	: 100
Hours	: 42L	Elective C (Professional Elective)	SEE Durations	: 3 Hrs
Faci	ilty Coordinator	Dr.Mamatha G S		1.100
Iuce		UNIT - I		9 Hrs
What is Roboti	c Process Autom	ation? Scope and Techniques of automation: wha	t should be autom	ated? What
can be automa	ted? Techniques	of automation Roboic Process Automation: What	can RPA do? Bene	fits of RPA
Components of	f RPA, RPA platfo	orms. About UiPath. The future of automation. Re	cord and Play: UiP	ath stack,
Downloading a	nd Installing Uil	Path Studio, Learning UiPath Studio, Task Record	er, Emptying trash	in Gmail,
Emptying Recy	vcle Bin.			
		UNIT - II		9 Hrs
Sequence, Flow	wchart, and Con	trol Flow: Sequencing the workflow, Activities, Cor	ntrol flow, various t	ypes of
loops, and dec	ision making, ho	w to use a sequence, how to use a flowchart, step	by step example u	sing
sequence and	control flow. Dat	a Manipulation: Variables and scope, Collections,	Arguments-purpos	se and use,
Data table usa	ge with example	s, Clipboard management, File operation with step	p-by-step example.	CSV/Excel
to data table a	nd vice versa exa	amples.	59	
		UNIT - III		8 Hrs
Taking control	of the controls :	Finding and attaching windows, Finding the cont	rol, Techniques for	waiting for
a control, Act o	on controls-mous	se and keyboard activities, working with UiExplore	er, Handling events	s, Revisit
recorder, Scree	en scraping, Whe	en to use OCR, Types of OCR available, How to use	e OCR, Avoiding ty	pical failure
Citrin outomot	hat Application	DE pluging and Extensions Terminal plugin; SAP	automation, Java	Plugin,
Citrix automat	ion, man plugin,	PDF plugin, web integration, Excel and word plu	gins, credential ma	
TT 11' TT	D ( 14		· · · ·	o nrs
Monitoring im	Evenus and Assi	triggers Launching an assistant bots? Monitoring s	system event trigger	Uandling
Debugging on	d Logging Excen	ting handling: Common exceptions and ways to he	andle them I orgin	a and taking
screenshots D	ehugging techni	ques Collecting crash dumps Error reporting	anuic them, Loggin	g and taking
	0.000888 000	UNIT - V		8 Hrs
Managing and	Maintaining the	Code: Project Organization, Nesting workflows, Re	eusability of workfl	0WS.
commenting te	chniques. State	Machine, When to use Flowcharts, State Machine	s or sequences. Us	ing config
files and exam	ples of a config f	ile. Deploying and Maintaining the Bot: Publishing	g using publish uti	lity,
Overview of Or	chestration Serv	er, Using Orchestration Server to control bots, Us	ing Orchestration S	Server to
deploy bots.	No.			
<b>Course Outco</b>	mes:			
After going thr	ough this course	the student will be able to:		
CO1	: Apply the con	cept of Robotic Process Automation to automate v	arious applications	8.
CO2	: Analyse the u	sage of appropriate Robotic Process Automation to	echnique for a giver	n
	application.			
CO3	: Design and in	plement techniques of Robotic Process Automatic	on.	
CO4	: Evaluate the o	code for deployment and maintenance.		
<b>Reference Boo</b>	oks			
1. Alok Mani T 178847094X	ripathi, Learning	g Robotic Process Automation, 1st Edition, Packpu	ıb.com, 2018, ISBN	N:
2. Ed Freitas, 1 978-1-64200-1	Robotic Process A	Automation Succinctly, Succinctly EBook Series, 2	2020, ISBN:	
3. Nividous, Ro	obotic Process Au	ıtomation, www.nividous.com, 2018		
4. Vaibhav Sri 978938989828	vastava, Getting 36	started with RPA using Automation Anywhere, BF	B publishers, 2018	8, ISBN:

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	RUBRIC for CIE			RUBRIC for SEE					
SLNo	Content	Marks	Q. No	Contents	Marks				
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks each. An	swer FIVE				
2 Tests - T1 & T2		40		full questions selecting ONE from each unit (1 to 5	)-				
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20				
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20				
			5&6	Unit-3: Question 5 or 6	20				
			78 8	Unit-4: Question 7 or 8	20				
			9 & 10	Unit-5: Question 9 or 10	20				
				Total Mar	ks 100				



oniversity, Be	uguv	•			_	
			SEMESTER: II			
Course Code	:	22MSE2C2T		CIE Marks :	:T	100
Credits L-T-P	:	3 - 0 - 0	SOFTWARE PROJECT MANAGEMENT	SEE Marks :	:†	100
Hours	:	42L	Elective C (Professional Elective)	SEE Durations :	:†	3 Hrs
Facu	ltv	Coordinator:	Prof. Rekha B S	!I		
			UNIT - I		T	9 Hrs
PROJECT EVA	LU	JATION AND P	ROJECT PLANNING : Importance of Software Proje	ect Management – A	 .ct	ivities -
Methodologies -	- (	Categorization	of Software Projects - Setting objectives - Manager	ment Principles – Ma	ar	nagement
Control – Proje	ct	portfolio Mana	gement – Cost-benefit evaluation technology – Ris	k evaluation – Strate	eş	gic
program Manag	gei	ment – Stepwi	se Project Planning.			
			UNIT - II		ľ	9 Hrs
PROJECT LIFE	C	YCLE AND EF	FORT ESTIMATION : Software process and Proces	s Models - Selection	1 (	of an
Appropriate Pro	oje	ct Approach -	Rapid Application development – Agile methods –	Dynamic System De	)V(	elopment
Method – Extre	m	e Programmin	g– Managing interactive processes – Basics of Softw	ware estimation – Ef	fc	ort and
Cost estimation	ı t	echniques – C	OSMIC Full function points - COCOMO II - a Para	metric Productivity N	M	odel.
			UNIT - III			8 Hrs
ACTIVITY PLAN	IN	ING AND RISH	MANAGEMENT : Objectives of Activity planning -	- Project schedules –	- F	Activities
- Sequencing a	nc	l scheduling –	Network Planning models – Formulating Network	Model – Forward Pas	SS	; &
Backward Pass	te	echniques – Ci	itical path (CRM) method – Risk Management – Na	ature of Risks, Types	3 (	of Risks,
Managing Risk	s,	Risk Planning	and Control, Evaluating risks to the schedule – Re	esource Allocation –	~~	
Identifying Kes	ou	ites kequiten	unity in the sources, creation of critical pa	atils – Cost schedule	38 T	9 Цио
DDO IECT MON	T17	ODINC AND	CONTROL + Enemotioning and control	Callection of data	<u> </u>	<u>o nis</u>
Visualizing pro	ari	OKING AND C	vitoring - Farned Value Analysis - Prioritizing Mon	- Collection of data	– പ	ring_
Change control	g1 (	Software Con	iguration Management – Managing contracts – Co	ntract Management	Un	iiig –
onange control		Soltware com	UNIT - V	intract management.	Ţ	8 Hrs
MANAGING PE	$\overline{\mathbf{O}}$	PLE AND ORG	ANIZING TEAMS · Organizational behavior - Best	methods of staff self		tion -
Instruction in t	he	e best method	- Motivation – Working in teams – Decision making	g – Leadership, Orga	in	izational
structures				5 ······ F/ · 8-	-	
		-				
Course Outcom	ies	s:				
After going thro	bu	gh this course	the student will be able to:			
CO1	:	Understand S	oftware Project Manamement principles to be follow	wed during its develo	oŗ	oment.
CO2	:	Estimate the r	isks invol <mark>ved in</mark> various Proj <mark>ect activities.</mark>			
CO3	:	Gain extensive	e knowledge about the basic concepts, framework a	and the process mod	de	els.
CO4	:	Obtain adequa	ate knowledge about software process models and	software effort estim	na	tion
		techniques.				
			~ 101/			
<b>Reference Boo</b>	k	5				
1. Bob Hughes 2016, ISBN - 9	, N 78	like Cotterell a 9387067189	nd Rajib Mall: Software Project Management – Six	th Edition, Tata Mc	G	raw Hill,
2. Robert K. Wy 0471360287, IS	yso SE	ocki —Effective 3N13-9780471	Software Project Management – Wiley Publication 360285.	, 2015, ISBN- ISBN:	:	
3. Gopalaswam ISBN13 - 9780	y 07	& Ramesh, —N 0598973.	Ianaging Global Software Projects – McGraw Hill E	Education (India), 20	)1	7,
4. Walker Royc	e:	-Software Pro	ject Management- Addison-Wesley, 2000.			

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# Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 Marks. Final test marks will be reduced to 40 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based seminar/presentation/demonstration (25) adding upto 40 marks.

	RUBRIC for CIE			RUBRIC for SEE	
SLNo	Content	Marks	Q. No	Contents	Marks
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks	each. Answer FIVE
2	Tests - T1 & T2	40		full questions selecting ONE from each u	mit (1 to 5).
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20
			5&6	Unit-3: Question 5 or 6	20
			7 & 8	Unit-4: Question 7 or 8	20
			9 & 10	Unit-5: Question 9 or 10	20
					Total Marks 100



University, Be	elagav							
			SEMESTER: II	÷				
Course Code	:	22MIT2C3T			CIE Marks	:	; 1	00
Credits L-T-P	:	3 - 0 - 0	CLOOD COMPUTING	Ī	SEE Marks	:	; 1	00
Hours	:	42L	Elective C (Professional Elective)		SEE Durations	:	:	3 Hrs
Facu	lty	Coordinator:	Prof. B K Srinivas	ı				
			UNIT - I				9	Hrs
Cloud computi	ng	, Cloud compi	$\overline{ting}$ delivery models and services, Ethical issue	es, Clo	oud vulnerabili	tie	s,	Cloud
computing at A	١m	azon, Cloud c	omputing the Google perspective, Microsoft Win	dows	Azure and onli	ne	s	ervices,
Opensource so ecological impa	ftw act	vare platforms	for private clouds, Cloud storage diversity and	vendo	or lock-in, Ener	gy	u	se and
			UNIT - II				Ş	) Hrs
Challenges of c	loi	ad computing	Architectural styles of cloud computing, Workf	flows:	Coordination of	of n	nυ	ltiple
activities, Coor	dir	nation based of	n a state machine model: The Zookeeper, The M	/Iap R	educe program	mi	nę	g model,
A case study: 7	ſ'nε	e Gre The Web	application, Cloud for science and engineering,	, High	-performance o	on	np	uting or
a cloud, Cloud	со	mputing for B	iology research, Social computing, digital conten	nt an	d cloud compu	in	g.	
			UNIT - III	6			8	3 Hrs
Virtualization,	La	yering and vir	tualization, Virtual machine monitors, Virtual M	Machi	nes, Performan	ce	ar	nd
Security Isolati	ion	, Full virtualiz	ation and paravirtualization, Hardware support	t for v	rirtualization, C	as	e \$	Study:
Xen a VMM ba	sec	l paravirtualiz	ation, Optimization of network virtualization, vI	Blade	s, Performance	со	m	parison
of virtual mach	nin	es, The dark s	ide of virtualization.					
		/ 19	UNIT - IV	<u>.</u>			8	3 Hrs
computing clou deadlines, Scho scaling.	ads edi	s, Fair queuing uling MapRed	g, Start-time fair queuing, Borrowed virtual time	e, Clo mana	ud scheduling agement and dy	sul ma	bje im	ect to lic
security.			UNIT - V	-			8	3 Hrs
Cloud security	ris	sks, Security:	The top concern for cloud users, Privacy and pr	ivacy	impact assessr	ne	nt	, Trust,
Operating syste images, Securi EC2 instances transport layer java, Cloud-ba adaptive data s	em ty , C , pi sec	security, Virt risks posed by onnecting clie rotocols in EC simulation o eaming, Cloud	a management OS, A trusted virtualization, a management OS, A trusted virtual machine r nts to cloud instances through firewalls, Securit 2, How to launch an EC2 Linux instance and co f a distributed trust algorithm, A trust managen based optimal FPGA synthesis .Exercises and p	, Secu monit ty rul onnec nent s proble	arity risks pose for, Amazon we es for application t to it, How to u service, A cloud ems.	d b b s on ise se	y ser aı s S erv	shared vices: nd 3 in vice for
Course Outco	me							
After going thr	0110	whith this course	the student will be able to:					
<u>CO1</u>	$\left  \cdot \right $	Apply fundam	ental concepts in cloud infrastructures to under	rstan	d the tradeoffs	in	pr	ower
001	$\left  \cdot \right $	efficiency and	cost				ЪС	,
CO2	:	Understand sy	rstem, network and storage virtualization and or	utline	e their role in er	nał	əli	ng the
CO3	:	Illustrate the f	undamental concepts of cloud storage and dem	onstr	ate their use in	st	tot	rage
		systems such	as Amazon S3 and HDFS					0
CO4	:	Analyze variou	is cloud programming models and apply them t	o solv	ve problems on	the	e	cloud.
					-			
Reference Boo	oks	<b>i</b>						
1. Dan C. Mari ISBN: 978-0-1	ne 24(	scu, Cloud Co )4-627-6	mputing - Theory and Practice, Morgan Kaufma	ann, E	Elsevier, 2013 E	di	tic	on,
2. Srinivasan A	<u></u>	Cloud Compu	ting: A practical approach for learning and					
implementation	n. 1	2014, Pearson	Education India					
3 Thomas F	-, '							
J. Inomas. E.	Za	ugham, M., &	Ricardo, P., 2013, Cloud Computing Concepts.	,				
Technology & A	Za Arc	ugham, M., & hitecture	Ricardo, P., 2013, Cloud Computing Concepts,	,				

4. Hurwitz, J. S., & Kirsch, D, 2020, Cloud computing for dummies. John Wiley & Sons



### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

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	RUBRIC for CIE			RUBRIC for SEE				
SLNo	Content	Marks	Q. No	Contents	Marks			
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks ea	ch. Answer FIVE			
2	Tests - T1 & T2	40		full questions selecting ONE from each unit	(1 to 5).			
3	Experiential Learning - EL1 & EL2	40	1 & 2	Unit-1: Question 1 or 2	20			
	Total Marks	100	3 & 4	Unit-2: Question 3 or 4	20			
			5&6	Unit-3: Question 5 or 6	20			
			7 & 8	Unit-4: Question 7 or 8	20			
			9 & 10	Unit-5: Question 9 or 10	20			
				Tot	al Marks 100			



1 1	SEMESTER: II		
Course Code : 22MIT2C4T		CIE Marks	: 100
Credits L-T-P : 3 - 0 - 0	DATA ENGINEERING	SEE Marks	: 100
Hours : 42L	Elective C (Professional Elective)	SEE Durations	: 3 Hrs
Faculty Coordinator:	Prof. Poornima Kulkarni		
	UNIT - I		9 Hrs
Data Warehousing and Online	e Analytical Processing: Basic Concepts Data W	arehouse, Data Wa	rehouse
Modelling: Data Cube, A Multic	limensional Data Model, Stars, Snowflakes, and	Fact Constellations	: Schemas
for Multidimensional Data Mod	lels. Dimensions: The Role of Concept Hierarchies	s, Measures: The Ca	ategorizatio
and Computation. Typical OLA	P Operations, Starnet query model for querying n	nultidimensional da	atabases.
	UNIT - II		9 Hrs
Data Analytics Life Cycle: Da	ta Analytics Lifecycle Overview, Discovery, Data I	Preparation, Model	Planning,
Model Building, Communicate	Results, Operationalize, Case study of GINA. Min	ing Frequent Patte	rns,
Associations, and Correlations:	Basic Concepts and Methods, Frequent Item set	Mining Methods, V	Vhich
Patterns Are Interesting? Patter	rn Evaluation Methods. Learning Models: Basic C	Concepts, Decision '	Ггее
Induction, Bayes Classification	Methods, Linear Regression.		
	UNIT - III		8 Hrs
Introduction to NOSOL Datab	ases: Definition and Introduction. Sorted Ordere	d Column-Oriented	1 Stores.
Kev/Value Stores, Document F	Databases, Graph Databases, Understanding the	Storage Architectur	re - Working
with Column-Oriented Databas	ses HBase Distributed Storage Architecture Doc	ument Store Intern	als
Performing CRUD operations -	Creating Records, Accessing Data, Undating and	Deleting Data Out	enving
NOSOL stores Similarities Be	tween SOL and MongoDB Query Features. Access	Deleting Data, Que	Jiying
Column Oriented Databases Li	tween SQL and Mongood Query Features, Access	sing Data nom	vind a
Detahase Index Indexian and	Re HBase, indexing and Ordering datasets - Esse	initial Concepts Ben	
Database Index, Indexing and	Ordering in MongoDB Creating and Using Indexe	s in MongoDB, CAP	<u>theorem.</u>
	UNIT - IV		8 Hrs
Hadoop Distributed Filesyste	<b>m:</b> The Design of HDFS, HDFS Concepts, Data F	low – Anatomy of a	File Read,
Anatomy of File Write, Coheren	icy Model. Data Ingest with Flume an <mark>d Sqoo</mark> p. Wo	orking with MapRec	luce:
Anatomy of MapReduce, Job Se	<mark>cheduli</mark> ng, Shuffle and Sort, Task Ex <mark>ecution.</mark> Map	Reduce Types and	Formats –
Default Types, Input Formats,	<mark>Output</mark> Formats. MapReduce Featur <mark>es – Cou</mark> nter	s, Sorting, Joins.	
	UNIT - V		8 Hrs
Sqoop: Sqoop Connectors, Imp	orts, Sample Import – Text and Binary File Form	ats, Working with I	mported
Data. Hive: Comparison with T	raditional Databases – Schema on Read Versus S	chema on Write, U	pdates.
Transactions and Indexes. Hive	eOL, Tables, Ouerving Data, User – Defined Func	tions. Case Studies	: Hadoop
and Hive at Facebook, Nutch S	earch Engine, Log Processing at Rackspace.		· · · · · · · · · · · · · · · · · · ·
Course Outcomes:			
After going through this course	the student will be able to:		
CO1 : Understandin	g the life cycle of Data Processing.		
CO2 : Explore the co	procepts of processing different types of Data		
CO3 : Understand th	he applications Data Processing		
CO4: Use Hedeep r	alated tools such as Sacap and Hive for hig data	processing	
	elated tools such as Sqoop and filve for big data	processing.	
Keterence Koove			
L ligwoi Hon and Michaling V	ambor "Data Mining Concents and Techniques"	' and Edition.	
1. Jiawei Han and Micheline Ka	amber, "Data Mining – Concepts and Techniques"	' 3rd Edition;	
1. Jiawei Han and Micheline Ka Morgan Kaufmann Publishers I	amber, "Data Mining – Concepts and Techniques' Inc, 2011; ISBN 9789380931913.	' 3rd Edition;	
1. Jiawei Han and Micheline Ka Morgan Kaufmann Publishers 1 2. David Dietrich, Barry Heller,	amber, "Data Mining – Concepts and Techniques' Inc, 2011; ISBN 9789380931913. Beibei Yang, "Data Science and Big Data Analyti abora 2015, ISBN 978-81-265-2750-1	' 3rd Edition; cs", 2nd Edition, E	MC
1. Jiawei Han and Micheline Ka Morgan Kaufmann Publishers 1 2. David Dietrich, Barry Heller, education services, Wiley Publi	amber, "Data Mining – Concepts and Techniques' Inc, 2011; ISBN 9789380931913. , Beibei Yang, "Data Science and Big Data Analyti shers, 2015, ISBN 978-81-265-3750-1.	" 3rd Edition;	MC
1. Jiawei Han and Micheline Ka Morgan Kaufmann Publishers I 2. David Dietrich, Barry Heller, education services, Wiley Publi 3. Shashank Tiwari, "Profession	amber, "Data Mining – Concepts and Techniques' Inc, 2011; ISBN 9789380931913. Beibei Yang, "Data Science and Big Data Analyti shers, 2015, ISBN 978-81-265-3750-1. nal NOSQL", Wiley Publishers, 2011, ISBN: 978-0	" 3rd Edition; ics", 2nd Edition, E )-470-94224-6.	MC

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**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based seminar/presentation/demonstration (25) adding upto 40 marks.

	RUBRIC for CIE	1		RUBRIC for SEE					
SLNo	Content	Marks	Q. No	Contents	Marks				
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks each. Ans	wer FIVE				
2 Tests - T1 & T2		40		full questions selecting ONE from each unit (1 to 5).					
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20				
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20				
			5&6	Unit-3: Question 5 or 6	20				
			7 & 8	Unit-4: Question 7 or 8	20				
			9 & 10	Unit-5: Question 9 or 10	20				
				Total Mark	s 100				





University, Belagavi			
	SEMESTER: II		
Course Code : 22BT2D01T	BIOINSPIRED ENGINEERING	CIE Marks	: 100
Credits L-T-P : 3-0-0		SEE Marks	: 100
Hours : 42L	Elective D (Global Elective)	SEE Durations	s : 3 Hr
Faculty Coordinator	Dr Nagashree Rao and Dr Ashwani Sharma		
	UNIT - I		8 Hrs
Introduction to Bio-inspired E	ngineering: Macromolecules, Stem cells; types and applications.	Synthetic Biology; J	Bottom-up
and 'top-down' engineering ap	proaches. Synthetic/ artificial life. Biological Clock, Genetic Algo	rithms.	
	UNIT - II		9 Hrs
Principles of bioinspired mater	rials: Biological and synthetic materials, Self-assembly, hierarchy	y and evolution. Bio	polymers,
Bio-steel, Bio-composites, mu	ti-functional biological materials. Thermal Properties. Antireflect	tion and photo-ther	mal
biomaterials, Microfluidics in	biology, Invasive and non-invasive thermal detection inspired by	skin	
	UNIT - III		9 Hrs
Lessons from Nature:Bioinspin	ed Materials and mechanism: Firefly-Bioluminescence, Cocklebu	urs –Velcro, Lotus le	eaf -
Self-cleaning materials, Gecko	- Gecko tape, Whale fins - Turbine blades, Box Fish / Bone - Bi	onic car, Shark skir	n - Friction
reducing swim suits, Kingfishe	er beak - Bullet train, Coral - Calera cement, Forest floor / Ecosy	stem functioning -	Flooring
tiles, Morpho butterfly- Struct	ural color, Namib beetle- Water collecting, Termite mound passiv	ve cooling, Birds/In	sects-
flights/ aerodynamics, Mosqu	ito inspired micro needle.		
	UNIT - IV		8 Hrs
Biomedical Inspiration-Concep	ot and applications: Organ system- Circulatory- artificial blood, a	artificial heart, pace	maker.
Respiratory- artificial lungs. E	xcretory- Artificial kidney and skin. Artificial Support and replac	ement of human or	gans:
artificial liver and pancreas. T	otal joint replacements- artificial limbs. Visual prosthesis -artific	ial eye/ bionic eye.	
	UNIT - V		8 Hrs
	ture for fruman filliovation. I notosynthesis and i notovortaic cen	s, bionic/Artificiar	icai.
Bio-ink and 3D-Bioprinting. C	eliular automata. Biosensors: Artificial tongue and nose. Biomin	letic echolation. Ins	ect loot
adaptations for adhesion. The	rmal insulation and storage materials. Bees and Honeycomb Str	ucture. Artificial Int	elligence.
Neural Networking and bio-rol	potics.		0
Course Outcomes:			
After going through this cours	e th <mark>e studen</mark> t will be able to:		
CO1 : Elucidate the	concepts and phenomenon of natural processes		
CO2 : Apply the bas	ic principles for design and development of bioinspired structure	es	
CO3 : Analyse and a	append the concept of bio-mimetics for diverse applications		
CO4 : Designing tec	hnical solutions by utilization of bio-inspiration modules		
Reference Books			
1 D Floreano and C Mattius	si Bio-Inspired Artificial Intelligence: Theories, Methods and Tec	hnologies 1st editie	n MIT
Press 2008 ISBN: 978026200	50718	iniologics, 1st curit	<i>J</i> <b>I</b> , <b>WII</b>
2 Guang Vang Lin Xiao and	Lallenak Lamboni, Bioinspired Materials Science and Engineerir	a 1st edition John	Wilow
2.000000000000000000000000000000000000	Lanepak Lamborn, Diomspired Materials Science and Engineerin.	ig. 1st eution, John	i wney,
2010, 13BN. 970-1-119-39030	Dialogical Materiala, Disingapired Materiala, and Diamateriala, 1	at adition Combrid	
University Press 2014 ISBN (	278 1 107 01045	st cultion, cambing	ge
4 Tao Dong Disingpined Engi	778-1-107-01045.	ISDN: 079 2 507 (	22024 4
+. Tao Deng. Bioinspired Engr	neering of Thermal Materials, 1st editon, whey-vCH Press, 2018	. ISBN: 978-3-327-	33834-4.
Sahama of Oastingers 7.4	ral Evaluation (OIE) 00 + 40 + 40 = 100		
Scheme of Continuous Inter	$\begin{array}{c} \text{nal Evaluation (CIE): } 20 + 40 + 40 = 100 \\ 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 \\ 1 + 1 +$		1 4 1 6
<b>ULZES:</b> Quizzes will be cond	aucted in online/oilline mode. Two quizzes will be conducted & E	ach Quiz will be ev	aluated fo
TO Marks. The sum of two qui	zzes will be the Final Quiz marks.	a (Davis - 1 D1	T
<b>LOIS:</b> Students will be evalu	ated in test, descriptive questions with different complexity level	s (Revised Bloom's	1 axonomy
Levels: Remembering, Underst	anding, Applying, Analyzing, Evaluating, and Creating). Two tes	ts will be conducted	. Each te
will be evaluated for 50 Marks	, adding upto 100 marks. Final test marks will be reduced to 40	Marks.	
EXPERIENTIAL LEARNING:	students will be evaluated for their creativity and practical imple	mentation of the pr	oblem.
Case study-based teaching lea	rning and Program specific requirements (15), Video based		
seminar/presentation/demon	stration (25) adding upto 40 marks.		

RUBRIC for CIE			RUBRIC for SEE			
SLNo	Content	Marks	Q. No Contents Marks		Marks	
1	Quizzes - Q1 & Q2	20	20 Each unit consists of TWO questions of 20 Marks each. Answer FIVE			
2	Tests - T1 & T2	40	]	full questions selecting ONE from each unit (1 to 5).		
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20	
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20	
			5&6	Unit-3: Question 5 or 6	20	
			78 8	Unit-4: Question 7 or 8	20	
			9 & 10	Unit-5: Question 9 or 10	20	
				Total Marks	100	





	SEMESTER: II		
Course Code : 22BT2D02T	HEALTH INFORMATION	CIE Marks	: 100
Credits L-T-P : 3-0-0	HEALTH INFORMATICS	SEE Marks	: 100
Hours : 42L	Elective D (Global Elective)	SEE Duration	s : 3 Hrs
Faculty Coordinator:	Dr A H Manjunatha Reddy		
	UNIT - I		8 Hrs
Introduction, Healthcare data,	, information and knowledge: Data types, data conversion, clin	ical data warehouse,	data
analytics, challenges, role of in	nformatics in analytics, future trends		
	UNIT - II		8 Hrs
Electronic health records: Intr	oduction, scope for the e health records, challenges, examples	, logical steps to seled	cting and
implementing EHR			
	UNIT - III		8 Hrs
Data standards and medical c	oding: Introduction, medical content standards, termonology s	standards, transport	standards,
medical coding and reimburse	ement, future trends,		
		• .• • • • •	9 Hrs
Healthcare Enterprise: Overvie	ew of Health Informatics: Introduction, Key players in HI, organ	nizations involved, ba	urriers,
programs, organizations and o	career, HI Resoruces		0.11==
Health Information privacy on	d acquirity: Introduction, basic acquirity principles, outbontiest	ion and identity man	9 nrs
data security in the cloud and	client/server monogement	ion and identity man	agement,
uata security in the cloud and	chent/server management		
Course Outcomes:	1.50 9/2		
After going through this cours	e the student will be able to:		
CO1 : Understand t	he basic principles of Health informatics		
CO2 : Data capture	to data transformation and to analysis		
CO3 : Creation of E	health records identify the challenges	1	
CO4 : Improvise the	significant factors as per the spatio-temporal requirements	-	
Reference Books:	organicant nactore de per the spatie temperar requirements	-	
1. Robert E. Hovt Ann K. Yosh	ihashi, Health Informatics, Practical guide for Healthcare and	Information Technolo	
Professionals, 6th edition, Info	prmatics Education. 2014. ISBN: 978-0-9887529-2-4		-87
2. Kathryn J. Hannah Marion	J. Ball, Health Informatics, Springer Series edition, Springer,	2005, ISBN: 1-85233	-826-1
3. William R Hersh, Health Inf	formatics, a Practical guide, 8th edition. 2022, ISBN 978-1-387	7-85475-2	
4. Pentti Nieminen. Medical in	formatics and data analysis 1st edition, MDPI AG, 2021, ISBN	-13 : 978-30365009	80
Scheme of Continuous Inter	nal Evaluation (CIE): 20 + 40 + 40 = 100	1	
<b>QUIZZES:</b> Quizzes will be cond	ducted in online/offline mode. Two quizzes will be conducted &	k Each Quiz will be e	valuated fo
10 Marks. The sum of two qui	zzes will be the Final Quiz marks.	C C	
TESTS: Students will be evalu	nated in test, descriptive questions with different complexity lev	vels (Revised Bloom's	Taxonomy
Levels: Remembering, Underst	tanding, Applying, Analyzing, Evaluating, and Creating). Two t	ests will be conducted	d. Each tea
will be evaluated for 50 Marks	, adding upto 100 marks. Final test marks will be reduced to 4	10 Marks.	
<b>EXPERIENTIAL LEARNING:</b>	Students will be evaluated for their creativity and practical imp	plementation of the p	roblem.

Case study-based teaching learning and Program specific requirements (15), Video based

seminar/presentation/demonstration (25) adding upto 40 marks.

Rubric for CIE & SEE Theory courses							
RUBRIC for CIE				RUBRIC for SEE			
SLNo	Content	Marks	Q. No Contents Marks		Marks		
1	Quizzes - Q1 & Q2	20	20 Each unit consists of TWO questions of 20 Marks each. Answer FIVE				
2	Tests - T1 & T2	40		full questions selecting ONE from each unit (1 to 5).			
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20		
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20		
			5&6	Unit-3: Question 5 or 6	20		
			7&8	Unit-4: Question 7 or 8	20		
			9 & 10	Unit-5: Question 9 or 10	20		
				Total Marks	100		





		SEMESTER: II		
Course Code	: 22CS2D03T		CIE Marks	: 100
Credits L-T-P	: 3-0-0	BUSINESS ANALYTICS	SEE Marks	: 100
Hours	: 42L	Elective D (Global Elective)	SEE Durations	: 3 Hrs
Facı	alty Coordinator:	Dr. Azra Nasreen and Dr. Badarinath K	_	
	5	UNIT - I		9 Hrs
Overview of B	usiness analytics	, Scope of Business analytics, Business Analytics Process, Relation	ship of Business	Analytics
Process and o	rganization, com	petitive advantages of Business Analytics. Statistical Tools: Statisti	cal Notation, Des	criptive
Statistical me	thods, Review of	probability distribution and data modelling.		
		UNIT - II		9 Hrs
Trendiness an Resources, Bu	nd Regression An asiness Analytics	alysis Modelling Relationships and Trends in Data, simple Linear R Personnel, Data and models for Business analytics, problem solvir	egression. Impor ıg, Visualizing an	tant Id
Exploring Dat	a, Dusiness Ana			Q U#0
Organization	Structures of Bu	Siness analytics Team management Management Issues Designing	Information Pol	
Outsourcing	Ensuring Data (	uality Measuring contribution of Business analytics Managing Ch	anges Descriptiv	icy, ve
Analytics. Pre	dictive Analytics	Predicative Modelling, Predictive analytics analysis.	ungeo. Desempti	
		UNIT - IV		8 Hrs
Forecasting Te	echniques Oualit	ative and Judgmental Forecasting, Statistical Forecasting Models, I	Forecasting Mode	els for
Stationary Tin	ne Series, Foreca	sting Models for Time Series with a Linear Trend, Forecasting Time	Series with Seas	onality,
Regression Fo	recasting with C	asual Variables, Selecting Appropriate Forecasting Models.		5,
		UNIT - V		8 Hrs
Decision Anal	ysis Formulating	Decision Problems, Decision Strategies with and without Outcome	, Probabilities, D	ecision
Trees, The Val	lue of Informatio	n, Utility and Decision Making.		
	1.			
<b>Course Outco</b>	omes:			
After going the	hrough this cou	rse th <mark>e stud</mark> ent will be able to:		
CO1	: Apply the con	cepts and methods of business analytics to solve business problem:	3	
CO2	: Analyse, mod	el an <mark>d solve</mark> decision problems in different sett <mark>ings</mark>		
CO3	: Interpret resu	lts/ <mark>solution</mark> s and identify appropriate courses <mark>of actio</mark> n for a given i	business scenari	0
CO4	: Demonstrate ethical practic	skills like investigation, effective communication, working in team/less by implementing solutions to decision making problems	ndividual and fol	llowing
Reference Bo	oks:		·	
1. Business and Schniederians	halytics Principle Christopher M	Starkey 1st Edition 2014 ISBN-13: 978-0133989403 ISBN-10: (	9133989402	
2 The Value of	of Business Anal	tics: Identifying the Path to Profitability Evan Stubs John Wiley	Sons	
DOI:10.1002	/978111898388	1.1st Edition 2014. ISBN:978111898388	2 00110,	
3. Business A	nalvtics. James	Evans, Pearsons Education 2nd Edition, ISBN-13: 978-0321997821	ISBN-	
10: 03219978	24			
4. Predictive E	Business Analytic	s Forward Looking Capabilities to Improve Business, Gary Cokins	and	
Lawrence Mai	sel, Wiley; 1st Ed	lition, 2013, ISBN: 978-1-118-17556-9.		
Scheme of Co	ontinuous Inter	nal Evaluation (CIE): 20 + 40 + 40 = 100		
QUIZZES: Qu	izzes will be cone	lucted in online/offline mode. Two quizzes will be conducted & Eac	h Quiz will be eva	aluated for
10 Marks. The	e sum of two qui	zzes will be the Final Quiz marks.		
TESTS: Stude	ents will be evalu	ated in test, descriptive questions with different complexity levels (I	Revised Bloom's 7	Гахопоту
Levels: Remen	nbering, Underst	anding, Applying, Analyzing, Evaluating, and Creating). Two tests v	vill be conducted	. Each test
will be evaluat	ted for 50 Marks	adding upto 100 marks. Final test marks will be reduced to 40 Ma	rks.	
EXPERIENTI	AL LEARNING: S	Students will be evaluated for their creativity and practical impleme	ntation of the pro	oblem.
Case study-ba	ased teaching lea	rning and Program specific requirements (15), Video based		
seminar/pres	entation/demon	stration (25) adding upto 40 marks.		

Rubric for CIE & SEE Theory courses						
RUBRIC for CIE			RUBRIC for SEE			
SLNo	Content	Marks	Q. No Contents Marks		Marks	
1	Quizzes - Q1 & Q2	20	Each unit consists of TWO questions of 20 Marks each. Answer FIVE			
2	Tests - T1 & T2	40		full questions selecting ONE from each unit (1 to 5).		
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20	
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20	
			5&6	Unit-3: Question 5 or 6	20	
			7&8	Unit-4: Question 7 or 8	20	
			9 & 10	Unit-5: Question 9 or 10	20	
				Total Marks	100	





	SEMESTER: II									
Course Code : 22CV2D04T	INDUSTRIAL AND OCCURATIONAL HEALTH AND SAFETY	CIE Marks	: 100							
Credits L-T-P : 3-0-0		SEE Marks	: 100							
Hours : 42L	Elective D (Global Elective)	SEE Durations	: 3 Hrs							
Faculty Coordinator:	Dr.V.AnanthaRam									
	UNIT - I		08Hrs							
Industrial safety: Accident, cau	Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and									
preventive steps/procedure, de	escribe salient points of factories act 1948 for health and safety, we	ash rooms, drinkin	ng water							
layouts, light, cleanliness, fire,	guarding, pressure vessels, etc, Safety color codes. Fire preventior	n and fire fighting,								
equipment and methods.										
	UNIT - II 09Hrs									
Occupational health and safety	7: Introduction, Health, Occupational health: definition, Interaction	between work an	d health,							
Health hazards, workplace, eco	monity and sustainable development, work as a factor in health pro	omotion. Health pi	ond							
unions Communities Occupa	tional health professionals. Potential health hazards: Air contamin	ants Chemical ha	anu zarde							
Biological hazards, Physical ha	izards. Ergonomic hazards. Psychosocial factors. Evaluation of hea	th hazards: Expo	sure							
measurement techniques. Inte	rpretation of findings recommended exposure limits. Controlling h	azards: Engineerin	lg							
controls, Work practice control	s, Administrative controls. Occupational diseases: Definition, Char	racteristics of occu	pational							
diseases, Prevention of occupa	tional diseases.		-							
	UNIT - III		09Hrs							
Hazardous Materials character	istics and effects on health: Introduction, Chemical Agents, Organ	ic Liquids, Gases,	Metals							
and Metallic Compounds, Part	iculates and Fibers, Alkalies and Oxidizers, General Manufacturing	g Materials, Chemi	ical							
Substitutes, Allergens, Carcino	ogens, Mutagens, Reproductive Hazards, Sensitizers and Teratogen	s, Recommended	Chemical							
Exposure Limits. Physical Ager	its, Noise and Vibration, Temperature and Pressure, Carcinogenici	ty, Mutagenicity a	nd							
Teratogenicity. Ergonomic Stre	sses: Stress-Related Health Incidents, Eyestrain, Repetitive Motion	i, Lower Back Pain	i, Video							
Display Terminals.			00 11							
Ween and Correction and their	UNII - IV	hibricanta traca a	UO IIIS							
applications Lubrication meth	ods general sketch working and applications i Screw down great	se cup ii Pressure	llu e grease							
gun, iji, Splash lubrication, iv.	Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication	on, vii, Ring lubric	ation.							
Definition, principle and factor	s affecting the corrosion. Types of corrosion, corrosion prevention	methods.	,							
	UNIT - V		08 Hrs							
Periodic and preventive mainte	nance: Periodic inspection-concept and need, degreasing, cleaning	and repairing sch	iemes,							
overhauling of mechanical com	ipon <mark>ents, ove</mark> r hauling of electrical motor, co <mark>mmon tro</mark> ubles and re	medies of electric	motor,							
repair complexities and its use	, definition, need, steps and advantages of preventive maintenance	e. Steps/procedure	e for							
periodic and preventive mainte	nance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diese	el generating (DG)	sets,							
Program and schedule of preve	intive maintenance of mechanical and electrical equipment, advant	ages of preventive								
maintenance. Repair cycle con			maintenance. Repair cycle concept and importance.							
Course Outcomes										
Course Outcomes:										
After going through this cour	se the student will be able to:									
After going through this cour	rse the student will be able to:									
After going through this course CO1 : Explain the In CO2 : Demonstrate t	rse the student will be able to: dustrial and Occupational health and safety and its importance.	nich the employee	can							
After going through this courseCO1 : Explain the InCO2 : Demonstrate texpose in the in	rse the student will be able to: dustrial and Occupational health and safety and its importance. he exposure of different materials, occupational environment to wh ndustries.	nich the employee	can							
After going through this countCO1 : Explain the InCO2 : Demonstrate toexpose in the inCO3 : Characterize to	rse the student will be able to: dustrial and Occupational health and safety and its importance. he exposure of different materials, occupational environment to whindustries. he different type materials, with respect to safety and health hazard	nich the employee ds of it.	can							
After going through this countCO1 : Explain the InCO2 : Demonstrate texpose in the inCO3 : Characterize tCO4 : Analyze the di	rse the student will be able to: dustrial and Occupational health and safety and its importance. he exposure of different materials, occupational environment to whindustries. he different type materials, with respect to safety and health hazard fferent processes with regards to safety and health and the mainter	nich the employee ds of it. nance required in	can							
After going through this countCO1 : Explain the InCO2 : Demonstrate texpose in the inCO3 : Characterize tCO4 : Analyze the diindustries to a	rse the student will be able to: dustrial and Occupational health and safety and its importance. he exposure of different materials, occupational environment to whindustries. he different type materials, with respect to safety and health hazar fferent processes with regards to safety and health and the mainter void accidents.	nich the employee ds of it. nance required in	can							
After going through this coup         CO1 : Explain the In         CO2 : Demonstrate t         expose in the i         CO3 : Characterize t         CO4 : Analyze the di         industries to a         Reference Books:	<b>rse the student will be able to:</b> dustrial and Occupational health and safety and its importance. he exposure of different materials, occupational environment to whindustries. he different type materials, with respect to safety and health hazar fferent processes with regards to safety and health and the mainter void accidents.	nich the employee ds of it. nance required in	can							
After going through this count         CO1 :       Explain the In         CO2 :       Demonstrate the expose in the indicator of the expose in the expose in the indicator of the expose in the expose	rse the student will be able to: dustrial and Occupational health and safety and its importance. he exposure of different materials, occupational environment to whindustries. he different type materials, with respect to safety and health hazard fferent processes with regards to safety and health and the mainter woid accidents. ndbook, Higgins & Morrow, SBN 10: 0070432015 / ISBN 13: 9780	nich the employee ds of it. nance required in 0070432017, Publ	can the ished by							
After going through this count         CO1 :       Explain the In         CO2 :       Demonstrate the expose in the industries to a         CO3 :       Characterize the industries to a         CO4 :       Analyze the di industries to a         Reference Books:       1.Maintenance Engineering Hammed	rse the student will be able to: dustrial and Occupational health and safety and its importance. he exposure of different materials, occupational environment to whindustries. he different type materials, with respect to safety and health hazard fferent processes with regards to safety and health and the mainter woid accidents. ndbook, Higgins & Morrow, SBN 10: 0070432015 / ISBN 13: 9780 formation Services.	nich the employee ds of it. nance required in 0070432017, Publ	can the ished by							
After going through this count         CO1 :       Explain the In         CO2 :       Demonstrate the expose in the industries to a         CO3 :       Characterize the industries to a         CO4 :       Analyze the di industries to a         Reference Books:       1.Maintenance Engineering Ha         McGraw-Hill Education. Da Infa       2. H. P. Garg, Maintenance Engineering Ha	rse the student will be able to: dustrial and Occupational health and safety and its importance. he exposure of different materials, occupational environment to whindustries. he different type materials, with respect to safety and health hazar fferent processes with regards to safety and health and the mainter woid accidents. Indbook, Higgins & Morrow, SBN 10: 0070432015 / ISBN 13: 9780 formation Services. gineering Principles, Practices & Management, 2009,S. Chand and	nich the employee ds of it. nance required in 0070432017, Publ Company, New D	can the ished by elhi,							
After going through this count         CO1 :       Explain the In         CO2 :       Demonstrate the expose in the indicator is constrained to expose in the indicator is constrated to expose in the indicator is constrained	rse the student will be able to: dustrial and Occupational health and safety and its importance. he exposure of different materials, occupational environment to whindustries. he different type materials, with respect to safety and health hazar fferent processes with regards to safety and health and the mainter woid accidents. ndbook, Higgins & Morrow, SBN 10: 0070432015 / ISBN 13: 9780 formation Services. gineering Principles, Practices & Management, 2009,S. Chand and	nich the employee ds of it. nance required in 0070432017, Publ Company, New D	can the ished by elhi,							
After going through this count         CO1 :       Explain the In         CO2 :       Demonstrate the expose in the indicator is constrained to expose in the indicator indicator is constrained to expose in the indicator indicator indicator indicator indicator indicator indicator indindicator indicator indindicator indicator indicator indicator ind	rse the student will be able to: dustrial and Occupational health and safety and its importance. he exposure of different materials, occupational environment to whindustries. he different type materials, with respect to safety and health hazar fferent processes with regards to safety and health and the mainter void accidents. Indbook, Higgins & Morrow, SBN 10: 0070432015 / ISBN 13: 9780 formation Services. gineering Principles, Practices & Management, 2009,S. Chand and ccupational Health and Safety, Benjamin O. ALLI, Second edition,2	nich the employee ds of it. nance required in 0070432017, Publ Company, New D 2008 International	can the ished by elhi, Labour							
After going through this count         CO1 :       Explain the In         CO2 :       Demonstrate the expose in the indicator is constrained to expose in the indicator in the indin term indicator is constrated to expose in	rse the student will be able to: dustrial and Occupational health and safety and its importance. he exposure of different materials, occupational environment to whindustries. he different type materials, with respect to safety and health hazar fferent processes with regards to safety and health and the mainter woid accidents. Indbook, Higgins & Morrow, SBN 10: 0070432015 / ISBN 13: 9780 formation Services. gineering Principles, Practices & Management, 2009,S. Chand and ccupational Health and Safety, Benjamin O. ALLI, Second edition,2 i-92-2-120454-1	nich the employee ds of it. nance required in 0070432017, Publ Company, New D 2008 International	can the ished by elhi, Labour							



#### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 marks. Final test marks will be reduced to 40 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based

seminar/presentation/demonstration (25) adding upto 40 marks.

RUBRIC for CIE			RUBRIC for SEE			
SLNo	Content	Marks	Q. No	Contents	Marks	
1	Quizzes - Q1 & Q2	20	Each u	Each unit consists of TWO questions of 20 Marks each. Answ		
2	Tests - T1 & T2	40	full questions selecting ONE from each unit (1 to 5).			
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20	
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20	
	10	149	5&6	Unit-3: Question 5 or 6	20	
			7&8	Unit-4: Question 7 or 8	20	
			9 & 10	Unit-5: Question 9 or 10	20	
				Total Marks	100	



RV Educational Institutions	Go, change	the world					
Autonomous Institution Affiliated to Visvesvaraya Technological University, Belagavi							
SEMESTER: II							
Course Code : 22CV2D05T INTELLIGENT TRANSPORT SYSTEMS	CIE Marks	: 100					
Credits L-T-P : 3-0-0	SEE Marks	: 100					
Hours : 42L Elective D (Global Elective)	SEE Durations	: 3 Hrs					
Faculty Coordinator: Dr.Sunil S							
UNIT - I		8 Hrs					
Fundamentals of Traffic Flow and Control- Traffic flow elements, Traffic flow models, Shock waves signalization and control principles, Ramp metering, Traffic simulation	in Traffic stream	s, Traffic					
UNIT - II		9 Hrs					
ITS User services-User services bundles, Travel and Traffic management, Public Transportation Op Payment, Commercial Vehicles Operations, Emergency Management, Advanced Vehicle Control an Information Management, Maintenance and construction Management. ITS Architecture-Regional Architecture, Need of ITS architecture, concept of Operations, National ITS Architecture, Architecture	perations, Electro Id safety systems and Project ITS ure development	tool					
UNIT - III	1 · 1 m	9 Hrs					
Technology Building Blocks for ITS-Introduction, Data acquisition, Communication Tools, Data An Information. Various detection, identification and collection methods for ITS. ITS Applications and and incident management systems, Advanced arterial traffic control systems, Advanced Public Tra Multimodal Traveller Information systems	alysis, and Trave their benefits-Fr nsportation Syst	eller eeway ems,					
UNIT - IV		8 Hrs					
into Transportation Planning, relevant case studies. ITS Standards-Standard development process and standards, ITS standards application areas, National Transportation Communications for ITS testing	, National ITS ar Protocol, Standa	chitecture rds					
UNIT - V	Benefits by ITS	o nrs					
components, Evaluation Guidelines, Challenges and Opportunities. ITS for Law Enforcement: Intro support the enforcement traffic rules and regulations, ITS Funding options and ITS case studies	oduction, Enhand	ce and					
Course Outcomes: After going through this course the student will be able to:							
CO1 : Identify and apply ITS applications at different levels							
CO2 : Illustrate ITS architecture for planning process							
CO3 : Examine the significance of ITS for various levels							
CO4 : Compose the importance of ITS in implimentions							
1. Pradip Kumar Sarkar and Amit Kumar Jain, "Intelligent Transport Systems", PHI Learning Priva	ate Limited, Delh	i,2018,					
2. Choudury M A and Sadek A, "Fundamentals of Intelligent Transportation Systems Planning" Art March 2003); ISBN-10: 1580531601	tech House publi	shers (31					
3. Bob Williams, "Intelligent transportation systems standards", Artech House, London, 2008. ISBN-13: 978-1-59693-291-3							
4. Asier Perallos, Unai Hernandez-Jayo, Enrique Onieva, Ignacio Julio García Zuazola "Intelligent " Technologies and Applications" Wiley Publishing ©2015, ISBN:1118894782 9781118894781	Fransport Systen	18:					
Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100 QUIZZES: Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each 10 Marks. The sum of two quizzes will be the Final Quiz marks. TESTS: Students will be evaluated in test, descriptive questions with different complexity levels (R Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests w will be evaluated for 50 Marks, adding upto 100 marks. Final test marks will be reduced to 40 Mar EXPERIENTIAL LEARNING: Students will be evaluated for their creativity and practical implement Case study-based teaching learning and Program specific requirements (15), Video based seminar/presentation/demonstration (25) adding upto 40 marks.	n Quiz will be eva evised Bloom's T ill be conducted. rks. ntation of the pro	luated for axonomy Each test blem.					
Scheme of Semester End Examination (SEE) for 100 marks: The question paper will have FIVE	questions with i	nternal					
choice from each unit. Each question will carry 20 marks. Student will have to answer one full que	estion from each	unit.					

Rubric for CIE & SEE Theory courses							
RUBRIC for CIE				RUBRIC for SEE			
SLNo	Content	Marks	Q. No Contents Marks		Marks		
1	Quizzes - Q1 & Q2	20	20 Each unit consists of TWO questions of 20 Marks each. Answer FIVE				
2	Tests - T1 & T2	40		full questions selecting ONE from each unit (1 to 5).			
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20		
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20		
			5&6	Unit-3: Question 5 or 6	20		
			7&8	Unit-4: Question 7 or 8	20		
			9 & 10	Unit-5: Question 9 or 10	20		
				Total Marks	100		





University, B	elagavi	SEMESTED: II		
Course Code	: 22EC2D06T		CIE Marks	: 100
Credits L-T-P	: 3-0-0	ELECTRONIC SYSTEM DESIGN	SEE Marks	: 100
Hours	: 42L	Elective D (Global Elective)	SEE Durations	: 3 Hrs
Facu	lty Coordinator:	Prof. Ravishankar Holla		<u></u>
	5	UNIT - I		9 Hrs
Design Process	s & its Fundame	ntals: Life Cycle of Electronic Products, Design and Development Pr	rocess, Guidance	for
Product Planni	ing, Design and	Development, Technical Drawings, Circuit Diagrams, Computer-Aid	led Design (CAD)	
		UNIT - II		9 Hrs
System Archite	ecture and Prote	ction Requirements: Introduction - Terminology, Functions and		
Structures, Sy	stems Design Aı	chitecture, Electronic System Levels, System Protection		
Experiential Le	earning: (4 quizz	es on the below mentioned topics other than CIE) Reliability Analys	is: Introduction,	
Calculation Pri	Incipies, Expone	in that Distribution, Failure of Electronic, Components, Failure of Electronic	o Systems,	
Reliability Alla				Q U#0
Thermol Mono	gement and Cor	UNIT - III	ion Colculation I	Drinciples
Heat Transfer	Methods to Inci	rease Heat Transfer Application Examples in Electronic Systems R	ecommendations	for
Thermal Mana	gement of Electi	onic Systems, Cooling systems, liquid, air and non cooling systems		101
	80110110 01 21000	UNIT - IV	·	8 Hrs
Electromagnet	ic Compatibility	(EMC):		
Introduction, C	Coupling Betwee	n System Components, Grounding Electronic Systems, Shielding fr	om Fields, Electr	ostatic
Discharge (ESI	D), Recommenda	ations for EMC-compliant Systems Design	·	
		UNIT - V		8 Hrs
Manufacture, Material Recyc Development, 1	Use, and Dispos ling in the Dispo Recommendatio	al of Electronic Systems in the Circular Economy, Product Recyclin osal Process, Design and Development for Disassembly, Material Su ns for Environmentally Compliant Systems	g in the Disposal itability in Design	Process, n and
	10			
Course Outco	mes:			
After going th	rough this cou	rse the student will be able to:		
CO1	: Realize the fur	ndamentals of Design, Architecture, thermal management, EMC and	d Recycling requi	rements o
COD	Electronic Sys	tem Design	long with the role	atad
02	: Analyze the va	inous application wise design requirements in Electronic systems a	long with the rela	itea
CO3	· Use modern o	pen source tools to realize the various concepts of Electronic system		
C04	· Engage in self	study through assignments, simulations, case studies and projects		
Reference Boy		study unough assignments, simulations, case studies and project	5	
1. Fundamenta	als of Electronic	Systems Design, Jens Lienig, Hans Brümmer 2017, Springer Intern		ng. ISBN
978-3-319-558	339-4, DOI:10.1	007/978-3-319-55840-0	lational i abiloni	
2. "Embedded	System Design"	Marwedel, Peter, Springer Nature, 10.1007/978-3-030-60910-8		
3. "Electromag	netic Compatibi	lity Engineering", Henry W. Ott, WILEY Publication, ISBN: 978-0-47	70-18930-6	
4. "Handbook o	of Electronic Sv	stems Design" by Charles A. Harper, McGraw-Hill Inc., US, 0070266	5832, 978-00702	66834
		······································		
Scheme of Co	ntinuous Inter	nal Evaluation (CIE): 20 + 40 + 40 = 100		
QUIZZES: Qui	zzes will be cond	lucted in online/offline mode. Two guizzes will be conducted & Each	h Quiz will be eva	aluated fo
10 Marks. The	sum of two quiz	zzes will be the Final Quiz marks.	c	
TESTS: Studer	nts will be evalu	ated in test, descriptive questions with different complexity levels (F	Revised Bloom's T	`axonomy
Levels: Remem	ibering, Underst	anding, Applying, Analyzing, Evaluating, and Creating). Two tests w	vill be conducted.	Each tes
will be evaluate	ed for 50 Marks	adding upto 100 marks. Final test marks will be reduced to 40 Ma	rks.	
EXPERIENTIA	L LEARNING: S	Students will be evaluated for their creativity and practical implement	ntation of the pro	oblem.
Case study-bas	sed teaching lea	rning and Program specific requirements (15), Video based		
seminar/prese	ntation/demons	stration (25) adding upto 40 marks.		
Scheme of Se	mester End Exa	amination (SEE) for 100 marks: The question paper will have FIVE	questions with i questions	ınternal
choice from ea	ch unit. Each qi	lestion will carry 20 marks. Student will have to answer one full qu	estion from each	unit.

RUBRIC for CIE			RUBRIC for SEE			
SLNo	Content	Marks	Q. No Contents Marks		Marks	
1	Quizzes - Q1 & Q2	20	0 Each unit consists of TWO questions of 20 Marks each. Answer FIVE			
2	Tests - T1 & T2	40	1	full questions selecting ONE from each unit (1 to 5).		
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20	
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20	
			5&6	Unit-3: Question 5 or 6	20	
			78 8	Unit-4: Question 7 or 8	20	
			9 & 10	Unit-5: Question 9 or 10	20	
				Total Marks	100	



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STRUTO*	Autonomous Institution Affiliated to Visvesvaraya Technological University, Belagavi	Approved by AICTE, New Delhi					

University, Delagavi		
ļ	SEMESTER: II	<u> </u>
Course Code : 22EC2D07T	EVOLUTION OF WIRELESS TECHNOLOGIES	CIE Marks : 100
Credits L-T-P : 3-0-0		SEE Marks : 100
Hours : 42L	Elective D (Global Elective)	SEE Durations : 3 Hrs
Faculty Coordinator:	Dr. Mahesh A	
	UNIT - I	9 Hrs
Introduction to cellular system	s: Overview of Cellular Systems and evolution 2G/3G/4G/5G, Ce	llular Concepts – Frequency
reuse, Co		
channel and Adjacent channel	Interference, C/I, Handoff, Blocking, Erlang Capacity, Bluetooth,	WiFi, WWAN and PAN.
	UNIT - II	9 Hrs
Fundamentals of wireless com	munication: Wireless Channel, Wireless propagation, Link budget	, Free-space path loss, Noise
figure of receiver, Multipath fac	ling, Shadowing, Fading margin, Shadowing margin, Wireless Cha	annel Capacity, OFDM
and LTE, Large Scale Propagat	ion effects and Channel Models	
	UNIT - III	8 Hrs
Fundamentals of 5G architectu	are: Difference between 4G and 5G, 5G Architecture, Planning of 5	5G Network, Quality of
Service, Radio		
Network, Requirements, Securi	ity, SIM in 5G Era, Specifications, Standardization, Terminal Stat	es
	UNIT - IV	8 Hrs
mmWave and Visible Light Cor	nmunications: Back ground and concept of mmWave Communica	tions, Frequency bands,
propagation characteristics, ch	annel models, applications and challenges in 5G	
	UNIT - V	8 Hrs
Location Based Services, Mass	ive Internet of Things, Measurements, Network Functions Virtuali	ization,
(VR/AR/XR) Case study- Bhat	, Oser Equipment, Venicle-to-Venicle communications (V2V), Virt	ual Reality
(The find find case study blind		
Course Outcomes:		
After going through this cour	rse the student will be able to:	
CO1 : Demonstrate t	heir understanding on functioning of wireless communication sys	stem and evolution of
different wirele	ess communication systems and standards	
CO2 : Compare differ	rent technologies used for wireless communication systems.	
CO3 : Demonstrate a	an ability explain recent techniques for Wireless Communication s	systems
CO4 : Update the lat	est trends in wireless communications	
Reference Books:		
1 Theodore S Rappaport "Wit	reless Communications: Principles and Practice" Pearson, 2nd Ed	lition
2 Aditva K Jagannatham "Pri	nciples of Modern Wireless Communications" McGraw Hill 2017	
2. Ruitya K Gagainiathani, 11	"Massive MIMO Systems for 5G and howard Networks, Overview	Poopt Tranda Challongoo
ond Future Research Direction	" Sensors May 2020	Recent menus, chanenges,
4 A N Llwaechia and N M M	abyuddin A Comprehensive Survey on Millimeter Wave Commut	nications for
Fifth-Generation Wireless Netw	vorks: Feasibility and Challenges in IEEE. Access vol 8 nn 623	67-62414 2020
	onio, reasonit, and onancinges, in 1222, necess, vol. 0, pp. 020	0. 02111,2020
Scheme of Continuous Interr	nal Evaluation (CIE): $20 + 40 + 40 = 100$	
<b>OUIZZES:</b> Ouizzes will be cond	lucted in online /offline mode. Two quizzes will be conducted & Ea	ach Ouiz will be evaluated for
10 Marks. The sum of two quiz	izes will be the Final Ouiz marks.	

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 marks. Final test marks will be reduced to 40 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based

seminar/presentation/demonstration (25) adding upto 40 marks.

	RUBRIC for CIE		RUBRIC for SEE				
SLNo	Content	Marks	Q. No	Contents	Marks		
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks each. Answ	ver FIVE		
2	Tests - T1 & T2	40	1	full questions selecting ONE from each unit (1 to 5).			
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20		
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20		
			5&6	Unit-3: Question 5 or 6	20		
			78 8	Unit-4: Question 7 or 8	20		
			9 & 10	Unit-5: Question 9 or 10	20		
				Total Marks	100		



	Delagavi	SEMESTER: II		
Course Code	: 22ET2D08T	CIE Marks	: 100	)
Credits L-T-P	: 3-0-0	SEE Marks	: 100	)
Hours	: 42L	Elective D (Global Elective) SEE Durations	: 3 H	Irs
Faculty Coord	inator:	Prof. Shambulinga .M, Dr. B. Roja Reddy		
C C		UNIT - I	9 H	Irs
An Introduction Application of of Detection as	on to Radar: Basi radar, Types of I nd False alarm, I	c Radar, The simple form of the Radar Equation, Radar Block Diagram, Radar Frequ Radars. Detection of signals in Noise, Receiver Noise and the Signal-to Noise Ratio, P. ntroduction to Doppler, MTI, UWB Radars	encie obab	s, oility
		UNIT - II	8 H	Irs
Terrestrial Net positioning in	twork based posi cellular network	tioning and navigation: General Issues of wireless positions location, Fundamentals, s, positioning in WLANs, Positioning in Wireless sensor networks.		
		UNIT - III	8 H	Irs
Satellite-based	1 navigation syst	ems: Global Navigation satellite systems (GNSS), GNSS receivers.		
		UNIT - IV	9 H	Irs
LiDAR: Introdu Flash LiDAR v Basic compon	ersus Scanning ents and physica	LiDAR, Monostatic versus Bistatic LiDAR, Major Devices in a LiDAR, LiDAR remote s li principles of LiDAR, LiDAR accuracy and data formats.	odes, ensin	ıg,
		UNIT - V	8 H	ſrs
Course Outco After going th	omes: hrough this cou	rse the student will be able to:		
CO1	: Understand th	e conc <mark>epts</mark> of Radar, LiDAR, Sonar, terrestria <mark>l and</mark> satellite based navigation system		
CO2	: Apply the cond determining th	cepts <mark>of rad</mark> ars, LiDAR, Sonar, cellular networ <mark>ks, WL</mark> AN, sensor networks and satellin ne us <mark>er pos</mark> ition and navigation.	es in	
CO3	: Analyze the di	fferent parameters of satellite and terrestrial networks for navigation systems.		
CO4	: Evaluate the F tracking syste	Radar, LiDAR, Sonar systems and satellite and terrestrial network based navigation a	nd	
<b>Reference Bo</b>	oks:			
1. M. L Skolni	k,Introduction to	RADAR Systems,3rd edition, 2017,TATA Mcgraw-Hill, ISBN: 978-0070445338		
2. Mark A Ricl edition,SciTec	hards, James A S h Publishing Inc	Sche <mark>er, William A Holam,Principles of Modern Radar</mark> Basic Principles, 2010, 1st , ISBN:978-1891121524 .		
3. Davide dard	lari, Emanuela F	alletti, Marco Luise, Satellite and Terrestrial Radio Positioning techniques- A signal p	proces	ssin
perspective, 1	st Edition, 2012,	Elsevier Academic Press, ISBN: 978-0-12-382084-6.		
4. Paul McMa	namon,LiDAR Te	chnologies and Systems, SPIE press, 2019.		
5. Pinliang Do	ng and Qi Chen,	LiDAR Remote Sensing and Applications, CRC Press, 2018, ISBN: 978-1-4822-4301-	7	
6. Jean-Paul M	Marage, Yvon Mo	ri, Sonar and Underwater Acoustics, Wiley, 2013, ISBN: 9781118600658		
		No long NU /		
Scheme of Co QUIZZES: Qui 10 Marks. The TESTS: Stude	ontinuous Intern izzes will be cond e sum of two quiz ents will be evalu	<b>hal Evaluation (CIE): 20 + 40 + 40 = 100</b> lucted in online/offline mode. Two quizzes will be conducted & Each Quiz will be eva zes will be the Final Quiz marks. ated in test, descriptive questions with different complexity levels (Revised Bloom's T	luateo axonc	d fo: omy

Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 marks. Final test marks will be reduced to 40 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based

seminar/presentation/demonstration (25) adding upto 40 marks.

	Rub	ric for	CIE & S	SEE Theory courses			
	RUBRIC for CIE			RUBRIC for SEE			
SLNo	Content	Marks	Q. No	Contents	Marks		
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks each. Answ	er FIVE		
2	Tests - T1 & T2	40		full questions selecting ONE from each unit (1 to 5).			
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20		
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20		
			5&6	Unit-3: Question 5 or 6	20		
			7&8	Unit-4: Question 7 or 8	20		
			9 & 10	Unit-5: Question 9 or 10	20		
				Total Marks	100		





,	Doilug		SEMESTED. II			
Course Code		TODOT	SEMESTER: II	CIE Montro	. 1	00
Crodita L T D	·	221111/2/1/91	PROJECT MANAGEMENT	CIE Marks	+	.00
Lieuns L-I-P	•	3-0-0	Floating D (Clobal Floating)	SEE Marks		.00
Hours	•	42L		SEE Durations	: 3	Hrs
Faci	ut	y Coordinator:	Dr. Vikram N Banadurdesai			
				1 / 1 / 1 /	<u>8</u>	<u>Hrs</u>
Introduction: Planning Proc	P es	roject Planning s, Work Breako	g, Need of Project Planning, Project Life Cycle, Roles, Responsibility as lown Structure (WBS), Introduction to Agile Methodology.	nd Team Work,	Pro	iject
			UNIT - II		8	3 Hrs
<b>Capital Budge</b> facets of proje	eti ct	<b>ng</b> : Capital Inv analysis, feasil	vestments: Importance and Difficulties, phases of capital budgeting, l bility study – a schematic diagram, objectives of capital budgeting	levels of decision	ı m	laking,
FJ-			UNIT - III		ç	Hrs
Project Costi	ng	. Cost of Project	t Means of Finance Cost of Production Working Capital Requireme	nt and its Finar		ng
Profitability Pr Modeling, Soc	oj ial	ections, Project Cost Benefit A	ted Cash Flow Statement, Projected Balance Sheet, Multi-year Projectanalysis	tions, Financial		-8,
			UNIT - IV		8	3 Hrs
Tools & Tech networks, Pro	<b>ni</b> jec	<b>ques of Projec</b> et evaluation ar	<b>t Management:</b> Bar (GANTT) chart, bar chart for combined activities and review Techniques (PERT) Critical Path Method (CPM), Computeriz	s, logic diagrams zed project man	s ai age	nd ment
			UNIT - V	1 5	Ĭç	Hrs
Course Outco	m	es:	ree the student will be able to:			
CO1		Fyplain project	t planning activities that accurately forecast project costs, timelines	and quality		
<u> </u>	•	Explain project	udget and cost analysis of project feasibility	and quanty.		
<u> </u>	•	Applyze the co	neepts, tools and techniques for managing projects			
<u> </u>	•	Illustrata proje	neepts, tools and techniques for managing projects.	holdors from m	11+	inlo
04	ŀ	sectors of the	economy (i.e. consulting government arts media and charity organ	izations)	JIU	ipie
Peference Bo			ceonomy (i.e. consulting, government, arts, media, and charity organ	112atio113).		
1 Prasanna C	h	andra Project I	Planning Analysis Selection Financing Implementation & amp: Review	7 Tata		
McGraw Hill F	411 711	olication. 8th F	Cition, 2010, ISBN 0-07-007793-2.	, iata		
2. Project Mar	าลย	gement Institut	e. A Guide to the Project Management Body of Knowledge (PMBOK			
Guide), 5th Ec	lit	ion, 2013, ISB	N: 978-1-935589-67-9			
3. Harold Kerz	zne	er, Project Man	agement A System approach to Planning Scheduling & amp; Controll	ing,		
John Wiley &a	۱m	p; Sons Inc., 1	1th Edition, 2013, ISBN 978-1-118-02227-6.			
4. Rory Burke	, F	Project Manage	ment – Planning and Controlling Techniques, John Wiley & amp; Son	s, 4th		
Edition, 2004,	IS	SBN: 9812-53-	121-1			
Scheme of Co QUIZZES: Qui 10 Marks. The TESTS: Stude Levels: Remen	on izz e s ent	tinuous Interr es will be cond um of two quiz s will be evalua ering, Understa	<b>hal Evaluation (CIE): 20 + 40 + 40 = 100</b> Jucted in online/offline mode. Two quizzes will be conducted & Each izes will be the Final Quiz marks. ated in test, descriptive questions with different complexity levels (Re anding, Applying, Analyzing, Evaluating, and Creating). Two tests will	Quiz will be eva vised Bloom's Ta ll be conducted.	lua axc Ea	ited for onomy ich tes

will be evaluated for 50 Marks, adding upto 100 marks. Final test marks will be reduced to 40 Marks. **EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem.

Case study-based teaching learning and Program specific requirements (15), Video based

seminar/presentation/demonstration (25) adding upto 40 marks.

	Rub	ric for (	CIE &	SEE Theory courses	
	RUBRIC for CIE			RUBRIC for SEE	1
SLNo	Content	Marks	Q. No	Contents	Marks
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks each. Answ	ver FIVE
2	Tests - T1 & T2	40		full questions selecting ONE from each unit (1 to 5).	
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20
			5&6	Unit-3: Question 5 or 6	20
			7&8	Unit-4: Question 7 or 8	20
			9 & 10	Unit-5: Question 9 or 10	20
				Total Marks	100



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STITUTION.	Autonomous Institution Affiliated to Visvesvaraya Technological University, Belagavi	Approved by AICTE, New Delhi

University, I	Selag	avi								
			SEMESTER: II	1						
Course Code	:	22IS2D10T	DATABASE AND INFORMATION SYSTEMS       CIE Marks       : 1         SEE Marks       : 1							
Credits L-T-P	:	3-0-0		SEE Marks	: 100	)				
Hours	:	42L	Elective D (Global Elective)	SEE Durations	: 3 H1	rs				
Facu	ılt	y Coordinator:	Prof.Smitha G R							
			UNIT - I		8 H	rs				
Advanced Dat	ab	ase Models, Sy	stems, and Applications : Enhanced Data Models: Introduction to A	Active, Temporal,	Spatia	al,				
Multimedia, a	nd	Deductive Da	tabases . Distributed Database Concepts : Distributed Database Co	ncepts, Data	_					
Fragmentatior	<b>1</b> , İ	Replication, an	d Allocation Techniques for Distributed Database Design, Overview	of Concurrency	Contro	ol				
and Recovery	in	Distributed Da	atabases							
			UNIT - II		8 H:	rs				
Introduction to	o I	nformation Re	trieval and Web Search : Information Retrieval (IR) Concepts Retriev	al Models, Types	of					
Queries in IR	Sy	stems , Text Pi	reprocessing , Inverted Indexing, Evaluation Measures of Search Re	levance ,Web Sea	rch ar	nd				
Analysis, Tren	ds	s in Information	n Retrieval .							
			UNIT - III		8 H:	rs				
Information Sy	ys	tems, Organiza	tions and Strategy: Organizations and information systems, How in	formation system	ns imp	oact				
organization a	no	l business firm	s, Using information systems to gain competitive advantage, managed	gement issues, Et	thical a	and				
Social issues i	n	Information Sy	stems: Understanding ethical and Social issues related to Information	on Systems, Eth	ics in a	an				
information so	oci	ety, The moral	dimensions of information society. A Case study on business plann	ling.						
			UNIT - IV		<b>9</b> H	rs				
Achieving Ope	ra	tional Excellen	ce and Customer Intimacy: Enterprise systems, Supply chain mana	agement(SCM) sy	stems,	,				
Customer rela	tic	onship manage	ment(CRM) systems, Enterprise application. E-commerce: Digital M	arkets Digital Go	ods:					
E-commerce a	no	the internet,	E-commerce-business and technology, The mobile digital platform a	and mobile E-com	imerce	e,				
Building and I	£-(	commerce web	site. A Case study on ERP.							
			UNIT - V		<b>9 H</b>	rs				
Managing Kno	w	ledge:								
The knowledge	e r	nanagement la	ndscape, Enterprise-wide knowledge management system, Knowled	ige work systems	,					
Intelligent tech	nn	iques. Enhanc	ing Decision Making: Decision making and information systems, Bi	isiness intelligen	ce in t	he				
enterprise. Bu	S1	ness intelligend	ce constituencies. Building Information Systems: Systems as planne	ed organizational	chang	ge,				
Overview of sy	st	ems developme	ent.							
0										
Course Outco	m	les:	the student will be able to:							
		Understand th	se the student will be able to:							
C01	•		a technology of Information Detrievel and Web Secret							
002	:	Appricieate the	te technology of miormation Retrieval and web Search							
003	:	To understand	the basic principles and working of information technology.							
CO4	:	Describe the r	ole of information technology and information systems in business.							
<b>Reference Bo</b>	oł	s:								
1. Kenneth C.	La	audon and Jan	e P. Laudon: Management Information System, Managing the Digita	al Firm, Pearson						
Education, 14	th	Global edition	, 2016, ISBN:9781292094007.							
2. Fundament	al	s of Database S	Systems, Ramez Elmasri, Shamkant B. Navathe, 7th Edition, 2016,	Published by Pea	arson,					
Copyright © , 1	IS:	BN-10: 013397	70779							
3. James A. O	' E	Brien, George M	I. Marakas: Management Information Systems, Global McGraw Hill,	, 10th Edition, 20	)11, IS	3BN:				
978-00728231	1	0.								
4. Database M	lai	nagement Syste	ems, Raghu Ramakrishnan and Johannes Gehrke, 3rd Edition, 200	3, McGraw-Hill,	ISBN:					
97800712315	10	)								
Scheme of Co	n	tinuous Intern	hal Evaluation (CIE): $20 + 40 + 40 = 100$	o · · · · · · · · · · ·		1.0				
QUIZZES: Qui	ZZ	es will be cond	succed in online/offline mode. Two quizzes will be conducted & Each	1 Quiz will be eva	uated	1 for				
10 Marks. The	s	um of two quiz	zes will be the Final Quiz marks.	· · 1 D1 · / //						
Levela: Doman	nt .h	s will be evaluated	area in rest, descriptive questions with different complexity levels (k	evised Bloom's T	axonol	test				
will be evolue	ω. U	tor 50 Morizo	anding up to 100 marks. Final test marks will be reduced to 40 Ma	m DE COMUUCIEA.	њасп	ເຕຣເ				
EXPERIENTI	.CC \1		auding up to 100 marks. Final icst marks will be reduced to 40 Ma	tation of the pro	hlem					
Case study-ba	se	d teaching leas	rning and Program specific requirements (15) Video based	nation of the plo	JICIII.					
seminar/nrese	-n	tation / demons	tration (25) adding unto 40 marks							
Scheme of Se	m	ester End Eva	mination (SEE) for 100 marks: The question paper will have FIVE	auestions with i	nterno	al				
choice from ea	lcł	n unit. Each qu	testion will carry 20 marks. Student will have to answer one full qu	estion from each	unit.					

Rubric for CIE & SEE Theory courses

RV Educational Institutions \* RV College of Engineering \* Autonomous Institution Affiliated University, Belagari

	RUBRIC for CIE	1		RUBRIC for SEE	1
SLNo	Content	Marks	Q. No	Contents	Marks
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks each. Answ	ver FIVE
2	Tests - T1 & T2	40	]	full questions selecting ONE from each unit (1 to 5).	
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20
			5&6	Unit-3: Question 5 or 6	20
			78 8	Unit-4: Question 7 or 8	20
			9 & 10	Unit-5: Question 9 or 10	20
				Total Marks	100



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Autonomous Institution Affiliated to Visvesvarava		
Technological University, Belagavi		
	SEMESTER: II	
Course Code : 22IS2D11T	MANAGEMENT INFORMATION SYSTEMS	CIE Marks : 100
Credits L-T-P : 3-0-0	Elective D (Clobal Elective)	SEE Marks : 100
Hours : 42L	Prof Vanishree K	SEE Durations  : 3 Hrs
	UNIT - I	8 Hrs
Overview: Introduction: Professional Software Develop activities, Coping with Change Agile Software Development: I scaling agile methods. Informa	oment, Software Engineering Ethics, Case studies. Software Proce e, Process improvement. The Rational Unified Process. Computer Introduction to agile methods, Agile development techniques, Agi ation Systems in Global Business Today: The role of information	esses: Models, Process Aided Software Engineering. le project management and systems in business today,
Perspectives on information s	ystems, Contemporary approaches to information systems	
	UNIT - II	9 Hrs
Software Requirements: Func and Change. System Modeling architecture. Information Syst systems impact organization a issues	tional and Non-functional requirements. Requirements Elicitatio g: Context models, Interaction models, Structural models, Behav tems, Organizations and Strategy: Organizations and information and business firms, Using information systems to gain competitiv	n, Specification, Validation ioural models, Model driven n systems, How information ve advantage, management
	UNIT - III	9 Hrs
Development and Testing:		
Design and implementation: O development. Software Testing Securing Information Systems framework for security and co	Dbject oriented design using UML, Design patterns, Implementat g: Development testing, Test-driven development, Release testing s: System vulnerability and abuse, Business value of security and ontrol, Technology and tools for protecting information resources UNIT - IV	ion issues, Open-source g, User testing. d control, Establishing . A case study on cybercrime. <b>8 Hrs</b>
Dependable systems: Dependa dependability, A15 Availability Markets Digital Goods: E-com	ability properties, Sociotechnical systems, dependable processes y and reliability, reliability requirements, Reliability measuremen merce and the internet, E-commerce-business and technology, A	, formal methods and ats E-commerce: Digital A Case study on ERP.
Software Managements	UNIT - V	8 Hrs
Project Management: Risk Ma development, Project Schedul Systems: Systems as planned	nagement, Managing People, Teamwork, Project Planning: Softwing, Agile planning, Estimation Techniques, COCOMO cost mode organizational change, Overview of systems development.	are Pricing, Plan driven eling. Building Information
Course Outcomes: After going through this cou	urse the student will be able to:	
CO1 : Understand a	and apply the fundamental concepts of software engineering for i	nformation systems.
CO2 : Develop the k	knowledge about software engineering for management of information of the second state	ation systems.
CO3 : Interpret and	recommend the use information technology to solve business pr	oblems.
Peference Books:	ework and process for anguing organizations in objectives with t	Jusiness strategy.
1. Kenneth C. Laudon and Ja Education, 14th Global edition	ne P. Laudon: Management Information System, Managing the D n, 2016, ISBN:9781292094007.	Digital Firm, Pearson
2. Ian Sommerville,— Software 9788131762165	e Engineering, 9th Edition, Pearson Education, 2013, ISBN:	
3. W.S. Jawadekar: Managem	ent Information Systems, Tata McGraw Hill, 2006, ISBN: 978007	70616349.
4. James A. O'Brien, George 1 10th Edition, 2011, ISBN: 978	M. Marakas: Management Information Systems, Global McGraw 8-0072823110	Hill,
Scheme of Continuous Inter	rnal Evaluation (CIE): $20 + 40 + 40 = 100$	
<b>QUIZZES:</b> Quizzes will be con	ducted in online/offline mode. Two quizzes will be conducted & 1	Each Quiz will be evaluated for
10 Marks. The sum of two qui <b>TESTS:</b> Students will be evalu Levels: Remembering, Unders will be evaluated for 50 Marks	izzes will be the Final Quiz marks. Lated in test, descriptive questions with different complexity leve tanding, Applying, Analyzing, Evaluating, and Creating). Two tes an adding upto 100 marks. Final test marks will be reduced to 40	ls (Revised Bloom's Taxonomy ts will be conducted. Each test Marks.
<b>EXPERIENTIAL LEARNING:</b> Case study-based teaching lease study-based teaching lease seminar/presentation/demon	Students will be evaluated for their creativity and practical imple arning and Program specific requirements (15), Video based estration (25) adding unto 40 marks	ementation of the problem.
Scheme of Semester End Ex	amination (SEE) for 100 marks: The question paper will have 1	FIVE questions with internal
choice from each unit. Each q	uestion will carry 20 marks. Student will have to answer one ful	l question from each unit.
	Rubric for CIE & SEE Theory courses	

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	RUBRIC for CIE	1		RUBRIC for SEE	1
SLNo	Content	Marks	Q. No	Contents	Marks
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks each. Answ	ver FIVE
2	Tests - T1 & T2	40	]	full questions selecting ONE from each unit (1 to 5).	
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20
			5&6	Unit-3: Question 5 or 6	20
			78 8	Unit-4: Question 7 or 8	20
			9 & 10	Unit-5: Question 9 or 10	20
				Total Marks	100



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Autonomou Institution A to Visvesva	Approved by AICTE, Affiliated New Delhi araya			
Technologi University,	cal Belagavi			
		SEMESTER: II		
Course Code Credits L-T-P	: 22MAT2D12T : 3-0-0	STATISTICAL AND OPTIMIZATION METHODS	CIE Marks SEE Marks	: 100 : 100
Hours	: 42L	Elective D (Global Elective)	SEE Durations	s : 3 Hrs
Faculty Coord	inator:	Dr. PRAKASH R		
		UNIT - I		9 Hrs
Probability mo and random v Expected valu (MGF), MGF o	odels of N random ectors, Function es of sums, Prob f the sum of inde	n variables, Vector notation, Marginal probability functions, Inde s of random vectors, Expected value vector and Correlation matri ability density function of the sum of two random variables, Mon pendent random variables, Characteristic function and Probabili	pendence of rando x, Gaussian rando tent Generating Fu ity generating func	m variables om vectors, inctions etion.
(//		UNIT - II		8 Hrs
<b>Estimation:</b> F and sufficienc likelihood, Bay	Point estimation, y, Variance of a j yesian estimation	Estimator and estimate, Criteria for good estimates - unbiasedne point estimator, Methods of point estimation - Method of moment a of parameters.	ess, consistency, ef is and Method of m	fficiency naximum
		UNIT - III		9 Hrs
Null and alter regions and po and two-sided samples (F, Cl	native hypothesis ower, Standard M confidence inter hi – square, Z, t -	s, Procedure for statistical testing, Type I and Type II errors: level formal null distribution (Z-test), Z-tests for means and proportion vals, P-value, Inference about variances, Special tests of significa- test).	of significance, Re 18, Duality: two-sic 19, the for large and s	ejection led tests small
<b>1</b>		UNIT - IV		8 Hrs
Artificial Neur variants, Loss	al Networks: Intr functions in arti	oduction - Neuron model, Multilayer perceptions - Back propaga ficial neural networks, Stochastic gradient descent method.	tion algorithm and	l its
		UNIT - V		8 Hrs
Data mining, 1 data, Statistic Kernel functio	Hierarchy Cluste al nature of Big o ons and Nonlinea	ring, k-Means Clustering, Distance Metric, Data mining for Big d lata, Support Vector Machines, Statistical Learning Theory, Lines r Support Vector Machines.	ata, Characteristic ar Support Vector	rs of Big Machine,
After going th	hrough this cou	rse the student will be able to:		
CO1	: Illustrate the f	undamental concepts of statistics, random variables, estimation, nd machine learning algorithms.	, inferential statisti	ics, fuzzy
CO2	: Derive the solution statistics, fuzz	ation by applying the acquired knowledge of random variables, es y optimization and machine learning algorithms to the problems	stimation, inferenti of engineering apr	ial plications.
CO3	: Evaluate the s world problem	olution of the problems using appropriate statistical and probabi s arising in many practical situations.	ility techniques to	the real
CO4	: Compile the or optimization g	verall knowledge of statistics, probability distributions and estima ained to engage in life – long learning.	ation, tests of hypo	othesis and
Reference Bo	oks:		· • • • • • • • • • • • • • • • • • • •	
1. Roy D. Yate ISBN: 978935	es, David J. Good 4243455.	man, "Probability and Stochastic Processes", 3rd Edition, An Ind	ian Adaptation, Wi	iley, 2021,
2. Douglas C. & Sons, 2019,	Montgomery and ISBN: 9781119	George C. Runger, "Applied Statistics and Probability for Engine 570615.	ers", 7th Edition,	John Wiley
3. Trevor Hast Prediction", 21	nd Edition, Sprin	ani Jerome Friedman, "The Elements of Statistical Learning - Da ger, 2009 (Reprint 2017), ISBN-10: 0387848576, ISBN-13: 9780	ita Mining, Inferen 387848570.	ce, and
4. Michael Ba 2014, ISBN- 1	ron, "Probability 3: 978-1-4822-1	and Statistics for Computer Scientists", 2nd Edition, CRC Press, 410-9.		
<ol> <li>Shai Shalev Cambridge Ur</li> </ol>	v-Shwartz and Sh niversity Press, 20	aa Ben-David "Understanding Machine Learning: From Theory to 014, ISBN: 978-1-107-05713-5.	) Algorithms", 1st I	Edition,



#### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 marks. Final test marks will be reduced to 40 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based

seminar/presentation/demonstration (25) adding upto 40 marks.

	RUBRIC for CIE			RUBRIC for SEE			
SLNo	Content	Marks	Q. No	Contents	Marks		
1	Quizzes - Q1 & Q2	20	Each u	Each unit consists of TWO questions of 20 Marks each. Answer FIVE			
2	Tests - T1 & T2	40		full questions selecting ONE from each unit (1 to 5).			
3	Experiential Learning - EL1 & EL2	40	1&2	Unit-1: Question 1 or 2	20		
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20		
			5&6	Unit-3: Question 5 or 6	20		
			7&8	Unit-4: Question 7 or 8	20		
			9 & 10	Unit-5: Question 9 or 10	20		
				Total Marks	100		





SEMESTER: II									
Course Code :	22ME2D13T	INDUSTRY 4.0	CIE Marks	: 100					
Credits L-T-P :	3-0-0		SEE Marks	: 100					
Hours :	42L	Elective D (Global Elective)	SEE Durations	: 3 Hrs					
Faculty Coordinator: Dr. Gopalakrishna H D									
UNIT - I 8 Hrs									
Fundamentals of Industry 4.0 Introduction, Industry 4.0, RAMI 4.0 (Reference Architecture Model Industry 4.0), Servitization, Product Service-System (PSS) Industry 4.0 across the Sectors Introduction, Transportation 4.0: Multimodal Transportation Systems, Rail 4.0, Digital Transformation of Railways, Logistics 4.0 (Implications), Fundamentals of Industry 4.0, Introduction, Industry 4.0, RAMI 4.0 (Reference Architecture Model Industry 4.0), Servitization, Product Service-System (PSS) Industry 4.0 across the Sectors Introduction, Transportation 4.0: Multimodal Transportation Systems, Rail 4.0, Digital Transformation of Railways, Logistics 4.0 (Implications)									
	·	UNIT - II		8 Hrs					
The Concept of the IIoT: Modern Communication Protocols, Wireless Communication Technologies, Proximity Network Communication Protocols, TCP/IP, API: A Technical Perspective, Middleware Architecture.									
		UNIT - III		8 Hrs					
Data Analytics : Conditioning, S Internet of Thin Standards, Sect Advances in Ro Sensor Technol	in Manufacturin mart Remote M ags and New Val urity and Privac botics in the Er ogies Artificial	ng: Introduction, Power Consumption in manufacturing, Anomaly D achinery Maintenance Systems with Komatsu, Quality Prediction ir ue Proposition, Introduction, Internet of Things Examples, IoTs Val y Concerns. a of Industry 4.0, Introduction, Recent Technological Components of Intelligence, Internet of Robotic Things, Cloud Robotics	etection in Air 1 Steel Manufactu ue Creation Barr of Robots, Advano	uring. iers: ced					
	ogies, minician	IINIT - IV		9 Hrs					
lithography, 3D Net Shaping, Ad Advances in Vir Commercial Sof	P, Fused Depos dvantages of Ad- rtual Factory Re ftware.	ition Modeling, Selective Laser Sintering, Laminated Object Manufa ditive Manufacturing, Disadvantages of Additive Manufacturing. search and Applications, The State of Art, The Virtual Factory Softw	cturing, Laser Envare , Limitations	ngineered s of the					
		UNIT - V		9 Hrs					
Augmented Reality: Definitions and application of AR, VR, MR, Limitations of AR, VR, Hardware devices and Software systems, Technical issues and challenges in AR, Industrial applications, IoT and the Need for Data Rationalization Internet of Things (IoT), Internet of Things Vision, Internet of Things (IoT) Frameworks, Architecture of Internet of Things (IoT), Visualizing the Internet of Things (IoT), Essential Technologies of the Internet of Things (IoT), Key Technologies Involved in Internet of Things, Enablers of IoT, Collaborative Operations, Training. Smart Factories: Introduction, Smart factories in action, Importance, Real world smart factories, The way forward. A Roadmap: Digital Transformation, Transforming Operational Processes, Business Models, Increase Operational Efficiency, Develop New Business Models.									
Course Outcon	nes:								
After going thr	ough this cour	se the student will be able to:							
CO1 :	Understand th individuals	e opportunities, challenges brought about by Industry 4.0 for benef	its of organizatio	ons and					
CO2 :	Analyze the eff	ectiveness of Smart Factories, Smart cities, Smart products and Sn	nart services						
CO3 :	Apply the Indu	strial 4.0 concepts in a manufacturing plant to improve productivit	y and profits						
CO4 :	Evaluate the e	ffectiveness of Cloud Computing in a networked economy							
Reference Boo	ks:								
1. Alasdair Gilchrist, Industry 4.0 The Industrial Internet Of Things, Apress Publisher, ISBN-13 (pbk): 978-1-4842-2046-7									
2. Alp Ustundag, Emre Cevikcan, Industry 4.0: Managing The Digital Transformation, Springer, 2018 ISBN 978-3-319-57869-9.									
3.Ovidiu Verme worlds, Rivers F	san and Peer Fi Publishers, 2016	riess, Designing the industry - Internet of things connecting the phy 5 ISBN 978-87-93379-81-7	vsical, digital and	l virtual					
4.Christoph Jan Logistics, Sprin	n Bartodziej, Th ger Gabler, 201	e concept Industry 4.0- An Empirical Analysis of Technologies and 7 ISBN 978-3-6581-6502-4.	Applications in P	roduction					


#### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 marks. Final test marks will be reduced to 40 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based

seminar/presentation/demonstration (25) adding upto 40 marks.

RUBRIC for CIE				RUBRIC for SEE				
SLNo	Content	Marks	Q. No	Contents	Marks			
1	Quizzes - Q1 & Q2	20	Each u	nit consists of TWO questions of 20 Marks each. Answ	er FIVE			
2	Tests - T1 & T2	40		full questions selecting ONE from each unit (1 to 5).				
3	Experiential Learning - EL1 & EL2	40	1 & 2	Unit-1: Question 1 or 2	20			
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20			
	10	t KS	5&6	Unit-3: Question 5 or 6	20			
			7 & 8	Unit-4: Question 7 or 8	20			
			9 & 10	Unit-5: Question 9 or 10	20			
				Total Marks	100			





	-		SEMESTER: II	•	-	
Course Code	·	22MIT24L		CIE Marks	•	50
Credits L-T-P	:	1 - 0 - 1	API Development and Integration Lab	SEE Marks	:	50
Hours	:	14L + 28P	(Coding / Skill Laboratory)	SEE Durations	:	3 Hrs
Facu	lts	v Coordinator	Dr. G.S. Mamatha	022 2 th th th th	ŀ	
1 deu	<u> </u>		Content			
Design and dev	P	lon Java-hased	RESTful APIs using the latest versions of the Spring	MVC and Sprin	σ	Boot
frameworks Th	nie	s course helps	in designing and building a REST application while	delving into desig	ຮ່ ຫ	
nrinciples and	he	est practices fo	r versioning security documentation error handlin	a naging and so	511 nrt	ing Also
skills to build s	50 50	phisticated RE	ST applications using Spring technologies can be de	veloped	10	ing. 71150,
Learnings	.0	pinoticatea ICD	er applications doing opring teenhologies can be de	velopeu.		
• Build Java-ba	as	ed microservic	es, native cloud, or any applications using Spring RI	EST		
Employ Sprin	g	MVC and RES	Tful Spring			
Build a Ouick	cP	oll application	example			
• Document RF	CS	T services, as	well as versioning, paging, and sorting			
• Test, handle e	er	rors and secur	e vour application			
Examples of A	P	I Integration 1	Jse Cases			
Connect Cloud	А	apps	Change C			
Creation of Cus	ste	om APIs				
Ease the Devel	or	oment of Apps				
Strategic Team	Ň	lovement				
Multiple Servi	ce	es Managemer	it is a second se			
Building an Ap	p	lication with Sp	pring Boot			
Spring Boot off	er	s a fast way to	build applications. It gives focus more on business	features and less	0	n
infrastructure.						
<b>References:</b>						
• Modern API D	)e	velopment with	Spring and Spring Boot: Design highly scalable and	d maintainable A	PI	s with
REST, gRPC, G	ra	aphQL, and the	reactive paradigm Kindle Edition by Sourabh Shari	ma.		
<ul> <li>Mastering Spi</li> </ul>	riı	ng Boot 2.0: Bi	uild modern, cloud-native, and distributed systems u	using Spring Boo	t,	2018 by
Dinesh rajput		Spring REST: E	uilding Java Microservices and Cloud Applications	2nd ed. Edition		5
by Balaji Varar	ıa	si • Learn Micr	oservices with Spring Boot: A Practical Approach to	<b>RESTful Services</b>	sυ	Ising
RabbitMQ, Eur	el	ka, Ribbon, Zu	ul and Cucumber, January 2018			
			6			
<b>Course Outcon</b>	n	es:				
After going thro	่วน	igh this course	the student will be able to:			
CO1	:	Learn how to a	authorize a user with access token			
CO2	:	Learn how to	configure Auth0 and implement different servlets			
CO3	:	Learn how to	nake a transaction with Stripe			
CO4	:	Focus on the	inique requirements of an application while outsour	cing repetitive co	m	plex code
		to APIs.		0		-
Reference Boo	k	S				
1. Modern API	D	evelopment wit	h Spring and Spring Boot: Design highly scalable ar	nd maintainable /	٩P	Is with
REST, gRPC. G	ra	aphQL, and the	e reactive paradigm Kindle Edition by Sourabh Shar	ma.		
2. Mastering St	or	ing Boot 2.0. F	build modern, cloud-native, and distributed systems	using Spring Bo	ot	. 2018 b
Dinesh Rajput		0	,	<u> </u>	-	,

3. Spring REST: Building Java Microservices and Cloud Applications 2nd ed. Edition by Balaji Varanasi

4. Learn Microservices with Spring Boot: A Practical Approach to RESTful Services using RabbitMQ, Eureka, Ribbon, Zuul and Cucumber, January 2018



**Scheme of Continuous Internal Evaluation (CIE- Laboratory) : Only LAB Course** 30 + 10 + 10 = 50. The Laboratory session is held every week as per the timetable and the performance of the student is evaluated in every session. The average of marks over number of experiments conducted over the weeks is considered for 30 Marks i.e (Lab Report, Observation & Analysis). The students are encouraged to implement additional innovative experiments in the lab (10 marks). At the end of the semester a test is conducted for 10 Marks (Lab Test). This adds to 50 Marks.

**Scheme of Semester End Examination (SEE- Laboratory) : Only LAB Course** 40 + 10 =50. Students will be evaluated for Write-up, Experimental Setup, Experiment Conduction with Results, Analysis & Discussions for 40 Marks and Viva will be conducted for 10 Marks adding to 50 Marks.

	Only LAB	Courses	s with 50 Marks		
RUBRIC FOR CIE			RUBRIC FOR SEE		
Sl.No	No Content		Content	Marks	
1	Write Up, Setup, Conduction Results, Analysis & Discussions	30	1. Write Up, Setup, Conduction	40	
2	Innovative Experiment/Concept Design & Implementation	10	2. Results, Analysis & Discussions	40	
3	Laboratory Internal	10	Viva Voce	10	
	Total Marks	50	Total Marks	50	



Autonomous Institution Affiliated to Visvesvaraya Technological University, Belagavi

		SEMESTER: II		
Course Code	: 22HSS25T	PROFESSIONAL SKILL	CIE Marks	: 50
Credits L-T-P	: 2-0-0	DEVELOPMENT- I	SEE Marks	: 50
Hours	: 28L	Common Course to all M.Tech Programs	SEE Durations	: 2 Hrs
Facu	lty Coordinator:	Dr. C.Bindu Ashwini		
		UNIT - I		4 Hrs
Communicati	on Skills: Basic	s of Communication, Personal Skills &	; Presentation Sl	kills –
Introduction,	Application, Sir	nulation, Attitudinal Development, Self Co	nfidence, SWOC	analysis.
Resume Writi	ng: Understand	ing the basic essentials for a resume, Resu	ume writing tips (	Guidelines
for better pres	sentation of fact	s. Theory and Applications.		
		UNIT - II		8 Hrs
Quantitative	Aptitude and Da	ata Analysis: Number Systems, Math Vocal	oulary, fraction d	ecimals, digit
places etc. Sin	mple equations	– Linear equations, Elimination Method, S	ubstitution meth	od,
Inequalities.	Reasoning – a. V	erbal - Blood Relation, Sense of Direction,	Arithmetic &am	p; Alphabet.
b. Non- Verba	al reasoning - Vi	sual Sequence, Visual analogy and classifi	cation. Analytica	l Reasoning -
Jorical Aptitu	Multiple compa	Venn-diagram method Three statement s	villogism Deduct	ive and
inductive reas	soning Introduc	stion to puzzle and games organizing inform	mation narts of a	ive allu
common flaw	s, arguments ar	ad assumptions	nation, parts of e	in argument,
Verbal Analog	zies/Aptitude – i	introduction to different question types $-a$	nalogies, Gramm	ar review.
sentence com	pletions, senten	ce corrections, antonyms/synonyms, voca	bulary building	etc. Reading
Comprehensi	on, Problem Sol	ving,		C
	~	UNIT - III	0	6 Hrs
Interview Skil	lls: Questions as	sked & how to handle them, Body lan	guage in intervie <sup>,</sup>	w, and
Etiquette – Co	onversational ar	<mark>nd Prof</mark> essional, Dress code in inte <mark>rview, P</mark> r	ofessional attire	and Grooming,
Behavioral an	nd technical inte	<mark>rviews,</mark> Mock interviews - Mock in <mark>terview</mark> s	with different Pa	nels. Practice
on Stress Inte	erviews, Technic	al Interviews, and General HR interviews		
		UNIT - IV		5 Hrs
Interpersonal	and Manageria	l Skills: Optimal co-existence, cultural sen	sitivity, gender se	ensitivity;
capability and	d maturity mode	el, decision making ability and analysis for	brain storming;	Group
discussion(As	ssertiveness) and	d presentation skills;	/	
	10 1: 1:		T 1	5 Hrs
Motivation: So	elf-motivation, g	group motivation, Behavioral Management,	Inspirational an	d motivational
speech with c	iliter	mples to be cited). Leadership Skills: Ethic	s and integrity, C	Joal Setting,
Course Outor	omes:			
After going t	hrough this co	urse the student will be able to:		
CO1	· Develop profe	essional skill to suit the industry requirement	ent.	
CO2	· Analyze prob	lems using quantitative and reasoning skil	18	
C03	· Develop leade	ership and inter personal working skills	10	
C04	: Demonstrate	verbal communication skills with appropr	iate hody langua	ne
Peference Br		verbal communication skins with appropri-		50.
1 The 7 Hobi	ts of Highly Effe	octive Deonle Stenhen P. Covey Free Dress	2004 Edition	
ISBN: 074327	72455	cuve reopie, Stephen R covey rice riess,	2004 Eution,	
2 How to win	friends and inf	luence people. Dale Carnegie General Pres	s 1st Edition 20	)16
ISBN: 978938	30914787		-, 15t Bardon, 20	
3. Crucial Co	nversation: Tool	s for Talking When Stakes are High. Kerrv	Patterson, Joser	h
Grenny, Ron	Mcmillan 2012	Edition, McGraw-Hill Publication ISBN: 97	80071772204	
4. Ethnus Ar	otimithra: Best A	Aptitude Book ,2014 Edition. Tata McGraw	Hill ISBN: 9781	259058738



Phase *	Activity
	Test 1 is conducted after completion 9 of hours of training program (3 Class) for 50
т	marks
1	Part A- Quiz for 15 Marks and Part B for 50 Marks (Descriptive answers). Part B – 50
	Marks is consolidated to 35 and total marks on 50 is 15 + 35 = 50 Marks.
	Test 2 is conducted after completion 18 hours of training program (6 Class) for 50 marks
TT	Part
11	A- Quiz for 15 Marks and Part B for 50 Marks (Descriptive answers). Part B – 50 Marks
	is consolidated to 35 and total marks on 50 is $15 + 35 = 50$ Marks.
	Average of 2 tests is considered as final CIE marks
emester E	<b>nd Examination:</b> SEE is conducted for 50 Marks for a duration of 2 hours.



	i i	SEMESTER: III	
Course Code	: 22MIT31T		CIE Marks : 100
Credits L-T-P	: 3 - 1 - 0	BIG DATA ANALYTICS	SEE Marks : 100
Hours	: 42L + 28T	Professional Core - 5	SEE Durations : 3 Hrs
Facu	ilty Coordinator:	Prof. Swetha S	
1 400		UNIT - I	9 Hrs
INTRODUCTIO	ON TO BIG DAT	A: Big Data – Definition, Characteristic Features –	Big Data Applications - Big
Data vs Tradit	ional Data - Risk	s of Big Data - Structure of Big Data - Challenges of	of Conventional Systems -
Web Data – Ev	olution of Analyt	ic Scalability - Evolution of Analytic Processes, Too	ols and methods - Analysis vs
Reporting - Mo	dern Data Analy	tic Tools.	_
		UNIT - II	9 Hrs
HADOOP FRA	MEWORK: Distr	ibuted File Systems - Large-Scale FileSystem Organ	nization – HDFS concepts -
MapReduce Ex	ecution, Algorith	ms using MapReduce, Matrix-Vector Multiplication	n – Hadoop YARN
		UNIT - III	8 Hrs
DATA ANALYS	<b>SIS:</b> Statistical M	ethods:Regression modelling, Multivariate Analysis	s - Classification: SVM &
Kernel Method	s - Rule Mining -	Cluster Analysis, Types of Data in Cluster Analysi	s, Partitioning
Methods,Hiera	rchical Methods,	Density Based Methods, Grid Based Methods, Mod	del Based Clustering Methods,
Clustering Hig	h Dimensional D	ata - Predictive Analytics	
		UNIT - IV	8 Hrs
MINING DATA	STREAMS: Stre	eams: Concepts – Stream Data Model and Architect	ure - Sampling data in a
stream - Minin	ig Data Streams	and Mining Time-series data - Real Time Analytics	Platform (RTAP) Applications
- Case Studies	- Real Time Sen	timent Analysis, Stock Market Predictions.	
		UNIT - V	8 Hrs
BIG DATA FR	AMEWORKS : In	troduction to NoSQL – Aggregate Data Models – Hb	base: Data Model and
Implementatio	ns – Hbase Clien	ts – Examples – .Cassandra: Data Model – Example	es – Cassandra Clients –
Hadoop Integra	ation. Pig – Grun	t – Pig Data Model – Pig Latin – developing and test	ing Pig Latin scripts. Hive –
Data Types an	d File Formats –	HiveQL Data Definition – HiveQL Data Manipulatio	n – HiveQL Queries
Course Outco	mes:	the standard mill he ship to:	
After going thr	Dough this course	the student will be able to:	
C01	: Perform analy	tics on real-time streaming data and design solution	
C02	: Apply NoSql a	Iternative database models to solve real world prob	lems
C03	: Analyze data	by utilizing various statistical and data mining appr	roaches
CO4	: Design and In	plementation of solution using pig and Hive to solu	ve data intensive problems.
Reference Bo	oks		
1. Bill Franks,	-Taming the Big	g Data Tidal Wave: Finding Opportunities in Huge I	Data Streams with Advanced
Analytics <sup>  </sup> , Wile	ey and SAS Busi	ness Series, 2012.	
2. David Loshi	n, Big Data Anal	ytics: From Strategic Planning to Enterprise Integra	ation with Tools, Techniques,
NoSQL, and G	raph, 2013.		
3. Michael Min	elli, Michelle Ch	ambers, and Ambiga Dhiraj, Big Data, Big Analytic	s: Emerging Business
Intelligence an	d Analytic Trend	s for Today's Businesses, Wiley, 2013	
4. P. J. Sadala	ge and M. Fowler	r, NoSQL Distilled: A Brief Guide to the Emerging W	Vorld of Polyglot Persistence,
Addison-Wesle	y Professional, 2	012.	
Scheme of Co	ntinuous Intern	al Evaluation (CIE): $20 + 40 + 40 = 100$	
QUIZZES: Qui	zzes will be cond	ucted in online/offline mode. Two quizzes will be co	onducted & Each Quiz will be
evaluated for 1	0 Marks. The su	m of two quizzes will be the Final Quiz marks.	
TESTS: Stude:	nts will be evalua	ated in test, descriptive questions with different con	nplexity levels (Revised
Bloom's laxon	uny Levels: Kem	terribering, Understanding, Applying, Analyzing, Eva	and Creating). Two
he reduced to	Mortea. Each to	est will be evaluated for 50 Marks, adding upto 100	i marks. Final test marks will
	HU MAIKS.	tudente will be evaluated for their exectivity and an	vention implementation of the
problem Cose	atudy based too	ching learning and Program apositio requirements	(15) Video based
seminar/nrese	entation / demons	tration (25) adding up to 40 marks	(10), video based
Locimar / prese	manon acmons	auton (20) adding upto 10 marks.	

RV Educational Institutions \* RV College of Engineering \* Autonomus Institution Affiliated to Visewaraya Technological University, Belagavi

			Rubri	c for C	IE & \$	SEE Theory courses				
		RUBRIC for C	HE .			RUBRIC for SEE	:			
	SLNo	Content		Marks	Q. No	Contents		Mari	65	
	1	Quizzes - Q1 & Q2		20	Each u	nit consists of TWO questions of 20	Marks each. Answ	er Fl	VE	
	2	Tests - T1 & T2		40		full questions selecting ONE from	each unit (1 to 5).			
	3	Experiential Learning - E	L1 & EL2	40	18:2	Unit-1: Question 1 or 2		2	)	
		•	Total Marks	100	3&4	Unit-2: Question 3 or 4		2	)	
					5&6	Unit-3: Question 5 or 6		2	)	
					7&8	Unit-4: Question 7 or 8		2	)	
					9 & 10	Unit-5: Question 9 or 10		2	)	
							Total Marks	10	0	
				Ś	SEME	STER: III	-			
Course C	ode	: 22MIT3E1T	AUCME		DEALI	TY - VIDTILAL DEALITY	CIE Marks		: 1	100
Credits L	-T-P	: 3 - 1 - 0	AUGME		KEALI	III & VIRIOAL REALIII	SEE Marks		: 1	100
Hours		: 42L + 28T	El	ective	E (Pro	ofessional Elective)	SEE Duratio	ns	:::	3 Hrs
	Fac	ulty Coordinator: D	r. Ashwir	ni K B		11/2	-			
		1.97		U	NIT - I				9	) Hrs
Introduct Transforr Manipula	tion t ning ting	o Virtual Reality an models, 2D and 3D the Scene, Code blo	d its app rotation	lication yaw, p Methor	is, Geo itch, a is Del	ometry of Virtual Worlds: Ge and roll Programming with U bugging Conditional and loc	cometric mode Jnity: Unity Ba pping statemen	ls, asic: ats	8,	
interinp date		<u>une scene, scae sr</u>		UN	IT - I		·p8 •		9	9 Hrs
Programm Menu and Further I Controlle	ning d UI, Learn r.	with Unity: Workin Advanced 3D move ing for Unity: The A	g with ob ement Asset Stor	jects, V re. Mou	Vorkin se-Air	ng with Script <mark>s, Playe</mark> r move	ment, Camera ontroller, Third	Mo l Pe	ver	nent, n
				UN	IT - II	I			8	3 Hrs
Augment Characte Fusion. (	ed Re ristic Comp	eality, Mixed Reality is of Tracking Techr uter Vision for Aug	y and its a nology, St mented R	applica ationar cality :	tions, ry Trac Mark	Tracking: Tracking, Calibra cking Systems, Mobile Sens er-based tracking, Marker-1	tion, and Regis ors, Optical Tr ess tracking.	stra ack	tio	n, , Sensor
		V		UN	IT - IV				8	3 Hrs
Modeling Blender t	Tool o Un	s for AR : An introd ity, Modifiers, Parti	uction to cle syster	Blende n, Anin	er. Mo nation	deling of an object, Sculptin	ig objects, Imp	orti	ng	from
				UN	IT - V	T			8	8 Hrs
Introduct through Creating event har	ion t WebX an A ndlin	o WebXR: Entering KR. R website with Web g function for the er	VR throu XR: Obje nd of the	igh We ct crea sessior	bXR, I tion, s 1.	ife cycle of WebXR applicat patial tracking, start AR ses	ion, Creating a	an X , cre	R s	session e an



#### **Course Outcomes:**

After going through this course the student will be able to:

0 0		
CO1	:	Understand the concepts of Virtual Reality/Augmented Reality and its Applications
CO2	:	Identify immersive effects and its usage to experience AR/VR through exploration of its
		environment
CO3	:	Apply virtual/augmented environment to captivate its experiences
CO4	:	Analyze the technology for unimodal/multimodal user interaction in AR and VR

#### **Reference Books**

1. "Virtual Reality", Steven M. LaValle, Copyright Steven M. LaValle 2017 Available for downloading at <a href="http://vr.cs.uiuc.edu/">http://vr.cs.uiuc.edu/</a>

"AR and VR Using the WebXR API", Rakesh Baruah, 2021, ISBN-13 (pbk): 978-1-4842-

6317-4 ISBN-13 (electronic): 978-1-4842-6318-1 https://doi.org/10.1007/978-1-4842-6318-1

3. Augmented Reality Principles and Practice", Dieter Schmalstieg Tobias Höllerer, 2016 Pearson Education, Inc., ISBN-13: 978-0-321-88357-5

4. Blender 3D: Designing Objects", Romain Caudron, Pierre-Armand Nicq, Enrico Valenza, 2016, Packt Publishing Ltd, ISBN 978-1-78712-719-7

#### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). Two tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 Marks. Final test marks will be reduced to 40 Marks.

**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning and Program specific requirements (15), Video based seminar/presentation/demonstration (25) adding upto 40 marks.

	RUBRIC for CIE	1		RUBRIC for SEE				
SLNo	Content	Marks	Q. No	). No Contents Ma				
1	Quizzes - Q1 & Q2	20	Each u	Each unit consists of TWO questions of 20 Marks each. Answer FIVE full questions selecting ONE from each unit (1 to 5).				
2	Tests - T1 & T2	40						
3	Experiential Learning - EL1 & EL2	40	1 & 2	Unit-1: Question 1 or 2	20			
	Total Marks	100	3&4	Unit-2: Question 3 or 4	20			
			5&6	Unit-3: Question 5 or 6	20			
			7 & 8	Unit-4: Question 7 or 8	20			
			9 & 10	Unit-5: Question 9 or 10	20			
				Total Mar	cs 100			



			SEMESTER: III		
Course Code	:	22MIT3E2T	NATURAL LANGUAGE PROCESSING	CIE Marks :	100
Credits L-T-P	:	3 - 1 - 0	NATURAL LANGUAGE PROCESSING	SEE Marks :	100
Hours	:	42L + 28T	Elective E (Professional Elective)	SEE Durations :	3 Hrs
Facu	ltx	Coordinator	Dr. Rajashekara Murthy S		
Tucu	103	coordinator.			9 Hrs
Introduction t	0	Natural Lang	age Processing: The Study of Language application	ns of natural lang	1900
understanding	. <b>U</b>	valuating lang	uage understanding, different levels of language and	lysis renresentati	ons and
understanding	, c 0	rganization of	natural language understanding systems Foundati	ons of Computati	ional
Linguistics: D	, o ict	ionaries Thes	auri and WordNets Morphology POS Tagging Synta	ax: Grammars and	Parsers
Semantics. Pra	gr	natics. Other	Areas of Linguistics		raisers,
Language Tec	hn	ologies (India	<b>n Scenario</b> ): The Text Processing Environment. The	Alphabet, The Sci	ript
Grammar. Fon	ts.	Glyphs and E	ncoding Standards, Character Encoding Standards,	Romanization, Sp	ell
Checkers, Opti	ca	l Character Re	cognition, Language Identification, Others Technolo	gies for Indian Lar	auages,
NLP and Sansk	ri	t, Epilogue			
			UNIT - II		9 Hrs
Statistical Ma	ch	ine learning a	and Approaches to NLP - Statistical Approaches, Co	orpora. Statistical	I
Approaches to	La	nguage, Mach	ine Learning Markov Models:Hidden Markov Models	, The three fundam	nental
questions for H	IM	Ms, HMMs: In	plementation, Properties, and Variants	,	
Part-of-Speech	ı 7	Tagging: The In	nformation Sources in Tagging, Markov Model Tagge	rs, Hidden Markov	Model
Taggers, Trans	foi	rmation-Based	Learning of Tags, Tagging Accuracy and Uses of Tag	ggers	
		150	UNIT - III		8 Hrs
Text categoriz	zat	tion: Why Text	Categorization?, Approaches to Automatic Text Cat	egorization, Text	•
Representation	, I	Feature Weight	ing, Text Classification and Clustering – Hierarchica	and Non-Hierarc	hical,
Decision Trees	, N	laximum Entr	opy Modeling, Perceptrons, k Nearest Neighbor Class	sification, Informat	tion
Retrieval: IR De	efi	ned, Documen	ts and Bags-of-words, The Vector Sp <mark>ace Mo</mark> del, Perf	ormance Evaluatio	n,
Measuring Rele	eva	ance Challeng	es in Information Retrieval Information Extraction	on(IE): What is Inf	ormation
Extraction? Inf	or	mation Extrac	<mark>tion Ta</mark> sks, Architecture of an IE Sys <mark>tem. Te</mark> xt Sumr	narization - Why	
Summarization	ı?,	Approaches to	<mark>o Autom</mark> atic Summarization, Summa <mark>rization</mark> in Rela	tion to Information	ι
Extraction, Sur	mr	narization in F	elation to Other Technologies, Evaluation of Summa	arization Systems	
Summarization	ı iı	n the Context of	of Indian Tradition		
			UNIT - IV		8 Hrs
Machine Trans	sla	ation: Machine	e Tr <mark>anslation</mark> is Hard, Deployin <mark>g Machin</mark> e Translation	n, Approaches to N	Iachine
Translation, Cl	na	llenges in Mac	hine Tra <mark>nslation,</mark> Machine Translation in India Amb	iguity Resolution:	Selectional
restrictions, se	m	antic filtering ι	asing selectional restrictions, semantic networks, sta	atistical word sense	e
disambiguatior	ı,	statistical sem	antic preferences, combining approaches to disambi	guation Statistical	
Alignment and	Μ	achine Transla	ation: Text Alignment, Word Alignment, Statistical M	achine Translation	1
			UNIT - V		8 Hrs
Basic IR Mode	ls	- History of IR	, IR Models, Term Weighting: tf-idf, Similarity Measu	ares, The Probabili	ty
Ranking Princi	ple	e, Performance	Evaluation, Towards Intelligent IR - Improving Use	r Queries - Releva	nce
Feedback, Page	εF	Ranking, Role o	of Linguistics, Latent Semantic Indexing, Meta Searc	h Engines, Seman	tic Web,
Speech Recogn	iti	on and Spoker	Language : Issues in Speech Recognition, The sour	nd structure of Lar	iguage,
Signal Processi	ng	g, Speech Reco	gnition, Speech Recognition and Natural Language I	Processing, Prosod	y and
Intonation, Tex	t 1	to Speech, Opt	ical Character Recognition		
Course Outcon	me	es:			
After going thro	bu	gh this course	the student will be able to:		
CO1	:	Describe and i	mplement methods for morphological analysis and t	agging of natural l	anguage,
		and evaluate s	such systems.		
CO2	:	Describe and i	mplement some important parsing algorithms, meth	ods for capturing	and/or
	$\square$	classifying the	content of texts in natural language.		
CO3	:	Demonstrate 1	nastery of knowledge representation for semantics		
CO4	:	Understand of	how NLP relates to search engines, text mining and	decision support	systems.



#### **Reference Books**

1. James Allen – Natural Language Understanding, Pearson Education, 2nd Edition, ISBN: 978-81-317-0895-8, 1995

2. Christopher D. Manning, Foundations of Statistical Natural Language Processing, The MIT Press; 1st edition, ISBN: 0-262-13360-1, 1999

3. Kavi Narayana Murthy - "Natural Language Processing - An Information Access Perspective", Ess Ess Publications, 1st Edition, ISBN: 81-7000-485-3, 2006

4. Anne Kao and Stephen R. Poteet (Eds), -Natural Language Processing and Text Mining, Springer, 2007, ISBN: 9781846281754

#### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**OUIZZES:** Ouizzes will be conducted in online/offline mode. Two guizzes will be conducted & Each Ouiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

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	RUBRIC for CIE					RUBRIC for SEE			
SLNo	Content			Marks	Q. No	Contents	and the second sec	Marks	
1	Quizzes -	Q1 & Q2		20	Each u	nit consists of TWO qu	estions of 20 Marks each. Ansv	ver FIVE	
2	Tests - Tl	& T2		40	40 full questions selecting ONE from each unit (1 to 5).				
3	Experient	ial Learning -	EL1 & EL2	40	1 & 2	Unit-1: Question 1 or	2	20	
			Total Marks	100	38⊾4	Unit-2: Question 3 or	4	20	
					5&6	Unit-3: Question 5 or	6	20	
					7 & 8	Unit-4: Question 7 or	8	20	
					9 & 10	Unit-5: Question 9 or	10	20	
							Total Marks	100	

University, B	elagavi			
		SEMESTER: III		
Course Code	: 22MIT3E3T	ΙΝΈΩΡΜΑΤΙΩΝ ΒΕΤΒΙΕΊΛΙ	CIE Marks	: 100
Credits L-T-P	: 3 - 1 - 0	INFORMATION RETRIEVAL	SEE Marks	: 100
Hours	: 42L + 28P	Elective E (Professional Elective)	SEE Durations	: 3 Hrs
Facu	lty Coordinator:	Prof. Vanishree K		
	5	UNIT - I		9 Hrs
Boolean Retri	eval: An exampl	e information retrieval problem, A first take at b	uilding an inverted in	dex,
Processing Boo	olean queries, Th	ne extended Boolean model versus ranked retriev	al The term Vocabula	ry and
Postings Lists:	Document delin	leation and character sequence decoding, Obtain	ing the character seq	uence in a
document, Cho	oosing a docume	ent unit, Determining the vocabulary of terms, To	kenization, Dropping	common
terms: stop wo	ords, Normalizati	on (equivalence classing of terms), Stemming and	d lemmatization, Fast	er posting
list intersection	n via skip pointe	rs, Positional postings and phrase queries, Bi-wo	ord indexes, Positiona	l indexes,
Combination s	chemes			
		UNIT - II		9 Hrs
Dictionaries a	nd tolerant ret	rieval: Search structures for dictionaries, Wildca	ard queries, General v	vildcard
queries, k-grar	n indexes for wil	dcard queries, Spelling correction, Implementing	g spelling correction, I	Forms of
spelling correc	tion, Edit distan	ce, k-gram indexes for spelling correction, Conte	xt sensitive spelling c	orrection,
Phonetic corre	ction Index Cons	struction: Hardware basics, Blocked sort-based in	ndexing, Single-pass	in-memory
indexing, Distr	ributed indexing,	, Dynamic indexing and Other types of indexes.		0.11
		UNIT - III		8 Hrs
Index compre	ssion: Statistica	l properties of terms in information retrieval, Hea	aps' law: Estimating t	he numbe
of terms, Zipf's	a law: Modeling t	he distribution of terms, Dictionary compression	, Dictionary as a stri	ng, Blocke
storage.	/			
Scoring, term	weighting and th	e vector space model: Parametric and zone index	kes, Weighted zone sc	oring,
Learning weigh	its, The optimal	weight g, Term frequency and weighting, Inverse	document frequency	, TF-IDF
weighting, The	vector space mo	odel for scoring, Dot products, Queries as vectors	s, Computing vector s	cores.
		UNIT - IV		8 Hrs
Computing sc	ores in a compl	lete search system: Efficient scoring and rankin	ig, Inexact top K doci	iment
retrieval, Index	c elimination, Ch	ampion lists, Static quality scores and ordering,	Impact ordering, Clu	ster
pruning, Comp	ponents of an inf	ormation retrieval system, Tiered indexes, Query	-term proximity, Des	ıgnıng
parsing and sc	coring functions.	Putting it all together.	1 1 11 .	
Evaluation in 1	information retrie	eval: Information retrieval system evaluation, Sta	andard test collection	s,
Evaluation of i	inranked retriev	al sets, Evaluation of ranked retrieval results.	/	0.77
		UNIT - V		8 Hrs
XML Retrieva	<b>1:</b> Basic XML cor	ncepts, Challenges in XML retrieval, A vector spa	ce model for XML ret	rieval,
Evaluation of $\lambda$	XML retrieval, Te	ext-centric vs. data-centric XML retrieval.		1
Probabilistic in	iformation retrie	val: Review of basic probability theory, The Proba	ability Ranking Princi	ple, The
Binary Indeper	ndence Model.			
Course Outco	mes:			
After going thr	ough this course	e the student will be able to:		
C01	: Analyze and in	mplement algorithms to extract relevant informa	tion from unstructur	ed data us
CO2	: Evaluate infor	rmation retrieval algorithms for document indexi	ng, relevance ranking	g, web sear
CO3	: Apply various	information retrieval techniques to retrieve infor	rmation.	
CO4	: Create inform	ation retrieval applications based on various ran	king principles and r	etrieval
	methods.			
<b>Reference Boo</b>	oks			
1. Christopher	D. Manning, Pra	abhakar Raghavan, Hinrich Schütze: "An Introdu	action to Information	Retrieval"
Cambridge Un	iversity Press Fi	ngland 2008 ISBN 13 9780521865715		
O Chang Vien	Iversity i ress, Er	ingland, 2000, 10Dit 10. 9100021000110.		
2. Cheng Alang	g Zhai, "Statistic	al Language Models for Information Retrieval", M	lorgan &	
Claypool Publi	g Zhai, "Statistic shers, 2009, ISB	al Language Models for Information Retrieval", N 8N: 9781598295900	lorgan &	

3. Ricardo Baeza-Yates, Berthier Ribeiro-Neto, "Modern Information Retrieval", Addison Wesley Longman Publishing Co. Inc, 2009, ISBN-10: 0321416910.



4. David A. Grossman, OphirFrieder, Information Retrieval Algorithms and Heuristics; 2ndEdition, Springer Verlag; 2012; ISBN-9788181289179.

#### Scheme of Continuous Internal Evaluation (CIE): 20 + 40 + 40 = 100

**QUIZZES:** Quizzes will be conducted in online/offline mode. Two quizzes will be conducted & Each Quiz will be evaluated for 10 Marks. The sum of two quizzes will be the Final Quiz marks.

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	RUBRIC for CIE				RUBRIC for SEE		
SLNo	Content	<u>~~</u>	Marks	Q. No	Contents	Merks	
1         Quizzes - Q1 & Q2         20           2         Tests - T1 & T2         40			Each u	nit consists of TWO questions of 20 Mari	ks each. Answer FIVE		
				full questions selecting ONE from each unit (1 to 5).			
3	Experiential Learning -	EL1 & EL2	40	18:2	Unit-1: Question 1 or 2	20	
	1.2	T <mark>otal Marks</mark>	100	3&4	Unit-2: Question 3 or 4	20	
				5&6	Unit-3: Question 5 or 6	20	
				7 & 8	Unit-4: Question 7 or 8	20	
				9 & 10	Unit-5: Question 9 or 10	20	
						Total Marks 100	

University, B	elaga	avi					
		1	SEMESTER: III				
Course Code	:	22MIT3E4T	FINTECH APPLICATIONS	CIE Marks	:	: 100	
Credits L-T-P	:	3 - 1 - 0	FINTLOH AT LICATIONS	SEE Marks	:	1	.00
Hours	:	42L + 28T	Elective E (Professional Elective)	SEE Durations	:	3	3 Hrs
Facu	ilt	y Coordinator:	Prof. B K Srinivas				
			UNIT - I			9	) Hrs
Introduction : Financial Tech Compliance is Giants Becomi FinTech Solut (POS) Innovatio Cornerstone of Behavioural Bi Crowdfunding Businesses; Pa Innovation for Technologies and Autonomo	tic f R ion f R ion ion ion ion ion ion ion ion	Banking and the plogy; FinTech ey; Lending (Ca g Non-Bank Ba ons: Rewiring t a; Predictive Alg Regulatory Com metrics – A New cosystems; Rer ment Solutions rearables hat Can Creat s, B for Big Dat	e E-Book Moment; Why We're so Excited About Fin Themes; Banks Need to Think Collaboration Rather pital) in the 21st Century; The Next Big Innovation nks; Design is No Longer an Option-User Experience <b>UNIT - II</b> he Deal – The Path Forward for B2B Supply Chains porithms – Building Innovative Online Banking Solu- pliance Systems; FinTech Solutions in Complex Co v Era of Security; Ultra-Fast Text Analytics in Tradi- nittances – International FX Payments at Low Cost; Including Apple Pay; FinTech Solutions Benefiting <b>UNIT - III</b> the New ABC of Fintech : A for Artificial intellige a, Blockchain and Bitcoin, C for Cloud, Crypto (Eth	Tech; Current Tre Than Competition in FinTech - Iden e (UX) in FinTech ; Payments and F tions; Big Data is ntracts Optimizat ng Strategies; Reg FinTech Solution other Sectors; Fin ence, Algorithms, nereum, Smart co	en nti n; Poi s tl tio gu ns nT Ar ont	ds ; C ty I nt he n; la fo Yec	in Hobal , Tech Hrs of Sales ted or Small ch Hrs maly acts) and
Cybersecurity		ypto-currencie	s and Blockchains, FinTech + Digital Currency – Co	onvergence or Col	llis	sic	)n?,
BIOCKCHAIN AN	a	Crypto-current		<u> </u>			) U
Integrated Cus Impact on Reta Connected API the Future Itse	sto ail E elf	omer Experienc Banking – Fro conomy, Bank , A Future With	e, The Rise of BankTech – The Beauty of a Hybrid M m a Universal Banking Model to Banking Verticaliz ing Like Water, Eliminating Friction in Customers' out Money, Ethics in FinTech	Aodel for Banks, I ation, Embracing Financial Lives, F	Fir th `in	nT ne Te	ech ech is
			UNIT - V			8	Hrs
<b>FinTech Hubs</b> an Integrated I FinTech Hub in Emerging Marl Able to Enter a Unbanked Rea Opportunity,	Fin Fin ke a E a E	Nurturing New nTech Ecosyste Mobile Paymen ts and Social I: Bank?; The Ris n Financial Inc	FinTech Communities, La (French) FinTech Connec m – The Netherland, Luxembourg, a Future FinTec ts?, India's FinTech Ecosystem, Singapore, the Fin' npact; FinTech – The Not So Little Engine That Car e of the Rest in FinTech; Smartphones, FinTech, an usion, The Social Impact of FinTech in Nigeria, Ind	ction, The Journe h Hub?, Vienna a Fech Hub for Sou ı; Why Am I Not C .d Education – He ia and the Pyram	y ' as th Go lp id	To th lea nr in of	wards e No. 1 ist Asia ia Be g the
Course Outco	m	es:					
After going thr		igh this course	the student will be able to:	· · · ·			
COI	:	Explain the in	terplay of finance and technology and how the two	universes inevital	bly	y a	ire
000	+		one another	·			
02	:	implement	echnology can make risk and compliance information	ion systems easie	rτ	ιo	
CO3	:	Understand th	e role of emerging technologies in securing and lev	eraging banking s	ser	rvi	ces
CO4	:	Analyse the in case studies	pact of applying trending technologies to financial	institutions throu	Jgl	h :	real time
Reference Boo	ok	S					
1.Susanne Chi <u>Financial Tech</u> 978-1-119-218	isł <u>n</u> 38	nti and Janos H blogy Handboo 7-6	Barberis, <u>The FinTech Book: The</u> <u>x for Investors, Entrepreneurs and Visionaries</u> , Wile	ey, 2016, ISBN:			

2. Sanjay Phadke, FinTech Future, SAGE, 2020, ISBN: 9789353882488

Go, change the world



3. Pranay Gupta, T. Mandy Tham, Fintech: The New DNA of Financial Services, First Edition, De Gruyter, 2018, ISBN: 978-1547417087

4. Steven O'Hanlon, Susanne Christi, FinTech For Dummies, First Edition, Wiley, 2021, ISBN: 978-8126515929

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	RUBRIC for CIE			RUBRIC for CIE				RUBRIC for SEE		
SLNo Content Marks				Q. No	Contents		Marks			
1	Quizzes - Q1 & Q2		20	Each u	nit consists of TWO questions of 20 Mar	ks each. Answe	r FIVE			
2 Tests - T1 & T2 40				full questions selecting ONE from each	unit (1 to 5).					
3	Experiential Learning - E	L1 & EL2	40	1842	Unit-1: Question 1 or 2		20			
		Total Marks	100	3&4	Unit-2: Question 3 or 4		20			
				5&6	Unit-3: Question 5 or 6		20			
				7 & 8	Unit-4: Question 7 or 8		20			
				9 & 10	Unit-5: Questio <mark>n 9 or 10</mark>		20			
						Total Marks	100			

RV	RV Educational Institutions <sup>®</sup> RV College of Engineerin			
STRUTTON	Autonomous Institution Affiliated to Visvesvaraya Technological University, Belagavi	Approved by AICTE, New Delhi		

SEMESTER III

Course Code	:	22MIT32N		CIE Marks	:	50
Credits L-T-P	:	0 - 0 - 6	INTERNSHIP	SEE Marks	:	50
Hours/Week	:	12		SEE Durations	:	3 Hrs

#### **Guidelines:**

1. The duration of the internship shall be for a period of 6 weeks on full time basis after II semester final exams and before the commencement of III semester.

2. The student must submit letters from the industry clearly specifying his / her name and the duration of the internship on the company letter head with authorized signature.

3. Internship must be related to the field of specialization of the respective PG programme in which the student has enrolled.

4. Students undergoing internship training are advised to report their progress and submit periodic progress reports to their respective guides.

5. Students have to present the internship activities carried out to the departmental committee and only upon approval by the committee, the student can proceed to prepare and submit the hard copy of the final internship report. 6. The reports shall be printed on A4 size with 1.5 spacing and Times New Roman with font size 12, outer cover of the report (wrapper) has to be softbound in Ivory color for PG circuit Programs and Light Blue for Non-Circuit Programs.

#### Course Outcomes: After going through the internship the student will be able to

CO1: Apply Engineering and Management principles to solve the problems

CO2: Analyze real-time problems and suggest alternate solutions

CO3: Communicate effectively and work in teams

CO4: Imbibe the practice of professional ethics and lifelong learning

#### Scheme of Continuous Internal Evaluation (CIE):

The evaluation committee shall consist of Guide, Professor, Associate Professor/Assistant Professor. The committee shall assess the presentation and the progress reports.

The evaluation criteria shall be as per the rubrics given below:						
Reviews	Activity	Weightage				
Ι	Application of Engineering knowledge in industries, ability to comprehend the functioning of the Organization/ Departments.	40%				
II	Importance of Resource Management, Environment and Sustainability. Demonstration and Presentation of Internship work with Report Submission	60%				
		•				

#### Scheme for Semester End Evaluation (SEE):

The SEE examination shall be conducted by an external examiner (domain expert) and an internal examiner. Evaluation shall be done in batches, not exceeding 6 students per batch.

Autonomus Institution Affiliated to Visvesvaraya Technological University, Belagavi

## Go, change the world

		SEMESTER III					
Course Code	: 22MIT33P		CIE Marks	: 50			
Credits L-T-P	: 0 - 0 - 6	MINOR PROJECT	SEE Marks	: 50			
Hours/Week	: 12		SEE Durations	: 3 Hrs			
Guidelines:	• •						
1. Each proje	ct group will co	nsist of maximum of two students.					
2. Each stude	ent / group has	to select a contemporary topic that will use the t	echnical knowled	lge of their			
program of study after intensive literature survey.							
3. Allocation of the guides preferably in accordance with the expertise of the faculty.							
4. The minor	project would b	be performed in-house.					
5. The implen	nentation of the	e project must be preferably carried out using the	resources availa	ble in the			
department/o	college.						
Course Outco	omes: After co	mpleting the course, the students will be able	to				
CO1: Concept	tualize, design	and implement solutions for specific problems.					
CO2: Commu	nicate the solu	tions through presentations and technical reports	s.				
CO3: Apply re	esource manage	ements skills for projects.					
CO4: Synthes	size self-learnin	g, team work and ethics.					
			~				
Scheme of C	ontinuous Inte	ernal Examination					
Evaluation sh	all be carried o	out in three reviews. The evaluation committee sh	all consist of Gui	de, Professor and			
Associate Pro	fessor/Assistar	it Professor.	-				
	1.63						
Phase *		Activity		Weightage			
I	Approval of the Objectives with	ne selected topic, formulation of Problem Stateme Th Synopsis submission	nt and	20 %			
II	Mid-term sem	iin <mark>ar to rev</mark> iew the progress of the work with docu	mentation	40 %			
III	Oral presenta	tion, demonstration and submission of project re	port	40 %			
* Phase wise	* Phase wise rubrics to be prepared by the respective departments						
	· · ·						
<b>CIE</b> Evaluati	on shall be do:	ne with weightage / distribution as follows:	1				
• Selection of	the topic & for	mulation of Problem Statement and Objectives	10 %				
• Design and	simulation/ Al	gorithm development/ Experimental setup	25 %				
Conducting	experiments / 1	mplementation / Testing	25 %				

Demonstration & Presentation

• Report writing

#### Scheme of Semester End Examination (SEE):

The evaluation will be done by ONE senior faculty from the department and ONE external faculty member from Academia / Industry / Research Organization. The following weightages would be given for the examination. Evaluation will be done in batches, not exceeding 6 students.

25%

15 %

• Brief write up about the project 05%

- Methodology and Experimental Results & Discussion 20%
- Presentation / Demonstration of the Project 25%

• Report 20%

• Viva Voce 30%

Autonor Instituti to Visve Technol Univers	W Educational Institutions °       Go, change the world         AV College of Engineering °       Approved by AICTE, New Delhi         visuesvaraya echnological inversity, Belagavi       Percent of the second of th						
			SEMESTER IV				
Course Code	:	22MIT41P		CIE Marks	:	100	
Credits L-T-I	<b>'</b> :	0 - 0 - 18	MAJOR PROJECT	SEE Marks	:	100	
Hours/Week	:	36		SEE Durations	:	3 Hrs	
Guidelines:		•		•			
1. Major Proj	. Major Project is to be carried out for a duration of 18 weeks						
2. Students must adhere to the Project Presentation Schedule, report to their guide on a weekly basis and							
get their Proj	ect	diary signed	by their guide 4. Students must execute the Maj	or Project individ	lu	ally and	
not in teams							
5. It is mand	ato	rv for the stu	idents to present/publish their project work in Na	ational/Internati	on	ial	

Conferences or Journals 6. The reports shall be printed on A4 size with 1.5 spacing and Times New Roman with font size 12, outer

cover of the report (wrapper) has to be soft bound and in Ivory color for PG circuit Programs and Light Blue for Non-Circuit Programs

### Course Outcomes: After completing the course, the students will be able to

CO1: Conceptualize, Design and Implement solutions for specific problems.

CO2: Communicate the solutions through presentations and technical reports.

CO3: Apply project and resource managements skills, professional ethics and societal concerns

CO4: Synthesize self-learning, sustainable solutions and demonstrate life-long learning

#### Scheme of Continuous Internal Examination

Evaluation shall be carried out in three reviews. The evaluation committee shall consist of Guide, Professor, Associate Professor/Assistant Professor.

Phase *	Activity Weightag				
Ι	Selection of Project Title, Formulation of Problem Statement and Objectives	20 %			
II	Design, Implementation and Testing 40 %				
т	Experimental Result & Analysis, Conclusions and Future Scope of Work,				
11	Report Writing and Paper Publication	40 %			
* Phase wise rubries to be prepared by the respective departments					

Phase wise rubrics to be prepared by the respective departments

#### Scheme for Semester End Evaluation (SEE):

Major Project SEE evaluation shall be conducted in two stages. This is initiated after fulfilment of submission of Project Report and CIE marks.

**Stage-1 Report Evaluation:** Evaluation of Project Report shall be done by the Guide and an External examiner.

**Stage-2 Project Viva-voce:** Major Project Viva-voce examination is conducted after receipt of evaluation reports from Guide and External examiner.

SEE procedure is as follows:						
Report	Internal Examiner: 100 Marks	= 20	00			
Evaluation	External Examiner: 100 Marks	200 / 2 = <b>100</b>	Α			
Viva-Voce	Jointly evaluated by Internal Guide & External Evaluator	= 100	В			
	Total Marks = $(A + B) / 2 =$	100				



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### **Curriculum Design Process**



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### **Process For Course Outcome Attainment**



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### **Program Outcome Attainment Process**



### Innovative Clubs of RVCE

-	+	Ashwa Mability Foundation (AMF) is a student R&D platform that designs and
1	Ashwa Racing	fabricates Formula theme race cars and future mobility solutions to tackle urban transportation problems.
2	Astra Robites	Team involved in the design, fabrication and building application specific robots.
3	Coding Club	To facilitate students the skills, confidence, and opportunity to change their world using coding and help them become successful in GSoC, ACM-ICPC, and other recognized coding competitions.
4	Entrepreneurship Development Cell	E-Cell is a student run body that aims to promote entrepreneurship by conducting workshops, speaker sessions and discussions on business and its aspects. We possess a mentor board to help startups grow.
5	Frequency Club	Team aims at contributing in both software and hardware domains mainly focusing on Artificial Intelligence, Machine Learning and it's advances.
6	Garuda	Design and development of supermileage urban concept electric car. Indigenous development of E-mobility products.
7	Jatayu	Build a low cost Unmanned Aerial Vehicle capable of Autonomous Navigation, Obstacle Avoidance, Object Detection, Localization, Classification and Air Drop of a package of optimum weight.
8	Solar Car	Build a roadworthy solar electric vehicle in order to build a green and sustainable environment.
9	Team Antariksh	Team Antariksh is a Space Technology Student Club whose goal is to understand, disseminate and apply the engineering skills for innovation in the field of Space technology. designing Nano-Satellite payload for ISRO PS4 Orbital platform, RVSAT-1 along with developing experimental rockets of various altitude.
10	Team Chimera	Building a Formula Electric Car through Research and Development in E-Mobility. Electrifying Formula Racing.
11	Helios Racing	Team involved in design, manufacturing and testing of All-Terrain Vehicles and other supportive tasks for the functioning of the team. Participating in BAJA competitions organized by SAE in India and the USA.
12	Team Hydra	Developing autonomous underwater vehicles and use it for various real world applications such as water purification, solid waste detection and disposal etc.
13	Team Krushi	Develop low cost equipments, which help farmers in cultivating and harvesting the crops. Use new technology applications to reduce the labour time hand cost for farmers. Aims at developing implants for Tractors.
14	Team vyoma	Design, fabrication and testing of radio controlled aircrafts and research on various types of unmanned aerial vehicles.
15	Team Dhruva	Organizing activities like quizzes based on astronomy.Stargazing and telescope handling sessions.Construction of a standard observatory. working on small projects with organizations like ICTS, IIA, ARIES etc.
16	Ham club	To popularize Amateur Radio as a hobby among students, alongside exploring technical innovations in the communications domain. Intended to provide human capital for service to the nation at times of natural calamities.

NCC



NSS



"Not me but you" " Education through Community Service & Community Service through education" **Cultural Activity Teams** 

- 1. AALAP (Music club)
- 2. DEBSOC (Debating society)
- 3. CARV (Dramatics club)
- 4. FOOTPRINTS (Dance club)
- 5. QUIZCORP (Quizzing society)
- 6. ROTARACT (Social welfare club)
- 7. RAAG (Youth club)
- 8. EVOKE (Fashion team)
- 9. f/6.3 (Photography club)
- 10. CARV ACCESS (Film-making club)

# VISION

Leadership in Quality Technical Education, Interdisciplinary Research & Innovation, with a Focus on Sustainable and Inclusive Technology



# **MISSION**

- To deliver outcome based Quality education, emphasizing on experiential learning with the state of the art infrastructure.
- To create a conducive environment for interdisciplinary research and innovation.



- To develop professionals through holistic education focusing on individual growth, discipline, integrity, ethics and social sensitivity.
- To nurture industry-institution collaboration leading to competency enhancement and entrepreneurship.
- To focus on technologies that are sustainable and inclusive, benefiting all sections of the society.

# **QUALITY POLICY**

Achieving Excellence in Technical Education, Research and Consulting through an Outcome Based Curriculum focusing on Continuous Improvement and Innovation by Benchmarking against the global Best Practices.

# **CORE VALUES**

Professionalism, Commitment, Integrity, Team Work, Innovation

