Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
(Accredited 'A++' Grade by NAAC with a score of 3.6)
Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology SoE & Syllabus 2023 1st to 6th Semester

(Department of Computer Science & Engineering)

B. Tech in Computer Science and Engineering



Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering) B. Tech in Computer Science & Engineering

SoE No. 23CSE-101

SN	Sem	Type	BoS/	Sub. Code	Subject	T/P	Co	onta	ct H	ours	Credits	% W	eightag	je	ESE
			Deptt				L	T	Р	Hrs		MSEs*	TA**	ESE	Duration
						RO	UP-	B)							
1	1	BS	GE	23GE1103	Differential Equations and Complex Analysis	Т	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1110	Applied Physics	Т	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1111	Lab: Applied Physics	Р	0	0	2	2	1		60	40	
4	1	BES	ME	23ME1101	Engineering Graphics	Т	1	0	0	1	1	30	20	50	3
5	1	BES	ME	23ME1102	Lab : Engineering Graphics	Р	0	0	4	4	2		60	40	
6	1	BES	EL	23EL1101	Basic Electrical and Electronics Engineering	Т	3	0	0	3	3	30	20	50	3
7	1	BES	CT	23CT1103	Lab : Computer WorkShop	Р	0	0	2	2	1		60	40	
8	1	PC	CSE	23CSE1101	Object Oriented Programming using Python	Т	3	0	0	3	3	30	20	50	3
9	1	PC	CSE	23CSE1102	Lab : Object Oriented Programming using Python	Р	0	0	2	2	1		60	40	
10	1	VSEC	GE	23GE1117	Get Set Go						2		60	40	
11	1	CC2	GE		Liberal Learning Course (LLC2)						2		60	40	
					TOTAL FIRST	SEM	13	0	10	23	22				
MA	NDAT	ORY LEAR	NING CO	DURSES											
1	1	HS		GE2131	Universal Human Values (UHV)	Α	2	0	0	2	0				
					SECOND SEMESTER (GRO	IID	Βl							
1	2	BS	GE	23GE1201	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1206	Engineering Chemistry	Т	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1207	Lab: Engineering Chemistry	Р	0	0	2	2	1		60	40	
4	2	HS/AEC1	GE	23GE1212	Professional Communication	Т	2	0	0	2	2	30	20	50	2
5	2	HS/IKS	GE	23GE1215	Indian Knowledge System	Т	2	0	0	2	2	30	20	50	2
6	2	BES	CV	23CV1201	Engineering Mechanics	Т	3	0	0	3	3	30	20	50	3
7	2	BES	CV	23CV1202	Lab: Engineering Mechanics	Р	0	0	2	2	1		60	40	
8	2	BES	IT	23IT1203	Programming for Problem Solving	Т	2	0	0	2	2	30	20	50	2
9	2	BES	IT	23IT1204	Lab: Programming for Problem Solving	Р	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English						2		60	40	
11	2	CC1	GE		Liberal Learning Course (LLC1)						2	_	60	40	
				1	TOTAL SECOND	SEM	15	0	6	21	22			ı	

Liberal Learning Course

SN	Sem	Type	BoS/	Sub. Code	Subject
			Deptt		
1	2	CC2	GE	23LLC1201	Music (Vocal)
2	2	CC2	GE	23LLC1202	Music (Instrumental)
3	2	CC2	GE	23LLC1203	Indian Classical Dance
4	2	CC2	GE	23LLC1204	Other forms of Dances
5	2	CC2	GE	23LLC1205	Painting
6	2	CC2	GE	23LLC1206	Theatre and acting
7	2	CC2	GE	23LLC1207	Photography
8	2	CC2	GE	23LLC1208	Yoga
9	2	CC2	GE	23LLC1209	Chess
10	2	CC2	GE	23LLC1210	Athletics
11	2	CC2	GE	23LLC1211	Basket Ball
12	2	CC2	GE	23LLC1212	Judo
13	2	CC2	GE	23LLC1213	Elements of Japanese Language
14	2	CC2	GE	23LLC1214	Elements of German Language
15	2	CC2	GE	23LLC1215	Elements of French Language
16	2	CC2	GE	23LLC1216	Elements of Spanish Language
17	2	CC2	GE	23LLC1217	Basics of Vedic Maths
18	2	CC2	GE	23LLC1218	Skilling in Microsoft Visio and Inkscape



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B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering)
B. Tech in Computer Science & Engineering

SoE No. 23CSE-101

Deptt L T P Hrs MSEs* TA** ESE Duration Hours	s	N Sem	Type	BoS/	Sub. Code	Subject	T/P	Co	onta	ct H	ours	Credits	% W	eightag	je	ESE	ĺ
				Deptt				L	Т	Р	Hrs		MSEs*	TA**	ESE		

Lib	eral	Learning	Cours	е	
SN	Sem	Type	BoS/	Sub. Code	Subject
			Deptt		
1	1	CC1	GE	23LLC1101	Music (Vocal)
2	1	CC1	GE	23LLC1102	Music (Instrumental)
3	1	CC1	GE	23LLC1103	Indian Classical Dance
4	1	CC1	GE	23LLC1104	Other forms of Dances
5	1	CC1	GE	23LLC1105	Painting
6	1	CC1	GE	23LLC1106	Theatre and acting
7	1	CC1	GE	23LLC1107	Photography
8	1	CC1	GE	23LLC1108	Yoga
9	1	CC1	GE	23LLC1109	Chess
10	1	CC1	GE	23LLC1110	Athletics
11	1	CC1	GE	23LLC1111	Basket Ball
12	1	CC1	GE	23LLC1112	Judo
13	1	CC1	GE	23LLC1113	Elements of Japanese Language
14	1	CC1	GE	23LLC1114	Elements of German Language
15	1	CC1	GE	23LLC1115	Elements of French Language
16	1	CC1	GE	23LLC1116	Elements of Spanish Language
17	1	CC1	GE	23LLC1117	Basics of Vedic Maths
18	1	CC1	GE	23LLC1118	Skilling in Microsoft Visio and Inkscape

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory: TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance TA** = for Practical: MSPA will be 15 marks each

A	AY 2023-24 Onwards
July, 2023 1.00	Applicable for



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(Department of Computer Science & Engineering) B. Tech. in Computer Science & Engineering

SoE No. 23CSE-101

SN	Sem	Type	BoS/	Sub. Code	Subject	T/P											ESE
			Deptt				L	Т	Р	Hrs		MSEs*	TA**	ESE	Duration		
	<u>l</u>				THIRD SEMI	ECT	ED	l	l		L				Hours		
	ı					<u> </u>		ı	ı								
1	3	HSSM-1	GE	23GE1301	Fundamentals of Management & Economics	Т	2	0	0	2	2	30	20	50	3		
2	3	BS	GE	23GE1303	Linear Algebra	Т	3	0	0	3	3	30	20	50	3		
3	3	PC	CSE	23CSE1301	Computer Architecture & Organization	Т	3	0	0	3	3	30	20	50	3		
4	3	PC	CSE	23CSE1302	Data structures	Т	3	0	0	3	3	30	20	50	3		
5	3	PC	CSE	23CSE1303	Lab : Data structures	Р	0	0	2	2	1		60	40			
6	3	PC	CSE	23CSE1304	Lab : Programming with JAVA	Р	0	0	2	2	1		60	40			
7	3	VEC-2	CSE	23CSE1305	Digital & Tecnological Solution / Understanding India-Ethics in IT	Т	2	0	0	2	2	30	20	50	3		
8	3	CEP	CSE	23CSE1306	Community Engagement Project	Р	0	0	2	4	2		60	40			
9	3	OE-1	OE		Open Elective - I	Т	2	0	0	2	2	30	20	50	3		
10	3	MDM			MD Minor Course - I	Т	2	0	0	2	2	30	20	50	3		
		•			Т	otal	17	0	6	25	21						

Lis	List of Mandatory Learning Course (MLC)														
1	3	HS	T&P	MLC2123	YCAP3 : YCCE Communication Aptitude Preparation	Α	3	0	0	3	0				

Ope	n Ele	ctive - I			
SN	Sem	Туре	BoS/ Deptt	Sub. Code	Subject
1	3	OE1	GE	23OE1301	OE-I : Combinatorics
2	3	OE1	GE	23OE1302	OE-I : Fuzzy Set Theory, Arithmetic And Logic
3	3	OE1	GE	23OE1303	OE-I : Green Chemistry & Sustainability
4	3	OE1	GE	23OE1304	OE-I : Hydrogen Fuel
5	3	OE1	GE	23OE1305	OE-I : Electronic Materials And Applications
6	3	OE1	GE	23OE1306	OE-I : Laser Technology And Applications
7	3	OE1	MGT	23OE1307	OE-I : Finance And Cost Management
8	3	OE1	MGT	23OE1308	OE-I : Operation Research Techniques
9	3	OE1	MGT	23OE1309	OE-I : Project Evaluation & Management
10	3	OE1	MGT	23OE1310	OE-I : Total Quality Management
11	3	OE1	MGT	230E1311	OE-I : Value Engineering
12	3	OE1	MGT	230E1312	OE-I : Maintenance Management
13	3	OE1	MGT	230E1313	OE-I : Industrial Safety
14	3	OE1	MGT	230E1314	OE-I : Industry 4.0
15	3	OE1	MGT	230E1315	OE-I : Operation Management
16	3	OE1	MGT	230E1316	OE-I : Material Management
17	3	OE1	MGT	230E1317	OE-I : Hospitality Management
18	3	OE1	MGT	230E1318	OE-I : Human Resource Management & Organizational Behaviour
19	3	OE1	MGT	230E1319	OE-I : Agri-Business Management
20	3	OE1	MGT	230E1320	OE-I : Rural Marketing
21	3	OE1	MGT	230E1321	OE-I : Marketing Management
22	3	OE1	MGT	230E1322	OE-I : Health Care Management
23	3	OE1	MGT	230E1323	OE-I : Designated approved online NPTEL/KKSU Course
24	3	OE1	MGT	230E1324	OE-I : Indian Archeology
25	3	OE1	MGT	230E1325	OE-I : Social & Positive Psychology
26	3	OE1	MGT	230E1326	OE-I : Seismology & Earthquake

Dame C.	AD.	July, 2023	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	A1 2020-24 Oliwards



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B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering) B. Tech. in Computer Science & Engineering

SoE No. 23CSE-101

SN	Sem	Type	BoS/	Sub. Code	Subject	T/P			t Hours		Credits		eighta/		ESE
			Deptt				L	Т	Р	Hrs		MSEs*	TA**	ESE	Duration Hours
					FOURTH SEN	IES	TER								Hours
1	4	HSSM-2	GE	23GE1401	Entrepreneurship Development	Т	2	0	0	2	2	30	20	50	3
2	4	AEC-2	GE	23GE1405 23GE1406	Marathi Language / Hindi Language	Т	2	0	0	2	2	30	20	50	3
3	4	VEC-1	CV	23CV1411	Environmental Sustainability, Pollution and Management	Т	2	0	0	2	2	30	20	50	3
4	4	PC	CSE	23CSE1401	Discrete Mathematics and Graph Theory	Т	3	0	0	3	3	30	20	50	3
5	4	PC	CSE	23CSE1402	Operating system	Т	3	0	0	3	3	30	20	50	3
6	4	PC	CSE	23CSE1403	Lab : Operating system	Р	0	0	2	2	1		60	40	
7	4	PC	CSE	23CSE1404	Introduction to data analysis	Т	3	0	0	3	3	30	20	50	3
8	4	PC	CSE	23CSE1405	Lab: Introduction to data analysis	Т	0	0	2	2	1		60	40	
9	4	VSEC-3	CSE	23CSE1406	Lab : Vocational & Skill Enhancement - Web Technology	Р	0	0	2	4	2		60	40	
10	4	OE-2	OE		Open Elective - II	Т	2	0	0	2	2	30	20	50	3
11	4	MDM	CSE		MD Minor Course - II	Т	2	0	0	2	2	30	20	50	3
					TO ⁻	TAL	19	0	6	27	23				

Li	st (of Ma	ndatory I	_earnin	ng Course (I	/ILC)								
1	1	4	HS	T&P	MLC2124	YCAP4 : YCCE Communication Aptitude Preparation	Α	3	0	0	3	0		

Ope	n Ele	ctive - II			
SN	Sem	Туре	BoS/ Deptt	Sub. Code	Subject
1	4	OE2	GE	230E2401	OE-II : Combinatorics
2	4	OE2	GE	230E2402	OE-II : Fuzzy Set Theory, Arithmetic And Logic
3	4	OE2	GE	23OE2403	OE-II : Green Chem. & Sustainability
4	4	OE2	GE	230E2404	OE-II : Hydrogen Fuel
5	4	OE2	GE	230E2405	OE-II : Electronic Materials And Applications
6	4	OE2	GE	230E2406	OE-II : Laser Technology And Applications
7	4	OE2	MGT	230E2407	OE-II : Finance And Cost Management
8	4	OE2	MGT	230E2408	OE-II : Operation Research Techniques
9	4	OE2	MGT	230E2409	OE-II : Project Evaluation & Management
10	4	OE2	MGT	230E2410	OE-II : Total Quality Management
11	4	OE2	MGT	230E2411	OE-II : Value Engineering
12	4	OE2	MGT	230E2412	OE-II : Maintenance Management
13	4	OE2	MGT	230E2413	OE-II : Industrial Safety
14	4	OE2	MGT	230E2414	OE-II : Industry 4.0
15	4	OE2	MGT	230E2415	OE-II : Operation Management
16	4	OE2	MGT	230E2416	OE-II : Material Management
17	4	OE2	MGT	230E2417	OE-II : Hospitality Management
18	4	OE2	MGT	230E2418	OE-II : Human Resource Management & Organizational Behaviour
19	4	OE2	MGT	230E2419	OE-II : Agri-Business Management
20	4	OE2	MGT	230E2420	OE-II : Rural Marketing
21	4	OE2	MGT	230E2421	OE-II : Marketing Management
22	4	OE2	MGT	230E2422	OE-II : Health Care Management
23	4	OE2	MGT	230E2423	OE-II : Designated approved online NPTEL/KKSU Course
24	4	OE2	MGT	230E2424	OE-II : Indian Archeology
25	4	OE2	MGT	230E2425	OE-II : Social & Positive Psychology
26	4	OE2	MGT	230E2426	OE-II : Seismology & Earthquake

Dame Le	do-	July, 2023	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	AT 2023-24 Offwards



Nagar Yuwak Shikshan Sanstha's

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B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering)

B. Tech. in Computer Science & Engineering

SoE No. 23CSE-101

SN	Sem	Туре	BoS/	Sub. Code	T/P									ESE		
			Deptt					<u>'</u>	P	Hrs	Hrs MSEs* TA** ESE Durat					
					FIFTH SEMESTE	R										
1	5	PC	CSE		Theory of computation	Т	3	0	0	3	3	30	20	50	3	
2	5	PC	CSE		Database management systems	T	3	0	0	3	3	30	20	50	3	
3	5 5	PC PC	CSE	23CSE1503	Lab : Database management systems Design and Analysis of Algorithms	P T	3	0	0	3	3	30	60 20	40 50	3	
5	5	PC	CSE		Lab: Design and Analysis of Algorithms	P	0	0	2	2	1	30	60	40	3	
6	5	PC	CSE	23CSE1506		P	0	0	2	2	1		60	40		
7	5	PE	CSE		Professional Elective I	Т	3	0	0	3	3	30	20	50	3	
8	5	PE	CSE		Lab : Professional Elective I	Р	0	0	2	2	1		60	40		
9	5	OE-3	OE		Open Elective -III	T	3	0	0	3	3	30	20	50	3	
10	5 5	MDM STR	CSE	23CSE1507	MD Minor Course-III Intership, Seminar and Report	T P	0	0	2	2	3	30	20 60	50 40	3	
	J	SIIX	COL	23C3L1307	TO		18	0	10	28	23		00	40		
List	of IV	1	ory Lear	ning Course	(MLC)		1					l l				
1	5	HS	T&P	MLC2125	YCAP5 : YCCE Communication Aptitude Preparation	Α	3	0	0	3	0					
Des	f	ianal l		•												
Pro	1ess 5	PE-I	Elective CSE		PE-I : Digital Image Processing											
2	5	PE-I	CSE		PE-I : Lab : Digital Image Processing											
3	5	PE-I	CSE	23CSE1523	PE-I: Business Intelligence											
4	5	PE-I	CSE		PE-I: Lab: Business Intelligence											
5	<u>5</u>	PE-I	CSE CSE	23CSF1526	PE-I: Mobile Application Development PE-I: Lab: Mobile Application Development											
7	5	PE-I	CSE		PE-I: Internet of Things											
8	5	PE-I	CSE	23CSE1528	PE-I: Lab: Internet of Things											
9	5	PE-I	CSE		PE-I: Introduction to geographical information sy											
10 11	<u>5</u>	PE-I	CSE CSE		PE-I: Lab: Introduction to geographical informat PE-I: Neural networks and applications	ion s	ystem									
12	5	PE-I	CSE		PE-I: Lab: Neural networks and applications											
13	5	PE-I	CSE		PE-I : Advanced web technology											
14	5	PE-I	CSE		PE-I: Lab: Advanced web technology Lab											
15 16	<u>5</u>	PE-I	CSE CSE		PE-I: Customer Relationship Management PE-I: Lab: Customer Relationship Management											
10	J	L-1	COL	23COL 1330	TE-1. Lab. Ouslomer Relationship Management											
Cour	sera E	lectives	i													
1	5	PE-I	PC	23CSE1537	PE-I : IBM Generative AI Engineering Profession	al Ce	rtificate	9								
2	5	PE-I	PC	23CSE1538	PE I : Lab.: IBM Generative AI Engineering Profe	eeior	al Car	tificate								
	,	1 =1	10	2300E 1330	T L T . Lab Ibivi Generative At Engineering 1 Tole	33101	iai Cci	uncate								
One	en Fl	lective	9 - III													
	Sem	Туре	BoS/Deptt	Sub. Code	Subject							_	ACUL	TY		
1	5	OE3	CSE	23OE3501	OE-III : Social Reformers in Modern Maharashtra								ART			
2	5	OE3	CSE	230E3502	OE-III : Independent India 1948-2010								ART			
4	5 5	OE3	CT CT	23OE3503 23OE3504	OE-III : Introduction To Cognitive Psychology OE-III : Introduction To Engineering Psychology								ART			
5	5	OE3	CT	230E3505	OE-III : Introduction To Engineering r sychology								ART			
6	5	OE3	CT	230E3506	OE-III : Introduction To Emotional Psychology								ART			
7	5	OE3	EL	23OE3507 23OE3508	OE-III : Elements of Public Administration OE-III : Ancient Indian History								ART			
8	5 5	OE3	ETC IT	230E3508 230E3509	OE-III : Ancient indian history OE-III : Consciousness Studies								ART			
10	5	OE3	IT	23OE3510	OE-III : Psychology for Professionals								ART	S		
11	5	OE3	IT	230E3511	OE-III : Introduction to Sociology and Human Behavio	ſ							ART			
12	5 5	OE3	GE GE	23OE3512 23OE3513	OE-III : Economics of Money and Banking OE-III : Economics of Capital Market								ART			
14	5	OE3	GE	230E3514	OE-III : Digital Humanities								ART			
15	5	OE3	GE	230E3515	OE-III : Introduction to Political Science								ART	S		
16 17	5	OE3	CT	23OE3516 23OE3517	OE-III : Bhagwat Geeta - An Engineer's Interpretation OE-III : Artha shastra by Kautiliya								RTS - RTS -			
18	5 5	OE3	CT CSD	230E3517 230E3518	OE-III : Glimpses of Ancient science and Technology								RTS -			
19	5	OE3	CV	230E3519	OE-III : Indian taxation system							C	OMME	RCE		
20	5	OE3	CV	230E3520	OE-III : Elements of share trading								DMME			
21	5 5	OE3	EE EE	23OE3521 23OE3522	OE-III : Introduction to Fintech OE-III : Financial Analytics								OMME OMME			
23	5	OE3	ETC	230E3522	OE-III : Fundamentals of Investments								OMME			
24	5	OE3	EE	230E3524	OE-III : Lifestyle Diseases						HE	ALTHO	ARE 8	& MEDI		
25 26	5 5	OE3	EE EL	23OE3525 23OE3526	OE-III : Holistic Nutrition OE-III : Community Organization & Development									IENCE IENCE		
27	5	OE3	CSE	230E3526 230E3527	OE-III : Human Rights & International Laws							пОГ	LAW			
28	5	OE3	CSE	230E3528	OE-III : Cyber Crime Administration								LAV	/		
29	5	OE3	MATHS	230E3529	OE-III : Finite Differences & Numerical Methods								SCIEN			
30	5 5	OE3	MATHS PHY	23OE3530 23OE3531	OE-III : Business Statistics OE-III : Crystalline Solids: Properties and Applications								SCIEN SCIEN			
32	5	OE3	PHY	230E3531	OE-III : Nanotechnology: Fundamental to Applications							,	SCIEN	CE		
33	5	OE3	CHE	230E3533	OE-III : Chemistry in daily life							,	SCIEN	CE		
34 35	5 5	OE3	CHE NPTEL	23OE3534 23OE3535	OE-III: Battery Systems and Management OE-III: Designated approved online NPTEL Course						-	;	SCIEN NPTE			
- 55		JLJ	191 166	20020000	1 Boolg. accu approved of mile 14. TEL Course								1L	-		
	_	Les	aux Q.		de-1			July, 20)23		1.0	00	4	Applicat	ole for	
-			hairperson		Dean (Acad. Matters)		Da	te of Re			Vers	ion			Onwards	
Щ.		-			Dodn (Acad. matters)		Da	or NE			7618					



Dame le

Chairperson

del

Dean (Acad. Matters)

Nagar Yuwak Shikshan Sanstha's

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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B. Tech. in Computer Science & Engineering

SoE No. 23CSE-101

Applicable for AY 2023-24 Onwards

Version

July, 2023 Date of Release

SN	Sem	Туре	BoS/ Deptt	Sub. Code	L T P Hrs MSEs* TA** ESE Du										ESE Duration
			.,		SIXTH SEMESTER									Hours	
					I	:R	ı	ı	ı	ı				ı	
1	6	PC	CSE	23CSE1601	Machine Learning	Т	3	0	0	3	3	30	20	50	3
2	6	PC	CSE	23CSE1602	Lab: Machine Learning	Р	0	0	2	2	1		60	40	
3	6	PC	CSE	23CSE1603	Language Processors	Т	3	0	0	3	3	30	20	50	3
4	6	PC	CSE	23CSE1604	Lab : Language Processors	Р	0	0	2	2	1	60	40		
5	6	PC	CSE	23CSE1605	Design Thinking and Research Methodology	Т	2	0	0	2	2	30	20	50	3
6	6	PE	CSE		Professional elective-II	Т	3	0	0	3	3	30	20	50	3
7	6	PE	CSE		Professional elective-III	Т	3	0	0	3	3	30	20	50	3
8	6	PE	CSE		Professional elective-IV	Т	3	0	0	3	3	30	20	50	3
9	6	MDM	MDM		MD Minor Course-IV	Т	3	0	0	3	3	30	20	50	3
					Lab: Vocational & Skill Enhancement -Linux										
10	6	VSEC-	CSE	23CSE1606	Administration and shell programming	Р	0	0	2	4	2		60	40	
11	6	4 STR	CSE	23CSE1607	Project Phase-I	Р	0	0	4	4	2	-	60	40	
- 1 1	0	OIIX	COL	2300L1007	-	<u> </u>	20			32	26		00	40	
					TO'	IAL	20	0	10	32	26				
List	of N	landat	ory Lear	ning Course	(MLC)			,							
1	6	HS	T&P	MLC126	YCAP6:	Α	3	0	0	3	0				
				l											
Professional Elective - II															
1 6 PE-II CSE 23CSE1621 PE-II: Big Data Analytics															
2	6	PE-II	CSE		SE 1621 PE-II : Dig Data Ariayucs SE 1622 PE-II : Computer Graphics										
					PE-II: Computer Graphics PE-II: Parallel computing										
3	6	PE-II PE-II	CSE	23CSE1623											
4	6	PE-II	CSE	23CSE1624	PE-II: Game Theory DE-II: Real time system										
5	6			23CSE1625	,										
6	6	PE-II	CSE	23CSE1626	· · ·										
7	6	PE-II	CSE	23CSE1627	PE-II: Management Information system										
0	6	PE-II	CSE	23CSE1628	PE-II : Digital Marketing Analytics										
Pro	fess	ional	Elective	- III											
1	6	PE-III	CSE	23CSE1641	PE-III : Financial Data analysis										
2	6	PE-III	CSE	23CSE1642	PE-III : Augmented Reality										
3	6	PE-III	CSE	23CSE1643	PE-III: Information Retrieval System										
4	6	PE-III	CSE	23CSE1644	PE-III: Optimization Techniques										
5	6	PE-III	CSE	23CSE1645	PE-III : Human Computer interaction										
6	6	PE-III	CSE	23CSE1646	PE-III : Blockchain Technology										
7	6	PE-III	CSE	23CSE1647	PE-III: Bioinformatics										
8	6	PE-III	CSE	23CSE1648	PE-III : Software Defined Network										
9	6	PE-III	CSE	23CSE1649	PE-III : Soft Computing										
				•											
Pro	fess	ional	Elective	- IV											
1	6	PE-IV	CSE	23CSE1661	PE IV : GPU architecture and Programming										
2	6	PE-IV	CSE	23CSE1662 PE IV : Quantum Computing											
3	6	PE-IV	CSE	23CSE1663											
4	6	PE-IV	CSE 23CSE1664 PE IV : Nature Inspired Computing												
5	6 PE-IV CSE 23CSE1665 PE IV : Distributed Computing														
6	6	PE-IV	CSE	23CSE1666	PE IV: Industry 4.0										
7	6	PE-IV	CSE	23CSE1667	PE IV : Distributed Database Management Syste	m									
8	6	PE-IV	CSE	23CSE1668	PE IV : Data Mining										
9	6	PE-IV	CSE	23CSE1669	PE-IV : Product Development										
			I		' '										
Cou	sera	Elective	es												
_	^	PE-IV	CSE	23CSE1670	PE-IV: IBM Deep Learning with PyTorch, Keras a	nd Te	ensorf	ow Pro	fessio	nal Cer	tificate				
1	6	PE-IV	CSE	23CSE1671	PE-IV: Lab. IBM Deep Learning with PyTorch, K	eras a	and Te	nsorfic	w Prof	ession	al Certi	ficate			
		1			. , ,										

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
(Accredited 'A++' Grade by NAAC with a score of 3.6)
Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology SoE & Syllabus 2023 1st Semester

(Department of Computer Science & Engineering)

B. Tech in Computer Science and Engineering



Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering) B. Tech in Computer Science & Engineering

SoE No. 23CSE-101

SN	Sem	Type	BoS/	Sub. Code	Subject	T/P	Co	Contact Hours		Credits	% W	eightag	je	ESE	
			Deptt				L	T	Р	Hrs		MSEs*	TA**	ESE	Duration
						RO	UP-	B)							
1	1	BS	GE	23GE1103	Differential Equations and Complex Analysis	Т	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1110	Applied Physics	Т	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1111	Lab: Applied Physics	Р	0	0	2	2	1		60	40	
4	1	BES	ME	23ME1101	Engineering Graphics	Т	1	0	0	1	1	30	20	50	3
5	1	BES	ME	23ME1102	Lab : Engineering Graphics	Р	0	0	4	4	2		60	40	
6	1	BES	EL	23EL1101	Basic Electrical and Electronics Engineering	Т	3	0	0	3	3	30	20	50	3
7	1	BES	CT	23CT1103	Lab : Computer WorkShop	Р	0	0	2	2	1		60	40	
8	1	PC	CSE	23CSE1101	Object Oriented Programming using Python	Т	3	0	0	3	3	30	20	50	3
9	1	PC	CSE	23CSE1102	Lab : Object Oriented Programming using Python	Р	0	0	2	2	1		60	40	
10	1	VSEC	GE	23GE1117	Get Set Go						2		60	40	
11	1	CC2	GE		Liberal Learning Course (LLC2)						2		60	40	
					TOTAL FIRST	SEM	13	0	10	23	22				
MA	NDAT	ORY LEAR	NING CO	DURSES											
1	1	HS		GE2131	Universal Human Values (UHV)	Α	2	0	0	2	0				
					SECOND SEMESTER (GRO	IID	Βl							
1	2	BS	GE	23GE1201	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1206	Engineering Chemistry	Т	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1207	Lab: Engineering Chemistry	Р	0	0	2	2	1		60	40	
4	2	HS/AEC1	GE	23GE1212	Professional Communication	Т	2	0	0	2	2	30	20	50	2
5	2	HS/IKS	GE	23GE1215	Indian Knowledge System	Т	2	0	0	2	2	30	20	50	2
6	2	BES	CV	23CV1201	Engineering Mechanics	Т	3	0	0	3	3	30	20	50	3
7	2	BES	CV	23CV1202	Lab: Engineering Mechanics	Р	0	0	2	2	1		60	40	
8	2	BES	IT	23IT1203	Programming for Problem Solving	Т	2	0	0	2	2	30	20	50	2
9	2	BES	IT	23IT1204	Lab: Programming for Problem Solving	Р	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English						2		60	40	
11	2	CC1	GE		Liberal Learning Course (LLC1)						2	_	60	40	
				1	TOTAL SECOND	SEM	15	0	6	21	22			ı	

Liberal Learning Course

SN	Sem	Type	BoS/	Sub. Code	Subject
			Deptt		
1	2	CC2	GE	23LLC1201	Music (Vocal)
2	2	CC2	GE	23LLC1202	Music (Instrumental)
3	2	CC2	GE	23LLC1203	Indian Classical Dance
4	2	CC2	GE	23LLC1204	Other forms of Dances
5	2	CC2	GE	23LLC1205	Painting
6	2	CC2	GE	23LLC1206	Theatre and acting
7	2	CC2	GE	23LLC1207	Photography
8	2	CC2	GE	23LLC1208	Yoga
9	2	CC2	GE	23LLC1209	Chess
10	2	CC2	GE	23LLC1210	Athletics
11	2	CC2	GE	23LLC1211	Basket Ball
12	2	CC2	GE	23LLC1212	Judo
13	2	CC2	GE	23LLC1213	Elements of Japanese Language
14	2	CC2	GE	23LLC1214	Elements of German Language
15	2	CC2	GE	23LLC1215	Elements of French Language
16	2	CC2	GE	23LLC1216	Elements of Spanish Language
17	2	CC2	GE	23LLC1217	Basics of Vedic Maths
18	2	CC2	GE	23LLC1218	Skilling in Microsoft Visio and Inkscape



Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering)
B. Tech in Computer Science & Engineering

SoE No. 23CSE-101

Deptt L T P Hrs MSEs* TA** ESE Duration Hours	s	N Sem	Type	BoS/	Sub. Code	Subject	T/P	Co	onta	ct H	ours	Credits	% W	eightag	je	ESE	ĺ
				Deptt				L	Т	Р	Hrs		MSEs*	TA**	ESE		

Lib	iberal Learning Course											
SN	Sem	Type	BoS/	Sub. Code	Subject							
			Deptt									
1	1	CC1	GE	23LLC1101	Music (Vocal)							
2	1	CC1	GE	23LLC1102	Music (Instrumental)							
3	1	CC1	GE	23LLC1103	Indian Classical Dance							
4	1	CC1	GE	23LLC1104	Other forms of Dances							
5	1	CC1	GE	23LLC1105	Painting							
6	1	CC1	GE	23LLC1106	Theatre and acting							
7	1	CC1	GE	23LLC1107	Photography							
8	1	CC1	GE	23LLC1108	Yoga							
9	1	CC1	GE	23LLC1109	Chess							
10	1	CC1	GE	23LLC1110	Athletics							
11	1	CC1	GE	23LLC1111	Basket Ball							
12	1	CC1	GE	23LLC1112	Judo							
13	1	CC1	GE	23LLC1113	Elements of Japanese Language							
14	1	CC1	GE	23LLC1114	Elements of German Language							
15	1	CC1	GE	23LLC1115	Elements of French Language							
16	1	CC1	GE	23LLC1116	Elements of Spanish Language							
17	1	CC1	GE	23LLC1117	Basics of Vedic Maths							
18	1	CC1	GE	23LLC1118	Skilling in Microsoft Visio and Inkscape							

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory: TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance TA** = for Practical: MSPA will be 15 marks each

A	AY 2023-24 Onwards
July, 2023 1.00	Applicable for





(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Mathematics & Humanities)

SoE No. 23FY-101

B.Tech First Year

I SEMESTER

23GE1103: Differential Equations and Complex Analysis

Course Outcomes

The students will be able to

- 1. Use appropriate Methods to solve first order and higher order differential equations and apply it to find solutions of engineering problems.
- 2. Use appropriate methods to solve partial differential equations.
- 3. Determine the various functions of complex numbers.
- 4. Evaluate the integration of function of complex variables.

Unit I: Differential Equations I

(7 Hrs.)

Linear differential equations of first order and first degree, Differential equation reducible to linear form, Exact differential equations (excluding the case of integrating factor) and their applications to various fields. (Contemporary Issues related to Topic)

Unit II: Differential Equations II

(8 Hrs.)

Higher order linear differential equations with constant coefficients, Complementary functions and Particular Integral for different cases, Method of variation of parameters, Examples on application to various fields.

(Contemporary Issues related to Topic) Unit III: Differential Equations III

(7 Hrg.)

Cauchy's homogeneous linear differential equations, Legendre's linear differential equations, Applications of differential equations to various fields (only up to second order). (Contemporary Issues related to Topic)

Unit IV: Partial Differential Equations

(8 Hrs.)

Partial Differential Equations of first order, first degree i.e. Lagrange's form, linear homogeneous equations o higher order with constant coefficient. Application of variable separable method to solve first and second order partial differential equations. (Contemporary Issues related to Topic)

Unit V: Complex Number

(8 Hrs.)

Basic concepts of complex numbers and its various forms. Separation of real and imaginary parts, De Moivre's theorem, Application of De Moivre's theorem, Exponential function of complex numbers, Circular function of complex numbers, Hyperbolic function and their inverse, Logarithm of a complex number.

(Contemporary Issues related to Topic)

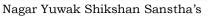
Unit VI: Complex Variables

(7 Hrs.)

Analytic function, Cauchy-Riemann conditions, Harmonic functions, Finding Harmonic conjugates, Taylor's and Laurent's Theorem (statement only), Examples on Taylor's and Laurent's Theorem, Evaluation integral by using Residue theorem. (Contemporary Issues related to Topic)

Total Lecture | 45 Hours

	del	Bhami	July,2023	1.00	Applicable for
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward)

(Department of Mathematics & Humanities)

SoE No. 23FY-101

B.Tech First Year

Tex	xtbooks:
1.	Erwin Kreyzig, Advance Engineering Mathematics, 6th Edition, John Wiley and Sons, INC.
2.	H.K. Dass, Engineering Mathematics, 11 th revised edition, S. Chand, Delhi.
3.	H.K. Dass, Advanced Engineering Mathematics, 8 th revised edition, S. Chand, Delhi.
4.	Dr. B.S. Grewal, Higher Engineering Mathematics, 42 th edition, Khanna Publishers.
5.	P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4th Edition, Vidyarthi GrihaPrakashan.

Reference Books:

- G B Thomas and R L Finney, Calculus and Analytical Geometry, 9th edition, Addison-Wesley, 1999.
- 2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10th edition, Laxmi Prakashan.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-

copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/

MO	MOOCs Links and additional reading, learning, video material							
1.	https://nptel.ac.in/courses/111103070							
2.	https://onlinecourses.nptel.ac.in/noc19_ma28/preview							
3.	https://nptel.ac.in/courses/111/106/111106100/							

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward)

(Department of Physics) **B.Tech First Year**

SoE No. 23FY-101

I SEMESTER 23GE1110 : Applied Physics

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Correlate fundamentals of quantum mechanics to solve problems dealing with quantum particles.
- 2. Justify the characteristics of semiconductor materials in terms of crystal structures, charge carriers and energy bands.
- 3. Analyze the motion of charged particles in electric and magnetic field and its applications to electron optic devices.
- 4. Examine the intensity variation of light due to Laser and its application.
- 5. Illustrate working principles of optical fibers for their use in the field of industry.

Unit I: Quantum Physics

(8 Hrs.)

Wave particle duality, Davisson and Germer experiment, Wave packet, Heisenberg's uncertainty principle, thought experiment, Significance, Applications. (Contemporary Issues related to Topic)

Unit II: Introduction to Quantum Computing

(7 Hrs.)

Introduction of complex numbers, operators, Eigen values, Eigen functions. Wave function and its probability interpretation, Schrodinger Equation, Particle in infinite and finite potential well, quantum tunneling, Introduction to Bits and Qubits. (Contemporary Issues related to Topic)

Unit III: Band Theory of Solids

(8 Hrs.)

Formation of energy bands in solids; Classification of solids, Energy band diagram of Si and Ge, Intrinsic and extrinsic semiconductors, Conductivity, Law of mass action, Hall effect, Direct and Indirect band gap semiconductors. (Contemporary Issues related to Topic)

Unit IV: Electron Ballistics and Devices

(9 Hrs.)

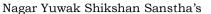
Motion of a charged particle in uniform electric and magnetic field, Cross field configuration; Electron refraction, Electron lens. Cathode ray oscilloscope and its application. (**Contemporary Issues related to Topic**)

Unit V: Lasers

(7 Hrs.)

Coherence and its types, Interaction of radiation with matter, Population Inversion, Pumping: methods and schemes, Optical resonant cavity, Ruby laser, He-Ne laser, diode laser, Properties and engineering applications of laser. (Contemporary Issues related to Topic)

	Mel	Shami	July,2023	1.00	Applicable for
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





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B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward)

(Department of Physics)

SoE No. 23FY-101

B.Tech First Year

Unit VI: Optical Fibres

(6 Hrs.)

Principle, structure and classification, Acceptance angle, Numerical aperture, Losses in optical fibers, Applications as sensors. (Contemporary Issues related to Topic)

Total Lecture | 45 Hours

Textbooks

- 1 M. N. Avadhanulu, P. G. Kshirsagar, A Textbook of Engg. Physics, S. Chand and Company.
- 2 Hitendra K Malik, A K Singh, Engineering Physics, 2nd Edition, Tata McGraw Hill Education Private Limited.

Reference Books

- David Halliday, Robert Resnick and Jerle Walker, John-Wiley India, Fundamentals of Physics, 10th John Wiley & Sons Inc.
- 2 | Brijlal and Subramanyam, Text Book of Optics, Revised edition, S. Chand and Company.
- 3 M.N. Avadhanulu, 2nd Edition, Laser, S.Chand and Company.
- 4 A. Beiser, Concept of Modern Physics, 6th Edition, Laser, Tata McGraw-Hill.
- 5 Thyagarajan K. and Ghatak A.K, LASERS: Theory and Applications, 2nd Edition, Macmillan **Publication**
- **6** S. O. Pillai, Solid State Physics, 9th Edition, New Edge International Publishers.
- 7 Palanisamy, Solid State Physics, 8th Edition, New Edge International Publishers.
- **8** C. Kittel, Solid State Physics, 8th Edition, Willey Publication.

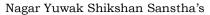
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

- chrome-http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Eisberg%20&%2 0Resnick%20-%20Quantum%20Physics.pdf
- http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/2016 Book ThePhysicsOfSemiconductors.pdf

MOOCs Links and additional reading, learning, video material

- https://nptel.ac.in/courses/115106066 Quantum Physics
- https://archive.nptel.ac.in/courses/115/105/115105121/ -CRO
- www.digimat.in/nptel/courses/video/115102124/L36.html-Laser

	del	Bhami	July,2023	1.00	Applicable for
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward)

(Department of Physics) **B.Tech First Year**

SoE No. 23FY-101

I SEMESTER

23GE1111: Lab. Applied Physics

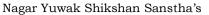
Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Correlate fundamentals of quantum mechanics to solve problems dealing with quantum particles.
- 2. Justify the characteristics of semiconductor materials in terms of crystal structures, charge carriers and energy bands.
- 3. Analyze the motion of charged particles in electric and magnetic field and its applications to electron optic devices.
- 4. Examine the intensity variation of light due to Laser and its application.
- 5. Illustrate working principle of optical fibers for their use in the field of industry.

List of E	xperiments:
Sr. No.	Experiments based on
1	Determination of Planck's Constant
2	Study of Tunnel Diode.
3	Determination of Hall coefficient and density of charge carriers using Hall effect.
4	Dependence of Hall coefficient on temperature.
5	The study of V-I characteristics of a semiconductor diode (Germanium and silicon) in forward and reverse bias mode.
6	Determination of Band gap in a semiconductor by four probe method.
7	Determination of Band gap in a semiconductor using reverse biased p-n junction diode.
8	Determination of wavelength of laser using diffraction grating.
9	Determination of divergence of laser beam.
10	Determination of Acceptance angle and numerical aperture of a given optical fiber.
11	To measure the phase shift introduced by a phase shift network using Dual beam CRO.
12	Determination of amplitude and frequency of sinusoidal signal using CRO.

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Cha	airperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward) (Department of Mechanical Engineering)

SoE No. 23ME-101

B.Tech in Mechanical Engineering

I SEMESTER

23ME1101: Engineering Graphics

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Construct orthographic drawing and isometric drawing of a given object
- 2. Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects
- 3. Develop the lateral surfaces of various solids, their section and intersection.
- 4. Practice the use of software tools used for Two dimensional drawings.

Unit I: Theory of Orthographic Projections:

(3 Hrs.)

Introduction, Quadrant system, Theory of orthographic projection, Projection method and principal planes, First and Third angle projections,

Unit II: Theory of Isometric Projections:

(2 Hrs.)

Theory of isometric projection, Method for drawing isometric views, Different problems on isometric projections.

Unit III: Lines:

(2 Hrs.)

Projection of points, Projection of lines, True lengths and inclinations, apparent lengths and inclinations, various positions of lines in different quadrants, Traces of lines, projection of line on auxiliary plane.

Unit IV: Planes and Solids:

(4 Hrs.)

Projection planes: (Polygonal Lamina, Circular Lamina), Projection of Perpendicular planes and oblique planes. Auxiliary views (Auxiliary planes) Projection of Solids:(Inclined to One Plane Only) - Polyhedra (Regular and Irregular Polyhedra), Solids of Revolution

Unit V: Section of Solids and Development of Surfaces:

(2 Hrs.)

Types of Section planes, Sectional top view, True shape.

Development of different solids using Radial line and parallel line methods.

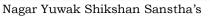
Unit VI: Intersection of Surfaces of solids:

(2 Hrs.)

Intersection between similar solids, Intersection between dissimilar solids, Lines and Curves of Intersection.

Total Lecture | 15 Hours

Li:	del	Bharri	July,2023	1.00	Applicable for
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward) (Department of Mechanical Engineering)

SoE No. 23ME-101

B.Tech in Mechanical Engineering

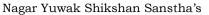
Te	Textbooks:						
1.	D.M. Kulkarni, A. P. Rastogi and A. K. Sarkar, Engineering Graphics with AutoCAD PHI learning Pvt. Ltd.,						
	Revised Edition(2014),						
2.	N. D. Bhatt ,Engineering Drawing Charotar Publishing House Pvt. Ltd, 53 rd Edition 2017						

R	Reference Books:					
1.	D. A. Jolhe Engineering Drawing, Tata McGraw Hill Publications, 2008,					
2.	K. L. Narayana & P. Kannaiah, Engineering Drawing SciTech Publication, 2010					
3.	R. K. Dhawan Engineering Drawing S. Chand Publication Multicolor revised edition 2015					

Y	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]				
1	Intranet on address 172.16.1.10. data/CCC/software / AutoCAD Software Setup.				

MO	MOOCs Links and additional reading, learning, video material					
1.	https://youtube.com/playlist?list=PLLy_2iUCG87Bw9XPfEF3r3EW5UlAOv8iz					
2.	Eng https://nptel.ac.in/courses/112105294					

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward) (Department of Mechanical Engineering)

SoE No. 23ME-101

B.Tech in Mechanical Engineering

I SEMESTER

23ME1102: Lab. Engineering Graphics

Course Outcomes:

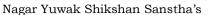
Upon successful completion of the course the students will be able to

- 1. Construct orthographic drawing and isometric drawing of a given object
- 2. Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects
- 3. Develop the lateral surfaces of various solids, their section and intersection.
- 4. Practice the use of software tools used for Two dimensional drawings.

Practical's to be performed from the list as below

SN	Experiments based on	No.of
		Practical's
1	Introduction of AutoCAD Basic Commands	02
2	Orthographic Projection	03
3	Isometric Projection	03
4	Projection of Straight Line	03
5	Projection of Planar Surface	03
6	Projection of Solid	03
7	Section and Development of Solid	04
8	Intersection of Surfaces	03
9	Drawing Sheet 1: Convention for various lines, Dimensioning and Orthographic Projection	02
10	Drawing Sheet 2: Projection of line, planar surface or solid. (Any one)	02
	Total Practical's	28 Hours

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Electrical Engineering)

SoE No. 23EL-101

B.Tech in Electrical Engineering

I SEMESTER

23EL1101: Basic Electrical and Electronics Engineering

Course Outcomes:

- 1. Understand the fundamental concepts of Analog Electronic and Electrical Circuits
- 2. Apply the concepts of Electrical and Electronic Circuits to obtain the desired parameter
- 3. Analyze analog Electrical Circuits for given application.
- 4. Analyze analog Electronic Circuits for given application

Unit I: Circuit Elements and Energy Sources

(7 Hrs.)

Circuit Elements, Series and Parallel Combination of Resistances, Inductance and Capacitances, Energy Sources, Source Transformation, Sources with Periodic Waveforms, A.C. in Inductance and Capacitance, Star-Delta Connection. (Contemporary Issues related to Topic)

Unit II: Analysis of Network

(7 Hrs.)

Kirchhof's Laws, Current Division, Voltage Division, Nodal and Mesh Analysis of Electric Circuits, Theorem (Contemporary Issues related to Topic)

Unit III: Generator and Motors

(7 Hrs.)

Introduction to Generator, Construction, working principle, Types of Generators, Introduction to DC Motor, Working Principle of DC Motor, Types of Motors. (Contemporary Issues related to Topic)

Unit IV: Diode and Transistor

(6 Hrs.)

Introduction to Semiconductor, P-N junction diodes, Biasing & Characteristics of diodes. Diode Circuits - Half wave rectifier, full wave rectifier, bridge rectifier. Introduction to BJT- NPN and PNP, Modes of operation,. (Contemporary Issues related to Topic)

Unit V: Operational Amplifier and Its Application

(7 Hrs.)

Introduction to Op-Amp, Inverting and Non-Inverting Amplifier, Linear Applications of OP-AMP like adder, Subtractor, integrator, differentiator and non-linear application using Comparator.

(Contemporary Issues related to Topic)

Unit VI: Electronics Measurement

(6 Hrs.)

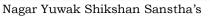
Introduction to Measurement System, Generalized block diagram of Measurement System, Static & dynamic

characteristics of measurement system, Types of errors & their sources, Statistical analysis.

(Contemporary Issues related to Topic)

Total Lecture | 40 Hours

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(Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward) (Department of Electrical Engineering)

SoE No. 23EL-101

B.Tech in Electrical Engineering

Te	xtbooks:
1.	Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford Higher Education,
	First Edition2005
2.	Electronics Devices and circuits, Millman Jacob, McGraw Hill Education, Fourth Edition (2015)
3.	Circuit Theory (Analysis and Synthesis), by A. Chakrabarti, Dhanpat Rai & Co., Reprint Edition
	2014

Re	ference Books:
1.	OP-AMP and Linear Integrated Circuit, by Ramakant A. Gayakwad, Prentice Hall India
	Learnin Private Limited, Published in 2002
2.	Electrical & Electronic measurement & Instrument, A. K. Sawhney, Dhanpat Rai & Co.,18th edition 2008

Y	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

MOO	OCs Links and additional reading, learning, video material
1.	https://onlinecourses.nptel.ac.in/noc22_ee113/preview

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(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Computer Technology)

SoE No. 23CT-101

B.Tech in Computer Technology

I SEMESTER

23CT1103: Lab. Computer WorkShop

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Understand the fundamentals of computer hardware and working of Linux operating system
- 2. Use Linux commands to manage files and file systems
- 3. Execute Scripts
- 4. Debug Programs on various IDEs

Unit I: Computer Hardware

(4 Hrs.)

Computer Hardware, RAM, HDD, Levels of Caches, Setting environment variables, Installation of software in Linux, Installing printers

Unit II: Introduction to Linux/Unix OS

(4 Hrs.)

Introduction to Linux/Unix OS - ls, wc, chdir, mkdir, chmod, cd, mv, df, du, netstat, ps, more, set, env, setenv, chgrp, man, rm, rmdir, grep, vi, tar, untar, uuencode, find, cat, history, ping, ifconfig, traceroute

Unit III: Unix tools (4 Hrs.)

Unix tools - Awk, sed, Emacs

Unit IV: Scripting

(4 Hrs.)

Scripting – variables, conditionals, loops, finding logged in users , Parameter passing to C program from shell (argc / argv)

Unit V: Installing Linux (or any variant)

(4 Hrs.)

Installing Linux (or any variant): Introduction to using different tools for identification of possible errors in C program – gdb, concepts of "core dump", backtracing using "bt", using "info" to dump all registers, creating watch-list / watch variables. DDD (Data Display Debugger) – introduction and usage

Unit VI: IDE for code development

(4 Hrs.)

IDE for code development Using DevCpp and/or VisualStudio, Create a project using multiple .c and .h files with cross-refrences, Setting compiler options and linker options, Understanding different settings

Total Lecture | 24 Hours

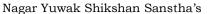
Textbooks:

- 1. Linux Pocket Guide, Daniel J. Barrett, 3rd edition, O'Reilly Media
- 2. The Linux Command Line, William Shotts, 2nd edition, No Starch Press
- 3. Linux for Beginners, Jason Cannon, 1st edition, Independently Published

Reference Books:

- 1. Linux Command Line and Shell Scripting Bible, Richard Blum, 3rd edition, Wiley
- 2. Command Line Kung Fu, Jason Cannon, 1st edition, Independently Published

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Technology)

SoE No. 23CT-101

B.Tech in Computer Technology

7	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	chrome-
	extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20fi
	1e/SERIES%20WISE%20BOOKS/COMPUTER%20TECHNOLOGY/COMPUTER%20TECHNOLOGY%20
	(G%20Series).pdf
2	2 chrome-
	extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20fi
	le/SERIES%20WISE%20BOOKS/COMPUTER%20TECHNOLOGY/COMPUTER%20TECHNOLOGY%20
	(I%20Series).pdf
3	B chrome-
	extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20fi
	1e/SERIES%20WISE%20BOOKS/COMPUTER%20TECHNOLOGY/COMPUTER%20TECHNOLOGY%20
	(PE%20Series).pdf

MC	OOCs Links and additional reading, learning, video material
1.	https://www.youtube.com/watch?v=19O5kFdtKb0
2.	https://www.youtube.com/watch?v=ZtqBQ68cfJc
3.	https://www.youtube.com/watch?v=kfjDWygSvnw
4.	https://www.youtube.com/watch?v=GtovwKDemnI&t=1578s
5.	https://www.youtube.com/watch?v=J7L2x1ATOgk
6.	https://www.youtube.com/watch?v=85FrhrIwBtw

Course Outcomes

Upon successful completion of the course the students will be able to

- 1. Understand the fundamentals of computer hardware and working of Linux operating system
- 2. Use Linux commands to manage files and file systems
- 3. Execute Scripts
- 4. Debug Programs on various IDEs

Minimum Eight Practical's to be performed from the list as below

SN	Experiments based on
1	Installation of various software in Linux environment
2	Basics of Linux commands and its use
3	Programs based on Scripting
4	Execution of C Program through command line argument
5	Debugging in Turbo C and DEVC++
6	Debugging using gdb debugger
7	Create project using multiple C files
8	Exploring various text editors in Linux: AWK, SED, Emacs

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

I SEMESTER

23CSE1101: Object Oriented Programming using Python

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Understand the basic data types, built in data structures, control statements and loops and write simple programs in Python.
- 2. Apply the concepts of functions modules and packages and write programs using them.
- 3. Design and develop classes in Python.
- 4. Solve real world problems and develop interesting applications using Python

Sharri

Dean OBE

Dean (Acad. Matters)

Chairperson

Unit:1	Introduction to Python	6 Hours
Build-in I	Data types & variables, arithmetic operators, Bitwise operators, relational	and logical
operators,	assignment statement, print & input function, Strings, and string operations, mu	table versus
immutable	e data types, Standard library functions	
Unit:2	Decision making and Loops	6 Hours
Decision r	making: if, if-else & nested if- else statements, loop statements: for, while and c	ontinue and
break state	ements, Programs for computing GCD, LCD, Taylor's series expansion, bisect	ion method,
etc. Real v	world problem solving based on decision making and looping statements.	
Unit:3	Object Oriented Concepts	7 Hours
Features of	of object oriented programming, Python Objects and Classes: defining class	es, member
variables,	doc strings for classes, private members, dunder methods, Operator Overloadin	g, designing
custom cla	asses	
Custom Cit	20000.	
Unit:4	Object Oriented Features & Data Structures	7 Hours
Unit:4		
Unit:4 Inheritance	Object Oriented Features & Data Structures	bstract base
Unit:4 Inheritance class, com	Object Oriented Features & Data Structures e, Encapsulation, Polymorphism, function overloading versus overriding, A	bstract base
Unit:4 Inheritance class, com	Object Oriented Features & Data Structures e, Encapsulation, Polymorphism, function overloading versus overriding, Amposition. Built in data structures: Lists, Dictionaries, Tuples, Sets, and Arrays.	bstract base
Unit:4 Inheritanc class, com Usage and Unit:5	Object Oriented Features & Data Structures e, Encapsulation, Polymorphism, function overloading versus overriding, Apposition. Built in data structures: Lists, Dictionaries, Tuples, Sets, and Arrays, Comparison of built in data structures, in Python.	bstract base, mutability. 6 Hours
Unit:4 Inheritance class, come Usage and Unit:5 User definition	Object Oriented Features & Data Structures e, Encapsulation, Polymorphism, function overloading versus overriding, Amposition. Built in data structures: Lists, Dictionaries, Tuples, Sets, and Arrays, Comparison of built in data structures, in Python. Function, Module & Packages	bstract base, mutability. 6 Hours al & global
Unit:4 Inheritance class, come Usage and Unit:5 User definition	Object Oriented Features & Data Structures e, Encapsulation, Polymorphism, function overloading versus overriding, Amposition. Built in data structures: Lists, Dictionaries, Tuples, Sets, and Arrays, Comparison of built in data structures, in Python. Function, Module & Packages med Functions, returning values, keyword arguments and default values, loc doc strings for functions, developing useful functions, Modules and Packages	bstract base, mutability. 6 Hours al & global
Unit:4 Inheritance class, come Usage and Unit:5 User definition variables,	Object Oriented Features & Data Structures e, Encapsulation, Polymorphism, function overloading versus overriding, Amposition. Built in data structures: Lists, Dictionaries, Tuples, Sets, and Arrays, Comparison of built in data structures, in Python. Function, Module & Packages med Functions, returning values, keyword arguments and default values, loc doc strings for functions, developing useful functions, Modules and Packages	bstract base, mutability. 6 Hours al & global
Unit:4 Inheritance class, come Usage and Unit:5 User definition variables, statement. Unit:6	Object Oriented Features & Data Structures e, Encapsulation, Polymorphism, function overloading versus overriding, Amposition. Built in data structures: Lists, Dictionaries, Tuples, Sets, and Arrays Comparison of built in data structures, in Python. Function, Module & Packages med Functions, returning values, keyword arguments and default values, local doc strings for functions, developing useful functions, Modules and Packages	bstract base, mutability. 6 Hours al & global ges, import 6 Hours
Unit:4 Inheritance class, come Usage and Unit:5 User definition variables, statement. Unit:6 Exception	Object Oriented Features & Data Structures e, Encapsulation, Polymorphism, function overloading versus overriding, Amposition. Built in data structures: Lists, Dictionaries, Tuples, Sets, and Arrays Comparison of built in data structures, in Python. Function, Module & Packages med Functions, returning values, keyword arguments and default values, loc doc strings for functions, developing useful functions, Modules and Packages Exception handling & Application Development	bstract base, mutability. 6 Hours al & global ges, import 6 Hours

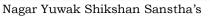
July,2023

Date of Release

1.00

Version

Applicable for AY 2023-24 Onwards





Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University) B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward) (Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

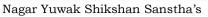
Tex	tbooks:
1	Python 3 Object Oriented Programming second Edition, Dusty Phillip, Packt Publishing
2	Fundamental of Python: First Programs, Kenneth A. Lambert, Cengage
3	Python Programming, A Modular Approach, Sheetal Taneja and Naveen Kumar, Pearson

Ref	erence Books:
1	Introduction to Computation and Programming Using Python, John V. Guttag, Second
	Edition, 2016, PHI
	EEE (MIT Press).
2.	Python for Programmers, Paul Deitel and Harvey Deitel, Pearson
3.	Learn Python Programming, Fabrizio Romano, Heinrich Kruger, Third Edition, 2020, PACKT
	Publishing

YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-
	copies%20of%20books/Computer%20Science%20and%20Engineering/python-basics-sample-
	<u>chapters.pdf</u>
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-
	copies%20of%20books/Computer%20Science%20and%20Engineering/practical-machine-
	<u>learning-python-</u>
	<u>problem-solvers.pdf</u>

MO	MOOCs Links and additional reading, learning, video material									
1	https://onlinecourses.nptel.ac.in/noc20_cs70/preview									
2	https://onlinecourses.nptel.ac.in/noc20_cs83/preview									

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward) (Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

I SEMESTER

23CSE1102: Lab. Object Oriented Programming using Python

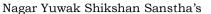
Course Outcomes:

Upon successful completion of the course the students will be able to

1. Implement solution to the real-world problems using various Python features

Sr. No.	Experiments based on
MSPA-1	Writing simple programs using various operators and decision making and loops.
MSPA-2	Writing real world programs using user defined classes, functions and modules
MSPA-3	Writing real world programs using object oriented features and built in data structures.
MSPA-4	Develop an useful real world application using files, modules and packages, and exception handling

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B.Tech in FYC

SoE No. 23FY-101

I SEMESTER 23GE1117-Get Set Go

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Students will understand the importance of building trust in communication and learn how to use the 3Vs of communication (Visual, Vocal, Verbal) to energize their interactions.
- 2. The course will focus on leadership principles and styles, emphasizing how effective communication can motivate others and gain willing cooperation. Students will participate in activities like skits and team presentations to demonstrate their leadership skills.
- 3. The course will equip students with team management and organization skills, enabling them to lead and participate in team-building activities effectively.

Unit:1 Build a foundation for success

6 Hours

Explain the Importance of Process of improvement, stating

your Name with Impact, Recall and Use Names, Name Remembering Formula o LIRA o

PACE - Individual Activity o BRAMMS o Chaining Method, Introduce "My Vision"

Communication Fundamentals for Building Trust- Be a good listener, use conversation links, show genuine interest Hi-Five of Success ♣ Build on Memory Skills and Enhance Relationships ♣ PEG words ♣ Explain Permanent PEG Memory System, energize our Communications − Explain 3Vs of communication − Visual-Vocal-Verbal

Activity - Practice Conversations, Pause-Part-Punch, Group Activity

Unit:2 Increase Self Confidence

6 Hours

Use our experiences to communicate more confidently • Communicate with clarity and conciseness • Discover how past experiences influence behaviour ,Motivate Others and Enhance Relationships- • Learning Objectives • Explain Gain Willing Cooperation Principles • Group Presentation • Explain Demonstration of Leadership Principles • Explain "Evidence" critical in establishing credibility

Individual Activity – Sharing of defining moment, Skit to demonstrate Leadership Principles, Stranded on Island.

Unit:3 Fundamentals of Communication

6 Hours

Fundamentals of Communication (Earn the right – Excite -Eagerness) ♣ Elevator Pitch ♣ Develop more Flexibility, ♣ Recap and Summarize

Activities - - Individual Presentation, Flexibility Drills, Individual Presentations - My Vision Assignment

Unit:4 Team Management and Organization skills

5 Hours

Team Management and Organization skills, Leadership Styles, Effective Communication

Activity- Team Presentation, Team building activities.

EVALUATION 1 Hour

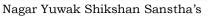
EVALUATION

WRITTEN TEST

Total Lecture Hours

24 Hours

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward) (Department of Civil Engineering)

SoE No. 23FY-101

B.Tech in FYC

Reference Books

- Soft Skills Enhancing Employability: Connecting Campus with Corporate. M S Rao
- 2 Soft Skills Training: A Workbook to Develop Skills for Employment - Frederick H Wentz
- 3 Soft Skills: Know Yourself and Know the World - Alex

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
(Accredited 'A++' Grade by NAAC with a score of 3.6)
Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology SoE & Syllabus 2023 2nd Semester

(Department of Computer Science & Engineering)

B. Tech in Computer Science and Engineering



Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering) B. Tech in Computer Science & Engineering

SoE No. 23CSE-101

SN	Sem	Type	BoS/	Sub. Code	Subject	T/P	Co			Credits	% W	eightag	je	ESE	
			Deptt				L	T	Р	Hrs		MSEs*	TA**	ESE	Duration
						RO	UP-	B)							
1	1	BS	GE	23GE1103	Differential Equations and Complex Analysis	Т	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1110	Applied Physics	Т	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1111	Lab: Applied Physics	Р	0	0	2	2	1		60	40	
4	1	BES	ME	23ME1101	Engineering Graphics	Т	1	0	0	1	1	30	20	50	3
5	1	BES	ME	23ME1102	Lab : Engineering Graphics	Р	0	0	4	4	2		60	40	
6	1	BES	EL	23EL1101	Basic Electrical and Electronics Engineering	Т	3	0	0	3	3	30	20	50	3
7	1	BES	CT	23CT1103	Lab : Computer WorkShop	Р	0	0	2	2	1		60	40	
8	1	PC	CSE	23CSE1101	Object Oriented Programming using Python	Т	3	0	0	3	3	30	20	50	3
9	1	PC	CSE	23CSE1102	Lab : Object Oriented Programming using Python	Р	0	0	2	2	1		60	40	
10	1	VSEC	GE	23GE1117	Get Set Go						2		60	40	
11	1	CC2	GE		Liberal Learning Course (LLC2)						2		60	40	
	TOTAL FIRST							0	10	23	22				
MA	NDAT	ORY LEAR	NING CO	DURSES											
1	1	HS		GE2131	Universal Human Values (UHV)	Α	2	0	0	2	0				
					SECOND SEMESTER (GRO	IID	Βl							
1	2	BS	GE	23GE1201	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1206	Engineering Chemistry	Т	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1207	Lab: Engineering Chemistry	Р	0	0	2	2	1		60	40	
4	2	HS/AEC1	GE	23GE1212	Professional Communication	Т	2	0	0	2	2	30	20	50	2
5	2	HS/IKS	GE	23GE1215	Indian Knowledge System	Т	2	0	0	2	2	30	20	50	2
6	2	BES	CV	23CV1201	Engineering Mechanics	Т	3	0	0	3	3	30	20	50	3
7	2	BES	CV	23CV1202	Lab: Engineering Mechanics	Р	0	0	2	2	1		60	40	
8	2	BES	IT	23IT1203	Programming for Problem Solving	Т	2	0	0	2	2	30	20	50	2
9	2	BES	IT	23IT1204	Lab: Programming for Problem Solving	Р	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English						2		60	40	
11	2	CC1	GE		Liberal Learning Course (LLC1)						2	_	60	40	
				1	TOTAL SECOND	SEM	15	0	6	21	22			ı	

Liberal Learning Course

SN	Sem	Type	BoS/	Sub. Code	Subject							
			Deptt									
1	2	CC2	GE	23LLC1201	Music (Vocal)							
2	2	CC2	GE	23LLC1202	Music (Instrumental)							
3	2	CC2	GE	23LLC1203	Indian Classical Dance							
4	2	CC2	GE	23LLC1204	Other forms of Dances							
5	2	CC2	GE	23LLC1205	Painting							
6	2	CC2	GE	23LLC1206	Theatre and acting							
7	2	CC2	GE	23LLC1207	Photography							
8	2	CC2	GE	23LLC1208	Yoga							
9	2	CC2	GE	23LLC1209	Chess							
10	2	CC2	GE	23LLC1210	Athletics							
11	2	CC2	GE	23LLC1211	Basket Ball							
12	2	CC2	GE	23LLC1212	Judo							
13	2	CC2	GE	23LLC1213	Elements of Japanese Language							
14	2	CC2	GE	23LLC1214	Elements of German Language							
15	2	CC2	GE	23LLC1215	Elements of French Language							
16	2	CC2	GE	23LLC1216	Elements of Spanish Language							
17	2	CC2	GE	23LLC1217	Basics of Vedic Maths							
18	2	CC2	GE	23LLC1218	Skilling in Microsoft Visio and Inkscape							



Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering)
B. Tech in Computer Science & Engineering

SoE No. 23CSE-101

SN Sem	Type	BoS/	Sub. Code	Subject	T/P	Co	onta	ct H	lours	Credits	% W	eightag	je	ESE
		Deptt				L	Т	Р	Hrs		MSEs*	TA**	ESE	Duration
														Hours
Liberal I	Learning	Cours	е											
SN Sem	Type	BoS/	Sub. Code	Subject										
1 1 1										i				

SN	Sem	Type	BoS/	Sub. Code	Subject
			Deptt		
1	1	CC1	GE	23LLC1101	Music (Vocal)
2	1	CC1	GE	23LLC1102	Music (Instrumental)
3	1	CC1	GE	23LLC1103	Indian Classical Dance
4	1	CC1	GE	23LLC1104	Other forms of Dances
5	1	CC1	GE	23LLC1105	Painting
6	1	CC1	GE	23LLC1106	Theatre and acting
7	1	CC1	GE	23LLC1107	Photography
8	1	CC1	GE	23LLC1108	Yoga
9	1	CC1	GE	23LLC1109	Chess
10	1	CC1	GE	23LLC1110	Athletics
11	1	CC1	GE	23LLC1111	Basket Ball
12	1	CC1	GE	23LLC1112	Judo
13	1	CC1	GE	23LLC1113	Elements of Japanese Language
14	1	CC1	GE	23LLC1114	Elements of German Language
15	1	CC1	GE	23LLC1115	Elements of French Language
16	1	CC1	GE	23LLC1116	Elements of Spanish Language
17	1	CC1	GE	23LLC1117	Basics of Vedic Maths
18	1	CC1	GE	23LLC1118	Skilling in Microsoft Visio and Inkscape

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory: TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance TA** = for Practical: MSPA will be 15 marks each

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(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Mathematics & Humanities)

SoE No. 23FY-101

B.Tech First Year

II SEMESTER 23GE1201: Calculus and Vector

Course Outcomes:

The students will be able to

- 1. Apply the knowledge of differentiation to solve the Engineering problems.
- 2. Determine the derivatives of functions of several variables and develop the relations among the derivatives of variables.
- 3. Apply the knowledge of Beta and Gamma functions to find area, volume and mass.
- 4. Discuss Calculus of Scalar and vector point function and use appropriate theorems to evaluate integrals of functions of single and multiple variables.

Unit I: Differential Calculus

(7 Hrs.)

Successive differentiation, nth derivative of rational function, Trigonometrical transformations, nth derivative of the product of two functions (Leibnitz's theorem), Taylor's theorem, Use of Maclaurin's theorem for one variable, standard expansions, Examples on Taylor's Theorem. (Contemporary Issues related to Topic)

Unit II: Partial Differentiation

(8 Hrs.)

Derivative of Functions of several variables, First and higher order derivatives, Homogeneous functions, Euler's theorem on homogeneous function, Chain rule and total differential coefficient of composite functions, Jacobians, Properties of Jacobians, Relation between functions

(Contemporary Issues related to Topic)

Unit III: Integral Calculus

(7 Hrs.)

Gamma function, Transformation of Gamma functions, Beta function, Transformation of Betta functions, Properties of Beta function (without proof), Relation between Beta and Gamma functions, Differentiation under Integral sign (Leibniz rule) (Contemporary Issues related to Topic)

Unit IV: Multiple integrals

(8 Hrs.)

Double integral, change of order of integral, change of variables, triple integrals and its applications on Area, Mass, Centre of Gravity, Volume.

(Contemporary Issues related to Topic)

Unit V: Vector Calculus

(7 Hrs.)

Vector fields, Vector differentiation, Gradient, Divergence and Curl, Directional derivatives with physical interpretation, Solenoidal and irrotational motions. (Contemporary Issues related to Topic) (Contemporary **Issues related to Topic**)

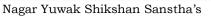
Unit VI: Vector Integration & Applications

(8 Hrs.)

Vector integration: Line, surface and volume integrals, Statement of Stoke's theorem, Gauss divergence theorem and Green's theorem (without proof), Simple applications of these theorems. (Contemporary Issues related to Topic)

Total Lecture | 45 Hours

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(Department of Mathematics & Humanities)

SoE No. 23FY-101

B.Tech First Year

Tex	Textbooks:				
1.	Erwin Kreyzig, Advance Engineering Mathematics, 10 th Edition, John Wiley and Sons, INC.				
2.	H.K. Dass, Engineering Mathematics, 11 th revised edition, S. Chand, Delhi.				
3.	H.K. Dass, Advanced Engineering Mathematics, 8th revised edition, S. Chand, Delhi.				
4.	Dr. B.S. Grewal, Higher Engineering Mathematics, 42 th edition, Khanna Publishers.				
5.	P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4 th Edition, Vidyarthi GrihaPrakashan.				

Ref	Reference Books:				
1.	G B Thomas and R L Finney, Calculus and Analytical Geometry, 9th edition, Addison-Wesley, 1999.				
2.	Michael Spivak and Tom Apostol, Calculus, VolI & Vol II 2 nd edition, Wiley.				
3.	N.P. Bali and Manish Goval. A text book of Engineering Mathematics, 10 th edition, Laxmi Prakashan.				

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]					
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-				
	copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/				

MOOCs Links and additional reading, learning, video material				
1.	https://nptel.ac.in/courses/111/106/111106146/			
2.	https://nitkkr.ac.in/docs/5-Multiple%20Integrals%20and%20their%20Applications.pdf			

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(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Applied Chemistry)

B.Tech First Year

SoE No. 23FY-101

I/II SEMESTER

23GE1106/23GE1206: Engineering Chemistry

Course Outcomes:

Upon successful completion of the course the students will be able to:

- 1. **Build** the knowledge of qualitative and quantitative aspects of water for industrial and domestic applications. (L3)
- 2. **Apply** fundamental principles of electrochemistry to understand corrosion, energy storage devices and their industrial applications. (L3)
- 3. **Develop** insight into spectroscopic techniques for material characterization. (L3)
- 4. Utilize knowledge of advanced engineering materials for technological applications. (L3).

Unit I: Water Chemistry

(8 Hrs.)

Introduction, Potable water quality parameters. Hardness, Types of hardness. Sterilization. Desalination of water by R.O. Softening of water by Zeolite process and Ion Exchange Process (principle, advantages, and limitations). Numerical based on Hardness and Zeolite process. Boiler trouble (Scale and sludge).

Contemporary issues related to the topic.

Unit II: Electrochemistry

(8 Hrs.)

Introduction, Redox reactions, EMF of a cell, standard electrode potential, Nernst equation, numerical and applications to chemical cells. Conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Electrolysis, laws of electrolysis and numerical.

Industrial applications: Electroplating, Electrolytic refining.

Corrosion: Definition, Causes, theories of corrosion-dry, wet and differential aeration.

Contemporary issues related to the topic.

Unit III: Energy storage devices

(7 Hrs.)

Battery: Introduction, Characteristics, and General applications

Lithium-ion battery, Glass battery, H₂-O₂ Fuel cell. Differences between Battery and Fuel cell. Recycling and safe disposal of batteries.

Supercapacitors: Definition, Types, Characteristics, and Application.

H₂ as a green fuel: Introduction, Production, Storage, and Utilization. Contemporary issues related to the topic.

Unit IV: Spectroscopic Techniques and Applications

(7 Hrs.)

Introduction, fundamentals, types, principles, and selection rules of spectroscopy.

Basic principle and applications of UV- Visible, IR, NMR Spectroscopy and numerical.

Contemporary issues related to the topic.

Unit V: Drugs & Polymer chemistry

(8 Hrs.)

Drugs: Introduction, types of drugs, synthesis of commonly used drug molecules such as aspirin and paracetamol.

Polymer: Introduction, Classification of polymers, Use and disposal of polymers.

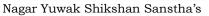
Properties of polymers - Solubility, Molecular Weight, Crystallinity and Glass transition temperature.

Synthesis of conducting polymers: Polyaniline, Polypyrole. Contemporary issues related to the topic.

Unit VI: Advanced Materials

(7 Hrs.)

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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward) (Department of Applied Chemistry)

SoE No. 23FY-101

B.Tech in CT/IT/CSE/AIDS/AIML/CSD/CSE-IoT

Nanomaterials: Definition, Carbon Nanotubes and types. Applications of Nanomaterials in Electronics, Environment and Medicine.

Chemical sensors: Types and application.

Liquid Crystal Polymers: Introduction, General properties and applications.

Polymers in electronic industries: Introduction, Piezo, Pyroelectric, Ferroelectric polymers.

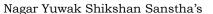
Smart materials: Introduction, Properties and applications of Chromoactive, Photoactive and Magneto

rheological materials. Contemporary issues related to the topic

Total Lecture 45 Hours

Tex	t books
1	S S. Dara, A Textbook of Engineering Chemistry, S. Chand & Co New Delhi. Eleventh Edition.
2	P.C. Jain and Monica Jain, Engineering Chemistry, Dhanpat Rai & sons New Delhi, Sixteenth Edition.
3	P. W. Atkins, Physical Chemistry, Oxford Publications, Eighth edition.
4	Y.R. Sharma, Elementary organic spectroscopy, S. Chand and company private limited.
Ref	erence Books
1.	B.K.Sharma Krishna, Engineering Chemistry, Prakashan media private LTD. 1st Edition, 2014.
2.	CNR Rao, Chemistry of Advanced Materials, Willey Publications, 1993.
3.	Fred. Billmeyer Jr., A textbook of polymer science, Wiley India, 2nd Edition.
4.	Robert B Leighou, Chemistry of Engineering Materials, Hill Book Company, Inc New York
5.	C.N. Banwell ,Fundamentals of Molecular Spectroscopy ,Mc Graw hill education , 4th Edition
6.	William C. O'Mara, Robert B. Herring, Handbook of Semiconductor Silicon Technology ,Noyes
	Publications Park Ridge, NJ, USA.1st Edition.
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/CHEMIS
	TRY/
MO	OCs Links and additional reading, learning, video material
1	https://www.youtube.com/watch?v=XTt3gXB0a84
2	https://www.youtube.com/watch?v=iihYXx79QiE
3	https://www.youtube.com/watch?v=JfJ7MlP9Dco
4	https://www.youtube.com/watch?v=L2VSOccUrSk
5	https://www.youtube.com/watch?v=p5pk4Um6lsk
6	https://www.youtube.com/watch?v=zVDMgoffmC0

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(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Applied Chemistry)

B.**Tech First Year**

SoE No. 23FY-101

I/II SEMESTER

23GE1107/23GE1207: Engineering Chemistry Lab

Course Objectives (PR)

- 1) Develop analytical ability.
- 2) Integrate chemistry fundamentals with practical applications.

Course Outcomes

Upon successful completion of the course the students will be able to

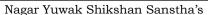
- 1. **Apply** the knowledge of quantitative and qualitative chemical analysis to perform record and analyze the results. (L3)
- 2. **Experiment** with instrumental and analytical techniques in Chemistry to solve engineering problems related to sustainability. (L3)
- 3. Write effective reports and communicate through oral presentations. (L3)
- 4. **Review a**nd apply laboratory safety protocols and procedures to acquire the ability for independent and lifelong learning. (L3)

Total 9 experiments are to be performed

(4 each from Lab I and Lab II and one demonstration experiment)

SN	Experiments based on			
	List of Experiments-Lab- I			
1	Estimation of Nickel.			
2	Estimation of Fe ²⁺ ions by redox titration			
3	Determination of copper by iodometric titration			
4	Determination of Cation exchange capacity of an ion exchange resin			
5	To determine the strength of a given potassium dichromate solution with N/20 sodium thiosulphate solution			
6	Determination of COD of water sample.			
	List of Experiments-Lab- II			
1	Determination of viscosity of lubricating oil by Redwood Viscometer I or II			
2	Determination of molecular weight of a polymer.			
3	Proximate analysis of coal			
4	Determination of electrochemical equivalence of copper using Faradays Law			
5	Determination of strength of the given acid conductometrically.			
6	To verify Beer-Lambert law for KMnO ₄ calorimetrically and determine the concentration of the given solution of KMnO ₄ .			
	List of Demonstration Experiments			
1	Synthesis of urea formaldehyde.			

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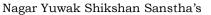
(Scheme of Examination w.e.f. 2023-24 onward) (Department of Applied Chemistry)

SoE No. 23FY-101

B.Tech in CT/IT/CSE/AIDS/AIML/CSD/IOT

	Advanced Topics (CBS)	
1.	To Determine optimum alum dosage for water or wastewater treatment by turbidity measurement using nephelometer and residual chlorine testing using chloroscope.	
2.	Comparative study of effects of different drying techniques on the quality of fruits and vegetables.	

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B. Tech SoE and Syllabus 2023

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SoE No. 23FY-101

B.Tech First Year

II SEMESTER

23GE1212: Professional Communication

Course Outcomes:

Upon successful completion of the course the students will be able to:

- 1. Apply different modes for effective communication
- 2. Produce competently the Phonology of English language
- 3. Apply nuances of LSRW skills
- 4. Practice Communication through different channels

Unit I: Basics of Communication

(7 Hrs.)

Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Classification of Barriers (Intrapersonal, Interpersonal, Organizational).

Unit II: English Phonetics

(8 Hrs.)

Speech Mechanism, Organs of speech, Consonant and Vowels sounds symbols, word stress rules

Unit III: Presentation & Interview Skills

(7 Hrs.)

Presentation-Nuances of presentation- Kinesics, Proxemics, Chronemics, Vocalics, Modes of Presentation,

Interview-Purpose, expectations of employer and preparation for Interview, Types, Types of Questions & Answering Techniques, Telephonic Interviews – preparation and guidelines

Unit IV: Technical Reports, Memo & E-Mail Etiquettes

(8 Hrs.)

Report -Types, Characteristics, prewriting aspects of report and preparing reports

Memo- Objectives, Types, Structure and Layout

Email-Etiquettes, acronyms.

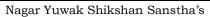
Total Lecture | 30 Hours

Textbooks:

- Meenakshi Raman & Sangeeta Sharma, Technical Communication, Raman & Sharma, Oxford University Press Orford University Press
- T. Balasubramaniam, Textbook of English Phonetics for Indian Students, Macmillan India Ltd

3.

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Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University) B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward) (Department of Mathematics & Humanities) SoE No 23FY-10

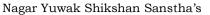
SoE No. 23FY-101

B.Tech First Year

Ref	Reference Books:						
1.	Dale Carnegie ,How to Develop Self – Confidence & Influence People by Public Speaking						
2.	Asha Kaul, Communication Skills						
3.	Allen Peas ,Body Language						
4.	Gerson's Gerson, Technical Communication						

M	MOOCs Links and additional reading, learning, video material						
1.	https://dl.uswr.ac.ir/bitstream/Hannan/141245/1/9781138219120.pdf						
2.	https://www.pdfdrive.com/word-power-made-easy-the-complete-handbook-for-building-a-superiorvocabulary-e157841139.html						
3.	https://www.pdfdrive.com/improve-your-communication-skills-present-with-confidence-write-with-						
	stylelearn-skills-of-persuasion-e156963640.html						
4.	https://www.pdfdrive.com/21-days-of-effective-communication-everyday-habits-and-exercises-to-						
	improveyour-communication-skills-and-social-intelligence-e158273760.html						

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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward) (Department of Mathematics & Humanities)

SoE No. 23FY-101

B.Tech First Year

II SEMESTER

23GE1215: Indian Knowledge System

Course Outcomes:

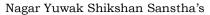
Upon successful completion of the course the students will be able to

- Apply primary requirements pertaining towards awareness of Indian Knowledge System.
- Analyze various Indian society, culture and literature to enhance their traditions. 2.
- 3. Evaluate structure of Indian art.
- 4. Understand Indian heritage and architectural skills.

Unit:1	Introduction to Indian Civilization	7 Hours
Develop	oment of Human Civilization with specific reference:	
Stone a	ge: Tool Technology and Cultural Development, Indus Valley civilization, Vedic Civiliza	tion.
(Conten	nporary Issues related to Topic)	
Unit:2	Indian Society, Culture and Literature	7 Hours
Society	and its types, Culture and its Characteristics, Foundational Literature.	
(Conten	nporary Issues related to Topic)	
Unit:3	Tradition of Indian Art and Painting	8 Hours
Indian 7	Traditional Painting, Art style folk, mural with Gandhara and Mathura school of art.	
(Conten	nporary Issues related to Topic)	
Unit:4	Indic Traditions of Architecture, Design and Planning	8 Hours
Monum	ental studies of architectural skill: Rock Cut Caves, Stupa and Temple Architecture,	The Ancient
cities of	Indus Saraswati region. Town Planning and drainage system.	
(Conten	nporary Issues related to Topic)	
	Total Lecture Hours	30 Hours

T	extbooks								
1	Reader's Digest: Vanished Civilizations, THE READER'S DIGEST ASSOCIATION LIMITED,								
	LONDON,NEWYORK.								
2	Qaiser Zoha Alam ; Language and Literature Divers Indian Experience								
3	Bal Ram Singh (Author), Nath Girish (Author); Science and Technology in Ancient Indian Texts								
4	NCERT Books								

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B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward)

(Department of Mathematics & Humanities)

SoE No. 23FY-101

B.Tech First Year

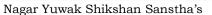
Re	Reference Books						
1	B S Harishankar; Art and Archaeology of India: Stone Age to the Present, 2003.						
2	Gupte R S and Mahajan B D; Ajanta, Ellora and Aurangabad, 1962.						
3	Dharampal, Some Aspects of Earlier Indian Society and Polity and Their Relevance Today,						
	New Quest Publications, Pune, 1987.						
4	Michel Lorblanchet, "Rock Art In The Old World" IGNCA series, in India						
5	Percy Brown, "Indian Architecture" D. B. Taraporevala sons & co. Pvt. Ltd. Bombay(1959).						

PPT's/Research papers

- 1 https://www.researchgate.net/publication/360889208_STONE_AGE_TOOL_TECHNOLOGY_and_CULTUR_AL_DEVELOPMENT
- 2 https://scholar.google.com/citations?view_op=view_citation&hl=en&user=iT1KSV8AAAAJ&sortby=pubdate &citation for view=iT1KSV8AAAAJ:UeHWp8X0CEIC

MOOCs Links and additional reading, learning, video material 1 https://prepp.in/news/e-492-indian-architecture-art-and-culture-notes 2 https://www.artzolo.com/blog/most-famous-indian-painting-styles 3 https://www.researchgate.net/publication/360889332_Stone_Age_Tool_Technology_Cultural_Development 4 https://testbook.com/ias-preparation/ancient-history-16-mahajanapadas

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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Civil Engineering)

SoE No. 23CV-101

B.Tech in Civil Engineering

II SEMESTER

23CV1201: Engineering Mechanics

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Describe the fundamental concepts of statics and dynamics.
- 2. Apply the basic concepts of applied mechanics for solution of problems on planar force system.
- 3. Determine the properties of surface like centroid, moment of inertia, etc. for planar surfaces and mass moment of inertia for rigid body.
- 4. Analyze pin jointed truss frame structure and beam structure analytically and graphically.
- 5. Evaluate the dynamic variables of kinetics of particles and simple lifting machine

Unit I: Resultant of planar force System

(7 Hrs.)

Fundamental concepts, system of forces, laws of mechanics, principle of transmissibility of force, Moment of force, Principle of moment, Couple, Resultant of a planar force system, Equivalent force couple system. (Contemporary Issues related to Topic)

Unit II: Equilibrium of planar force System

(6 Hrs.)

Free body diagrams, Conditions of equilibrium, types of supports, types of beams, types of loads on beam, Equilibrium of a planar force system (Contemporary Issues related to Topic)

Unit III: Friction and Trusses

(7 Hrs.)

Friction: Coulomb's laws of dry friction, plane friction, belt friction.

Trusses: Types of trusses, assumptions in analysis of truss, Analysis of truss by method of joint. (Contemporary Issues related to Topic)

Unit IV: Properties of Surfaces

(6 Hrs.)

Centroid: Introduction, First Moment of Area, Centroid of composite areas.

Moment of Inertia: Introduction, Second Moment of Area, Polar moment of Inertia, Radius of Gyration, Transfer formula for moment of Inertia, Product of Inertia, Moment of Inertia, and product of inertia for composite areas, Principal Moments of Inertia. (Contemporary Issues related to Topic)

Unit V: Virtual Work Method and Kinetics of Particle

(7 Hrs.)

Virtual Work Method: Introduction, Principle of virtual work, Application to beam and frame.

Kinetics of Particle: Introduction, Newton's law of motion for a Particle, D' Alembert's principle, Translation of particle and connected system. (Contemporary Issues related to Topic)

Unit VI: Work Energy and Impulse Momentum Method

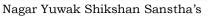
(6 Hrs.)

Work Energy Method: Introduction, Work energy equation for translation, Work energy applied to particle motion and connected system.

Impulse Momentum Method: Introduction, Linear Impulse momentum, Conservation of linear momentum, coefficient of restitution, elastic impact, Impulse momentum in plane motion. (Contemporary Issues related to Topic)

Total Lecture | 39 Hours

J. J	Mel	Bhami	July,2023	1.00	Applicable for
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University) B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward) SoE No.

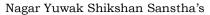
(Department of Civil Engineering)

SoE No. 23CV-101

B.Tech in Civil Engineering

Te	xtbooks:
1.	Nelson A., Engineering Mechanics (Statics and Dynamics), ed 2009, Tata Mc. Grew Hill Education Pvt. Ltd.,
	New Delhi, 2009.
2.	Dubey N.H., Engineering Mechanics (Statics and Dynamics) first edition 2013, Tata Mc. Graw Hill
	Education Pvt. Ltd., New Delhi, 2013.
3.	Singer F.L, Engineering Mechanics (Statics and Dynamics), Harper and Rowe publication, New Delhi, 1994.
Re	ference Books:
1.	Timoshenko S, Young D.H and Rao J.V, Engineering Mechanics, Mc. Graw Hill Publication, New Delhi, 2007.
2.	Bhattacharyya B., Engineering Mechanics, Oxford University Press, New Delhi, 2008.
3.	Hibbeler R.C, Engineering Mechanics (Statics and Dynamics), Pearson Publication, Singapore, 2000.
4.	Shames I.H. and Rao J.V., Engineering Mechanics (Statics and Dynamics), First Edition, Pearson
	Publication, New Delhi, 2003.
5.	Beer F.P. and Johnston E.R; Vector Mechanics for Engineers, 9th edition Tata Mc. Graw Hill Publication,
	New Delhi. 2007.
	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	chrome-
	extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20f
	ile/e-copies%20of%20books/Civil%20Engineering/78.%20Engineering-Mechanics-Statics-and-Dinamics-E-
	W-Nelson-C-L-Best-W-G-McLean-1st-Ed-1997-Schaum-Outline-McGraw-Hill%20(1).pdf
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	ile/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-
_	%20MERIAM%20%20AND%20KRAIGE.pdf
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	ile/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf
	OOCs Links and additional reading, learning, video material
1.	https://www.youtube.com/watch?v=nGfVTNfNwnk
2.	https://www.youtube.com/watch?v=6nguX-cEsvw
3.	https://nptel.ac.in/courses/112103108

517	Mal	Sharri	July,2023	1.00	Applicable for
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward)

me of Examination w.e.f. 2023-24 onward)
(Department of Civil Engineering)

SoE No.
23CV-101

B.Tech in Civil Engineering

II SEMESTER

23CV1202: Lab. Engineering Mechanics

Course Outcomes

Upon successful completion of the course the students will be able to

- 1. Describe the fundamental concepts of statics and dynamics.
- 2. Apply the basic concepts of applied mechanics for solution of problems on planar force system.
- 3. Determine the properties of surface like centroid, moment of inertia, etc. for planar surfaces and mass moment of inertia for rigid body.
- 4. Analyze pin jointed truss frame structure and beam structure analytically and graphically.
- 5. Evaluate the dynamic variables of kinetics of particles and simple lifting machine

Minimum Eight Practical's to be performed from the list as below

SN	Experiments based on			
1	To find determine the support reactions of a Simply Supported Beam experimentally and analytically.			
2	To determine the forces in the members of a Jib Crane Apparatus experimentally and graphically.			
3	To determine the coefficient of friction between two surfaces of different material on Plane Friction			
	Apparatus.			
4	To determine the coefficient of friction of Coil Friction Apparatus.			
5	To determine the forces in members of a Shear Leg Apparatus experimentally and manually.			
6	To determine the mass moment of inertia of a fly wheel using Fly Wheel Apparatus			
7	To determine efficiency and law of machine of Differential Axel & Wheel machine.			
8	To determine efficiency and Law of machine of Single Purchase Crab machine.			
9	To determine efficiency and Law of machine of Double Purchase Crab machine.			
10	To verify law of polygonal of forces using Law of Polygon Apparatus.			
11	To find support reactions of a simply supported beam using graphical method and hand calculation.			
12.	To find the forces in the member of truss using graphical method and hand calculation.			
13.	To find (1) Principle moment of inertia and (2) Moment of inertia and product of inertia about any inclined axis for a composite figure using Mohr's circle and hand calculation,			

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(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward) (Department of Information Technology)

SoE No. 23IT-101

B.Tech in Information Technology

II SEMESTER

23IT1203: Programming for Problem Solving

Course Outcomes:

- 1) Understand the basics of computer system operations and algorithms, flowcharts.
- 2) Apply the basics of C programming for problem solving.
- 3) Apply and analyze the different dimensional arrays for problem solving.
- 4) Understand the basics of string, structure, and union and apply them to problem solving.

Unit I: Computer System Basics:

(3 Hrs.)

Basics of programming and problem solving. Introduction to algorithms and flowcharts, Types of programming errors, basic input/output statements and functions (scanf, printf, getch, putch, gets, puts), Introduction to library functions,

Unit II: Basic of C Programming

(6 Hrs.)

Basic building blocks of C: Character set, variables, identifiers & keywords, Data types, Operators: arithmetic, logical and relational operators, , bitwise operators, precedence of operators, Expressions, sizeof() operator, constants, typedef statement, writing straight line programs. Decision control statements: if, if - else and nested if-else statements, else-if ladder statement, switch-case control statement.

Unit III: Loop Structures:

(5 Hrs)

While, do while and for loops, break and continue statement, "goto" statement, real life programming examples based on these loop structures, real life programming examples.

Unit IV: Modular Programming:

(6 Hrs.)

Concept of functions, user defined functions, function prototypes, formal parameters, actual parameters, return types, call by value, call by reference, C programs using functions, Recursive functions, comparing recursion against iteration, C programs using recursive functions, real life programming examples

Unit V: Arrays:

(6 Hrs.)

One dimensional array, array manipulation, insertion, deletion of an element, searching techniques-Linear and binary search, sorting technique — Bubble sort. Two-dimensional arrays: matrix representation, programs for basic matrix operations such as addition, multiplication and transpose, Array as function arguments. real life programming examples

Unit VI: String, Structure and Union:

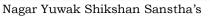
(4 Hrs.)

Strings: string representation and string handling functions, Introduction to pointer, structure and union. real life programming examples

Total Lecture

30 Hours

73/	April	& harri	July,2023	1.00	Applicable for
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B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward) (Department of Information Technology)

SoE No. 23IT-101

B.Tech in Information Technology

Text	Text books				
1	1 The C Programming Language, J.B.W.Kernighan & D.M.Ritchie, Prentice Hall				
2	Mastering C, K.R.Venugopal & S.R. Prasad, TMH, 2007.				
3	Programming in ANSI C, E. Balaguruswamy, Mc Graw Hill Education				

Refer	Reference Books							
1	Problem Solving And Program Design In C, Jeri. R. Hanly, Elliot B. Koffman, Pearson							
	Education.							
2	Programming with C, Byron Gottfried, Schaum;s Outline Series							
3	How to solve it by computers, R. G. Dromey, Prentice Hall India							

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books

M	MOOCs Links and additional reading, learning, video material					
1	https://nptel.ac.in/courses/106104128					
2	https://nptel.ac.in/courses/106104128					
3	https://www.youtube.com/watch?v=rQoqCP7LX60&list=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5					
	<u>hMt</u>					

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward)

(Department of Information Technology)

SoE No. 23IT-101

B.Tech in Information Technology

II SEMESTER

23IT1204: Lab. Programming for Problem Solving

Course Outcomes: Students will be able to

- 1) Understand the basics of computer system operations and algorithms, flowcharts.
- 2) Apply the basics of C programming for problem solving.
- 3) Apply and analyze the different dimensional arrays for problem solving.
- 4) Understand the basics of string, structure, and union and apply them to problem solving.

Unit I: Computer System Basics:

(3 Hrs.)

Basics of programming and problem solving. Introduction to algorithms and flowcharts, Types of programming errors, basic input/output statements and functions (scanf, printf, getch, putch, gets, puts), Introduction to library functions,

Unit II: Basic of C Programming

(6 Hrs.)

Basic building blocks of C: Character set, variables, identifiers & keywords, Data types, Operators: arithmetic, logical and relational operators, , bitwise operators, precedence of operators, Expressions, sizeof() operator, constants, typedef statement, writing straight line programs. Decision control statements: if, if - else and nested if-else statements, else-if ladder statement, switch-case control statement.

Unit III: Loop Structures:

(5 Hrs.)

While, do while and for loops, break and continue statement, "goto" statement, real life programming examples based on these loop structures, real life programming examples.

Unit IV: Modular Programming:

(6 Hrs.)

Concept of functions, user defined functions, function prototypes, formal parameters, actual parameters, return types, call by value , call by reference, C programs using functions, Recursive functions, comparing recursion against iteration, C programs using recursive functions, real life programming examples

Unit V: Arrays: (6 Hrs.)

One dimensional array, array manipulation, insertion, deletion of an element, searching techniques-Linear and binary search, sorting technique — Bubble sort. Two-dimensional arrays: matrix representation, programs for basic matrix operations such as addition, multiplication and transpose, Array as function arguments. real life programming examples

Unit VI: String, Structure and Union:

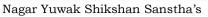
(4 Hrs.)

Strings: string representation and string handling functions, Introduction to pointer, structure and union. real life programming examples

Total Lecture

30 Hours

73/	Mel	& harri	July,2023	1.00	Applicable for
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward) (Department of Information Technology)

SoE No. 23IT-101

B.Tech in Information Technology

Text	Text books				
1	The C Programming Language, J.B.W.Kernighan & D.M.Ritchie, Prentice Hall				
2	Mastering C, K.R. Venugopal & S.R. Prasad, TMH, 2007.				
3	Programming in ANSI C, E. Balaguruswamy, Mc Graw Hill Education				

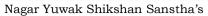
Re	Reference Books					
1	Problem Solving And Program Design In C, Jeri. R. Hanly, Elliot B. Koffman, Pearson Education.					
2	Programming with C, Byron Gottfried, Schaum;s Outline Series					
3	How to solve it by computers, R. G. Dromey, Prentice Hall India					

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1 http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books

\mathbf{M}	MOOCs Links and additional reading, learning, video material					
1	https://nptel.ac.in/courses/106104128					
2	https://nptel.ac.in/courses/106104128					
3	https://www.youtube.com/watch?v=rQoqCP7LX60&list=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5					
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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University) B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward) (Department of Information Technology)

SoE No. 23IT-101

B.Tech in Information Technology

List of Practical

SN	Unit	Name Of The Practical	Remark	CO'S Mapped	PO'S Mapped
1(A)		Introduction to Linux Operating system & it's different commands.	Manual	CO 1	PO1
1(B)		Introduction to Vi editor, Compilation and Execution of a program in Linux.	Manual	CO 1	PO1
2	II	Practical based on Arithmetic and Conditional operators.	Operators	CO 1	PO1
3	II	Practical based on Conditional and Unconditional Statements.	Conditional Statements	CO 1	PO1
4	III	Practical based on Entry Controlled Looping Statements.	For / While Loop	CO 2	PO 1, PO 2
5	III	Practical based on Exit Controlled Looping Statement	Do while Loop	CO 2	PO 1, PO 2
6	IV	Practical based on Functions and Recursion.	Functions / Recursion	CO 3	PO2, PO3
7	V	Practical based on 1-D Array.	1D Array	CO 3	PO2, PO3
8	V	Practical based on 2-D Array.	2D Array	CO 3	PO2, PO3
9	VI	Practical based on Strings.	Strings & Pointers	CO 3	PO2, PO3
10	VI	Practical based on Structures.	Structures	CO 4	PO1, PO2, PO3

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Mathematics & Humanities)

SoE No. 23FY-101

B.Tech First Year

II SEMESTER 23GE1218 : Functional English

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Understand the concept of FE (Functional English) and its application in various real-life scenarios.
- 2. Develop basic interactive communication skills, including greetings, asking for information, stating opinions, and providing feedback.
- 3. Acquire knowledge of social networking, texting, instant messaging, blogs, and discussion boards, along with the ethical considerations associated with online communication.
- 4. Successfully complete quizzes and assignments assessing knowledge in the covered topics of FE, social media, tenses, and effective communication.

Unit:1 Introduction to Functional English

6 Hours

What is FE? And Areas of application. Basic Interactive sentences - Greetings & Replies, Asking for information, Telling people what you do, Asking somebody's opinion, Giving your opinion, Saying someone is correct, Saying that someone is wrong, Apologizing, Praising someone's work, Saying goodbye. Introduction & Basics of Common Expressions – Offer, Request, Gratitude, Apology. Modal Verbs - Words used often: Can-could, Will – would, Shall – should, Ought to-Must, May-might.

Practice exercises, Practice Conversations, Script Activity

Unit:2 Internet & Social Media Communication

6 Hours

Introduction & Basics to Social Networking, Texting & Instant messaging, Blogs & Discussion Board- discussion with examples, Ethics of social media & communication

Topic: Introduction to Creative Ads Why Ads, What's in it for me? Characteristics of ads.

Assignment Quiz on the above Topics, Exercises for Evaluation

Unit:3 | TENSES | 6 Hours

Introduction & Basics, Simple Tense (Past, Present, Future), Continuous Tense (Past, Present, Future) – discussion with examples.

Introduction & Basics, Perfect Tense (Past, Present, Future), Perfect Continuous Tense (Past, Present, Future) – discussion with examples

Introduction to Movie Magic, Learn English with films, Film Vocabulary, Describing a film, Types of Films Assessment – Letter and Email Writing, Tenses – Quiz

Unit:4 Written Communication

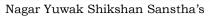
5 Hours

Introduction & Basics of Writing, five methods of communication, Mind your grammar, Commonly confusing words

Letters – Format, Parts of a business letter, When does communication fail?, Things to remember, Positive language not negative language, Active voice not passive voice

Effective emailing -How to make an effective e-mail, Few common e-mail habits that cause problems, Parts of an e-mail, Some other important aspects.

MK and	Mel	Shami	July,2023	1.00	Applicable for
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards





B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward) (Department of Mathematics & Humanities)

SoE No. 23FY-101

B.Tech First Year

Assignment Presentation on Mad Ads, Quiz on Tenses and social media-Internet Communication Topic: Activity Extempore

EVALUATION 1						
WRITTEN TEST	TA=60	ESE=40	TOTAL=100			
	<u>, </u>	<u> </u>	<u>, </u>			
Total Lecture Hours			24 Hours			

Reference Books

- How to win friends & influence people Dale Carnegie
- 2. Functional English for Communication - Ujjwala Kakarla
- 3 Functional English for Technical Students – Dr Prathibha Mahato & Dr Dora Thompson

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
(Accredited 'A++' Grade by NAAC with a score of 3.6)
Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology SoE & Syllabus 2023 3rd Semester

(Department of Computer Science & Engineering)

B. Tech in Computer Science and Engineering



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering) B. Tech. in Computer Science & Engineering

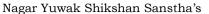
SoE No. 23CSE-101

SN	Sem	Type	BoS/	Sub. Code	Subject						ESE				
			Deptt				L	Т	Р	Hrs		MSEs*	TA**	ESE	Duration
	<u>l</u>				THIRD SEMI	ECT	ED	l	l		L				Hours
	ı					<u> </u>		ı	ı						
1	3	HSSM-1	GE	23GE1301	Fundamentals of Management & Economics	Т	2	0	0	2	2	30	20	50	3
2	3	BS	GE	23GE1303	Linear Algebra	Т	3	0	0	3	3	30	20	50	3
3	3	PC	CSE	23CSE1301	Computer Architecture & Organization	Т	3	0	0	3	3	30	20	50	3
4	3	PC	CSE	23CSE1302	Data structures	Т	3	0	0	3	3	30	20	50	3
5	3	PC	CSE	23CSE1303	Lab : Data structures	Р	0	0	2	2	1		60	40	
6	3	PC	CSE	23CSE1304	Lab : Programming with JAVA	Р	0	0	2	2	1		60	40	
7	3	VEC-2	CSE	23CSE1305	Digital & Tecnological Solution / Understanding India-Ethics in IT	Т	2	0	0	2	2	30	20	50	3
8	3	CEP	CSE	23CSE1306	Community Engagement Project	Р	0	0	2	4	2		60	40	
9	3	OE-1	OE		Open Elective - I	Т	2	0	0	2	2	30	20	50	3
10	3	MDM			MD Minor Course - I	Т	2	0	0	2	2	30	20	50	3
		•			Т	otal	17	0	6	25	21				

Lis	List of Mandatory Learning Course (MLC)														
1	3	HS	T&P	MLC2123	YCAP3 : YCCE Communication Aptitude Preparation	Α	3	0	0	3	0				

Open Elective - I					
SN	Sem	Туре	BoS/ Deptt	Sub. Code	Subject
1	3	OE1	GE	23OE1301	OE-I : Combinatorics
2	3	OE1	GE	23OE1302	OE-I: Fuzzy Set Theory, Arithmetic And Logic
3	3	OE1	GE	23OE1303	OE-I : Green Chemistry & Sustainability
4	3	OE1	GE	23OE1304	OE-I : Hydrogen Fuel
5	3	OE1	GE	23OE1305	OE-I : Electronic Materials And Applications
6	3	OE1	GE	23OE1306	OE-I : Laser Technology And Applications
7	3	OE1	MGT	23OE1307	OE-I : Finance And Cost Management
8	3	OE1	MGT	23OE1308	OE-I : Operation Research Techniques
9	3	OE1	MGT	23OE1309	OE-I : Project Evaluation & Management
10	3	OE1	MGT	23OE1310	OE-I : Total Quality Management
11	3	OE1	MGT	230E1311	OE-I : Value Engineering
12	3	OE1	MGT	230E1312	OE-I : Maintenance Management
13	3	OE1	MGT	230E1313	OE-I : Industrial Safety
14	3	OE1	MGT	230E1314	OE-I : Industry 4.0
15	3	OE1	MGT	230E1315	OE-I : Operation Management
16	3	OE1	MGT	230E1316	OE-I : Material Management
17	3	OE1	MGT	230E1317	OE-I : Hospitality Management
18	3	OE1	MGT	230E1318	OE-I : Human Resource Management & Organizational Behaviour
19	3	OE1	MGT	230E1319	OE-I : Agri-Business Management
20	3	OE1	MGT	230E1320	OE-I : Rural Marketing
21	3	OE1	MGT	230E1321	OE-I : Marketing Management
22	3	OE1	MGT	230E1322	OE-I : Health Care Management
23	3	OE1	MGT	230E1323	OE-I : Designated approved online NPTEL/KKSU Course
24	3	OE1	MGT	230E1324	OE-I : Indian Archeology
25	3	OE1	MGT	230E1325	OE-I : Social & Positive Psychology
26	3	OE1	MGT	230E1326	OE-I : Seismology & Earthquake

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Chairperson	Dean (Acad. Matters)	Date of Release	Version	A1 2020-24 Oliwards





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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

III SEMESTER

23GE1301: Fundamentals of Management & Economics

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Develop the Managerial Perspective and perform the various functions of management for optimum utilization of Engineering Resources
- 2. Identify and Analyze the role of Financial Accountancy and Marketing Management in the Organization
- 3. Develop perspective about economy based on logical reasoning and estimate the economic outcomes.
- 4. Interprets comparative advantage of resources.

Unit I: 7 Hrs.

Principles of Management: Evolution of Management Thought: Scientific and Administrative Theory of Management, Definition and Concept of Management, Functions of Management: Planning, Organizing, Directing, Staffing and Controlling, Motivational Theories, Concept of Leadership.

Unit II: 8 Hrs.

Marketing and Financial Management: Marketing and Financial Management –Marketing Theories and Concept-Marketing Mix, Market Segmentation, Targeting and Positioning and Functions Financial Management and Accountancy- Accountancy Rules and Capital, Preparation of Books of Account- Journal posting of Transaction into ledger and preparation of trial Balance, Introduction of Trading Account, Profit and loss account and balance sheet.

Unit III: 7 Hrs.

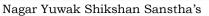
Introduction to Microeconomics: Nature and Scope of Microeconomics, Demand Analysis: Meaning and determinants of demand, law of demand, Elasticity of Demand - types and degrees, Utility analysis, Law of diminishing marginal utility, supply- law of supply, Law of Variable proportions and Return to Scale, Classification of market structure.

Unit IV: 8 Hrs.

Introduction to Macroeconomics: Nature and Scope of Macroeconomics, Concept of GDP, GNP, NDP, NNP, Measurement of GDP; Economic Growth and development, Money – definition, types and function of money, Inflation – meaning, types, causes and measure to control, concept of deflation, functions of central and commercial bank, Sources of public revenue - direct and indirect taxes.

Total Lecture	30 Hours
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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

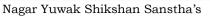
Tex	Textbooks:							
1	Principle of Management, 9th edition, Harold Koontz Ramchandra, Tata McGrow hills							
2	Marketing Management: Planning, Implementation and Control, 3rd Edition, Ramaswamy V.S. and							
	Namakumari S, Macmillian							
3	Fundamentals of Accounting Gupta R.L. & Radhaswamy;							
4	Modern Economics, 13th Edition, H. L. Ahuja, S. Chand Publisher, 2009							
5	Modern Economic Theory, 3rd edition, K. K. Devett, S. Chand Publisher,2007							
6	Principle of Economics, 7 th edition, Mankiw N. Gregory, Thomson, 2013							

Ref	Reference Books:			
1	Foundations of Financial Markets and Institutions, 3 rd Edition, Fabozzi, Pretice Hall			
2	Fundamentals of Financial Instruments, 2 nd Edition, Parameshwaran, Wiley India			
3	Marketing Management, 3 rd Edition, RajanSaxena, Tata McGraw Hill			
4	Advance Economic Theory, 17th Edition, H. L. Ahuja, S. Chand Publisher, 2009			
5	International Trade, 12 th edition, M. L. Zingan, Vindra Publication, 2007			
6	Macro Economics, 11 th edition, M. L. Zingan, Vindra Publication, 2007			
7	Monitory Economics:,1st Edition, M. L. Sheth, Himayalaya Publisher, 1995			

Y	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]		
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0		
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042		

MO	MOOCs Links and additional reading, learning, video material				
1	https://onlinecourses.nptel.ac.in/noc22_mg104/preview				
2	https://archive.nptel.ac.in/courses/110/101/110101131/				
3	https://onlinecourses.nptel.ac.in/noc23_mg122/preview				
4	https://onlinecourses.nptel.ac.in/noc21 hs52/preview				
5	https://onlinecourses.nptel.ac.in/noc22 hs67/preview				

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I Init I.

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Q Hrc

B.Tech in Computer Science and Engineering

III /IV SEMESTER 23GE1303/ 23GE1403 : Linear Algebra

Course Outcomes:

nonsingular linear transformation.

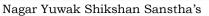
Upon successful completion of the course the students will be able to

- 1 Solve systems of linear equations using rank of matrix.
- 2. Determine eigen values and eigen vectors and solve eigen value problems.
- 3. Explain the concepts of vector space and subspace, span and basis.
- 4. Apply principles of matrix algebra to linear transformations and inner product.

Clift 1.	0 1115.
Elementary matrix operations: Introduction to Matrices and Determinants, Solution	of Linear
Equations, Cramer's rule, Inverse of a Matrix.	
Unit II:	7 Hrs.
Matrix Algebra: Rank of a matrix, Gaussian elimination, LU Decomposition (Crout's meth	od), Solving
Systems of Linear Equations using the tools of Matrices.	
Unit III:	7 Hrs.
Diagonalization of Matrix: Eigen Values and Eigen vectors, Linear dependence and inde	pendence of
Eigen Vectors, Orthogonal Eigen vector, Diagonalization of matrix, Cayley-Hamilton T	heorem and
Sylvester's Theorem.	
Unit IV:	8 Hrs.
Vector Space: Vector Space, Subspace, Sum of Sub space, linear combination, Linear dep	endence and
independence, Span and basis, Spanning sets, Generators.	
Unit V:	7 Hrs.

Linear Transformation: Linear transformation, Ranges and Kernel (null space) of linear transformation, Inverse of linear transformation, Algebra of linear transformation, Singular and

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B.Tech in Computer Science and Engineering

Un	nit VI:	8 Hrs.
In	ner product Spaces: Inner product space and Norms, orthogonal vector, the Gran	n Schamidt
ort	hogonalization Process, orthogonal compliment, Adjoint of Linear operator, Normal and	self-adjoint
one	erator, Unitary and orthogonal operator, Bilinear and Quadratic form.	v
op.	erator, emitary and orthogonal operator, Emited and Quadratic form.	
	Total Lecture	45 Hours
	Total Lecture	45 Hours
	xtbooks:	
1	Erwin Kreyzig, Advance Engineering Mathematics, 9th Edition, John Wiley and Sons, INC.	
2	Dr. B. S. Grewal, Higher Engineering Mathematics, 40 th edition, Khanna Publisher.	
3	H.K. Dass, Advanced Engineering Mathematics, 8 th revised edition, S. Chand, Delhi.	
4	Hoffman and Kunze, Linear Algebra, prentice Hall of India, New Delhi	
5	Glbert Strang, Linear Algebra and its Applications, Nelson Engineering (2007)	
	ference Books:	
1	Chandrika Prasad, Mathematics for Engineers (19th edition), , John Wiley & Sons.	
2	L.A. Pipes and Harville, Applied Mathematics for Engineers (3rd edition), McGraw Hill.	,
3	K.B.Datta, Matrix and Linear Algebra, , Prentice Hall of India.	
4	Linear Algebra, Schaum's Solved Problem Series, Seymour Lipschutz, McGraw	-Hill Book
	Company.	
	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-	• .• /
	copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20And%20Humanities/Mathematics%20and%20And%20Humanities/Mathematics%20and%20And%2	manities/
M	OOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/111106051	
2	https://archive.nptel.ac.in/courses/111/104/111104137/	
3	https://archive.nptel.ac.in/courses/111/106/111106135/	
	<u> </u>	

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B.Tech in Computer Science and Engineering

III SEMESTER

23CSE1301: Computer Architecture And Organization

Course Outcome

On completion of the course, student will be able to

- 1. Understand and demonstrate the basic computer architecture concepts related to the working of processors, memory systems, and input output systems.
- 2. Differentiate among various addressing modes and develop ability to write assembly language programs.
- 3. Comprehend information representation in computer and perform arithmetic operations using algorithms suitable for hardware implementation.
- 4. explain and compare techniques for improving the performance of a computer system components like CPU, main memory, input/output system and pipelining.

UNIT I: Basic Structure of Computer Hardware and Software

7

Functional Units, Basic Operational Concepts, Bus Structures, Software, processor clock and basic performance evaluation, number systems, and arithmetic operations, Memory Locations, addressing and encoding of information, instruction and instruction sequencing, branching, condition codes, zero, one and two address instructions, RISC vs CISC computers.

UNIT II: Addressing modes

.

Addressing modes, Stacks, and Subroutines, Processing Unit, Some fundamental concepts, Execution of a complete instruction, One, two, and three bus organization, Sequencing of control Signals, Assembly language programming.

UNIT III: Processor Design, hardwired control, Microprogrammed Control

8

Microinstructions, Grouping of control signals, Microprogram sequencing, Micro Instructions with next Address field, prefetching microinstructions.

UNIT IV: Arithmetic (Fixed and Floating point)

8

Number Representation, Addition of Positive numbers, Logic Design for fast adders, Addition and Subtraction, Arithmetic and Branching conditions, Multiplications of positive numbers, Signed- Operand multiplication, Booth's Algorithm , fast Multiplication, Integer Division algorithms, Floating point numbers and operations, IEEE floating point standards

UNIT V: The Main Memory & Cache Memory

8

The Main Memory: Basic concepts, Memory Hierarchy, semiconductor RAM memories, Static RAM vs Dynamic RAM, semiconductor ROM memories, DDRAM, Memory system considerations, Speed, Size and Cost. Cache Memory: cache memory mapping techniques, secondary storage devices, HDD vs SSD, Performance Considerations.

UNIT VI: Computer Peripherals, I/O modules and I/O Devices, I/O transfers

7

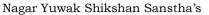
Computer Peripherals, I/O modules and I/O Devices, I/O transfers, Program controlled, memory mapped and I/O mapped I/O, Interrupt handling and Interrupt driven I/O, DMA.

Pipelining: Basic Concepts, Data Hazards and Instruction Hazards. Introduction to GPU and GPU Computing.

Total Lectures

45

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B.Tech in Computer Science and Engineering

Text Books

- 1. Computer Organization, 5th edition, V. Carl Hamacher, Zvonko Vranesic, McGraw Hill Publications.
- 2. Computer Architecture: A Quantitative approach, 6th edition, John L. Hennessy, David A. Patterson, MK series in computer architecture and design

Reference Books

- 1. Computer Organization and Architecture, 6th edition Willaiam Staling, Pearson Education
- 2. Computer Architecture & Organization , 3rd edition ,J.P. Hayes ,McGraw Hill Publications

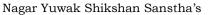
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

- 1 | file://172.16.1.10/cse/Ebooks/COmputer%20Organization%20Zaky%205th%20.pdf
- 2 http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Technology/53-CAO_V.%20Carl%20Hamacher-GKY.pdf

MOOCs Links and additional reading, learning, video material

1. https://nptel.ac.in/courses/106105163

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B.Tech in Computer Science and Engineering

III Semester

23CSE1302: Data Structures

Course Outcome

To understand fundamental concepts in data structures

To apply and analyse algorithms for performing operations on data structures

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To evaluate the performance of data structures and its applications. Simulate the algorithms for performing operations on data structures.

UNIT I: Introduction to data structures- Need of data structures, Types of data structures, recursion, Arrays, sorting – Bubble sort, Insertion sort, Selection sort, Merge sort, Quick sort and searching techniques- Linear Search and Binary Search, Hashing: Direct-address tables, Hash tables, open addressing, Perfect Hashing UNIT II: Stacks and queues: The stack as an ADT, Representation, Stack operation, Application. Queue: The Queue as an ADT, Representation, Queue operation, Circular and Priority queue, Applications of stacks and queues UNIT III: Linked Lists: Linked list as an ADT, Singly-linked lists, doubly linked lists and circular linked lists. Operations on linked list etc., Linked stacks and Queues, Applications of lists in polynomial representation, multi-precision arithmetic. **UNIT IV:** Binary Trees: Binary trees, binary trees- basic algorithms and various traversals. Binary Search Trees (BSTs) and insertion, deletion in BSTs. Heaps and heap sort **UNIT V:** 6 Balanced trees: Height-balanced (AVL) trees, Splay tree, Red-black trees, Multi-way trees-B and B+ and applications **UNIT VI:** 6 Graphs: Representation & traversals: Spanning trees, topological sort, shortest path algorithm, all-pairs shortest paths **Total Lectures 39**

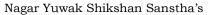
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Tex	Text books:				
1.	Data Structures & Program Design in C, Robert Kruse, G. L. Tondo and B. Leung ,Person				
2.	"Fundamentals of Data Structures in C", Horowitz, S. Sahni, S. Anderson-freed, University Press,				
3.	"Data Structures Using C and C++", Y. Langsam, M. J. Augenstein and A. M. Tannenbaum, Prentice Hall				
	India,				

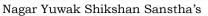
Ref	Reference books:					
1.	Fundamentals of Data Structures in C++, 2nd, 2009, Ellis Horowitz, Sartaj Sahani, Dinesh Mehta,					
	University Press					
2.	Data Structures with C, Seymour Lipschutz, Tata McGraw Hill					

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

- 1 http://103.152.199.179/YCCE/Suported% 20file/Supprted% 20file/ecopies%20of%20books/Computer%20Science%20and%20Engineering/Book%20Fundamentals%20of%20Dat a%20Structure%20(1982)%20by%20Ellis%20Horowitz%20and%20Sartaj%20Sahni.pdf
- http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Computer%20Science%20and%20Engineering/Data%20Structures%20Succinctly%20 Part%201.pdf

MC	MOOCs Links and additional reading, learning, video material			
1.	https://nptel.ac.in/courses/106102064			
2.	https://archive.nptel.ac.in/courses/106/106/106106127/			

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(Department of Computer Science & Engineering)

SoE No. 23CSE-101

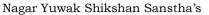
B.Tech in Computer Science and Engineering

III Semester 23CSE1303: Lab-Data Structures

List of Experiment

Sr. No.	Experiments based on
1	Program based on searching- linear, binary search
2	Program based on sorting- quick sort / merge sort
3	Program based on stacks creation and operations on it
4	Program based on queue creation and operations on it
5	Program based on single linked list creation and operations on it
6	Program based on double linked list creation and operations on it
7	Program based on Binary tree : creation and traversal
8	Program based on Binary search tree: creation and searching
9	Program based on graphs :creation and traversal
10	Program based on graph: Prims/ Kruskal algorithm for finding minimum cost spanning tree

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III Semester 23CSE1304: Lab -Programming with JAVA

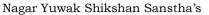
Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Demonstrate the understanding of Object oriented concepts.
- 2. Apply the programming language JAVA efficiently in object oriented software development
- 3. Able to analyze problem statement and identify appropriate objects and methods
- 4. Design and implement small programs using classes
- 5. Design, develop, test, and debug programs using object oriented principles of java

Sr.No.	Experiment based on
1	Implement the concept of Class and its data members and member functions in Java
2	Implement the concept of class constructor and its type in Java
3	Implement the concept of Abstraction in Java
4	Implement the concept of function overloading in Java
5	Implement the concept of run time polymorphism in Java
6	Implement the concept of all types of inheritance in Java
7	Implement the concept of arrays in Java
8	Implement the concept of exception in Java
9	Implement the concept of Collection Vector and Framework in Java
10	Implement the concept of Threads in Java
11	Implement the concept of Files in Java
12	Implement the concept of swing in java

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III Semester

23CSE1305: Digital & Technological Solution / Understanding India - Ethics in IT

Course Outcomes

On completion of this course students will be able to.

CO1: Adapt the global ethical principles and modern ethical issues.

CO2: Apprehend ethics in the business relationships and practices of IT.

CO3: Implement trustworthy computing to manage risk and security vulnerabilities.

CO4: Analyse concerns of privacy, privacy rights in information-gathering practices in IT.

UNIT I:

An overview of Ethics: Brief about ethics, Ethics in the Business World, Ethics in IT.

Ethics for IT professionals and IT users: IT professionals: Changing Professional Services, Professional Relationships, Codes of Ethics, awareness of IT malpractices, IT Users: Common Ethical Issues for IT Users, Supporting the Ethical Practices of IT Users.

UNIT II:

Introduction: IT security incidents, Types of Exploits, Types of Perpetrators, Laws for Prosecuting Computer Attacks, Implementing Trustworthy Computing, Risk and Vulnerability Assessment, Educating Employees, Contractors, and Part-Time Workers, Establishing a Security Policy Privacy: The right of Privacy, Privacy Protection and the Law, Key Privacy and Anonymity Issues Identity Theft, Consumer Profiling, Treating Consumer Data Responsibility, Workplace Monitoring Freedom of Expression: Defamation and Hate Speech, Key issues, Controlling Access to Information on the Internet, Anonymity on the Internet, Corporate Blogging, Pornography

UNIT III:

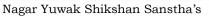
Social Networking: Brief about Social Networking, Social Networking Ethical Issues: Cyber bullying, Cyber stalking, Encounters with Sexual Predators, Uploading of Inappropriate Material, Online Virtual Worlds: Crime in Virtual Worlds, Educational and Business Uses of Virtual Worlds. Ethics of IT Organization: Key Ethical Issues for Organizations, of Workers, Outsourcing, Whistle blowing, Code of Ethics and Professional Conduct.

UNIT IV:

Malware, Medical Implants, Abusive Workplace Behaviour, Automated Active Response Weaponry, Malicious Inputs to Content Filters.

Total Lectures 24

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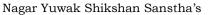
Tex	Text Books:				
1.	Ethics in Information Technology, George Reynolds, 5th Edition, Cengage learning				
2.	Professional Ethics, R. Subramanian, Second Edition, OXFORD University Press				

Ref	Reference Book:				
1.	An Introduction to Ethics, William Lillie, Allied Publishers				
2.	Engineering Ethics, Charles b. Fleddermann, Prentice Hall				
3.	Engineering Ethics & Human Values, M.Govindarajan, S.Natarajan & V.S.Senthilkumar, PHI Learning				

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MC	MOOCs Links and additional reading, learning, video material				
1.	https://onlinecourses.nptel.ac.in/noc19_hs35/preview				

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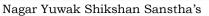
III Semester

23CSE1306: Lab- Field Project- Computer Literacy Practical's based on syllabus given below:

Course Outcome 1. Understand hardware and software components of the computer. 2. Understand and create high-level documentation, reports, and PPTs using different tools **UNIT I: Introduction to Computer: Hardware and Software** 5 Computer and Latest IT gadgets, Basics of Hardware and Software **UNIT II: Introduction to Operating System** Operating System Installation, Operating System Simple Setting, File and Folder Management, Types of file Extensions **UNIT III: MS Word and PowerPoint** 7 Word Processing Basics and advanced, PPT Processing Basics and advanced, Introduction to open office **UNIT IV: MS Excel** 7 MS Excel: Basics and advanced, Formulation in MS Excel: Basics and advanced, Pivot Tables, Dashboard Creation and data Representation. Total Lectures 24 **Text Books:** Computer Basics Absolute Beginner's Guide, Michael Miller Computer Fundamentals: Concepts, Systems & Applications- 8th Edition, Priti Sinha, Pradeep K, Sinha BPB's Computer Course Windows 10 with MS Office, Prof Satish Jain **Reference Book:** Microsoft Office 2016 Step by Step (pearsoncmg.com) Lesson 01.pdf (nios.ac.in) MOOCs Links and additional reading, learning, video material

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III SEMESTER

Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1CSE101: Image processing and Computer Vision
MDM-I	3	(MDM1CSE101) Algorithms and Data Structure
MDM-II	4	(MDM2CSE102) Programming with Open CV
MDM-III	5	(MDM3CSE103) Fundamentals of Digital Image Processing
MDM-IV	6	(MDM4CSE104) Basics of Artificial Neural Network
MDM-V	7	(MDM5CSE105) Machine Learning fundamentals
MDM-VI	8	(MDM6CSE106) Computer Vision Essentials

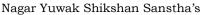
Track 2

Courses	Sem	MDMT2CSE201 : Cryptography and Digital Forensics
MDM-I	3	(MDM1CSE201) Internet technologies and Cyber laws
MDM-II	4	(MDM2CSE202) Cryptography
MDM-III	5	(MDM3CSE203) Ethical Hacking
MDM-IV	6	(MDM4CSE204) Digital Forensic
MDM-V	7	(MDM5CSE205) Cyber Audit
MDM-VI	8	(MDM6CSE206) IOT Security

Track 3

Courses	Sem	MDMT3CSE301 : Software Systems
MDM-I	3	(MDM1CSE301) Data Structure Essentials
MDM-II	4	(MDM2CSE302) Object Oriented Concepts using Java
MDM-III	5	(MDM3CSE303) Software Design Patterns
MDM-IV	6	(MDM4CSE304) Software Engineering Concepts
MDM-V	7	(MDM5CSE305) Software Testing Essentials
MDM-VI	8	(MDM6CSE306) Software Project Management in Practice

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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

III Semester

Track1: MDMT1CSE101: Image processing and Computer Vision (MDM1CSE101) Algorithms and Data Structure

Course Outcome

- 1.To review programming concepts and understand fundamental concepts in data structures
- 2.To apply and analyse algorithms for performing operations on data structures
- 3.To Evaluate the performance of data structures and its applications.
- 4. Simulate the algorithms for performing operations on data structures.

UNIT I: Introduction

Introduction: Function, Recursion, Array, Introduction to data structures- Need of data structures, Types of data structures, recursion, Arrays, sorting – Bubble sort, Insertion sort, Selection sort, Merge sort, Quick sort and searching techniques- Linear Search and Binary Search, Algorithmic analysis, finding complexity of small code.

UNIT II: Stack and Queue

7

The stack as an ADT, Representation, Stack operation, Application. Queue: The Queue as an ADT, Representation, Queue operation, Circular and Priority queue, Applications of stacks and queues

UNIT III: Linked List 7

Linked list as an ADT, Singly-linked lists, doubly linked lists and circular linked lists. Operations on linked list etc., Linked stacks and Queues, Applications of lists in polynomial representation,

UNIT IV: Trees and Graphs

Binary trees, binary trees- basic algorithms and various traversals. Binary Search Trees (BSTs) and insertion, deletion in BSTs, Introduction to Graphs: Graph Terminologies, Graph Traversal Methods.

Total Lectures

28

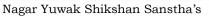
TEXT BOOKS:

- 1 Data Structures and Program Design in C, Robert Kruse, G. L. Tondo and B. Leung, PHI-EEE
- Fundamentals of Data Structures in C, Ellis Horowitz, Satraj Sahni and Susan, Anderson-Freed, W. H. Freeman and Company.
- 3 How to Solve it by Computer, R. G. Dromey, Pearson Education

Reference books:

1 Data Structures with C, Seymour Lipschutz, TMH

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B. Tech SoE and Syllabus 2023

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B.Tech in Computer Science and Engineering

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] 1 http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies% 20of% 20books/Computer% 20Science% 20and% 20Engineering/Book% 20Fundamentals% 20of% 20Dat a%20Structure%20(1982)%20by%20Ellis%20Horowitz%20and%20Sartaj%20Sahni.pdf http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Computer%20Science%20and%20Engineering/Data%20Structures%20Succinctly%20 Part% 201.pdf

MO	MOOCs Links and additional reading, learning, video material		
1.	https://nptel.ac.in/courses/106102064		
2.	https://archive.nptel.ac.in/courses/106/106/106106127/		
3.			

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B. Tech SoE and Syllabus 2023

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(Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

III Semester

Track2: MDMT2CSE201: Cryptography and Digital Forensics (MDM1CSE201) Internet technologies and Cyber laws

Course Outcome

- 1. Understand the historical development and key components of the internet.
- 2. Demonstrate proficiency in understanding Internet Protocol (IP) and its addressing mechanisms, including subnets and routing.
- 3. Analyze the functionalities of the User Datagram Protocol (UDP) and Transmission Control Protocol (TCP).
- 4. Understand the legal responses to computer hacking and related cybercrimes.

UNIT I 9

Introduction to the Internet: Introduction to Networks, OSI Model, TCP/IP Protocol suite, Comparison of OSI and TCP/IP, Addressing, IPV4, IPV6, Comparisons of IPV4 and IPV6 Headers.

Internetworking Protocols: Internet Protocol (IP), IP addressing, IP subnets, IP routing, Methods of delivery: unicast, broadcast, multicast, Internet Control Message Protocol (ICMP), Address Resolution Protocol (ARP), Reverse Address Resolution Protocol (RARP), Dynamic Host Configuration Protocol (DHCP).

UNIT II 8

Transport layer: User Datagram Protocol (UDP), Transmission Control Protocol (TCP), TCP segment format, Encapsulation and Dencapsulation, TCP connection, Error control, Flow control.

Application Layer: Name space, Domain Name Space (DNS), Distribution of Name Space, DNS in the Internet, Resolution DNS Messages, TELNET, SSH, FTP, TFTP, WWW, HTTP, SMTP, POP3, MIME, IMAP.

UNIT III 6

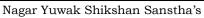
Introduction to Cyber Crime and the Law: The Legal response to Computer hacking, Computer Misuse Act, Concept of Access, Unauthorized Modification of data, Logic Bombs, Computer Viruses, Legal Response, Modification in the Computer Misuse Act, Operation of the Unauthorized modification offence, Hackers sites, Safety on the internet.

UNIT IV 5

Evolution of the IT Act, Genesis and Necessity Salient features of the IT Act, 2000, various authorities under IT Act and their powers.; Penalties & Offences, amendments. Introduction to E-Commerce Law

Total Lectures 28

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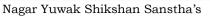
Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University) B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward) (Department of Computer Science & Engineering)

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B.Tech in Computer Science and Engineering

TE	EXT BOOKS:
1	Internet Technologies for Fixed and Mobile Networks, By Toni Janevski, Artech House Publishers
2	Law Relating to Computers, Internet and E-Commerce, by Nandan Kamath, Lexis Nexis
Re	eference books:
1	TCP/IP Protocol Suite, by Behrouz A. Forouzan, McGraw-Hill Forouzan Networking Series
2	Computer Networking with Internet Protocols and Technology, by William Stallings,
	Pearson Education
Y	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
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M	OOCs Links and additional reading, learning, video material
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B. Tech SoE and Syllabus 2023

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

III Semester

Track3: MDMT3CSE301: Software Systems (MDM1CSE301) Data Structure Essentials

Course Outcome

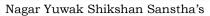
- To review programming concepts and understand fundamental concepts in data structures 1.
- 2. To apply and analyse algorithms for performing operations on data structures
- 3. To Evaluate the performance of data structures and its applications.
- 4. Simulate the algorithms for performing operations on data structures.

UNIT I: Introduction	7		
Introduction: Function, Recursion, Array, Introduction to data structures- Need of data structures, Ty structures, recursion, Arrays, sorting – Bubble sort, Insertion sort, Selection sort, Merge sort, Qui searching techniques- Linear Search and Binary Search, algorithmic analysis, finding time complexicode	ck sort and		
UNIT II: Stack and Queue	7		
The stack as an ADT, Representation, Stack operation, Application. Queue: The Queue as an ADT, Representation, Queue operation, Circular and Priority queue, Applications of stacks and queues			
UNIT III: Linked List	7		
Linked list as an ADT, Singly-linked lists, doubly linked lists and circular linked lists. Operations of etc., Linked stacks and Queues, Applications of lists in polynomial representation,	n linked list		
UNIT IV: Trees and Graphs	7		
Binary trees, binary trees- basic algorithms and various traversals. Binary Search Trees (BSTs) and deletion in BSTs, Introduction to Graphs: Graph Terminologies, Graph Traversal Methods.	nd insertion,		
Total Lectures	28		

TE	TEXT BOOKS:				
1.	Data Structures and Program Design in C, Robert Kruse, G. L. Tondo and B. Leung ,PHI-EEE				
2.	Fundamentals of Data Structures in C, Ellis Horowitz, Satraj Sahni and Susan, Anderson-Freed, W. H.				
	Freeman and Company.				
3.	How to Solve it by Computer, R. G. Dromey, Pearson Education				

Reference books:				
1.	Data Structures with C, Seymour Lipschutz, TMH			
2.				

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(Scheme of Examination w.e.f. 2023-24 onward) (Department of Computer Science & Engineering)

SoE No. 23CSE-101

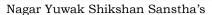
B.Tech in Computer Science and Engineering

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

- 1 http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies% 20of% 20books/Computer% 20Science% 20and% 20Engineering/Book% 20Fundamentals% 20of% 20Dat a%20Structure%20(1982)%20by%20Ellis%20Horowitz%20and%20Sartaj%20Sahni.pdf
- http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Computer%20Science%20and%20Engineering/Data%20Structures%20Succinctly%20 Part%201.pdf

MO	MOOCs Links and additional reading, learning, video material				
1.	https://nptel.ac.in/courses/106102064				
2.	https://archive.nptel.ac.in/courses/106/106/106106127/				

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(Department of Computer Science & Engineering)

SoE No. 23CSE-101

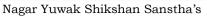
B.Tech in Computer Science and Engineering

III SEMESTER **Open Elective -I: Basket**

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	3	OE1	GE	23OE1301	OE-I : Combinatorics
2	3	OE1	GE	23OE1302	OE-I: Fuzzy Set Theory, Arithmetic And Logic
3	3	OE1	GE	23OE1303	OE-I : Green Chem. & Sustainability
4	3	OE1	GE	23OE1304	OE-I : Hydrogen Fuel
5	3	OE1	GE	23OE1305	OE-I : Electronic Materials And Applications
6	3	OE1	GE	23OE1306	OE-I: Laser Technology And Applications
7	3	OE1	MGT	23OE1307	OE-I: Finance And Cost Management
8	3	OE1	MGT	23OE1308	OE-I : Operation Research Techniques
9	3	OE1	MGT	23OE1309	OE-I : Project Evaluation & Management
10	3	OE1	MGT	23OE1310	OE-I : Total Quality Management
11	3	OE1	MGT	230E1311	OE-I : Value Engineering
12	3	OE1	MGT	230E1312	OE-I: Maintenance Management
13	3	OE1	MGT	23OE1313	OE-I : Industrial Safety
14	3	OE1	MGT	23OE1314	OE-I : Industry 4.0
15	3	OE1	MGT	23OE1315	OE-I: Operation Management
16	3	OE1	MGT	23OE1316	OE-I: Material Management
17	3	OE1	MGT	23OE1317	OE-I: Hospitality Management
18	3	OE1	MGT	23OE1318	OE-I : Human Resource Management & Organizational Behaviour
19	3	OE1	MGT	23OE1319	OE-I: Agri-Business Management
20	3	OE1	MGT	23OE1320	OE-I : Rural Marketing
21	3	OE1	MGT	23OE1321	OE-I: Marketing Management
22	3	OE1	MGT	23OE1322	OE-I : Health Care Management

Link for Open Electives: https://ycce.edu/syllabus/

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B.Tech in Computer Science and Engineering

III SEMESTER **Mandatory Learning Course (MLC)**

MLC2123: YCAP3

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Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
(Accredited 'A++' Grade by NAAC with a score of 3.6)
Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology SoE & Syllabus 2023 4th Semester

(Department of Computer Science & Engineering)



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering) B. Tech. in Computer Science & Engineering

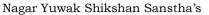
SoE No. 23CSE-101

SN	Sem	Type	BoS/	Sub. Code	Subject	T/P			t Hours		Credits				ESE
			Deptt				L	Т	Р	Hrs		MSEs*	TA**	ESE	Duration Hours
	FOURTH SEMESTER														
1	4	HSSM-2	GE	23GE1401	Entrepreneurship Development	Т	2	0	0	2	2	30	20	50	3
2	4	AEC-2	GE	23GE1405 23GE1406	Marathi Language / Hindi Language	Т	2	0	0	2	2	30	20	50	3
3	4	VEC-1	CV	23CV1411	Environmental Sustainability, Pollution and Management	Т	2	0	0	2	2	30	20	50	3
4	4	PC	CSE	23CSE1401	Discrete Mathematics and Graph Theory	Т	3	0	0	3	3	30	20	50	3
5	4	PC	CSE	23CSE1402	Operating system	Т	3	0	0	3	3	30	20	50	3
6	4	PC	CSE	23CSE1403	Lab : Operating system	Р	0	0	2	2	1		60	40	
7	4	PC	CSE	23CSE1404	Introduction to data analysis	Т	3	0	0	3	3	30	20	50	3
8	4	PC	CSE	23CSE1405	Lab: Introduction to data analysis	Т	0	0	2	2	1		60	40	
9	4	VSEC-3	CSE	23CSE1406	Lab : Vocational & Skill Enhancement - Web Technology	Р	0	0	2	4	2		60	40	
10	4	OE-2	OE		Open Elective - II	Т	2	0	0	2	2	30	20	50	3
11	4	MDM	CSE		MD Minor Course - II	Т	2	0	0	2	2	30	20	50	3
	TOTAL 19 0 6 27 23														

Li	st (of Ma	ndatory I	_earnin	ng Course (I	/ILC)								
1	1	4	HS	T&P	MLC2124	YCAP4 : YCCE Communication Aptitude Preparation	Α	3	0	0	3	0		

Ope	n Ele	ctive - II			
SN	Sem	Туре	BoS/ Deptt	Sub. Code	Subject
1	4	OE2	GE	230E2401	OE-II : Combinatorics
2	4	OE2	GE	230E2402	OE-II : Fuzzy Set Theory, Arithmetic And Logic
3	4	OE2	GE	23OE2403	OE-II : Green Chem. & Sustainability
4	4	OE2	GE	230E2404	OE-II : Hydrogen Fuel
5	4	OE2	GE	230E2405	OE-II : Electronic Materials And Applications
6	4	OE2	GE	230E2406	OE-II : Laser Technology And Applications
7	4	OE2	MGT	230E2407	OE-II : Finance And Cost Management
8	4	OE2	MGT	230E2408	OE-II : Operation Research Techniques
9	4	OE2	MGT	230E2409	OE-II : Project Evaluation & Management
10	4	OE2	MGT	230E2410	OE-II : Total Quality Management
11	4	OE2	MGT	230E2411	OE-II : Value Engineering
12	4	OE2	MGT	230E2412	OE-II : Maintenance Management
13	4	OE2	MGT	230E2413	OE-II : Industrial Safety
14	4	OE2	MGT	230E2414	OE-II : Industry 4.0
15	4	OE2	MGT	230E2415	OE-II : Operation Management
16	4	OE2	MGT	230E2416	OE-II : Material Management
17	4	OE2	MGT	230E2417	OE-II : Hospitality Management
18	4	OE2	MGT	230E2418	OE-II : Human Resource Management & Organizational Behaviour
19	4	OE2	MGT	230E2419	OE-II : Agri-Business Management
20	4	OE2	MGT	230E2420	OE-II : Rural Marketing
21	4	OE2	MGT	230E2421	OE-II : Marketing Management
22	4	OE2	MGT	230E2422	OE-II : Health Care Management
23	4	OE2	MGT	230E2423	OE-II : Designated approved online NPTEL/KKSU Course
24	4	OE2	MGT	230E2424	OE-II : Indian Archeology
25	4	OE2	MGT	230E2425	OE-II : Social & Positive Psychology
26	4	OE2	MGT	230E2426	OE-II : Seismology & Earthquake

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(Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

IV SEMESTER 23GE1401 : Entrepreneurship Development

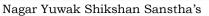
Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Appreciate role of entrepreneurs in society and develop entrepreneurial abilities by providing information about skill sets.
- 2. Develop an understanding of how and what form of business organization to choose for start up.
- 3. Stimulate to innovate, develop prototypes or ideas by applying theory into practice.
- 4. Identify the Support rendered by various Government Agencies.

Unit I:	7 Hrs.				
Entrepreneur & Entrepreneurship: Meaning of Entrepreneur, Evolution of the concept –	heories and				
Models, Types of Entrepreneur, Stages in entrepreneurial process- Idea Generation,	Screening,				
Selection and Managing Resources.					
Unit II:	8 Hrs.				
Legal Compliances for Incorporating Start up: Fundamentals of choosing the Business O	Organization				
form for startup, Incorporation of Partnership, LL.P & Co - operative, Incorporation of	One Person				
Company, Pvt. Ltd., Pub. Ltd. and not for profit company, Financing the legal Venture and Legal					
Compliances.					
Unit III:	7 Hrs.				
Entrepreneurship and IP Strategy: Intellectual Property : Definition and Concept of Trade N	Iark, Patent,				
Copyright, Industrial Design, IP Strategy and Entrepreneurship.					
Unit IV:	8 Hrs.				
Support to Entrepreneurs: Financing new ventures, Business Incubators – Government Police	cy for Small				
Scale Enterprises, Growth Strategies in small industry - Expansion, Diversification, Jo	int Venture,				
Merger and Subcontracting.					
Total Lecture	30 Hours				

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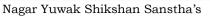




SoE No. 23CSE-101

Stud	lent activities:					
1.	Interview at least four entrepreneurs or businessman and identify Traits of successful					
	entrepreneurs.					
2.	Analyse case studies of any two successful entrepreneurs.					
3.	Download product development and innovative films from internet.					
4.	Identify your hobbies and interests and convert them into business idea					
Text	books					
1.	Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd., Ram Nagar, New Delhi, 2013.					
2.	Donald F Kuratko, "Entrepreneurship – Theory, Process and Practice", 9th Edition, Cengage Learning 2014.					
3.	Corporate Law, 33rd ed. 2016, Taxman New Delhi.					
4.	Narayanan, V. K., Managing technology and innovation for competitive advantage, first edition, Pearson education, New Delhi, (2006)					
5.	Idris, K. (2003), Intellectual property: a power tool for economic growth, second edition, WIPO publication no. 888, Switzerland					
6.	Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd., Ram Nagar, New Delhi, 2013.					
7.	Ramaiya's Guide to the Companies Act, 18th ed. 2014, Lexis Nexis New Delhi.					
	rence Books					
1.	Mehta, Monica- The Entrepreneurial Instinct : How everyone has the innate ability to start a					
	successful small business – McGraw – Hill Education, New Delhi 2012, ISBN 978-0-07-179742-9					
2	Prasanna Chandra "Protect Preparation, Appraisal, Implementation" Tata McGraw Hill. New					
	Delhi					
3	S Anil Kumar "Entrepreneurship Development" New Age International Publishers					
4	Nishith Dubey "Entrepreneurship Development" PHI Learning					
	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]					
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0					
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042					
	OCs Links and additional reading, learning, video material					
1	https://onlinecourses.swayam2.ac.in/cec23_mg24/course- entrepreneurship development					
2	https://onlinecourses.nptel.ac.in/noc23 mg74/announcements?force=true-entrepreneur					
3	https://onlinecourses.nptel.ac.in/noc23 mg126/announcements?force=true- Business fundamentals for entrepreneurship					

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B. Tech SoE and Syllabus 2023

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SoE No. 23CSE-101

8 Hours

B.Tech in Computer Science and Engineering

IV SEMESTER 23GE1405: Marathi Language

Course **Objectives**

- 1. मराठी भाषेच्या समृद्धीची जाणीव करून देणे.
- 2. विद्यार्थ्यांमध्ये भाषा कौशल्याचा विकास करणे आणि त्यातून रोजगाराच्या संधींचा शोध घेणे.

Course **Outcomes**

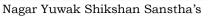
गद्य विभाग

- 3. भाषेचा जीवन व्यवहारात योग्य पद्धतीने वापर करण्याचा प्रयत्न करणे.
- 4. संत साहित्याच्या शिकवणुकीमुळे मानवता आणि मानवी व्यवहाराची सांगड घालणे, नैतिक मूल्ये रुजविणे.
- 5. विद्यार्थ्यांना रोजगाराभिमुख बनविणे.

Unit:1

			o Hours
۶.	भारतीय लोकशाहीचे भवितव्य काय?	- डॉ. बाबासाहेब आंबेडकर	
۶.	काळी आई	- व्यंकटेश माडगूळकर	
₹.	संत तुकारामांचे अभंग	- निर्मलकुमार फडकुले	
٧.	माझी शाळा	- प्रकाश खरात	
٧.	समतेचे वारकरी संत गाडगेबाबा	- अशोक राणा	
	आणि राष्ट्रसंत तुकडोजी महाराज		
ξ.	लोककल्याणकारी राजा:	- शरयू तायवाडे	
Unit:2		पद्य विभाग	8 Hours
१.	ज्ञानेश्वरांचे अभंग	- संत ज्ञानेश्वर	
٦.	वनसुधा	- वामन पंडित	
₹.	नवा शिपाई	- केशवसुत	
٧.	मेंढरं	- विट्ठल वाघ	
ч.	पोरी	- अनुराधा पाटील	
ξ.	गाव	- हेमंतकुमार कांबळे	

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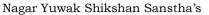
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Unit:3	व्यावहारिक मराठी	7 Hours
१.	म्हणी	1
۶.	मुलाखतलेखन - डॉ. वैशाली धनविजय	
₹.	वाक्प्रचार	
٧.	जाहिरातलेखन - डॉ. अजय देशपांडे	
Unit:4	रोजगाराभिमुख मराठी व्यावहारिक कौशल्ये	7 Hours
१.	प्रत्यक्ष मुलाखत कौशल्य	1
۶.	वाचन कौशल्य - (अ) बातमी वाचन (ब) कथा वाचन	
ર. ઍ	ॉनलाईन कौशल्य - (अ) ग्राहक सेवा केंद्राशी संवाद, (ब) ऑनलाईन अर्ज करणे	

Reference Books

- 1. पाठ्यपुस्तक : शब्दसाधना भाग ?
- 2. रोजगाराभिमुख मराठी व्यावहारिक कौशल्ये

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IV SEMESTER 23GE1406 : Hindi Language

Course Objectives

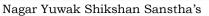
- 6. विद्यार्थियों में देशभक्तिपरक एवं पारिवारिक मृत्यों का विकास |
- 7. विद्यार्थियों पर्यावरण-संरक्षण के प्रति सजग करना |
- 8. एकांकी, कहानी, निबंध आदि विधाओं के मध्य का अंतर अवगत कराना |
- 9. हिंदी के प्रयोजनमूलक स्वरूप से परिचित कराना |
- 10. विद्यार्थियों को आधुनिक प्रौद्योगिकी (तकनीक) का प्रयोग करने में सक्षम बनाना |.

Course Outcomes

- 1. पौराणिक अथवा ऐतिहासिक घटनाओं को तार्किक आधार पर स्वीकार करेंगे | अपने परिवेश के उचित और अनुचित व्यवहारों के प्रति आकलन शक्ति बढ़ेगी |
- 2. एकांकी, कहानी, निबंध आदि विधाओं के मध्य का अंतर बताने में सक्षम होंगे |
- 3. कविता का रसास्वादन करने में समर्थ होंगे |
- 4. 'अनुवाद' के स्वरूप एवं प्रक्रिया से अवगत होंगे |
- 5. 'मार्गिक नक़्शे' का दैनिक जीवन में उपयोग करने में सक्षम होंगे |

Unit:1		गद्य विभाग	8 Hours
१.	भाईसाहब (कहानी)	- प्रेमचंद	-
٦.	स्मृति (निबंध)	- श्रीराम शर्मा	
₹.	गिल्लू (रेखाचित्र)	- महादेवी वर्मा	
٧.	अभाव (कहानी)	- विष्णु प्रभाकर	
ч.	महाभारत की साँझ (एकांकी)	- भारतभूषण	
ξ.	उखड़े खंबे (व्यंग्य)।	- हरिशंकर परसाई	

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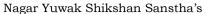


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Unit:2		पद्य विभाग	8 Hours
۶.	कबीर के दोहे	- कबीरदास	
۶.	ले चल यहाँ भुलावा देकर	- जयशंकर प्रसाद	
₹.	स्नेह-निर्झर बह गया	- हैसूर्यकांत त्रिपाठी "निराला"	
٧.	प्रथम रश्मि	- सुमित्रानंदन पंत	
ч.	जीवन का झरना	- आरसीप्रसाद सिंह	
ξ.	कविता के साथ	- दामोदर खड़से	
Unit:3		अन्य पाठ्य सामग्री	7 Hours
₹. ₹.		क में मुहावरे और लोकोक्तियाँ का अर्थ एवं वाक्य प्रयोग ।कार, शीर्षक का महत्त्व, विज्ञापन के प्रयोजन, सत्य, लक्ष्न ।	य, विज्ञापन की
Unit:4	<u>ē</u>	होशल्य आधारित घटक	7 Hours
१. च	गाचन कौशल्य (समाचार-वाचन, कहा	नी-वाचन)	
₹. ₹	गोशल मीडिया के शिष्टाचार		
3 . 3	ऑनलाइन आवेदन, ग्राहक-सेवा केंद्र र	ते संवाद	

Reference Books	
3. पाठ्यपुस्तक : ''पलाश''	

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B.Tech in Computer Science and Engineering

III/IV SEMESTER 23CV1311/23CV1411

Environmental Sustainability, Pollution and Management

Course Outcomes:

Upon successful completion of the course, the students will be able to

The student will be able to

- 1. Gain insights into the efforts to safeguard the Earth's environment and resources.
- 2. Develop a critical understanding of the contemporary environmental issues of concern
- 3. Have an overview of pollution, climate change and national and global efforts to address adaptation and mitigation to changing environment through environmental management.
- 4. Learn about the major international treaties and our country's stand on and responses to the major international agreements.

Unit:1 Environment and Sustainable Development

8 Hours

The man-environment interaction; Overview of natural resources: renewable, and non-renewable energy resources; Introduction to sustainable development: Sustainable Development Goals (SDGs)- targets and indicators, challenges and strategies for SDGs; Environmental issues: Global change, Climate Change and Mitigation.

Unit:2 Environmental Pollution and Health

7 Hours

Understanding pollution: Production processes and generation of wastes, Air pollution, Water pollution, Soil pollution and solid waste, Noise pollution, Thermal and Radioactive pollution. Impact on biotic and abiotic things.

Unit:3 Environmental Management

8 Hours

Environmental management system: ISO 14001, Concept of Circular Economy, Life cycle analysis; Cost-benefit analysis, Environmental audit and impact assessment; Waste Management and sustainability; Ecolabeling /Eco mark scheme

Unit:4 | Environmental Treaties and Legislation

7 Hours

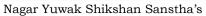
Introduction to environmental laws and regulation, An overview of instruments of international cooperation, Major International Environmental Agreements, Major Indian Environmental Legislations, Major International organizations, and initiatives

Total Lecture

30 Hours

Tex	t books
1	Chiras, D. D and Reganold, J. P. (2010). Natural Resource Conservation: Management for a Sustainable Future.10th
	edition, Upper Saddle River, N. J. Benjamin/Cummins/Pearson
2	Rajagopalan, R. (2011). Environmental Studies: From Crisis to Cure. India: Oxford University Press
3	Krishnamurthy, K.V. (2003) Textbook of Biodiversity, Science Publishers, Plymouth, UK
4	Jackson, A. R., & Jackson, J. M. (2000). Environmental Science: The Natural Environment and Human Impact. Pearson
	Education
5	Pittock, Barrie (2009) Climate Change: The Science, Impacts and Solutions. 2nd Edition. Routledge.
6	Theodore, M. K. and Theodore, Louis (2021) Introduction to Environmental Management, 2nd Edition. CRC Press
7	Kanchi Kohli and Manju Menon (2021) Development of Environment Laws in India, Cambridge University Press

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Ref	erence Books
1	Headrick, Daniel R. (2020) Humans versus Nature- A Global Environmental History, Oxford University Press
2	Gilbert M. Masters and W. P. (2008). An Introduction to Environmental Engineering and Science, Ela Publisher
	(Pearson)
3	William P. Cunningham and Mary A. (2015). Cunningham Environmental Science: A global concern, Publisher (Mc-
	Graw Hill, USA)
4	Varghese, Anita, Oommen, Meera Anna, Paul, Mridula Mary, Nath, Snehlata (Editors) (2022) Conservation through
	Sustainable Use: Lessons from India. Routledge.
5	Central Pollution Control Board Web page for various pollution standards. https://cpcb.nic.in/ standards
6	Barnett, J. & S. O'Neill (2010). Maladaptation. Global Environmental Change—Human and Policy Dimensions 20:
	211–213
7	Richard A. Marcantonio, Marc Lame (2022). Environmental Management: Concepts and Practical Skills. Cambridge
	University Press
8	Ministry of Environment, Forest and Climate Change (2019) A Handbook on International Environment Conventions &
	Programmes. https://moef.gov.in/wp- content/uploads/2020/02/ convention-V-16-CURVE-web.pdf
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MO	OCs Links and additional reading, learning, video material
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B.Tech in Computer Science and Engineering

IV SEMESTER 23CSE1401: Discrete Mathematics and Graph theory

Course Outcome

UNIT II: Relations and Functions

- 1. Identify the importance of statements in delivering valid interface.
- 2. Use relations and ordering methods to identify the relationship amongst the interfaces.
- 3. Select algebraic system to find solution for real time problems
- 4. Find suitable computing methods and applying graph theory concepts to solve complex problems.

UNIT I: Mathematical Logic and Set Theory Statement and Notation: Negation, Conjunction, Disjunction, Tautologies, Truth Tables, Basic Concepts of Set Theory, Inclusion & equality of set, Power Set, Ordered Pairs and n-tuples, Operations on Sets, Partial order, Equivalence relations, mathematical induction. Propositions, Predicate, logic, formal mathematical systems.

Relation and Ordering, Properties of Binary in a set, Relation Matrix and Graphs, Partition and Covering of a set, Equivalence relation, Partial ordering, Partially Ordered sets, Function (Definition and Introduction), Composition of functions, Inverse Functions, Characteristics function of a set.

UNIT III: Group Theory 7

Groups (Definitions and Examples) Subgroups and Homomorphism, Cosets and Lagrange's theorem, Normal subgroups, Codes and Group Codes. Semi groups and Monoids (definitions and examples). Homomorphism of semi groups and monoids, Sub semi groups and monoids.

UNIT IV: Rings (Definitions and Examples) 7

Integral domain, ring homomorphism, ideas of ring polynomial, Field, Lattice.

UNIT V: Fuzzy Sets and Fuzzy Logic

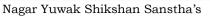
Fuzzy sets and systems, crisp sets, overview of fuzzy logic and classical logic, fuzzy compliment, fuzzy union, fuzzy intersection and combinations of these fuzzy sets operations crisp and fuzzy relations.

UNIT VI: Graph Theory 7

Basic concepts of graph theory, Basic definitions, Paths and circuits, Reach ability and connectedness, Matrix Representation of graphs, Tree and their representation and operations, Rooted trees, Path lengths in rooted trees, Multi graphs and weighted graphs, and graph isomorphism, shortest paths in weighted graphs, Hypergraphs, transitive closure, Spanning trees, Kruskal's algorithm, Prim's algorithm.

Total Lectures	39

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T	ext Books
1	Discrete Mathematics Structure with application to Computer Science, 23rd re-print, 2005, J. P. Tremblay &
	R. Manohar ,Tata McGraw-Hills Publication Company Limited, New Delhi.
2	Advanced Engineering Mathematics, 8th revised edition, 2007, H.K. Dass, by.S.Chand and Company
	Limited Delhi.

Fuzy Logic with Engineering Applications, T. J. Ross, John Wiley &Sons, Ltd. ISBN: 978-81-265-3126-4

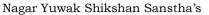
Re	eference Books
1	Discrete Mathematics ,2nd edition, Lipschutz, by Schaums's Outline series, Tata McGraw-Hills Publication
	Company Limited, New Delhi.

Discrete Mathematical structures ,3rd edition,2001, Bernard Kolman ,Robert C.Busby,Sharon Ross,Prentice Hall of India, New Delhi.

Y	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

MO	OOCs Links and additional reading, learning, video material
1.	https://onlinecourses.nptel.ac.in/noc20_cs82/preview
2.	https://onlinecourses.nptel.ac.in/noc20_cs37/preview

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B.Tech in Computer Science and Engineering

IV Semester 23CSE1402: Operating Systems

Course Outcome

After undergoing this course student will be able to

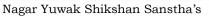
- 1. Understand the fundamental concepts in Operating Systems (OS) and understand how various hardware features support OS functionality.
- 2. Explain various OS mechanisms and policies for managing system resources.
- 3. Analyse algorithms and techniques for managing various OS resources in a multiprogramming and other environments.
- 4. Evaluate the performance of algorithms for managing various OS resources.

UNIT I: Introduction to OS evolution of OS, basic hardware support necessary for modern operating systems, Layered Structural of OS, process concept, process state transitions, Services provided by OS, system calls, privileged instructions, Dual mode of operation, I/O bound and CPU bound processes, concept of multiprogramming and multiprocessing. **UNIT II: Process management** process control block, process context switch, process versus threads, CPU scheduling, goals of scheduling, CPU scheduling algorithms, Algorithmic evaluation of CPU scheduling algorithms, multi-queue scheduling, multithreading **UNIT III: Interprocess communication and Synchronization** Operations on processes, Interprocess communication, process cooperation and synchronization, race condition, critical region, mutual exclusion and implementation, semaphores, classic problems of Synchronization using semaphores, other synchronization constructs. **UNIT IV: Memory management techniques** 8 Contiguous allocation, static and dynamic partitioning, non-contiguous allocation, paging, translation look aside buffer (TLB) and overheads, segmentation. **UNIT V: Virtual memory** 7 Demand paging, page replacement algorithms, thrashing, working set model. Deadlocks: necessary conditions, deadlock detection, deadlock avoidance, deadlock prevention, recovery from deadlock. **UNIT VI: File systems** Introduction, Access methods, Directory Structure disk space management and space allocation strategies, disk arm scheduling strategies: FCFS, SSTF, SCAN, CSACN, LOOK, CLOOK, Selecting a disk scheduling algorithm.

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Total Lectures

45





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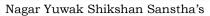
Tex	xt Books
1.	Operating system Principles, 9th Edition, A. Silberchatz and P.Galvin, John Wiley & Sons Inc.
2.	Operating Systems Internals and Design Principles , William Staling, Pearson

Ref	Reference Books	
1.	Operating Systems: A Design-Oriented Approach , Charles Crowley ,McGraw Hill	
2.	Operating system concepts and Design, Milan MilenKovic ,Tata McGraw Hill	

Y	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-
	copies%20of%20books/Computer%20Science%20and%20Engineering/Operating%20System%20Concept%2
	08thedition.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-
	copies%20of%20books/Computer%20Science%20and%20Engineering/Operating%20System.pdf
3	

MC	MOOCs Links and additional reading, learning, video material						
1.	https://archive.nptel.ac.in/courses/106/105/106105214/						
2.	https://archive.nptel.ac.in/courses/106/102/106102132/						
3.							

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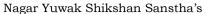
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IV Semester 23CSE1403: Lab- Operating Systems

List of Experiment

Sr. No.	Experiments based on
1	Study of Window task manger(Exploring various tabs: application, processes, services, networking, performance)
2	Study of Advanced Linux shell commands (Process management, memory management, networking, etc.)
3	Write a program that illustrates the creation of child process using fork system call. Each child and parent Processes perform different task.
4	Write a multithreaded program to multiply two given matrices.
5	Simulate: a) Any preemptive CPU Scheduling Algorithm b) Any Non-preemptive CPU Scheduling Algorithm
6	Write a program to perform Inter-Process-Communication using shared memory or, pipes or message queues.
7	Write a program that solves two process Producer-Consumer problem with bounded buffer using semaphores. OR Write a program that gives a deadlock and starvation free solution to the Dining Philosohers problem using semaphores.
8	Simulate: a) First Fit (Static Memory allocation algorithm) and b) Worst Fit (Dynamic Memory allocation algorithm)
9	Simulate any one of the following page replacement algorithms: FIFO, LRU, Optimal
10	Write a program to simulate Banker's Deadlock avoidance algorithm.

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IV Semester 23CSE1404: Introduction to Data Analysis

Course Outcomes

Upon successful completion of the course students will be able to:

- 1. Apply fundamental concepts of statistics and probability for data analysis.
- 2. Apply appropriate statistical methods on simple datasets.
- 3. Formulate and solve problems in a systematic manner.
- 4. Conduct investigation and Interpret output obtained from statistical analysis on datasets.
- 5. Obtain hands on experience with some popular software (like R) for analysis and visualization of data.

UNIT I: INTRODUCTION TO STATISTICS & PROBABILITY

7

The role of statistics. Grouping and displaying data. Measures of central tendency and dispersion, Basic terminology in probability, probability rules, Probabilities under conditions of statistical independence, probabilities under conditions of statistical dependence.

UNIT II: PROBABILITY DISTRIBUTION:

6

What is probability distribution, random variables, use of expected value in decision making, and various probability distributions:Binomial, Poisson, Uniform and Normal distributions.

UNIT III: SAMPLING DISTRIBUTION:

7

Introduction to sampling distributions, sampling distribution of mean and proportion, application of central limit theorem, sampling techniques.

ESTIMATION THEORY: Estimation: Point and Interval estimates ,confidence intervals ,calculating interval estimates for population parameters of large sample and small samples, determining the sample size

UNIT IV: TESTING OF HYPOTHESIS

7

Introduction, null hypothesis, tests of hypothesis and significance, type I and type II errors, one tailed and two tailed tests, p-value one sample tests for means and proportions of large samples (z-test), one sample tests for means of small samples (t-test), Chi-square tests for goodness of fit. Analysis of variance.

UNIT V: NON-PARAMETRIC METHODS

6

Sign test for paired data. Rank sum test. Mann –Whitney U test and Kruskal Wallis H test. One sample run test, rank correlation. Kolmogorov-Smirnov –test.

UNIT VI: REGRESSION and CORRELATION

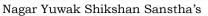
6

Estimation of regression line by least square method, linear regressions, Multivariate regression ,Correlation analysis, non linear regression, logistic regression .

Total Lectures

39

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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward) (Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

Tex	xt Books:
1.	Introduction to probability and statistics for engineers and scientist, Sheldon M. Ross ,3 rd Edition,Elsevier
2.	Statistics for Management, Richard I. Levin & David S. Rubin, 7 th Edition, Pearson Education
3.	Probability and Statistics, Murray R. Spiegel, John J.Schiller, R AluSrinivasan, Third Edition, Mc Graw Hill
	education

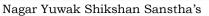
	Ref	erence Book:
	1.	Practical Statistics for Data Scientists, 50 Essential Concepts, Peter Bruce & Andrew Bruce
Ī	2.	An Introduction to Statistical Learning with Applications in R, Gareth James, Daniela Witten, Trevor
		Hastie & Robert Tibshirani

Y	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/COMPUTE
	R%20SCIENCE/COMPUTER%20SCIENCE%20(E%20Series).pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-

copies% 20of% 20books/Computer% 20Science% 20and% 20Engineering/The% 20Art% 20of% 20R% 20Program ming.pdf

M(OOCs Links and additional reading, learning, video material
1.	https://onlinecourses.nptel.ac.in/noc21_ma74/preview

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SoE No. 23CSE-101

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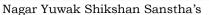
IV Semester

23CSE1405: Lab- Introduction to Data Analysis

List of Experiment

Sr. No.		Experime	nts based on					
1.	Obtai	ned the desc results usir	riptive statistic ng R.	s for the giv	en data usin	g MSEXCEL	and Check th	ne obtained
			Sample of da	ily product	ion in mete	rs of 30 car	pet looms	
		16.2	2 16.8	15.9	15.6	15.9	16.6	
		15.8	3 16	16	15.7	15.9	15.6	
		15.8		16.3	16	16.8	15.6	
		15.8		16	16.2	15.4	16.9	
		16.3	3 15.9	16.4	16.1	15.7	16.3	
2.	With [1] [2] [3] [4]	following: Produce a not produce a so produce side Create new of to divide un coming from How many versus Elite	the College data umerical summa catterplot matrice-by-side boxplo qualitative varia iversities into to the top 10 % of relite university.	ary of the var x of the first to ts of Outstat ble, called Eli wo groups ba f their high so ities are the	iables in the ten columns e versus Privite, by binning ised on when hool classes in? Produce	data set. or variables ate. g the Top10 ther or not exceeds 50 9 e side-by-s	of the data. perc variable. the proportio %. ide boxplots	We are going on of students of Outstate
3.	With [1] [2] [3] [4] [5]	have been Which of the What is the What is the Now remove deviation of Using the ful of your choic Suppose tha	the Auto data removed from to predictors are range of each queen and stande the 10th throeach predictor ill data set, investe. Create some to we wish to proggest that any to the Auto and	the data): quantitative, uantitative p dard deviation ugh 85th obe n the subset tigate the pre plots highligh redict gas mil	and which a redictor? n of each qua- servations. W of the data the edictors grap nting the rela eage (mpg)	are qualitative properties of the land is the land remains in the land on the basis	redictor? range, mean, g scatterplots nong the pred s of the other	and standard or other tools lictors. variables. Do

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4.	With	reference to the Boston housing data set, answer the following (The Boston data set is part of the MASS library in R)			
	[1]	Which of the predictors are quantitative, and which are qualitative?			
	[1] [2]	How many rows are in this data set? How many columns? What do the rows and columns			
	[4]	·			
	[2]	represent?			
	[3]	Make some pairwise scatterplots of the predictors (columns) in this data set. Describe your			
	F 4 1	findings.			
	[4]	Are any of the predictors associated with per capita crime rate? If so, explain the			
		relationship.			
	[5]	Do any of the suburbs of Boston appear to have particularly high crime rates? Tax rates?			
		Pupil-teacher ratios? Comment on the range of each predictor.			
	[6]	How many of the suburbs in this data set bound the Charles river?			
	[7]	What is the median pupil-teacher ratio among the towns in this data set?			
	[8]	Which suburb of Boston has lowest median value of owner-occupied homes? What are the			
		values of the other predictors for that suburb, and how do those values compare to the			
		overall ranges for those predictors? Comment on your findings.			
	[9]	In this data set, how many of the suburbs average more than seven rooms per dwelling?			
		More than eight rooms per dwelling? Comment on the suburbs that average more than			
		eight rooms per dwelling.			
5.		inomial/ Poisson/ Normal distribution to solve the following:			
	[1]	Suppose there are twelve multiple choice questions in an English class quiz. Each question			
		has five possible answers, and only one of them is correct. Find the probability of having four			
		or less correct answers if a student attempts to answer every question at random.			
	[2]	If there are twelve cars crossing a bridge per minute on average, find the probability of			
		having seventeen or more cars crossing the bridge in a particular minute.			
	[3]	Assume that the test scores of a college entrance exam fits a normal distribution.			
		Furthermore, the mean test score is 72, and the standard deviation is 15.2. What is the			
		percentage of students scoring 84 or more in the exam?			
	[4]	For binomial distribution with n=10 and p=0.45, find:			
		(a) P(r=8)			
	(b) P(r>4)				
		(c) P(r<=6)			
6.	Use E	inomial/ Poisson/ Normal distribution to solve the following:			
	[1]	Probability that a normal random variable with mean 22 and variance 25			
	L-J	(a) lies between 16.2 and 27.5			
		(b) is greater than 29			
		(c) is less than 17			
		(d) is less than 15 or greater than 25			
	[2]	Probability that in 60 tosses of a fair coin the head comes up			
	L~J	(a) 20,25 or 30 times			
		(b) less than 20 times			
		(c) between 20 and 30 times			
		(c) between 20 and 50 times			
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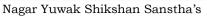
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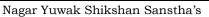




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	[3] A random variable X has Poisson distribution with mean 7. F (a) X is less than 5			n 7. Find the pro	bability that	
		(b) X is greater				
		(c) X is betwee	n 4 and 16			
	[4]			ndent trials, and tha	t the probability	of success on each
		trial is 0.6, find	the probability of 5	successes.		
7.	Use E	Binomial/ Poisson	n/ Normal distributi	on to solve the follo	wing:	
	[1]	• •	here are 10 indepe the probability of 5		at the probabilit	y of success on each
	[2]					one employee being ,3,4, or 5 employees
		being late simul	•			
	[3]		stribution with n=1	0 and p=0.45, find:		
		(a) P(r=8)				
		(b) P(r>4) (c) P(r<=6)				
	[4]		veights produced	at LEGO Toys Wor	rks have weight	s that are normally
		• • •	•	•	•	the probability that a
		randomly chose	en toy weighs more	than 19 grams?		
8.	With	reference to san	npling and sampling	g distribution, answe	er the following:	
	[1]		•			n (with mean 0 and
				e first 10 observation	ns. Evaluate the	mean and standard
	[0]		e sample values.	Construction of the state of th	21. 12	
	[2]		•			ean 2 and standard standard deviation of
		the sample valu		oservations. Evaluate	e tile illeali allu s	standard deviation of
	[3]	•		rom a normal distri	bution with mea	an 150 and standard
	L-1					tandard deviation of
	the sample values. Also, answer the following:					
	(a) What is P(xbar less than equals to 160) = ?					
	F 43	(b) What is P(x	•		.,	
	[4]			_	_	hts that are normally
		distributed with mean 17.46 grams and variance 375.67 grams. What is the probability that a randomly chosen widget weighs more than 19 grams?				the probability that a
		randonny enose	in wiaget weighs in	ore than 15 grains.		
9.	With	reference to san	npling and sampling	g distribution, answe	er the following:	
	[1]	_		·		a popular cola. The
		•	•		•	ccording to a normal
) = 3 ml. What is the
	[2]		_	nts of 6 randomly sel		295?
	[2]	Consider Mean = 8000 and standard deviation is = 3200, n=64. (a) What is P(xbar> 9000) = ?				
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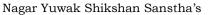




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	(b) What is P(xbar<=8500) = ?
	[3] In a sample of observations from a normal distribution with mean18 and standard deviation
	4.8.
	(a) What is P(xbar less than or equal to 16) = ?
	(b) What is P(xbar > 16) = ?
	(c) What is P(xbar <= 20) = ?
10.	With reference to hypothesis testing, answer the following:
	[1] Suppose the mean weight of King Penguins found in an Antarctic colony last year was 15.4
	kg. In a sample of 35 penguins same time this year in the same colony, the mean penguin
	weight is 14.6 kg. Assume the population standard deviation is 2.5 kg. At .05 significance
	level, can we reject the null hypothesis that the mean penguin weight does not differ from last year?
	[2] Suppose the manufacturer claims that the mean lifetime of a light bulb is more than 10,000
	hours. In a sample of 30 light bulbs, it was found that they only last 9,900 hours on average.
	Assume the population standard deviation is 120 hours. At .05 significance level, can we reject the claim by the manufacturer?
	[3] Suppose the food label on a cookie bag states that there is at most 2 grams of saturated fat
	in a single cookie. In a sample of 35 cookies, it is found that the mean amount of saturated
	fat per cookie is 2.1 grams. Assume that the sample standard deviation is 0.3 gram. At .05
	significance level, can we reject the claim on food label?
	,

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B.Tech in Computer Science and Engineering

IV Semester

23CSE1406: Lab - Vocational & Skill Enhancement - Web Technology

Course Outcomes

- Develop structured and responsive web pages using HTML, CSS, and Bootstrap
- Implement interactive client-side functionality using JavaScript
- Build dynamic web applications with React.js components and state management
- Develop server-side applications using Node. is and handle HTTP requests.
- Manage databases using MySQL and MongoDB for full-stack development.

Unit I:

HTML Elements, Attributes, Images, Complex table structure, Lists, Layout, Responsive website using Layout Elements and <meta>tags ,Forms, Iframes, Canvas, SVG, Symbols, Emojis, HTML Media- Video, Audio.

Unit II:

Bootstrap Containers, Colors, Tables, Images, Alerts, Buttons, dropdown menu, Navbars, Scrollspy, Dark Mode, Offcanvas, Spinners, Cards, Popovers, Flex, Forms, Select Menu, Checkboxes and Radio buttons, Form Validation

Unit-III

JavaScript Introduction, Loop, Regular Expressions, Event Handling, Dialog Boxes, Cookies, image slider, Arrow Functions, Callbacks, Asynchronous, Promises, Async/Await.

Unit-IV

React Components, Class Components, Props, Events, Conditional Rendering, Lists, Forms, Router, Memo, Styling React Using CSS, Styling React Using Sass.

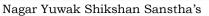
Unit-V

Node.js Modules, Node.js HTTP Module, Node.js File System Module, Node.js URL Module, Node.js NPM, Node.js Events, Node.js Upload Files, Node.js Send an Email

Unit-VI

Node.js MySQL Create Database, Create Table, Insert Into, Select From, Where, Order By, Delete, Drop Table, Update, Limit, Join, Node.js MongoDB.

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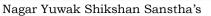
Tex	Text Books				
1.	Thomas A. Powell, "HTML & CSS: The Complete Reference, Fifth Edition", McGraw Hill LLC,2010.				
2.	David Herron, "Node.js Web Development", Packt Publishing,2020.				

	Ref	Reference Book:				
	1.	Mark J. Collins, "Pro HTML5 with CSS, JavaScript, and Multimedia", Apress, 2017.				
Ī	2.	David Herron, "Node.js Web Development", Packt Publishing, 2018.				
	3.	Brad Dayley, Brendan Dayley, Caleb Dayley , "Node.js, MongoDB and Angular Web Development",				
۱		Pearson Education 2017				

Y	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-
	copies%20of%20books/Computer%20Science%20and%20Engineering/JavaScript%20Programmer's%20Refe
	rence.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-
	copies%20of%20books/Computer%20Science%20and%20Engineering/The-Definitive-Guide-to-
	MongoDB.pdf

MC	MOOCs Links and additional reading, learning, video material			
1.	https://archive.nptel.ac.in/courses/106/105/106105084/			
2.	https://archive.nptel.ac.in/courses/106/105/106105084/			

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B.Tech in Computer Science and Engineering

IV SEMESTER

Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1CSE101: Image processing and Computer Vision
MDM-I	3	(MDM1CSE101) Algorithms and Data Structure
MDM-II	4	(MDM2CSE102) Fundamentals of Digital Image Processing
MDM-III	5	(MDM3CSE103) Computer Vision Essentials
MDM-IV	6	(MDM4CSE104) Programming Framework for Computer Vision
MDM-V	7	(MDM5CSE105) Basics of Artificial Neural Network
MDM-VI	8	(MDM6CSE106) Machine Learning fundamentals

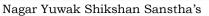
Track 2

Courses	Sem	MDMT2CSE201 : Cryptography and Digital Forensics
MDM-I	3	(MDM1CSE201) Internet technologies and Cyber laws
MDM-II	4	(MDM2CSE202) Digital Forensic
MDM-III	5	(MDM3CSE203) Ethical Hacking
MDM-IV	6	(MDM4CSE204) Cryptography
MDM-V	7	(MDM5CSE205) Cyber Audit
MDM-VI	8	(MDM6CSE206) IOT Security

Track 3

Courses	Sem	MDMT3CSE301 : Software Systems	
MDM-I	3	(MDM1CSE301) Data Structure Essentials	
MDM-II	4	(MDM2CSE302) Object Oriented Concepts using Java	
MDM-III	5	MDM3CSE303) Software Engineering Concepts	
MDM-IV	6	(MDM4CSE304) Software Design Patterns	
MDM-V	7	(MDM5CSE305) Software Testing Essentials	
MDM-VI	8	(MDM6CSE306) Software Project Management in Practice	

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B.Tech in Computer Science and Engineering

IV Semester

Track1: MDMT1CSE101: Image processing and Computer Vision (MDM2CSE102) Programming with Open CV

Course Outcome

Upon successful completion of the course the students will be able to

CO1: Understand basic principles of image processing.

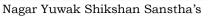
CO2: Apply image enhancement in spatial Domain.

CO3: Analyze image segmentation methods.

CO4: Evaluate image compression algorithms

Unit No.	Contents	Max. Hrs.
Unit:1	Fundamentals of Image Processing : Digital Image Fundamentals: Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships between Pixels, Linear and Nonlinear Operations.	6 Hours
Unit:2	Image Enhancement in spatial domain: Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters. Color image enhancement.	6 Hours
Unit:3	Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary/Edge Detection, Thresholding, Region-Based Segmentation: Region growing and Region Spitting and Merging, Segmentation by Morphological Watersheds.	6 Hours
Unit:4	Image Compression: Image Compression: Fundamentals, Some Basic Compression Methods -Run Length Coding, Huffman Coding, Arithmetic Coding, Bit Plane Coding, Block Truncation Coding. JPEG Compression.	6 Hours

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Te	xt Books
1	Digital Image Processing, (DIP/3e), 3 rd edition, Gonzalez and Woods, Prentice Hall - 2008
Re	ference Books
1	Digital Image Processing, Kenneth R Castleman, Pearson Education
2	Fundamentals of Digital image Processing, Anil Jain.K, Prentice Hall of India
YC	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-
	copies%20of%20books/Computer%20Technology/19-2016_Book_DigitalImageProcessing.pdf
Mo	OOCs Links and additional reading, learning, video material
1	https://onlinecourses.nptel.ac.in/noc21_cs04/preview
2	https://onlinecourses.nptel.ac.in/noc22_cs80/preview

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IV Semester

MDM2CSE202: Digital Forensic

(Track 2- Cryptography and Digital Forensics)

Course Outcomes

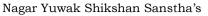
- Conduct digital investigations that conform to accepted professional standards and are based on the investigative process: identification, preservation, examination, analysis, and reporting.
- Identify and document potential security breaches of computer data that suggest violations of legal, ethical, moral, policy, and/or societal standards.
- Processing crimes and incident scenes, securing a computer incident or crime, seizing digital evidence at scene, storing digital evidence, obtaining digital hash, reviewing case.
- To be well-trained as next-generation computer crime investigators.

UNIT I: Introduction- Key developments, Digital devices in society, Technology and culture. Evidential Potential of Digital Devices- Closed vs. open systems, Evaluating digital evidence potential.	6
UNIT II: Device Handling- Seizure issues, Device identification, Networked devices, Contamination., Examination Principles- Previewing, Imaging, Continuity and hashing, Evidence locations	6
UNIT III: Evidence Creation- A seven-element security model, A developmental model of digital systems, Knowing, Unknowing, Audit and logs. Evidence Interpretation- Data content, Data context	6
UNIT IV: Intelligence- Device usage, Profiling and cyber-profiling, Evaluating online crime: automating the model, Application of the formula to case studies, From success estimates to profiling	6
Total Lectures	24

Text Books:

- 1. Digital Forensics Digital Evidence in Criminal Investigation Angus M. Marshall University of Teesside, UK, Willey- Blackwell Publications
- 2. Warren G. Kruse II and Jay G. Heiser, "Computer Forensics: Incident Response Essentials", Addison Wesley, 2002.

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B.Tech in Computer Science and Engineering

Reference Book:

- 1. Nelson, B, Phillips, A, Enfinger, F, Stuart, C., "Guide to Computer Forensics and Investigations, 2nd ed., Thomson Course Technology, 2006, ISBN: 0-619-21706-5.
- 2. Digital Forensic, Anders Flaglien, Inger Marie Sunde, Ausra Dilijonaite, Jeff Hamm, Jens Petter Sandvik, Petter Bjelland, Katrin Franke, Stefan Axelsson First published:23 May 2017, Copyright © 2018 John Wiley & Sons, Ltd. All rights reserved

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1 https://books.google.co.in/books/about/Digital_Forensics.html?id=xqNaDwAAQBAJ&redir_esc=y

MOOCs Links and additional reading, learning, video material

- 1. Digital Forensics Course (swayam2.ac.in)
- 2. Digital Forensics Concepts | Coursera

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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

IV Semester

MDM2CSE302: Object Oriented Concepts using Java

(Track 3- Software Systems)

Course Outcome

After completion of the course students will be able to:

- 1. Demonstrate the understanding of Object oriented concepts.
- 2. Make use of predefined classes and frameworks for reducing coding efforts and improving performance.
- 3. Apply features of object oriented programming to write programs to solve real world problems.

UNIT I: Introduction to object oriented programming paradigm

7

Introduction to object oriented programming paradigm, procedure oriented programming vs OOP, features of OOP, benefits of OOP, defining class, instantiating a class. Declaring Classes and objects, Creating Classes and objects, methods, argument passing, Recursion, this keyword, constructors ,Visibility control

UNIT II: Other Class Modifiers

7

static, final, Abstract, Method overloading, Super keyword, Overriding (polymorphism), nested inner classes, packages (encapsulation), Interfaces (multiple Inheritances) Arrays, Strings ,Arrays, variable size arrays, Strings and String Buffer classes, Wrapper Classes

UNIT III: Exception handling mechanism

7

Fundamentals exception types, uncaught exception, try-catch Block, displaying description of an exception, multiple catch clauses, nested try-catch statements, throw, throws, finally, built in exceptions, creating own exception subclasses. Introduction to multithreading, life cycle of Thread, Runnable interface and Thread class.

UNIT IV: Collection Vector and Framework, IO Steam

7

Introduction to collection framework, Vectors, Array List, Linked list, Hashset, Treeset, Hashmap, Accessing a collection via Iterator, Comparators, Introduction to stream classes, use of stream classes, I/O stream, bytes stream, character stream, predefined stream, reading console input, reading character, reading string, writing console output, the print write class, reading & writing files

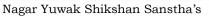
Total Lectures

28

Text Books

1. Java Complete Reference, 7th, Herbert Schildt, McGraw-Hill

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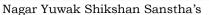
SoE No. 23CSE-101

l	Reference Books
	1. Thinking in Java, 4 th , Bruce Eckel, Prentice Hall
	2.Programming with Java, E. Balagurusamy, TATA McGraw-Hill

Y	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]					
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-					
	copies%20of%20books/Computer%20Science%20and%20Engineering/JAVA_Complete_Reference_Fifth_Ed					
	ition.pdf					
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-					
	copies%20of%20books/Computer%20Science%20and%20Engineering/thinking_in_java_4th_edition.pdf					
3						

MC	MOOCs Links and additional reading, learning, video material							
1.	https://onlinecourses.nptel.ac.in/noc22_cs47/preview							

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

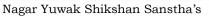
IV SEMESTER

Open Elective -II: Basket

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	4	OE2	GE	23OE2401	OE-II : Combinatorics
2	4	OE2	GE	23OE2402	OE-II: Fuzzy Set Theory, Arithmetic And Logic
3	4	OE2	GE	23OE2403	OE-II: Green Chem. & Sustainability
4	4	OE2	GE	23OE2404	OE-II : Hydrogen Fuel
5	4	OE2	GE	23OE2405	OE-II: Electronic Materials And Applications
6	4	OE2	GE	23OE2406	OE-II: Laser Technology And Applications
7	4	OE2	MGT	23OE2407	OE-II: Finance And Cost Management
8	4	OE2	MGT	23OE2408	OE-II: Operation Research Techniques
9	4	OE2	MGT	23OE2409	OE-II: Project Evaluation & Management
10	4	OE2	MGT	23OE2410	OE-II: Total Quality Management
11	4	OE2	MGT	230E2411	OE-II : Value Engineering
12	4	OE2	MGT	23OE2412	OE-II : Maintenance Management
13	4	OE2	MGT	23OE2413	OE-II : Industrial Safety
14	4	OE2	MGT	230E2414	OE-II: Industry 4.0
15	4	OE2	MGT	23OE2415	OE-II: Operation Management
16	4	OE2	MGT	23OE2416	OE-II : Material Management
17	4	OE2	MGT	23OE2417	OE-II: Hospitality Management
18	4	OE2	MGT	23OE2418	OE-II: Human Resource Management & Organizational Behaviour
19	4	OE2	MGT	23OE2419	OE-II : Agri-Business Management
20	4	OE2	MGT	23OE2420	OE-II: Rural Marketing
21	4	OE2	MGT	23OE2421	OE-II: Marketing Management
22	4	OE2	MGT	23OE2422	OE-II : Health Care Management

Link for Open Electives syllabus: https://ycce.edu/syllabus/

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(Department of Computer Science & Engineering)

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B.Tech in Computer Science and Engineering

IV SEMESTER Mandatory Learning Course (MLC)

MLC2124: YCAP4

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Nagar Yuwak Shikshan Sanstha's

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(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
(Accredited 'A++' Grade by NAAC with a score of 3.6)
Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology SoE & Syllabus 2023 5th Semester

(Department of Computer Science & Engineering)



Nagar Yuwak Shikshan Sanstha's

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering)

B. Tech. in Computer Science & Engineering

SoE No. 23CSE-101

SN	Sem	Туре	BoS/	Sub. Code	Subject T/P Contact Hours						Credits % Weightage				ESE
			Deptt				L	ı	Р	Hrs		MSEs*	IA**	ESE	Duration Hours
FIFTH SEMESTER															
1	5	PC	CSE		Theory of computation	Т	3	0	0	3	3	30	20	50	3
2	5	PC	CSE		Database management systems	T	3	0	0	3	3	30	20	50	3
3	5 5	PC	CSE	23CSE1503	Lab: Database management systems P 0 0 2 2 Design and Analysis of Algorithms T 3 0 0 3							20	60	40 50	2
5	5	PC PC	CSE		Design and Analysis of Algorithms							30	20 60	40	3
6	5	PC	CSE	23CSE1506									60	40	
7	5	PE	CSE		Professional Elective I	Т	3	0	0	3	3	30	20	50	3
8	5	PE	CSE		Lab : Professional Elective I	Р	0	0	2	2	1		60	40	
9	5	OE-3	OE		Open Elective -III	T	3	0	0	3	3	30	20	50	3
10	5 5	MDM STR	CSE	23CSE1507	MD Minor Course-III Intership, Seminar and Report	T P	0	0	2	2	3	30	20 60	50 40	3
11	3	SIK	CSE	23C3E1307	TO		18	0	10	28	23		00	40	
							10		10						
List	of M	landat	ory Lear	ning Course	e (MLC)	ı	1					ı		1	
1	5	HS	T&P	MLC2125	YCAP5 : YCCE Communication Aptitude Preparation	Α	3	0	0	3	0				
	_						1	1				1			
Pro			Elective		DE L. Digital Image Dragoning										
2	5 5	PE-I	CSE		PE-I : Digital Image Processing PE-I : Lab : Digital Image Processing										
3	5	PE-I	CSE	23CSE1523	PE-I: Business Intelligence										
4	5	PE-I	CSE		PE-I: Lab: Business Intelligence										
5	<u>5</u>	PE-I	CSE CSE	23CSE1525	PE-I: Mobile Application Development PE-I: Lab: Mobile Application Development										
7	5	PE-I	CSE	23CSE1527	PE-I: Internet of Things										
8	5	PE-I	CSE		PE-I: Lab: Internet of Things	_									
9	5 5	PE-I	CSE CSE		PE-I: Introduction to geographical information sy PE-I: Lab: Introduction to geographical informat		vetam								
11	5	PE-I	CSE		PE-I: Neural networks and applications	1011 3	ysterri								
12	5	PE-I	CSE		PE-I: Lab: Neural networks and applications										
13 14	5 5	PE-I	CSE CSE		PE-I : Advanced web technology PE-I : Lab : Advanced web technology Lab										
15	5	PE-I	CSE		PE-I : Customer Relationship Management										
16															
Cour	ooro E	lectives													
		1		000054507	DE L. IDM Commention Al Empire and a Destruction	-1.0-	-41E14								
1	5	PE-I	PC	23CSE1537	PE-I : IBM Generative AI Engineering Professional Certificate										
2	5	PE-I	PC	23CSE1538	PE I: Lab.: IBM Generative AI Engineering Profe	ssior	al Cer	tificate							
			•												
Ope	en El	lective	e - III												
	Sem	Type	BoS/Deptt		Subject								ACUL		
2	5 5	OE3	CSE CSE	23OE3501 23OE3502	OE-III : Social Reformers in Modern Maharashtra OE-III : Independent India 1948-2010								ART		
3	5	OE3	CT	230E3503	OE-III : Introduction To Cognitive Psychology								ART	S	
5	5 5	OE3	CT CT	23OE3504 23OE3505	OE-III : Introduction To Engineering Psychology OE-III : Introduction To Behavioural Psychology								ART		
6	5	OE3	CT	230E3506	OE-III : Introduction To Emotional Psychology								ART		
7	5	OE3	EL		OE-III : Elements of Public Administration								ART		
9	5 5	OE3	ETC IT	23OE3508 23OE3509	OE-III : Ancient Indian History OE-III : Consciousness Studies								ART		
10	5	OE3	IT	23OE3510	OE-III : Psychology for Professionals								ART	S	
11	5	OE3	IT GE	230E3511	OE-III : Introduction to Sociology and Human Behavio OE-III : Economics of Money and Banking	r							ART		
12	5 5	OE3	GE GE	23OE3512 23OE3513	OE-III : Economics of Money and Banking OE-III : Economics of Capital Market								ART		
14	5	OE3	GE	230E3514	OE-III : Digital Humanities								ART	S	
15 16	5 5	OE3	GE CT	23OE3515 23OE3516	OE-III : Introduction to Political Science OE-III : Bhagwat Geeta - An Engineer's Interpretation							۸	ART:		
17	5	OE3	CT	230E3517	OE-III : Artha shastra by Kautiliya							А	RTS -	IKS	
18	5	OE3	CSD	230E3518	OE-III : Glimpses of Ancient science and Technology								RTS -		
19 20	5 5	OE3	CV	23OE3519 23OE3520	OE-III : Indian taxation system OE-III : Elements of share trading								OMME OMME		
21	5	OE3	EE	230E3521	OE-III : Introduction to Fintech							C	JMME	RCE	
22	5	OE3	EE	23OE3522 23OE3523	OE-III : Financial Analytics OE-III : Fundamentals of Investments						_		OMME OMME		
24	5	OE3	ETC EE	230E3523 230E3524	OE-III : Lifestyle Diseases						HE	ALTHO			CINE
25	5	OE3	EE	230E3525	OE-III: Holistic Nutrition							HON	ИE SC	IENCE	
26 27	5 5	OE3	EL CSE	23OE3526 23OE3527	OE-III : Community Organization & Development OE-III : Human Rights & International Laws						-	HON	ME SC LAW	IENCE /	
28	5	OE3	CSE	230E3528	OE-III : Cyber Crime Administration								LAV	/	
29	5	OE3	MATHS	230E3529	OE-III : Finite Differences & Numerical Methods SCIENCE										
30	5 5	OE3	MATHS PHY	23OE3530 23OE3531	OE-III : Business Statistics OE-III : Crystalline Solids: Properties and Applications.								SCIEN SCIEN		
32	5	OE3	PHY	230E3532	OE-III : Nanotechnology: Fundamental to Applications						,	SCIEN	CE		
33 34	5	OE3	CHE CHE	230E3533	OE-III : Chemistry in daily life OE-III : Battery Systems and Management								SCIEN SCIEN		
35	5 5	OE3	NPTEL	23OE3534 23OE3535	OE-III: Battery Systems and Management OE-III: Designated approved online NPTEL Course								NPTE		
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B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering)

SoE No. 23CSE-101

AY 2023-24 Onwards

B.Tech in Computer Science and Engineering

V Semester

23CSE1501: Theory of Computation

Course Outcomes:

Upon successful completion of the course the students will be able:

- CO1. To understand and apply the basic properties of formal languages and to design finite automata for regular expression and Regular Grammar.

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Chairperson

Unit No.		Co	ontents			Max. Hrs.
Unit:1						7 Hours
Acceptance	Symbols, Sets, String te of strings and la on, Equivalence between	nguages, Non I	Deterministic Fini	te Automation,	Determin	
Unit:2						7 Hours
Pumping 1 grammars	ets, Regular expression Lemma, closure propert , inter-conversion between RE and	ties of regular sets ween LLG & R	, Regular grammaı	rs, Right linear a	and left lin	ear regular
Unit:3						7 Hours
	ree grammar, Derivation (CFL), Normal Form o	` •				ontext Free
Unit:4			,			6 Hours
	n automata, definition ce CFL and PDA, Inter-					final state,
Unit:5						6 Hours
enumerab hypothesis	achine, Definition, Mole language, Recursives, Chomsky hierarchy Turing Machine	e Language, Pro	perties of Recur	sive enumerabl	e language	c, Church's
Universal						
Unit:6						6 Hours
Unit :6 Un-decida	bility Problems relat			~ ~	_	chine, post
Unit :6 Un-decida	dence problem. Recurs			~ ~	_	chine, post

Date of Release

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B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering)

SoE No. 23CSE-101

	Total Lecture Hours	39 Hours
Text	tbooks	-
1.	Introduction to Automata Theory, Languages, and computation,3 rd Edition,Hopcroft J. Motwani, Jeffrey D. Ullman, Pearson Education	E., Rajeev
2.	Introduction to languages and the Theory of Computation, 3 rd Edition, John C. Martin, N	Mc Graw Hill
Refe	erence Books	
1.	Introduction to the Theory of Computation,2 nd Edition,Michael Sipser, GALE CENGA	AGE Learning
2.	Theory of Computation, 1st Edition, Dr. O. G. Kakde, Laxmi Publication	
YCC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	Introduction to Languages and the Theory of Computation	
MO	OCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc22_cs63/preview	
2	https://ocw.mit.edu/courses/18-404j-theory-of-computation-fall-2020/pages/lecture-notes/	

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

V Semester

23CSE1502: Database Management Systems

Course Outcome

Upon successful completion of the course, the student will be able to:

- CO1. Analyze & compare different levels of abstraction & data independence.
- CO2. Design Entity Relationship Diagram for any scenario.
- CO3. Solve queries based on relational algebra & SQL.
- CO4. Identify functional dependencies & normalize the database and apply ACID properties.
- CO5. Analyze transaction management, various concurrency control protocols and crash recovery methods.

Unit No.	Contents	Max. Hrs.
1	Introduction to Database Management System:	6
	File System and Database system Concepts and Architecture, Data Models, Schemas and s, Abstraction & Different Levels of Data Abstraction, Data Independence: Logical & Physic dence.	cal
2	Entity-Relationship Model:	7
Entity R	and Entity Sets, Relationships and Relationship Sets, Attributes, Mapping Constraints, Keys, elationship Diagram, Reducing E-R Diagrams to Tables, Generalization, Aggregation, Desig Database Scheme	
3	SQL and Advanced SQL	7
Queries, Joins. Advance	ata definition language (DDL), Data Manipulation Language (DML), Basic structure of SQL Set operations, Null Values, Nested subqueries, views, modification of database, transaction ed SQL: SQL data types & schemas, Integrity Constraints, Domain Constraints, Assertions, Advanced SQL Features.	
4	Relational Data Model:	7
Function Databas	e of Relational Databases, Relational Database Design : Pitfalls in Relational Database Designal Dependencies, Normalization using Functional Dependencies, Alternative Approaches to design. Relational Algebra : Structure of relational databases, Fundamental Relational-Algons, Additional relational algebra operations, extended relational algebra operations, modifical atabases	ebra
5	Data Storage and Querying & Transaction Management	6
Data St evaluati	orage and Querying: Storage and File Structure, Indexing and Hashing, Query Processing, on.	query-

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Transaction Management : ACID Properties, Implementation of ACID Properties, Database processes t					
support ACID Properties, Schedules, and Testing of Serializability.					
6	Concurrency Control & Crash Recovery	6			
Concur	Concurrency Control: Lock-based Protocols, Timestamp Based Protocols, Validation Techniques,				
Multiple	Multiple Granularity, Multi version Timestamp Protocol, Transaction isolation levels, Read consistency.				
Crash F	Crash Recovery: Failure Classification, Log Based Recovery, Buffer Management, Checkpoints, Shadow				
Paging.					
Total Lectures					

Text E	Text Books						
1	Database System Concepts, Korth, Silberschatz, sudarshan, McGraw-Hill publication						
2	Fundamentals of Database Systems, Elmasri, Navathe & Gupta, Pearson Education.						
Refere	Reference Books						
1	SQL & PL / SQL for Oracle 11g Black Book Kindle Edition, 3 rd Edition, Dr. P.S. Deshpande,						
	Dreamtech Press						
2	Database Systems, 3 rd Edition, Connolly, Begg, Pearson Education						
3	Database Systems, 6 th Edition,S. K. Singh,Pearson Education						

YC	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]					
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0					
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042					
MC	MOOCs Links and additional reading, learning, video material					
1	https://onlinecourses.nptel.ac.in/noc21_cs04/preview					
2	https://onlinecourses.nptel.ac.in/noc22_cs80/preview					

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

V Semester

23CSE1503: Lab: Database management systems

Course Outcomes:

Upon successful completion of the course the students will be able to

CO1. Apply basic SQL commands for data definition and data manipulation on relational databases.

CO2.Design Entity-Relationship (ER) diagrams for real-world scenarios and convert them into relational schemas.

CO3.Use SQL aggregate functions, grouping, and set operations to extract meaningful insights from data.

CO4.Implement joins, views, and transaction control commands to manage complex database queries and ensure data integrity.

CO5.Demonstrate database connectivity using JDBC and implement PL/SQL programs for procedural operations.

Sr.No.	Experiment based on
1	To implement different basic Data Definition Language(DDL) & Data Manipulation Language(DML) Commands in SQL.
2	To design an ER Diagram.
3	To implement aggregate function & grouping commands.
4	To implement basic set operations in SQL
5	To apply BETWEENAND, NOT BETWEEN, IN, NOT IN, IS NULL, IS NOT NULL clause on created database.
6	To implement commands that involves constraints.
7	To implement commands for various joins.
8	To create and manipulate various database object of table using views.
9	To implement Transaction Control Language (TCL) commands.
10	To display file database connectivity using JDBC.
11	Write a program in PL/SQL to check given number is even or odd

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

V Semester

23CSE1504: Design and Analysis of Algorithms

Course Outcomes:

Upon successful completion of the course the students will be able to

- CO-1 Understand time requirements of an algorithm and mathematical techniques used in analysis of algorithms.
- **CO-2** Develop an understanding of mathematical concepts such as summation of arithmetic and geometric series, asymptotic notations.
- **CO-3** Analyze the Complexities of different algorithms for a wide variety of foundational problems occurring in computer science applications.
- **CO-4** Apply the knowledge of different algorithms with discussions on complexity.
- **CO-5** Evaluate the knowledge of algorithms with Complexity and NP-completeness

Unit	Contents	Max. Hrs.
No.	Contents	wiax. 1115.
Unit:1	Introduction	7 Hours

Algorithm, pseudo code for expressing algorithms, performance analysis-space complexity, time complexity, asymptotic notation- big (O) notation, omega notation, theta notation and little (o) notation, recurrences, probabilistic analysis, disjoint set operations, union and find algorithms. Analysis of sorting algorithms such as selection sort, insertion sort, bubble sort, heap sort, external Sorting, lower bound proof.

Unit:2 Recursive Functions 6 Hours

Recursive functions and recurrence relations, solutions of recurrence relations using technique of characteristic equation and generating functions, elementary and advanced data structures with operations on them and their time complexity, Amortized analysis.

Unit:3 Divide and conquer 7 Hours

DIVIDE AND CONQUER: General method, applications-analysis of binary search, quick sort, merge sort, AND OR Graphs. **GREEDY METHOD**: General method, Applications-job sequencing with deadlines, Fractional knapsack problem, minimum cost spanning trees, Single source shortest path problem.

Unit:4 Dynamic Programming 7 Hours

GRAPHS: Breadth first search and traversal, Depth first search and traversal, connected components and biconnected components, Articulation points. **DYNAMIC PROGRAMMING:** General method, applications – LCS, Matrix Chain Multiplication, optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

Unit:5	Backtracking	6 Hours

Backtracking: General method, Applications- n-queen problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles. **BRANCH AND BOUND**: General method, applications - travelling sales person

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SoE No. 23CSE-101

pro	blem, 0/1 knapsack problem.	
Uni	it :6 NP-hard and NP-complete problems	6 Hours
	-hard and NP-complete problems, basic concepts, non-deterministic algorithms, NF nplete, Cook's Theorem, decision and optimization problems, polynomial reduction.	P-hard and NP-
Tot	tal Lecture Hours	39 Hours
Tex	xtbooks	
1	Computer Algorithms, Third edition, Horowitz, Sahani, Rajsekharan, Galgotia Publicati	ons Pvt. Ltd.
2	Introduction to Algorithms, Third edition, Thomas H. Cormen, Prentice Hall of India.	
3	Ellis Horowitz, Satraj Sahni, Rajasekharam (2007), Fundamentals of Computer Algorith University Press, New Delhi.	ms, 2nd edition,
Ref	ference Books	
1	Aho, Ullman, Hopcroft (2009), Design and Analysis of algorithms, 2nd edition, Pearson Delhi	education, New
2	R. C. T. Lee, S. S. Tseng, R.C. Chang and T. Tsai (2006), Introduction to Design Algorithms A strategic approach, McGraw Hill, India.	and Analysis of
3	Allen Weiss (2009), Data structures and Algorithm Analysis in C++, 2nd edition, Per New Delhi.	arson education,
YC	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0	
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042	
MC	OOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/106/101/106101060/	
2	https://nptel.ac.in/courses/106101060	

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V Semester

23CSE1505: Lab: Design and Analysis of Algorithms

Sr. No.	List of Experiment
1	To Compute and Analyze its time complexity of various sorting algorithm.
1	Bubble sort
	• Insertion sort
	Selection Sort
	Heap sort
2	To implement and compute time complexity of given problem using Divide and Conquer
2	algorithm.
	Merge sort
	• Quick sort
	Binary Search
3	To implement and compute time complexity of Job sequencing problem using Greedy Method
	for different number of inputs.
4	To implement and compute time complexity of Knapsack Problem using Greedy Method for
	different number of inputs.
5	To implement and compute time complexity of Dijikstra Problem using Greedy programming
	for different number of inputs.
6	To implement the given problem using minimum cost spanning trees.
	Kruskal Algorithm
	Prim Algorithm
7	To implement the given problem using Graph traversal
	Breadth first search
	Depth First Search
8	To implement and compute time complexity of All Pair Shortest Path using dynamic
	programming for different number of inputs.
9	To implement and compute time complexity of Travelling Salesman Problem using dynamic
	programming for different number of inputs.
1.0	
10	To implement and compute time complexity of LCS Problem using dynamic programming for
11	different number of inputs. To implement and compute time complexity of Sum of Subset Problem using dynamic
11	programming for different number of inputs.
12	To implement and compute time complexity of 0/1 Knapsack Problem using dynamic
12	programming for different number of inputs.
13	To implement and compute time complexity of Matrix Chain Multiplication using dynamic
	programming for different number of inputs.
14	To implement and compute time complexity of 8 Queens's problem using backtracking for
	different number of inputs.
15	To implement and compute time complexity of Graph coloring problem using backtracking for
	different number of inputs.

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V Semester

23CSE1506: Lab: Open Source Tools

Course Outcomes:

Upon successful completion of the course the students will be able

- 1 Install and operate Linux systems (Ubuntu/Fedora) and perform basic command-line operations.
- 2 Create documents, spreadsheets, and presentations using open-source tools; perform Git operations like commit, branch, merge, push, and pull.
- 3 Develop basic Python programs using functions, file handling, and OOP concepts.
- 4 Design and host static websites using HTML5, CSS3, and Bootstrap; create and query simple databases.
- Build a basic ML model, develop an IoT dashboard using Node-RED, design mobile app UI mockups, and manage projects using Kanban and user stories.

Sr.No.	Experiment based on
1	Install, configure, and operate Linux (Ubuntu/Fedora) and basic command-line operations.
2	Create documents, spreadsheets, and presentations using open-source office suites
3	Develop and test basic Python programs (functions, file handling, OOPs)
4	Version control operations: Initialize repository, commit, branch, merge, push and pull.
5	Design and host a basic static website using HTML5, CSS3, and Bootstrap.
6	Develop a small database application: Create DB, insert records, and perform queries.
7	Build a simple IoT Dashboard to monitor virtual sensors using Node-RED.
8	Create a simple Machine Learning model (e.g., linear regression) and visualize data.
9	Design low-fidelity wireframes and high-fidelity mockups for a mobile app.
10	Collaborative project management simulation: Create user stories, Kanban boards, and track project issues

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23CSE1521: PE-I: Digital Image Processing

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Describe Basic relationships between pixels.
- 2. Compare various image enhancement techniques in spatial domain and frequency domain.
- 3. Illustrate different image compression techniques to understand the advantage of image compression
- 4. Demonstrate the applications of similarity based and dissimilarity-based approaches for image segmentation.
- 5. Interpret various representation techniques

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction	5 Hours

Fundamental Steps in Image Processing, Elements of DIP systems, Elements of Visual Perception, Fundamentals of Image processing, A Simple Image Model, Sampling and Quantization, Some Basic Relationships between Pixels.

Unit:2 | **Image Enhancement in the Spatial Domain**

6 Hours

Introduction to Spatial and Frequency methods, Basic Gray Level Transformations, Histogram Equalization, Image Subtraction, Image Averaging, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.

Unit:3 | Transforms & Image Enhancement in the frequency Domain

7 Hours

Transforms: Introduction to the Fourier Transform, Discrete Fourier Transformation, Fourier Properties, 2DFT, inverse Fourier transform, **Image Enhancement in the frequency Domain:** Filtering in the Frequency Domain, Correspondence between Filtering in the Spatial and Frequency Domain, Smoothing Frequency-Domain Filters, Sharpening Frequency-Domain Filters, Homomorphic Filtering.

Unit:4 | **Image Compression**

6 Hours

Fundamentals of Image compression, coding redundancy, spatial and temporal redundancy, Measuring Image Information, Fidelity criteria, Image compression models, Basic compression methods, Huffman coding, arithmetic coding, LZW coding, run length coding.

Unit:5 | **Image Segmentation**

6 Hours

Point Detection, Line Detection, Edge Detection, Gradient Operator, Edge Linking and Boundary Detection, Thresholding, Region-oriented Segmentation.

Unit:6 | **Image Representation**

5 Hours

Chain Codes, Polygonal Approximations, Signatures, Boundary Segments, Skeleton of a Region. Description: Boundary Descriptors, Shape Numbers, Regional Descriptors, Topological Descriptors.

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Inti	roduction to color image processing: RGB and HSI color models.	
To	tal Lecture Hours	39 Hours
Te	xtbooks	
1	Digital Image Processing, 3rd edition 2007, Rafael C. Gonzalez and Richard, E. Woods, I	Prentice Hall
2	Digital Image Processing,2009, S Jayaraman, Tata McGraw Hill	
Re	ference Books	
1	Fundamentals of Digital Image Processing, A K Jain, Prentice Hall, 1988	
	Image Processing Principles & Applications 2005, TinkuAcharya&Ajoy K. Ray, Willey	Inter-Science
YC	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/37.Digital.Image.Processing.4th.E EBooksWorld.ir.pdf	dition.www.
2	Index of /YCCE/DTEL Material/6.Computer Technology/DTEL PPT's with copyrights/D	OIP
M(OOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_ee78/preview	
2	https://onlinecourses.nptel.ac.in/noc21_ee100/preview	

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V Semester

23CSE1522: Lab: PE-I: Digital Image Processing

Sr. No.	Experiments based on
1	1. Write a program in MATLAB for following Point processing techniques in spatial domain
	a. Negation of an image
	b. Thresholding of an image
	c. Contrast Stretching of an image
2	. Write a Program in MATLAB to Create a Histogram of a given Image OR
	https://cse19-iiith.vlabs.ac.in/objective.php?exp=histo
3	Write a program in MATLAB to perform following smoothing operations on an image
	a. Average filter
	b. Ordered Statistics filter
4	. Write a program in MATLAB to sharp an image using Laplacian mask.
5	. Write a program in MATLAB to segment an image using multilevel thresholding OR
	https://cse19-iiith.vlabs.ac.in/objective.php?exp=segment
6	. Write a program in MATLAB to apply split and merge algorithm on a given image.
7	Write a program in MATLAB to find the code chain of a given image.
8	Write a program in MATLAB to find Euler number of image a given image.
9	Write a program using OpenCV tool to detect the object present in an image.
10	Write a program using OpenCV tool to detect and track the object present in video.

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V Semester

23CSE1523: PE-I: Business Intelligence

Course Outcome

After completion of the course Students will be able to:

- 1. Explain the fundamental concepts, architecture, trends and applications of Business Intelligence and its role in decision-making
- 2. Demonstrate the importance of SQL knowledge in Business Intelligence by applying SQL queries for data extraction, transformation, and analysis to support decision-making
- 3. Design data warehousing solutions, including ETL processes, to support BI applications.
- 4. Explore and analyze the Business Intelligence (BI) lifecycle and its phases, to support data-driven decision-making.

Unit No.	Contents	Max. Hrs.
1	Introduction to Business Intelligence :	7
What	is business intelligence, why do we need BI, EIS,MIS,DSS& BI, information pyramid-data,	
inforn	nation, Knowledge & intelligence. Basis For operational, tactical & strategic decision making	g, OLTP
vs. Ol	LAP, Requirement gathering in BI through business question BI in various domains and func	tional
area, 1	role of datawarehousing in BI.	
2	SQL the universal language for Business Intelligence :	6
data f	duction to RDBMS, Language for retrieving data from a database, various clauses in a SQL refrom multiple tables- joins filtering, sorting & grouping datasets, Introduction to DDL & DM nents, various built- in functions in SQL, Use of sub- queries, data dictionary and dynamic SQ	L
3	Basics of data Integration (Extraction ,Transformation, Loading-ETL)	7
integr	epts of data integration, need and advantages of using data integration, introduction to comme ation approaches, introduction to ETL, introduction to data quality, data profiing concepts an eations	
4	Principles of Dimensional modelling:	7
dimer snowf	luction to multidimensional data model, ER modelling vs Multidimensional modelling, concasions, facts, cubes, attributes, hierarchies, Foundation for fact based decision making, star at flake schema, Pros& cons of the star/snowflake schema dimensional model, Slowly changing asion tables, Fact-less fact strategy, Time dimension.	nd
5	Business Intelligence system architecture:	6
NT 1	for enterprise class business intelligence infrastructure, The BI ecosystem, Building blocks o	fantier
Need		

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user interfaces-desktop vs. web vs. Mobile. Open architecture, Scalability, performance in BI-in memory

	analytics.	
6	BI Project Lifecycle :	6
repo	cal BI project lifecycle, Requirements gathering & analysis-functional & non- functional rec rts and dashboards design- mock – up and storyboarding, Testing in a BI project, BI project oyment, Post production support, Applications of BI, BI best practices Total Lectures	quirements,
Text	t Books	
1	Fundamentals of Business Analytics, R.N.Prasad, Seema Acharya, wiley	
2	Data Warehousing ETL toolkit, Indian edition, Ralph Kimball and Margy Ross, wiley	
3	Business Intelligence Roadmap: The Complete Project Lifecycle for Decision-Support Ap (Addison-Wesley Information Technology Series) 1st Edition, Kindle Edition by Larissa T. Moss (Author), Shaku Atre (Author), Edward Yourdon (Foreword)	pplications
Refe	erence Books	
1	Business Intelligence: The Savvy Manager's Guide, David Loshin	
2	Data Warehousing in the real world A practical guide for building Decision Support System Anahory, Dennis Murray, PEARSON	n , Sam
YCO	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
	tp://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/26.Bu	siness

%20Intelligence %20The%20Sav%20-%20David%20Loshin 1391.pdf

MOOCs Links and additional reading, learning, video material

https://onlinecourses.nptel.ac.in/noc21 mg65/preview

https://nptel.ac.in/courses/110107092

2. http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/book%20details/CSD.aspx

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23CSE1524: Lab: PE-I: Business Intelligence

Sr. No.	Name of Practical
1	Implementation of queries based on Joins (joining 2 or more tables), sub queries.
2	Implementation of Top- n, range queries
3	a. Design a multidimensional data cube for given data Using EXCELb. Perform OLAP- slicing operation on it
4	Creation Of Dashboard Using EXCEL
5	Exploring PowerBI/ Tableau OR/ MICROSTRATEGY ANALYTIC DESKTOP (MSTR): Installation tool, Importing Data from file, Data Wrangling (Editing Data).
6	Visualization Of Data Using different visualizations in PowerBI /Tableau/ MSTR analytic desktop, Filtering data, and delivering Insights from data
7	Create reports and Dashboard with defined insights /requirements in / PowerBI /Tableau/MSTR analytic desktop. (Sample Data to be provided)
8	Creating pipelines / DAX

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V Semester

23CSE1525: PE-I: Mobile Application Development

Course Outcomes:

Upon successful completion of the course the students will be able to:

- 1. Understand the basics of mobile programming.
- 2. Apply mobile programming concepts.
- 3. Design user interfaces.
- 4. Design mobile database.
- 5. Analyse inter application communication.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Mobile Operating System	6 Hours

Mobility Technology Trends, Mobile Ecosystem Overview, Mobile Devices Overview, Mobile Development, Methodology, Wireless Networks Overview, Proximity Technologies

Unit:2 Introduction to Android

7 Hours

Android Overview, Basic building blocks, Introduction to Activities/Fragments, Introduction to Services, broadcast receivers, content providers, Android Application Structure, Source Files, Resources, Assets, Manifest, Basic IDE Operation (Android Studio), Project Creation and Handling (App Creation through Wizard), Running App on AVD and Device, DDMS and Debugging, Layout Overview, Linear Layout, Relative Layout, Frame Layout, Widgets (UI Controls) Overview, Text View, Image View, button.

Unit:3 User Interface Designing

6 Hours

Notifications, Toast, Dialog, Listview and Adapter, View Re-usability, Spinner, Complex View, Android Component overview, Intent Resolution, Activity Stack, Launch Modes, Activity Flags, Service Overview, Service Lifecycle, Service Usage and Applicability, Message Binder.

Unit:4 | **Data Management**

7 Hours

Data Storage Overview, Persistant v/s Local, Shared Preferences, Internal Storage, SQLite Data Base, Thread, process overview, Async Task, Loaders, Handlers, Intent and Intent Filters, Broadcast receiver Overview, Manifest Registration vs Component Registration, Unregistration, SMS, Boot, Network etc., Action Bar and Context Menu.

Unit: 5 User Interface Designing

6 Hours

Inter app communication requirement overview, Intents Based, Gallery, Camera, SMS App, Contacts, Content provider Overview ,Need and Usage, Content Provider structure, URI Permissions, Views, triggers, Network communication basics, Connecting to server/ request creation, Response Formats

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XML/JSON, Rest / Web Services.

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Unit :	6 Data Management	7 Hour		
Thread Overv	Storage Overview, Persistant v/s Local, Shared Preferences, Internal Storage, d, process overview, Async Task, Loaders, Handlers, Intent and Intent Filters riew, Manifest Registration vs Component Registration, Unregistration, SMS, n Bar and Context Menu.	s, Broadcast receive		
	Total No. Lectu	ires 39		
Textb	oooks			
1	Mobile Design and Development, Brian Fling, O'Reilly Media, Inc			
2	Android Programming: The Big Nerd Ranch Guide, Bill Phillips, Chris Stewar Kristin Marsicano, Big Nerd Ranch LLC	t, Brian Hardy, and		
Refer	ence Books			
1.	Programming the Mobile Web, Maximilian o Firtman, O'Reilly Media, Inc.			
YCCI	E e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]			
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0			
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042			
MOO	Cs Links and additional reading, learning, video			
1	https://onlinecourses.swayam2.ac.in/nou21_ge41/preview			
2	https://onlinecourses.nptel.ac.in/noc20_cs52/preview			

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V Semester

23CSE1526: Lab: PE-I: Mobile Application Development

Course Outcomes:

Upon successful completion of the course the students will be able to:

- 1. Understand and implement the basics of mobile programming.
- 2. Apply mobile programming concepts.
- 3. Design user interfaces.
- 4. Design mobile database.
- 5. Analyse and develop inter application communication.

Sr. No.	Experiments based on
1	Study of Mobile devices & their history.
2	Study of Mobile Apps Architecture.
3	Installation of Android Studio.
4	Modification to AndroidManifest File.
5	Develop an app making use of Android layout.
6	Develop an app based on Android widgets.
7	Design & Develop an app making use of Event Handling.
8	Develop an app to demonstrate fragment manager.
9	Design & Develop an app making use of mobile database.
10	Design & Develop an app based on inter application communication.

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V Semester

23CSE1527: PE-I: Internet of Things

Course Outcomes:

Upon successful completion of the course the students will be able to:

- 1. Demonstrate IOT architecture and its enabling technologies
- 2. Apply various IOT enabling technologies for creation of IOT environments
- 3. Analyze IOT environments using various communication technologies
- 4. Develop various IOT environments

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction	6 Hours

Concepts behind the Internet of Things, Characteristics of IoT, IoT enabling technologies, IoT Communication Model, IoT architecture, Applications of IoT, Transducers, Sensors, Sensor classes, Sensor types, Actuators and its types.

Unit:2 | IOT Protocols | 6 Hours

Application layer: MQTT, COAP, XMPP, AMQP, Network Layer: IPv4, IPv6, 6LoWPAN, IoT Communication protocols: IEEE802.15.4, ZigBee, Wireless HART, Zwave, Bluetooth, NFC, RFID.

Unit:3 | Wireless Sensor networks

7 Hours

Components of sensor nodes, Node Behavior in WSNs, Applications, WSN Coverage, OGDC algorithm, Stationary and Mobile Wireless Sensor Networks.

Unit:4 Cloud Computing

6 Hours

Recent Trends in Computing, Characteristics, Components of Cloud Computing, Service Models, Deployment Models, Service Management, Cloud Security, IoT Data analytics, Case studies, Middleware for IoT

Unit:5 | Machine to Machine Communication

6 Hours

Node types, IP and Non IP based M2M network

Interoperability in Internet of Things: Current Challenges in IoT, Interoperability, Types of Interoperability

Unit:6 | Software-Defined Networking

6 Hours

Current Network to SDN, SDN Architecture, Challenges, OpenFlow Protocol, APIs in SDN, Controller Placement, Recent Advances of SDN in IoT, Industrial internet of things, Case studies

Total Lecture Hours

39 Hours

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Textb	Textbooks				
1.	Internet of Things: A Hands-On Approach, Arsheep Bahga, Vijay Madisetti				
Refer	ence Books				
1.	Introduction to IOT Latest S.Misra, A. Mukherjee, A.Roy, 2020				
2.	Introduction to Industrial Internet of Things and Industry S. Misra, C. Roy, and A. Mukherjee, 2020.				
YCCI	E e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]				
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/21.405352151-Industry-4-0-The-Industrial-Internet-of-Things-Apress-2016.pdf				
MOO	Cs Links and additional reading, learning, video material				
1	https://onlinecourses.nptel.ac.in/noc21_cs17/preview				
2	https://onlinecourses.nptel.ac.in/noc21_ee85/preview				

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V Semester

23CSE1528: Lab: PE-I: Internet of Things

Course Outcomes:

Upon successful completion of the course the students will be able to:

CO1: Demonstrate proficiency in interfacing sensors and actuators with Arduino and Raspberry Pi platforms.

CO2: Develop and implement embedded system applications for real-time data acquisition, processing, and display.

CO3: Design communication protocols for data exchange between embedded systems and cloud platforms for remote data storage and analysis.

CO4: Integrate IoT hardware with web technologies to enable real-time monitoring and control through online interfaces.

CO5: Evaluate and troubleshoot complete IoT systems comprising embedded devices, cloud connectivity, and user interfaces for optimized performance.

Sr.No.	Experiment based on
1	Familiarization with Arduino / Raspberry pi and perform necessary software installation.
2.a	To interface LED/ Buzzer with Arduino and write a program to turn ON LED for 1 sec after every 2 seconds.
2.b	To interface Push button / Digital sensor(IR/LDR) with Arduino and write a program to turn on LED when push button is presses at sensor detection
3	To interface DHT11 sensor with Arduino and write a program to print temperature and humidity on Liquid Crystal Displays (LCD).
4	To interface motor using relay with Arduino and write a program to turn ON motor when push button is pressed.
5.a	To interface Bluetooth with Arduino and write a program to send sensor data to smartphone using Bluetooth.
5.b	To interface Bluetooth with Arduino and write a program to turn LED ON /OFF when '1' / '0' is received from smartphone using Bluetooth.
6.a	Design a sketch on Arduino to upload temperature and humidity data to thingspeak cloud.
6.b	Design a sketch on Arduino to retrieve temperature and humidity data to thingspeak cloud.
7.a	Design a sketch on Arduino to publish temperature data to MQTT broker.
7.b	Design a sketch on Arduino to subscribe to MQTT broker for temperature data and print it.
8	Create 000webhost account and create MySQL Database.
9	Develop PHP Code to retrieve data from 000webhost account using MySQL Database.
10	Develop application using with Arduino / ESP 32 / Raspberry pi.

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(Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

V Semester

23CSE1529: PE-I: Introduction to Geographical information system

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Understand the basic concepts and applications of GIS
- 2. Work with spatial data models, coordinate systems, and map projections
- 3. Perform basic spatial analysis and data visualization
- 4. Use GIS software tools for solving real-world problems
- 5. Apply GIS techniques in fields like urban planning, environmental management

5.	Apply GIS techniques in fields like urban planning, environmental management			
Unit No.	Contents	Max. Hrs.		
Unit:1	Introduction to GIS	6 Hours		
GIS in	Introduction to GIS: Definition and development of GIS, Components and functions of GIS, Applications of GIS in various domains (urban planning, disaster management, agriculture, etc.), Differences between GIS, GPS, and Remote Sensing			
Unit:2	Unit:2 Spatial Data and Data Models 7 Hours			
	Spatial Data and Data Models: Spatial vs non-spatial data, Data types: Raster and Vector, Attribute data and databases, Data sources: Maps, GPS, Satellite Images, Survey Data, Data input methods and digitization			
	Coordinate Systems and Map Projections	6 Hours		
systems	Coordinate Systems and Map Projections: Basics of Geodesy and Earth models, Coordinate reference systems: geographic and projected, Common map projections and their uses, Transformation between coordinate system			
Unit:4	Spatial Data Analysis	7 Hours		
Spatial	natial Data Analysis: Query and analysis in GIS, Buffering, overlay, and spatial join operations, Raster data			

Unit:5 GIS Software and Tools	6 Hours
analysis: reclassification, map algebra, Network analysis and terrain modeling (basic concepts)	

GIS Software and Tools: Introduction to popular GIS software: QGIS, ArcGIS, etc., Basics of data visualization and cartography, Creating and interpreting thematic maps, Introduction to web GIS and mobile GIS (overview)

GIS (overview)		
Unit:6	Case studies	7 Hours

Case studies in urban planning, environmental management, public health, transportation, Integration of GIS with Remote Sensing and GPS, Trends in GIS: Big Data, AI in GIS, and real-time GIS

with Remote Sensing and GPS, Trends in GIS: Big Data, AI in GIS, and real-time GIS	20.11
Total Lecture Hours	39 Hours

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Tex	tbooks
1	Introduction To Geographic Information Systems 4th Edition (English, Paperback, Chang Kang-Tsung)
2	Introduction to Geographic Information Systems, Authors R. Adam Dastrup, MA, GISP
3	Introduction to Geographic Information Systems,9th edition, by Kang-tsung Chang
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] –
1	https://www.esri.com/en-us/what-is-gis/overview
2	https://www.manage.gov.in/studymaterial/gis.pdf

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B.Tech in Computer Science and Engineering

V Semester

23CSE1530: Lab: PE-I: Introduction to Geographical Information **System**

(Practical's based on above syllabus)

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

V Semester

23CSE1531: PE-I: Neural Networks and Applications

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Understand biological and artificial neural networks, neuron models, perceptrons, learning rules, and network types.
- 2. Apply single-layer perceptron algorithms and machine learning concepts for tasks like classification and regression.
- 3. Implement multilayer perceptrons with backpropagation and advanced optimization techniques.
- 4. Apply regularization techniques to improve neural network generalization and reduce overfitting.
- 5. Understand and analyze deep learning models, including CNNs and autoencoders, using modern architectures and transfer learning.

Unit	Contents				
Unit:1	Introduction to Biological and Artificial Neural Networks:	7 Hours			
Diologi	rical Naurons, Congrel Artificial Nauron Model, MD Nauron, Parcentrons, Naural Nativor				

Biological Neurons, General Artificial Neuron Model, MP Neuron, Perceptrons, Neural Network learning Rules, types of neural networks, feedforward vs recurrent neural networks

Unit:2 | Perceptrons and Machine Learning Basics:

6 Hours

Single Discrete Perceptron algorithm, linear machine and minimum distance classification, gradient descent and Single Continuous Perceptron algorithm Machine learning basics: supervised vs unsupervised learning, various Machine learning tasks like classification, regression, machine Translation, Anomaly detection, etc. Capacity, Overfitting and Underfitting, bias and variance.

Unit:3 | Multilayer Perceptrons and Backpropagation Algorithm

7 Hours

Multilayer Perceptrons (MLPs), Representation Power of MLPs, Feed forward Neural Networks, Backpropagation, algorithm, Momentum Based Gradient Descent (GD), Nesterov Accelerated GD, Stochastic GD, AdaGrad, RMSProp, Adam, Applications of MLPs for classification and regression, Performance measures.

Unit:4 | **Regularization:**

6 Hours

L1, L2 Regularization, Early stopping, Dataset augmentation, Parameter sharing and tying, Injecting noise at input, any other recent topics.

Unit:5 | **Introduction to Deep Networks:**

7 Hours

History of deep learning, Types of deep networks, Introduction to Convolutional Neural Networks, LeNet, Alex Net, ZF-Net, VGGNet, GoogLeNet, ResNet, Transfer learning using CNNs, comparison of shallow and deep networks.

Unit:6 Autoencoders:

6 Hours

Auto encoders, Regularization in auto encoders, Denoising auto encoders, Sparse auto encoders, Contractive auto encoders.

Total Lecture Ho	urs	
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39 Hours

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Textb	ooks
1	Deep Learning, Ian Goodfellow, Yoshua Bengio, Aaron Courville, MIT Press
2	Introduction to artificial neural system, Jacek M. Zurada
Refer	ence Books
1	Deep learning with python, François Chollet, Manning
2	Pattern Recognition and Machine Learning, Christopher Bishop, Springer
3.	Neural Networks: A Systematic Introduction, Raul Rojas, Springer
4.	Deep Learning, Amit Das, Saptarshi Goswami, Prabir Mitra, Amlan Chakrabarti, Pearson
YCCI	E e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] –
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOO	Cs Links and additional reading, learning, video material
1	<u>Deep Learning – Prof. Mitesh Khapra (IIT Ropar), Swayam Course https://onlinecourses.nptel.ac.in/noc22_cs124/preview</u>
2	Neural Networks and Deep Learning, Andrew Ng https://www.coursera.org/learn/neural-networks-deep-learning#syllabus

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

V Semester 23CSE1532: Lab: PE-I: Neural Networks and Applications

Sr.No.	List of Experiment
1	Design and Implement 3-input gates using Mc Culloch Pit's Model of a neuron.
2	Find the weights for 3-input NAND gate using Single Discrete Perceptron Training Algorithm.
3	Implement a Linear Machine using discrete perceptron to classify binary image patterns.
4	Implementing a classifier using feed forward Neural Network using Scikit learn
5	Implementing a feed forward Neural Network based regression using Scikit learn
6	Experiment on classification using Pre-trained deep network
7	Comparing Shallow and Deep Networks(CNN) for digit classification using MNIST dataset
8	Developing a real-world application using CNN.

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

V Semester

23CSE1533: PE-I: Advanced Web Technology

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Understand the core concepts of JavaScript and Node.js and their application in web development.
- 2. Design and structure scalable Angular applications
- 3. Implement advanced features in Angular, including component communication and reactive programming.
- 4. Develop secure and maintainable Angular applications by integrating services, route guards, and dependency injection.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction To Javascript Using NodeJs	7 Hours

Javascript, nodejs, Variables (var, let, const), Data types (number, string, boolean, object, null, undefined, symbol), Operators (arithmetic, assignment, comparison, logical), Conditional statements (if, else if, else, switch), Loops (for, while, do...while), Break and continue, Functions: Declaring functions, Function expressions, Arrow functions, Parameters and arguments, Return values, Scope (local vs. global), Objects and Arrays: Creating and accessing objects, Object methods, Creating and accessing arrays, Array methods (push, pop, shift, unshift, map, filter, reduce)

Unit:2 Angular 6 Hours

Angular Installation, Angular, CLI, Project Setup and First App, Basic File Structure, How an Angular App gets loaded and started, Components - 3 Files (ts,html, css, @component), JSON, Databinding, String Interpolation, Property Binding, Event Binding, Attribute Binding

Unit:3 Conditions & modules 6 Hours

Two-Way Binding, Forms Module and Two Way Binding, Understanding Directives, Using ngIf and Else Conditions, ng-switch and ng-class, Displaying Lists using ngFor, Creating Components, selector, Understanding app-module.ts, Module Introduction.

Unit:4 Angular Routing and Forms 7 Hours

Introduction to Routing, Component Routing, Navigating to Router Links, Lazy Loading, Forms in angular, Reactive Forms with validations, Dynamic Forms using FormArray and FormGroup, Different types of inputs (Input box, Dropdown, Radio, Checkbox)

Unit:5 Pipes & Directives 6 Hours

Component Communication in angular , Components Life-Cycle Hooks, Pipes & custom pipes , Directives & Custom Directives , Introduction to Guards , Understanding can activate , Understanding can Activate Child, Understanding can deactivate, Understanding Resolve Guard

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Uni	t:6 Angular Advance Concepts	7 Hours				
into HT'	lerstanding Services and Implementing Dependency Injection, Creating a Service, Injecting th Components, Introduction to HTTP Communication using HttpClientModule, CRUD Operat TP Client (GET, POST, PUT, DELETE), Observables and Subscription Handling in Angular, erial UI Library (Basics of Buttons, Cards, and Form Fields)	ions using				
	Total Lecture Hours	39 Hours				
Tex	tbooks					
1	Getting MEAN with Mongo, Express, Angular, and Node" by Simon Holmes and Clive Har	rber				
2	Pro Angular 9: Build Powerful and Dynamic Web Apps., Adam Freeman					
Ref	erence Books					
2.	Angular Up & Running: Learning Angular, Step by Step" by Shyam Seshadri					
3.	Eloquent JavaScript: A Modern Introduction to Programming" by Marijn Haverbeke					
YC	LE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]					
1						
	OCs Links and additional reading, learning, video material -					

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V Semester

23CSE1534: Lab: PE-I: Advanced Web Technology

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Apply JavaScript programming concepts to solve computational problems.
- 2. Develop and Structure Angular Applications with Components and Data Binding
- 3. Implement Advanced Angular Features for Dynamic Web Applications
- 4. Develop Angular Services, Implement HTTP Calls, and Create Custom Extensions for Scalable Applications

Sr.No.	Experiment based on
1	Create a JavaScript program that iterates through an array of numbers. For each number, check if it is even or odd using a loop. Log each number and its classification (even or odd) to the console.
2	Create a JavaScript program for managing a shopping cart: a) Initialize an empty array named shoppingCart.
	b) Write a function addToCart(item) that adds a given item (an object with name and price properties) to the shoppingCart array using the push method.
	c) Implement a function removeFromCart(itemName) that removes an item from shoppingCart based on its name using the filter method.
	d) Create a function calculateTotal() that calculates and logs the total price of all items in the shoppingCart using the reduce method.
	e) Test your program by adding a few items, removing one item by name, and calculating the total price of the remaining items.
3	Install Angular and set up a new Angular project using CLI. Create a basic application that displays "Hello, Angular!" on the homepage.
4	Create a new Angular component with its own HTML, CSS, and TypeScript files. Use the component in the main application. Also Implement string interpolation, property binding, event binding, and attribute binding in an Angular component to demonstrate data binding techniques.
5	Display a list of items using ngFor in an Angular component. Allow users to add and remove items from the list.
6	Set up routing in an Angular application. Create multiple components and use Angular Router to navigate between them. Also Implement lazy loading in an Angular application. Configure the

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	router to load specific modules only when they are needed.
7	Create a reactive form in Angular with validation. Include various input types such as input boxes, dropdowns, radios, and checkboxes.
8	Develop an Angular component that communicates with another component using @Input and @Output decorators. Demonstrate component communication.
9	Create custom pipes and custom directives in Angular. Use these custom pipes and directives in an Angular component.
10	Develop a simple CRUD application in Angular where you fetch, add, update, and delete user data using a dummy REST API and HttpClientModule.
11	Create an Angular service and use dependency injection to inject the service into components. Implement HTTP calls in the service to fetch data from an external API.

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B.Tech in Computer Science and Engineering

V Semester

23CSE1535: PE-I: Customer Relationship Management

Course Outcomes:

Upon successful completion of the course the students will be able to:

- 1. Understand the elements of CRM
- 2. Apply the elements of CRM to manage customer portfolios.
- 3. Understand the tools of CRM
- 4. Apply the tools of CRM to manage customer portfolios.
- 5. Understand different analytical methods of CRM to enhance customer experience

Unit No.	Contents	Max. Hrs.
Unit:1	CRM concepts	6 Hours

CRM concepts - Acquiring customers, - Customer loyalty and optimizing customer relationships - CRM defined - success factors, the three levels of Service/ Sales Profiling - Service Level Agreements (SLAs), creating and managing effective SLAs.

Unit:2 | CRM in Marketing

6 Hours

CRM in Marketing - One-to-one Relationship Marketing - Cross Selling & Up Selling - Customer Retention, Behaviour Prediction - Customer Profitability & Value Modelling, - Channel Optimization - Event-based marketing. - CRM and Customer Service - The Call Centre, Call Scripting - Customer Satisfaction Measurement.

Unit:3 | Sales Force Automation

7 Hours

Sales Force Automation - Sales Process, Activity, Contact- Lead and Knowledge Management - Field Force Automation. - CRM links in e-Business - E-Commerce and Customer Relationships on the Internet - Enterprise Resource Planning (ERP), - Supply Chain Management (SCM), - Supplier Relationship Management (SRM), - Partner relationship Management (PRM).

Unit:4 | ANALYTICAL CRM

7 Hours

Analytical CRM - Managing and sharing customer data - Customer information databases - Ethics and legalities of data use - Data Warehousing and Data Mining concepts - Data analysis - Market Basket Analysis (MBA), Click stream Analysis, Personalization and Collaborative Filtering.

Unit:5 | MANAGING CUSTOMER EXPERIENCE AND VALUE

7 Hours

Understanding Value and when do customers experience value, Modelling customer-perceived value, Sources of customer value, Value through the marketing mix, Customisation for customer value. Understanding customer experience and concepts, how to manage customer experience, CRM vs CEM, Use of CRM software in CEM

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Unit	:6	CRM	Impleme	entation					6 Hours
1	CRM Implementation - Defining success factors - Preparing a business plan requirements, justification and								
	processes Choosing CRM tools - Defining functionalities - Homegrown versus out-sourced approaches -								
						cency, Resetting			
interr	nally -	· CRM o	developm	nent Team - S	Scoping and price	oritizing - Develo	opment and de	elivery - Me	asurement
						Total	Lecture Hou	rs	39 Hours
Text	books	S							
1	Alo	k Kuma	ar Rai, C	USTOMER	RELATIONSH	IP MANAGEMI	ENT CONCE	PT & CAS	ES, Prentice
	Hal	1	of	India	Private	Limted,	New	Delhi.	2011
2						TONSHIP MAN	IAGEMENT,	Prentice H	all of India
			nted, Nev	v Delhi, 2008	8				
Refe	rence	Books							
1	Kau	ıshik M	ukherjee	, CUSTOME	ER RELATIONS	SHIP MANAGE	MENT, Prenti	ice Hall of I	ndia Private
			w Delhi,						
YCC	E e- l	library	book lin	ks [ACCES	SIBLE FROM	COLLEGE CA	MPUS]		
1									
2									
MOO	OCs L	Links aı	nd additi	ional readin	g, learning, vid	eo			
1	http	s://onli	necourses	s.nptel.ac.in/	noc20 mg57/pro	eview			
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V Semester

23CSE1536: Lab: PE-I: Customer Relationship Management (PRACTICALS BASED ON ABOVE SYLLABUS)

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V Semester

MDM3CSE103: Computer Vision Essentials

Course Outcomes:	
Upon successful completion of the course the students will be able to	
CO1 Understand the basic concepts of computer vision, image formation, and its	real-world application
CO2 Apply fundamental image processing techniques such as filtering,	transformations, and
thresholding.	
CO3 Analyze and extract features from images using edge, corner, and blob detect	
CO4 Implement basic object detection and recognition techniques using computer CO5 Evaluate the impact of computer vision technologies in different engineer	
ethical implications.	ing domains and their
Unit	Max. Hrs.
No. Contents	Max. III S.
Unit:1 Introduction to Computer Vision	7 Hours
Definition and scope of computer vision, Applications in robotics, industry, medicin	e etc. Human vs
computer vision, Basic steps in a computer vision system	e, etc., Human vs.
Unit:2 Image Formation and Representation	7 Hours
Image sensing, acquisition, and digitization, Color spaces (RGB, HSV, Grayscale), I	maga fila formats and
metadata, Introduction to OpenCV for image loading and viewing	mage me formats and
inctadata, introduction to opene vitor image loading and viewing	
Unit:3 Image Processing Fundamentals	7 Hours
Point operations: brightness, contrast, thresholding, Geometric transformations: rotate	tion, scaling, cropping,
Image filtering: smoothing and sharpening (blur, Gaussian, median), Histogram and	equalization.
Unit:4 Feature Detection and Description	6 Hours
Edge detection: Sobel, Canny, Corner detection: Harris and Shi-Tomasi	•
Blob detection: LoG, DoG, Introduction to keypoint descriptors (SIFT, ORB)	
Unit:5 Object Detection and Recognition	6 Hours
Template matching, Contour detection, Object classification (intro to ML-based met	hods). Simple
face/object detection using pre-trained models (e.g., Haar cascades)	nous), simple
Unit :6 Applications and Case Studies	6 Hours
Industry case studies: automation, manufacturing, surveillance, Vision in healthcare,	agriculture, and
autonomous vehicles. Project discussions: barcode reader, face unlock, gesture detec	۶
considerations in computer vision	
Total Lecture Hours	39 Hours

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Te	xtbooks
1	Richard Szeliski, Computer Vision: Algorithms and Applications - Springer
2	Sonka, Hlavac, Boyle, Image Processing, Analysis, and Machine Vision - Cengage
Re	ference Books
1	Gary Bradski & Adrian Kaehler, Learning OpenCV – O'Reilly Media
YC	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/54.NLP_Language_processing_jurafsky_BOOK.pdf
2	
M	OOCs Links and additional reading, learning, video material
1	https://www.youtube.com/live/FbOCV344iLA?si=IQdy1JM1b4z-Evww

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V Semester

MDM3CSE203: Ethical Hacking

Course Outcomes:

Upon successful completion of the course the students will be able to

CO1: Explain the phases of ethical hacking (reconnaissance, scanning, exploitation, post-exploitation) and relevant laws/ethics.

CO2: Execute network and host discovery techniques (OSINT, Nmap, Nessus) to map attack surfaces.

CO3: Demonstrate hands-on exploitation of system vulnerabilities (password attacks, buffer overflows, rootkits).

CO4: Conduct web-application attacks (SQL injection, XSS, CSRF) and wireless exploits (WEP/WPA2 cracking).

CO5: Evaluate penetration-test findings to assess an organization's security posture and propose mitigations.

CO6: Prepare professional-grade penetration-testing reports and present actionable recommendations to technical and non-technical stakeholders.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Management	7 Hours

Introduction to Ethical Disclosure, Types of Hackers(What Hat, Black Hat, Grey Hatetc), Legal Framework and Cyber Laws(Indian Act 2000), Penetration Testing vs Ethical Hacking, Legal and Ethical Considerations

Unit:2 Networking Basics

7 Hours

OSI Model and TCP/IP Model, IP Addressing, Subletting ports, protocol and services.

System Hacking Concepts, Cracking Passwords , Escalating Privileges , Executing Applications , Hiding Files , Covering Tracks , Penetration Testing

Unit:3 Foot printing and Reconnaissance

6 Hours

Information Gathering Techniques, DNS Footprinting ,WHOIS Lookups Port and Vulnerability Scanning, Enumeration Method, Social Engineering Concepts

Unit:4 | Scanning and Enumeration

7Hours

Network Scanning Techniques, Port and Vulnerability Scanning, Enumeration Method, NetBIOS Enumeration , Enumeration Pen Testing ,Nmap, Zenmap, Advanced Scan Types, Banner Grabbing, □ Enumeration: SMB, SNMP, LDA OS Fingerprintin, Vulnerability Scanning (Nessus, OpenVAS)

Unit:5 | **Vulnerability Analysis**

6 Hours

Passive Analysis ,Advanced Static Analysis with IDA Pro , Advanced Reverse Engineering, Client-Side Browser Exploits, Exploiting the Windows Access Control Model ,Intelligent Fuzzing with Sulley ,From Vulnerability to Exploit , Closing the Holes: Mitigation

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(Department of Computer Science & Engineering)

SoE No. 23CSE-101

Unit	Malware Analysis	6 Hours
in Ho Low- Detect Using Sand User	cting Malware and Initial Analysis, Types of Malware, Malware Defensive Techniques, Ineynet Technology, Honeypots, Honeynets, Why Honeypots Are Used, Limitations of Interaction Honeypots, High-Interaction Honeypots, Types of Honeynets, Thware tion Technologies, Catching Malware: Setting the Trap, VMware Host Setup, VMware Nepenthes to Catch a Fly, Initial Analysis of Malware, Static Analysis, Live Analysis Technology, Hacking Malware, Trends in Malware Embedded Components, Use of Space Hiding Techniques, Use of Rootkit Technology Persistence Measures, Eare, Packer Basics, Unpacking Binaries, Reverse-Engineering Malware.	of Honeypots, ting VMware Guest Setup, ysis, Norman of Encryption,
	Total Lecture Hours	39 Hours
Text	oooks	
2	Jonathan Ness, Chris Eagle, Gideon Lenkey, and Terron Williams Gray Hat Hacking, b HIL PBLICATION.	by MSGRAW
Refe	rence Books	
1.	Certified Ethical Hacker: Matt Walker, TMH,2011	
2.	Certified Ethical Hacker: Michael Gregg, Pearson Education, 1st Edition, 2013 2	
3.	The Basics of Hacking and Penetration Testing Ethical Hacking and Penetration Testin Second Edition Dr. Patrick Engebretson David Kennedy, Technical Editor	g Made Easy
YCC	E e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0	
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042	
MOC	OCs Links and additional reading, learning, video material	
1	http://www.pentest-standard.org/index.php/PTES_Technical_Guidelines https://www.owasp.org/index.php/Category:OWASP_Top_Ten_2017_Project https://www.owasp.org/index.php/Mobile_Top_10_2016-Top_10 https://www.owasp.org/index.php/OWASP_Testing_Guide_v4_Table_of_Contents https://www.owasp.org/index.php/OWASP_Secure_Coding_Practices Quick_References	ence_+Guide
2	http://resources.infosecinstitute.com/applications-threat-modeling/#gref	
3	https://cve.mitre.org/ https://access.redhat.com/blogs/766093/posts/2914051 1	

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Total Lecture Hours

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SoE No. 23CSE-101

39 Hours

B.Tech in Computer Science and Engineering

V Semester

MDM3CSE303: Software Engineering Concepts

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Explain the fundamental concepts of software engineering, software processes, and characteristics of software products.
- 2. Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- 3. Translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Specification Document (SRS).
- 4. Design software architecture and models using UML diagrams for given software requirements.
- 5. Experience awareness of testing problems and will be able to develop a simple testing report.

		_			
Unit No.	Contents	Max. Hrs.			
Unit:1	Introduction	6 Hours			
Software,	Program, Software Crisis and Solutions, Software Evolution, Software D	evelopment			
Paradigm,	Need of Software Engineering, Software Processes, Software Characteristics, A	Attributes of			
Software P	roduct, Software Myths, Software basic terminologies, Characteristics of good so	ftware.			
Unit:2	Software Development Life Cycle Models	6 Hours			
	Fix, Waterfall, Prototype, Iterative Enhancement, Rapid Application Dory, Prototyping, and Spiral Model.	evelopment,			
Unit:3	Software Requirements Analysis and Specifications	7 Hours			
-	nt Engineering, Types of Requirements. Requirement Elicitation: Interview, Branctional Deployment, Use Case 10 Approach.	instorming,			
Unit :4	Requirements Analysis	7 Hours			
Problem A	nalysis, Data Flow Diagrams, Data Dictionaries, EntityRelationship Diagram, Re	equirements			
	ation, Requirements Validation, Software Requirement and Specifications, Re				
Manageme	nt, Change Management Form, Structure of SRS, IEEE Std 830-1993, Software F	rototyping.			
Unit :5	Design Engineering	7 Hours			
Design pro	cess and design quality, design concepts, the design model. Creating an architect	ural design:			
software a	rchitecture, data design, architectural styles and patterns, architectural design,	conceptual			
model of U	JML, basic structural modeling, class diagrams, sequence diagrams, collaboratio	n diagrams,			
use case di	agrams, component diagrams.				
Unit :6	Testing Strategies	6 Hours			
A strategic	approach to software testing, test strategies for conventional software, black-box	and white-			
box testing	g, validation testing, system testing, the art of debugging. Product metrics: Softw	are quality,			
metrics for	r analysis model, metrics for design model, metrics for source code, metrics	for testing,			
metrics for	metrics for maintenance.				

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]	Гех	tbooks
1	1.	Software Engineering – A practitioner's approach, R. S. Pressman, 6th ed., McGraw Hill Int. Ed.
2	2.	Software Engineering, Ian Sommerville, Pearson Education; Tenth edition.

Ref	erence Books
1.	Software Engineering Concepts, Richard Fairley, McGraw Hill Education.
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] –
1	
MO	OCs Links and additional reading, learning, video material -
1	https://archive.nptel.ac.in/courses/106/105/106105182/

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

V Semester Open Elective –III: 23OE3501-Social Reformers in Modern Maharashtra

Course Outcomes:

Upon successful completion of the course the students will be able to

CO1: Identify the major social challenges in 19th–20th century Maharashtra and the reform movements addressing them.

CO2: Analyze the contributions of reformers like Phule, Ambedkar, and Savitribai through ethical frameworks.

CO3: Evaluate how religion, spirituality, and socio-political movements contributed to change.

CO4: Understand the origins and goals of the Dalit movement and gender justice in Maharashtra.

CO5: Apply lessons from reform history to contemporary socio-technical challenges and professional conduct.

Unit:1 Introduction to Social Reform Movements in Maharashtra

7 Hours

Historical background of 19th century Maharashtra, Social evils: caste system, gender, discrimination, untouchability, British colonial context and socio-political conditions, The emergence of social consciousness in 19th-century Maharashtra, Overview of reform organizations and thought leaders,

Unit:2 Early Reformers and Their Contributions

7Hours

Early Reformers and Their Contributions: Raja Ram Mohan Roy: religious, reform, Brahmo Samaj (national context) Mahatma Jyotirao Phule: education for oppressed, anti-caste movement, Satyashodhak Samaj, Savitribai Phule: first female teacher, women's rights and empowerment, Gopal Hari Deshmukh (Lokhitwadi): rationalism, public awakening Raja Ram Mohan Roy (Brief context from Bengal)

Unit:3 Reform Through Religion and Spirituality

7 Hours

Bhakti Movement and Sant, Parampara: Dnyaneshwar, Tukaram, Namdev, Ethical values in religious philosophy and poetry, Swami Vivekananda: spiritual nationalism, youth empowerment, Religious tolerance and inclusive spiritual reform

Unit:4 Social Justice and Dalit Movement

6 Hours

Social Justice and Dalit Movement: Dr. B.R. Ambedkar: biography, philosophy, and contributions, Annihilation of Caste: critical ideas and implications, Dalit Sahitya and post-Ambedkarite movements, Role of legal reform, Constitution, and reservation in social justice

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	Women R	eformers an	d Gender Justice	ę		6 Hours	
Textual	l analysis of S	tri-Purush Tu			nule, Tarabai Shind nts, and socio-religi	le, Pandita Ramabai, ious resistance,	
Unit			•			6 Hours	
:6	Contempor	rary Keleval	nce and Legacy			o Hours	
Contem	nporary Releva	ance and Leg	gacy: Continued in	ifluence of reforme	ers on, Indian demo	ocracy, Technology	
and soc	ial inclusion:	caste, class,	and gender access	Engineers' r	ole in promoting ed	quity and	
					cy of social reform		
Mahara		1	1	1 2, 2	•	•	
				Tot	al Lecture Hours	39 Hours	
Textbo	ooks						
1		` '	eted Writings of Jy				
2					Ambedkar Movemer	nt	
3	Gail Omved	t – Dalits and	d the Democratic	Revolution			
4	Rosalind O'l	Hanlon – Ca	ste, Conflict, and	Ideology			
5	Selected spe	eches and w	ritings of Dr. B.R	. Ambedkar, Ambe	dkar, B.R. – Annih	ilation of Caste	
6			<u> </u>				
	Gail Omvedt – Dalit Visions, Cultural Revolt in a Colonial Society, IGNOU/NCERT Texts on Social Reform, Documentaries: India Untouched, Children of Savitribai, Ambedkar Now, AICTE						
	Model Curriculum and UHV Modules						
	Model Curri			uched, Children of	Savitribai, Ambed	lkar Now, AICTE	
				uched, Children of	Savitribai, Ambed	lkar Now, AICTE	
Refere	Model Curri			uched, Children of	Savitribai, Ambed	lkar Now, AICTE	
				uched, Children of	Savitribai, Ambed	lkar Now, AICTE	
		culum and U Gulamgiri			Savitribai, Ambed	lkar Now, AICTE	
Referen	nce Books Jyotirao	Gulamgiri Commissi Gulamgiri	HV Modules i, Shetkaryacha As	sud, Hunter	Savitribai, Ambed	Ikar Now, AICTE	
	nce Books Jyotirao	Gulamgiri Commissi Gulamgiri preface)	HV Modules 5, Shetkaryacha Ason deposition) 6 (original Marathi	sud, Hunter		Ikar Now, AICTE	
1	Jyotirao Phule	Gulamgiri Commissi Gulamgiri preface) Shetkarya 1881)	HV Modules 5, Shetkaryacha Ason deposition) 5 (original Marathicha Asud (The Cu	sud, Hunter 1873; English	d,	lkar Now, AICTE	
	Jyotirao Phule	Gulamgiri Commissi Gulamgiri preface) Shetkaryad 1881) hule – Sama	HV Modules 5, Shetkaryacha Asson deposition) 6 (original Marathicha Asud (The Cugra Wangmay (co	sud, Hunter 1873; English ltivator's Whipcor	d,		
2	Jyotirao Phule Savitribai P Kavya Phul	Gulamgiri Commissi Gulamgiri preface) Shetkaryad 1881) hule – Sama	HV Modules i, Shetkaryacha Ason deposition) i (original Marathicha Asud (The Cugra Wangmay (con Bavan Kashi Sub	sud, Hunter 1873; English ltivator's Whipcor mplete writings, ecodh Ratnakar (189	d, l. M.G. Mali)		
1	Jyotirao Phule Savitribai P Kavya Phul Dr. B.R. An	Gulamgiri Commissi Gulamgiri preface) Shetkarya 1881) hule – Sama le (1854) and	HV Modules i, Shetkaryacha Ason deposition) i (original Marathicha Asud (The Cugra Wangmay (com Bavan Kashi Sublithe Dalit Mover	sud, Hunter 1873; English ltivator's Whipcor mplete writings, ecoodh Ratnakar (189	d, l. M.G. Mali) 92) – her two poetr		
2	Jyotirao Phule Savitribai P Kavya Phul Dr. B.R. An • Fron	Gulamgiri Commissi Gulamgiri preface) Shetkaryai 1881) hule – Samai le (1854) and	HV Modules i, Shetkaryacha Asson deposition) i (original Marathicha Asud (The Cugra Wangmay (cod Bavan Kashi Sublithe Dalit Moverble to Dalit: Essay	sud, Hunter 1873; English Itivator's Whipcor mplete writings, ecoodh Ratnakar (189 ment ys on the Ambedk	d, l. M.G. Mali) 92) – her two poetr	y anthologies	
2	Jyotirao Phule Savitribai P Kavya Phul Dr. B.R. An Fron A foo	Gulamgiri Commissi Gulamgiri preface) Shetkaryad 1881) hule – Samad le (1854) and bedkar and thoughal	HV Modules i, Shetkaryacha Ason deposition) i (original Marathicha Asud (The Cugra Wangmay (cod Bavan Kashi Subletto Dalit: Essapollection of 16 essapollection of 16 essapollection)	sud, Hunter 1873; English Itivator's Whipcor mplete writings, ecodh Ratnakar (189 nent ys on the Ambedk ays tracing the poli	d, l. M.G. Mali) 92) – her two poetr	y anthologies	
2	Jyotirao Phule Savitribai P Kavya Phul Dr. B.R. An Fron A for	Gulamgiri Commissi Gulamgiri preface) Shetkaryad 1881) hule – Samad le (1854) and bedkar and untouchal andational combedkar's m	HV Modules i, Shetkaryacha Ason deposition) i (original Marathicha Asud (The Cugra Wangmay (cod Bavan Kashi Subletto Dalit: Essapollection of 16 essapovement. Amazor	sud, Hunter 1873; English ltivator's Whipcor mplete writings, ecodh Ratnakar (189 nent ys on the Ambedk ays tracing the polinGoogle Books	d, l. M.G. Mali) 92) – her two poetr	y anthologies	
2	Jyotirao Phule Savitribai P Kavya Phule Dr. B.R. An From A fou of An Amb	Gulamgiri Commissi Gulamgiri preface) Shetkaryad 1881) hule – Samad le (1854) and bedkar and untouchal andational combedkar's m	HV Modules i, Shetkaryacha Ason deposition) i (original Marathicha Asud (The Cugra Wangmay (cod Bavan Kashi Subletto Dalit: Essapollection of 16 essapovement. Amazor	sud, Hunter 1873; English ltivator's Whipcor mplete writings, ecodh Ratnakar (189 nent ys on the Ambedk ays tracing the polinGoogle Books	d, l. M.G. Mali)	y anthologies	

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	Examines Ambedkar's intellectual development and the growth of Dalit Buddhism.
	<u>Wikipedia</u>
	• Untouchable Saints: An Indian Phenomenon (eds. Eleanor Zelliot & Rohini Mokashi-
	Punekar)
	Anthemic studies of medieval Dalit saint-poets. Wikipedia
4.	Pandita Ramabai: Pioneer of Women's Emancipation:
	Pandita Ramabai through Her Own Words: Selected Works (Meera Kosambi, ed.)
	Collected writings—Marathi originals & English translations—ideal for women's studies.
	The High-Caste Hindu Woman (1888)
	Ramabai's landmark exposé on child marriage and widowhood in British India.
5.	Thematic & Contextual Studies: Makers of Modern India (Ramachandra Guha, 2010)
	Profiles key figures—from Ram Mohan Roy to Ambedkar—including Phule and Savitribai Phule.
6.	Caste Matters (Suraj Yengde, 2019)
	Contemporary sociological analysis of caste persistence and Dalit identity in modern India.
YCC	E e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	https://archive.org/details/highcastehinduwo00ramaiala
2	https://www.cambridge.org/core/books/from-untouchable-to-dalit/
3	https://archive.org/details/dli.ministry.13898
4	https://yalebooks.yale.edu/book/9780300259434/caste-matters
5	https://orientblackswan.com/book/dalits-and-the-democratic-revolution

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B.Tech in Computer Science and Engineering

V Semester

Open Elective –III: 23OE3502- Independent India 1948-2010							
	Course Outcomes:						
Upon succ	Upon successful completion of the course the students will be able to						
CO1: Analyze the political legacy of colonialism.							
	CO2: Understand the historical context and process of framing the Indian Constitution.						
CO3: Ana	lyze major political dev	elopments in Indi	a since 1947				
CO4: Eval	luate the economic chal	lenges and transfo	rmations between	1965–1991			
CO5: Exa	mine the rise and impac	t of terrorism and	separatism in Punj	ab			
CO6: Iden	tify and evaluate the sig	gnificance of histo	rical and tourist pla	aces in India			
Unit:1 T	The Legacy of Colonial	ism and Nationa	l Movement:-			7 Hours	
	egacy of Colonialism, ce, Value and Legacy	Economic and S	ocial Legacy of C	colonialism, Na	tional mov	rements: Its	
Unit:2 T	The making of the Con	stitution and con	solidation as a nev	w nation:-		8 Hours	
	0.1.1. ~		11 5 2 5	•	1 1 .	0.7.11	
Constitution Consolidate	of Indian Constitution on, Indian constitution tion and Integration of Reorganization of the S	Basic Features/Indian States – R	and Institutions Tole of Sardar Patel	he Initial Year Kashmir issue	s: Process	of National	
	olitical developments			equility :		7 Hours	
	ontical developments	in maia since m	rependence.			7 110013	
Political of	development in India s	since Independent	ce, Politics in the	States: Tamil N	Vadu, Andl	nra Pradesh,	
Assam, W	est Bengal and Jammu	ı and Kashmir, th	ne Punjab Crisis, T	he Post-Coloni	al Indian S	tate and the	
Political E	conomy of Developme	nt: An Overview,	Foreign policy of I	ndia since indep	endence.		
	ocio-Economic develo			_		8 Hours	
Indian Eco	onomy, 1947-1965: the	Nehruvian Legac	v Indian Economy	. 1965-1991, Ed	conomic Re	eforms since	
	LPG, Land Reforms:						
	t, Cooperatives and an		-		-		
	Since Independence, I	_				_	
	d Strategies.				J	,	
Unit:5 P	easants Struggle:-					7 Hours	
T	: D : 1 A C	1 77 1	1	1: CT 1: T	1' 1 3 1	A 1' 1	
	in Punjab, Assam Strut, India and UNO-SAA		Struggle Foreign Po	olicy of India, I	ndia and N	on- Aligned	
T T 1. 6 3	D 1 (AT)	.•				0.77	
Unit:6	Development of Educa	ition:-				8 Hours	
Planned I	Planned Economic Development ,Transport and Communication- Cultural Activities in India. Visit						
Historical and important Tourist places in India							
						45 Hours	
(a)		<i>at</i> .					
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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards



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Textb	ooks
1	Ghai, K.K., Indian Government and Politics, New Delhi, 1912.
2	Menon, V.P ,The story of the integration of the Indian States, Orient Longmans, 1961.
3.	Bipan Chandra, Mridula Mukherjee and Aditya Mukherjee, <i>India Since Independence</i> , New Delhi, 2008.
Refer	ence Books
1	Biphan Chandra, India after Independence, (1947-2000) Penguin Books, New Delhi, 2000.
2	Braw P.K., Politics of India since Independence, New Delhi, 1999.
3	Chakaravarthy S.R, Contemporary India, New Delhi, 2005.

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(Department of Computer Science & Engineering) **B.Tech in Computer Science and Engineering**

SoE No. 23CSE-101

V Semester

Open Elective –III: 230E3527- Human Rights & International Laws

Course Outcomes:

Upon successful completion of the course the students will be able to

CO1: Explain the concept, evolution, and significance of human rights in a global and Indian context. CO2: Analyze key provisions of international human rights laws and their impact on digital and cyber laws.

CO3: Examine the working of various human rights protection mechanisms at national and international levels.

CO4: Understand the ethical implications of AI, privacy rights, and digital freedom in technology and law.

CO5: Evaluate case studies of human rights violations and suggest possible legal remedies.

CO6: Apply human rights principles to software development, AI ethics, and cyber regulations.

Introduction to Human Rights 7 Hours Unit:1 Definition, Nature, and Characteristics of Human Rights Evolution of Human Rights: Ancient, Medieval, and Modern Developments Universal Declaration of Human Rights (UDHR) Indian Constitution and Human Rights: Fundamental Rights and Duties Role of Judiciary in Protecting Human Rights **Unit:2** International Human Rights Law 7 Hours International Bill of Human Rights: UDHR, ICCPR, ICESCR Role of United Nations (UN), International Court of Justice (ICJ), International Criminal Court (ICC) Convention on Elimination of Discrimination, Child Rights, Refugees Human Rights in Armed Conflicts, War Crimes, and Geneva Conventions Case Studies on International Human Rights Violations Unit:3 **Human Rights and Technology** 6 Hours Right to Privacy, Data Protection, and Cyber Ethics Surveillance, AI, and Human Rights Issues Freedom of Speech & Expression in Digital Space Cybersecurity Laws and Ethical Hacking Case Studies: Pegasus Spyware, Cambridge Analytica, AI Bias in Decision Making Digital Rights and Responsibilities of Software Engineers **Unit:4** National Mechanisms for Human Rights Protection 7 Hours

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Role of National Human Rights Commission (NHRC) and State Human Rights

Commissions (SHRCs)

Indian Judiciary and Landmark Human Rights Cases



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B.Tech in Computer Science and Engineering

- Protection of Women, Children, LGBTQ+, and Minorities in India
 Legal Remedies for Human Rights Violations in India
 Case Studies on Human Rights Implementation in India
 Unit:5 International Law and Human Rights Treaties
 6 Hours
 - Sources of International Law: Treaties, Customs, General Principles
 - United Nations Charter and Human Rights Enforcement
 - Extradition and Asylum Laws
 - Human Rights & International Trade (WTO, MNCs, and Labour Rights)
 - Role of NGOs in Human Rights Protection (Amnesty International, Human Rights Watch, etc.)
 - Case Studies on International Human Rights and Legal Issues

Unit:6 Human Rights in the Digital Age & Future Challenges 7 Hours

- Ethical Issues in AI, Machine Learning, and Robotics
- Social Media, Hate Speech, and Online Censorship
- Impact of Big Data, Facial Recognition, and Biometric Surveillance on Human Rights
- Future Challenges in Space Law, Bioethics, and Genetic Engineering
- Role of Engineers and Computer Scientists in Promoting Human Rights
- Emerging Legal and Ethical Frameworks for Digital Human Rights

Total Lecture Hours	39 Hours

Tex	tbooks						
1	International Law and Human Rights, H.O. Agarwal, Central Law Publications, 23rd Edition, 2021						
2	Human Rights Under International Law and Indian Law, S.K. Kapoor, Central Law Agency 7th Edition, 2017						
Ref	Reference Books						
1	Human Rights and Constitutional Law, D.D. Basu, LexisNexis, 3rd Edition, 2008						
2	Human Rights, U. Chandra, Allahabad Law Agency,5th Edition, 2014						

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B.Tech in Computer Science and Engineering

V Semester

Open Elective –III: 230E3528- Cyber Crime Administration

Course Outcomes:

After completion of the course students will be able to:

- 1. Understand the fundamentals of cybercrime, its classification, and the legal framework associated with cyber laws in India and globally.
- 2. Analyze various types of cybercrimes and investigate real-world case studies to comprehend the modus operandi of cybercriminals.
- 3. Apply cyber investigation techniques and digital forensic tools to detect, trace, and document cyber incidents.
- 4. Evaluate the roles and responsibilities of cybercrime administration, including law enforcement agencies, cyber cells, and international collaboration.
- 5. Develop awareness of emerging cyber threats and propose suitable cyber policies or preventive strategies in response to evolving digital crime landscapes.

Unit:1 Fundamentals of Cybercrime

7 Hours

Definition, history, and evolution of cybercrime, Classification: Financial crimes, cyberstalking, cyberbullying, hacking, Motivation and psychology behind cybercriminals, Impact of cybercrime on individuals, organizations, and society.

Unit:2 Cybercrime Investigation and Digital Evidence

7 Hours

Phases of cybercrime investigation, Types of digital evidence: volatile vs. non-volatile, Collection, preservation, analysis, and presentation of evidence, Legal aspects of evidence: chain of custody and admissibility.

Unit:3 | Cyber Laws and Legal Framework

7 Hours

Overview of Indian IT Act 2000 and amendments, Relevant sections of IPC and CrPC for cyber offenses, International legal frameworks: GDPR, Budapest Convention, Case laws and recent judicial decisions.

Unit:4 Cybercrime Governance and Administration

6 Hours

National cybercrime administration: MHA, CERT-In, NCIIPC, State cybercrime cells and police units, Public-private cooperation and cybercrime reporting portals, Cybersecurity policy frameworks (National Cyber Security Policy),

Unit:5 | Digital Forensics and Tools

6 Hours

Basics of digital forensics and investigation lifecycle, Forensic tools: EnCase, FTK, Autopsy, Wireshark, Email, network, mobile, and cloud forensics, Lab/demonstration sessions and hands-on assignments

Unit :6 | Emerging Threats, Case Studies & Policy

6 Hours

Current and future cybercrime trends: ransomware, deepfakes, cyber warfare, crypto crimes,Role of AI/ML in cyberattacks and defense,Famous Indian and international cybercrime case studies,Drafting cybercrime policy for institutions and best practices in prevention.

Total Lecture Hours

39 Hours

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B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering)

SoE No. 23CSE-101

Textb	ooks
1.	Cyber Security and Cyber Laws, 1st Edition, Alfred Basta, Nadine Basta, Mary Brown, Cengage Learning, 2017
2.	Cyber Law in India, 3rd Edition, Pavan Duggal, Universal Law Publishing Co., 2021
3.	Computer Forensics: Principles and Practices, 1st Edition, Linda Volonino, Reynaldo Anzaldua, Pearson Education, 2008.
Refer	ence Books
1	Cyber Law and Ethics, 1st Edition, R.K. Suri, T.N. Chhabra, Kalyani Publishers, 2016
2	Computer Forensics and Cyber Crime: An Introduction, 3rd Edition, Marjie T. Britz, Pearson Education, 2013.
3	Cyber Crime & Information Technology Control, 1st Edition, Dr. B.R. Sharma, Universal Law Publishing, 2012.
4	Introduction to Cybercrime: Computer Crimes, Laws and Policing in the 21st Century, 1st Edition, Joshua B. Hill, Nancy E. Marion, Praeger, 2016
YCCE	E e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	https://link.springer.com/search?query=Cyber+Crime+Administration+
2	https://onlinelibrary.wiley.com/action/doSearch?AllField=Cyber+Crime+Administration
MOO	Cs Links and additional reading, learning, video material
1	https://onlinecourses.swayam2.ac.in/cec22_lw07/preview

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B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

V SEMESTER

Mandatory Learning Course (MLC)

MLC2125: YCAP5

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Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
(Accredited 'A++' Grade by NAAC with a score of 3.6)
Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology SoE & Syllabus 2023 6th Semester

(Department of Computer Science & Engineering)



Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
B.TECH SCHEME OF EXAMINATION 2023

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(Department of Computer Science & Engineering)
B. Tech. in Computer Science & Engineering

SoE No. 23CSE-101

Applicable for AY 2023-24 Onwards

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Date of Release

					B. Tech. in Computer Science &	Engi	neerin	g								
SN	Sem	Type	BoS/	Sub. Code	Subject	T/P			t Hours		Credits % Weightage				ESE	
			Deptt				L	Т	Р	Hrs		MSEs*	TA**	ESE	Duration Hours	
					SIXTH SEMESTE	R										
1	6	PC	CSE	23CSE1601	Machine Learning	Т	3	0	0	3	3	30	20	50	3	
2	6	PC	CSE	23CSE1602	Lab : Machine Learning	Р	0	0	2	2	1		60	40		
3	6	PC	CSE	23CSE1603	Language Processors	Т	3	0	0	3	3	30	20	50	3	
4	6	PC	CSE	23CSE1604	Lab : Language Processors	Р	0	0	2	2	1	60	40			
5	6	PC	CSE	23CSE1605	Design Thinking and Research Methodology	Т	2	0	0	2	2	30	20	50	3	
6	6	PE	CSE		Professional elective-II	Т	3	0	0	3	3	30	20	50	3	
7	6	PE	CSE		Professional elective-III	Т	3	0	0	3	3	30	20	50	3	
8	6	PE	CSE		Professional elective-IV	T	3	0	0	3	3	30	20	50	3	
9	6	MDM	MDM		MD Minor Course-IV	Т	3	0	0	3	3	30	20	50	3	
10	6	VSEC-	CSE	23CSE1606	Lab: Vocational & Skill Enhancement -Linux Administration and shell programming	Р	0	0	2	4	2		60	40		
11	6	STR	CSE	23CSE1607	Project Phase-I	Р	0	0	4	4	2		60	40		
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1	6	HS	T&P	MLC126	YCAP6:	Α	3	0	0	3	0					
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Pro	fess	ional l	Elective	- II												
1	6	PE-II	CSE	23CSE1621	PE-II : Big Data Analytics											
2	6	PE-II	CSE	23CSE1622	PE-II : Computer Graphics											
3	6	PE-II	CSE	23CSE1623	PE-II : Parallel computing											
4	6	PE-II	CSE	23CSE1624	PE-II: Game Theory											
5	6	PE-II	CSE	23CSE1625	PE-II: Real time system											
6	6	PE-II	CSE	23CSE1626	PE-II: Cloud Computing											
7	6	PE-II	CSE	23CSE1627	PE-II: Management Information system											
8	6	PE-II	CSE	23CSE1628	PE-II : Digital Marketing Analytics											
Pro	fess	ional l	Elective	-												
1	6	PE-III	CSE	23CSE1641	PE-III : Financial Data analysis											
2	6	PE-III	CSE	23CSE1642	PE-III : Augmented Reality											
3	6	PE-III	CSE	23CSE1643	PE-III : Information Retrieval System											
4	6	PE-III	CSE	23CSE1644	PE-III : Optimization Techniques											
5	6	PE-III	CSE	23CSE1645	PE-III : Human Computer interaction											
6	6	PE-III	CSE	23CSE1646	PE-III : Blockchain Technology											
7	6	PE-III	CSE	23CSE1647	PE-III: Bioinformatics											
8	6	PE-III	CSE	23CSE1648	PE-III: Software Defined Network											
9	6	PE-III	CSE	23CSE1649	PE-III: Soft Computing											
Dra	foor	ional	Elective	IV												
	1ess 6	PE-IV	Elective CSE		DE IV : GPI architecture and Programming											
1			CSE		PE IV : GPU architecture and Programming PE IV : Quantum Computing											
2	6	PE-IV PE-IV	CSE		' "											
3	6	PE-IV PE-IV	CSE		PE IV : Prompt Engineering PE IV : Nature Inspired Computing											
5	6	PE-IV	CSE		PE IV : Nature Inspired Computing PE IV : Distributed Computing											
6	6	PE-IV	CSE		PE IV : Industry 4.0											
7	6	PE-IV	CSE	23CSE16667	PE IV: Industry 4.0 PE IV: Distributed Database Management Syste	m										
8	6	PE-IV	CSE	23CSE1667 23CSE1668	PE IV : Data Mining											
9	6	PE-IV	CSE	23CSE1669	PE IV : Data Mining PE-IV : Product Development											
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Cou	sera	Elective	es													
		PE-IV	CSE	23CSE1670	70 PE-IV: IBM Deep Learning with PyTorch, Keras and Tensorflow Professional Certificate											
1	6	PE-IV	CSE	23CSE1671	PE-IV: Lab. IBM Deep Learning with PyTorch, K							ficate				

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Dean (Acad. Matters)

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Chairperson



Yeshwantrao Chavan College of Engineering

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(Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

VI Semester 23CSE1601: Machine Learning

Course Outcomes:

Upon successful completion of the course the students will be able to:

- CO1. To understand the basic principles of supervised and unsupervised machine learning algorithms, and strategies for the design of ML experiments.
- CO2. To apply supervised to the given dataset and predict the model outcome.
- CO3. To apply unsupervised learning algorithms to the given dataset and predict the model outcome.
- CO4.To analyse a given problem and classify it as supervised(regression or classification), or unsupervised learning and select the appropriate algorithm(s) to solve the problem
- CO5. To evaluate the performance of ML models using appropriate performance measures.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Machine learning:	6 Hours
Overvie	w of Machine Learning, Types of Machine Learning: Supervised, Unsupervised, Re	inforcement
learning	, Classification, Regression, Supervised and Unsupervised Learning, Learning Associa	tions,
Machin	e Learning Workflow, Examples of Machine Learning Applications.	
Unit:2	Supervised Learning-1:	7 Hours
	and polynomial regression, classification with k-Nearest Neighbors, Naive Bayes Classi on Trees, Generalization, Overfitting, and Underfitting.	fiers,
Unit:3	Supervised Learning-2:	6Hours
	n forests, Kernelized Support Vector Machines, Uncertainty in Multiclass Classification ring and selection, evaluation metrics for supervised learning.	, feature
Unit:4	Unsupervised Learning:	7 Hours
	s Clustering , Choosing the Number of Clusters, Semi-Supervised Learning , Evaluation vised learning	nmetrics for
Unit:5	Design and Analysis of Machine Learning Experiments :	6 Hours
Blockin	Response, and Strategy of Experimentation, Randomization, Hypothesis testing, Replig, Guidelines for Machine Learning Experiments, Cross-Validationand Resampling Moss-Validation, Comparing, Two Classification Algorithms.	•

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SoE No. 23CSE-101

Unit	:6 Advances in Machine Learning:	7 Hours
Intro	oduction to learning using Neural networks, types of artificial neuron and activation fun	ections,
Feed	lforward vs. Recurrent networks, multi-layer feedforward networks.	
	Total Lecture Hours	39 Hours
Text	tbooks	
1.	'Introduction to Machine Learning', Ethem Alpaydin, The MIT Press, secondedition	 1
2.	'Applied MachineLearning', M.Gopal, McGraw-Hill	
Refe	erence Books	
1.	'Machine Learning ', Tom Mitchell, McGraw-Hill	
2.	'Introduction to Machine Learning with Python, A Guide for Data Scientists Andreas C ',Müller and Sarah Guido, O'RIELLY	
3.	Pattern Recognition and Machine Learning ',Christopher M. Bishop, Springer New Y	ork, NY
YCC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	,
1		
MO	OCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs24/preview	
2	https://onlinecourses.nptel.ac.in/noc21_cs85/preview	

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(Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

VI Semester 23CSE1602: Lab: Machine Learning

Course Outcomes:

Upon successful completion of the course the students will be able to:

- 1. Understand the basic principles of supervised and unsupervised machine learning algorithms, and strategies for the design of ML experiments.
- 2. Apply supervised to the given dataset and predict the model outcome.
- 3. Apply unsupervised learning algorithms to the given dataset and predict the model outcome.
- 4. Analyse a given problem and classify it as supervised(regression or classification), or unsupervised learning and select the appropriate algorithm(s) to solve the problem
- 5. valuate the performance of ML models using appropriate performance measures and Recursive Enumerable Language.

Sr. No	Experiments based on:
1	a) Linear regression using linear least squares fit method
	b) Linear regression with Ordinary least squares method using ML Library
2	a) Implementing linear classifier using Linear discriminant function
_	b) Implementing polynomial regression
3	Program for Classification using KNN algorithm
4	Implementing KNN for regression
5	Implementing Naïve Bayes Classifier
6	Decision Trees using Scikit-learn
7	Implementing SVM Classifier
8	Implementing K-means clustering
9	PBL based on the ML Model used for Research Paper based TA Activity.

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(Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

VI Semester

23CSE1603: Language processors

Course Outcomes:

Upon successful completion of the course the students will be able to

- CO1. Understand the structure, phases, and working of a compiler including lexical and syntax analysis.
- CO2. Apply top-down and bottom-up parsing techniques, and construct parsing tables for LL(1) and LR parsers.
- CO3. Implement syntax-directed translation schemes and generate intermediate code representations.
- CO4. Analyze symbol table organization, and mechanisms for scope representation and error handling.
- CO5. Evaluate and apply code optimization techniques and generate efficient target code.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Compilation Process, Compilers & Translators, Phase structure of Compiler, Design of Lexical Analysis.	6 Hours
Unit:2	Specifying Syntactic Structure of Programming Language using Context Free Grammars, The role of Parser, Top-down Parsing, Bottom Up Parsing, Predictive Parsers, and Recursive Decent Parser.	7 Hours
Unit:3	Construction of efficient LR Parsers (SLR, CLR & LALR), Canonical Collection of set of items and construction of Parsing table, Implementation of LR Parsing table.	7 Hours
Unit:4	Syntax Directed Translation: Intermediate Code, Postfix notation, Parse tree and Syntax Trees, Three address codes, quadruples, triples, Translation of Arithmetic Expression, Boolean expressions, Control Statements. Array references, Use of Compiler writing tools (LEX/FLEX, YACC / BIASON).	7 Hours
Unit:5	Symbol Tables: Contents, Representing scope information. Error detection and Recovery: Error handling, Lexical-phase, Syntactic phase and semantic phase.	5 Hours
Unit :6	Introduction to Code Optimization, The principle sources of optimization, Loop optimization, The DAG representation, Introductory Data Flow analysis, Introduction to Code Generation: Object programs, Problems in Code Generation, Register allocation and assignment, Code generation from DAG, Peephole optimization.	7 Hours
	Total Lecture Hours	39 Hours

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SoE No. 23CSE-101

Textl	ooks				
1	Alfred V. Aho, Jeffrey D. Ullman & Ravi Sethi, Compilers Principles, Techniques & Tools Pearson Education				
2	Alfred V. Aho, Jeffrey D. Ullman, Principles of Compiler Design, Addison Wesley Publication				
Refer	rence Books				
1	Dr. O.G. Kakde, Compiler Design, Laxmi Publication				
2	J. P. Bennett, Introduction to Compiling Techniques: First Course Using ANSI C, LEX and YACC				
	McGraw-Hill Publication				
YCC	E e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]				
1	https://www.scribd.com/document/441141979/Compilers-Construction				
MOC	OCs Links and additional reading, learning, video material -				
1	https://onlinecourses.nptel.ac.in/noc21_cs07/preview				

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(Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

VI Semester

23CSE1604: Lab: Language processors

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Implement lexical analyzers using LEX/FLEX to tokenize source programs and perform lexical-level transformations.
- 2. Design and implement syntax analyzers using YACC/Bison to recognize syntactic constructs and validate grammatical rules.
- 3. Construct and simulate automata and parsing techniques using tools like JFLAP for context-free grammars.
- 4. Design and implement data structures to represent grammars and compute FIRST and FOLLOW sets for parsing.
- 5. Develop components of intermediate code generation and symbol table using LEX/YACC to support compiler back-end.

Sr.No.	Experiment based on
1	Implement a Lexical Analyzer using FLEX and develop:
	A. Program For converting all small case letters to UPPER case letters and Vice-Versa.
	B. Program to count the words, spaces, and linesin a given input file.
2	Study the LEX/Flex and YACC/Bison tool and Develop:
	A. LEX program to eliminate comment lines (Single and Multiple) in a text(C program) file and
	copy the resulting program into a separate file.
	B. YACC program to recognize valid identifier, operators and keywords in the given text (C
	program) file.
3	A. Develop a LEX program to recognize valid arithmetic expression. Identifiers in the expression
	could be only integers and operators could be + and *. Count the identifiers & operators present
	and print them separately.
	B. Develop a YACC program to evaluate arithmetic expression involving operators: +, -, *, and /.
4	Develop, Implement and execute a program using YACC/Bison tool to recognize all strings
	ending with b preceded by n a's using the grammar a n b (note: input n value), also create DFA of
	given grammar using JFLAP

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5	Develop a program to find FIRST and FOLLOW of all variables. Write a suitable data structure
	to store a context fee grammar. Prerequisite is to eliminate left recursion from the grammar before
	storing
6	Design and Simulate Predictive / LL (1) Parsing Table using JFLAP for the grammar rules:
	$A \rightarrow aBa, B \rightarrow bB$.
7	Design and Simulate SLR(1) parsing using JFLAP for the grammar rules: $E \rightarrow E+T \mid T, T \rightarrow T*F$
	$ F, F \rightarrow (E) id$ and parse the sentence: $id + id * id$.
8	Develop a program for intermediate code generator to generate three address code using LEX &
	YACC.
9	Develop a YACC program Symbol table.
10	Develop a YACC program for code generator.

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

VI Semester

23CSE1605: Design Thinking in CSE and Research Methodology

Course Outcomes:

Upon successful completion of the course the students will be able to:

- CO1. Understand the principles and approach of design thinking.
- CO2. Comprehend the foundational concepts of research methodology
- CO3. Identify and formulate research problems and conduct effective literature reviews and adhere to ethical research practices
- CO4. Collect and analyze data using appropriate methods.
- CO5.Interpret research findings and write scientific reports.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Design Thinking	6 Hours

History and evolution of Design Thinking, Why Design Thinking for engineers? Overview of the 5 stages: Empathize, Define, Ideate, Prototype, Test, Case studies in tech and software.

Unit:2 Integration with Software Development

6 Hours

Agile and Design Thinking, Design sprints in CSE projects, UX/UI and backend considerations, a real-world solution using the design thinking framework.

Unit:3 Research Fundamentals, Research Problem and Design, Literature Review

7 Hours

Research Fundamentals: Definition, objectives, and significance of research, Types of research: Basic, Applied, Descriptive, Analytical, Quantitative, and Qualitative.

Research Problem and Design: Criteria of good research, Techniques for defining and identifying a research problem, Features of good research problem/design, Necessity of defining the problem, Meaning of research design, Types of research design – Exploratory, Descriptive, Diagnostic, and Experimental

Literature Review: Importance and methods of conducting a literature review, Sources of information: Journals, conferences, patents, etc., Technical reading strategies.

Unit:4	Sampling and Data Collection, Data Analysis and Interpretation, Technical	7 Hours
	Writing, Research Ethics	

Sampling and Data Collection: Sampling techniques: Probability and Non-probability sampling,

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Total Lecture Hours

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(Department of Computer Science & Engineering)

SoE No. 23CSE-101

26 Hours

B.Tech in Computer Science and Engineering

Characteristics of a good sample, Sample size determination, Data types: Primary and Secondary, Methods of primary data collection: Observation, Interview, Questionnaire, Schedule, Secondary data sources **Data Analysis and Interpretation:** Processing and analyzing data, Statistical tools: Measures of central tendency, Dispersion, Correlation, Regression, Hypothesis testing: Null and alternative hypothesis, Type I and II errors, Use of software tools (e.g., Excel/SPSS/MATLAB for analysis), Interpretation of results **Technical Writing, Research Ethics:** Publication ethics and responsibilities of researchers, Structure and components of research report, Types of technical reports and papers, Writing thesis and dissertations, Referencing and citation styles (APA, IEEE, etc.), Ethical considerations in engineering research., Plagiarism and research ethics

Textbooks H. S. Fogler and S. E. LeBlanc, Strategies for Creative Problem Solving, 2nd edition, Pearson, Upper Saddle River, NJ, 2008. Sprint by Jake Knapp C.R. Kothari – Research Methodology: Methods and Techniques, New Age International 3. Ranjit Kumar – Research Methodology: A Step-by-Step Guide for Beginners, Sage Publications. **Reference Books** Activities for Teaching creativity and Problem Solving - By Arthur B Vangundy - Pfeiffer 1 Whimbey and J. Lochhead, Problem Solving & Comprehension, 6th edition, Lawrence 2 Erlbaum, Mahwah, NJ, 1999. R. Panneerselvam – *Research Methodology*, PHI Learning 4. Dawson, C. – Practical Research Methods, UBS Publishers. 5. Trochim, W.M.K. – Research Methods: The Concise Knowledge Base. YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] MOOCs Links and additional reading, learning, video material www.nptelvideos.in 2 www.coursera.com 3 www.udemy.com 4 swayam.gov.in

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B.Tech in Computer Science and Engineering

VI Semester

23CSE1606: Lab: Vocational & Skill Enhancement -Linux Administration and shell programming

Course Outcomes: Upon successful completion of the course the students will be able to

CO1	To demonstrate the basic knowledge of Linux commands and file handling utilities by using Linux shell environment		
CO2	To evaluate the concept of shell scripting programs by using an AWK and SED commands.		
CO3	To create the directory, how to change and remove the directory		
CO4	To analyze the process of how the parent and child relationships and IPC mechanism		
CO5	To understand the concept of client-server communication by using sockets.		

Sr. No.	Experiment based on
1	 Write a shell script that accept a file name starting and ending line numbers as arguments and display all the lines between given line no: Write a shell script that delete all lines containing a specified word
2	 Write a shell script that displays a list of all the files in the current directory Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file or directory.
3	 Write a shell script that accept a list of file names as arguments count and report the occurrence of each word. Write a shell script to find the factorial of given integer Write a shell script that list the all files in a directory.
4	 Write an awk script to find the number of characters, words and lines in a file? Linked list respectively. Write a C Program that makes a copy of a file using standard I/O and system calls? Implement in C the following Unix commands using system calls A) cat B)mv
5	 Write a C program to emulate the Unix ls-l command? Write a C program to list for every file in a directory, its inode number and file name.? Write a C Program that demonstrates redirection of standard output to a file .EX:ls>f1.?

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	1. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.
6	2. Write a C program to create a child process and allow the parent to display "parent" and the
	child to display "child" on the screen.
	3. Write a C program to create a Zombie process.
	1. Write a C program that illustrates how an orphan is created
7	2. Write a program that illustrates how to execute two commands concurrently with a
/	command pipe.
	3. Write a C program that illustrate communication between two unrelated processes using
	named pipe.
	1. Write a C program to create a message queue with read and write permissions to write 3
8	messages to it with different priority numbers.
	2. Write a C program that receives the messages(From the above message queue as specified in
	(21) and display them.?
9	3. Write a C program that illustrates suspending and resuming processes using signals
9	4. Write client and server programs(using c) for interaction between server and client
	processes using Unix Domain sockets
	1. Write a client and server programs (using c) for interaction between server and client
	processes using Internet Domain sockets?
10	2. write a program to implement the shared memory
	3. Write a client and server programs (using c) for interaction between server and client
	processes using Internet Domain sockets?
	4. Write a C program that illustrates two processes communicating using shared memory?

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B.Tech in Computer Science and Engineering

VI Semester

23CSE1621: PE-II: Big Data Analytics

Course Outcomes:

Upon successful completion of the course the students will be able to

- CO1. Explain fundamentals of big data, issues in big data management, big data analytics and its associated applications in intelligent business and scientific computing
- CO2. Apply machine Learning algorithms for real world data, to provide analytics
- CO3. Make use of the Map Reduce programming model to process the big data along with Hadoop tools
- CO4. Analyze and compare various NoSQL databases based on their data models, consistency, scalability, and use cases, and effectively apply the appropriate NoSQL database solutions to real-world applications.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Big Data	7 Hours

Data, Characteristics of data and Types of digital data: Unstructured, Semi-structured and Structured, Sources of data, working with unstructured data, Evolution and Definition of big data, Characteristics and Need of big data, Challenges of big data, big data environment terminologies, Big Data Analysis Life Cycle. Overview of business intelligence, Characteristics and need of big data analytics, Classification of analytics, Challenges to big data analytics

Unit:2 Big data analytics and Analytical methods 6 Hours

Analytical operations: Associations rules- Apriori algorithm, classifications- decision trees, naïve bayes clustering- K means.

Unit:3 Hadoop foundation for analytics

7Hours

Features, key advantages of Hadoop, key aspects of Hadoop, versions of Hadoop, Hadoop ecosystem, and Components, HDFS, HBase, Hadoop Technology Stack: Hive, Pig, Zookeeper, Swoop, oozie, flume, etc. Hadoop distributions, Hadoop vs SQL,, Hadoop Vs Spark, Spark architecture, SparkQL

Unit:4 MapReduce and YARN framework

7 Hours

Introduction to MapReduce, Processing data with MapReduce, map reduce example, Introduction to YARN, YARN architecture, Data serialization and common serialization formats, Big data serialization formats.

Unit:5 | **NoSQL Databases**

6 Hours

Introduction to NoSQL, advantages of NoSQL, SQL vs NoSQL, types of NoSQL databases- Schema-less Models|: Increasing Flexibility for Data Manipulation-KeyValue Stores- Document Stores - Tabular Stores - Object Data Stores - Graph Databases , Hive -- Sharding —- Hbase , Introduction to Cassandra

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Uni	it:6 Introduction to MongoDB key features	6 Hours			
rem	roduction to MongoDB key features, data types in MongoDB, MongoDB move, insert methods, MongoDB through the JavaScript's Shell, Creating and Document searching, Constructing queries on Databases, documents.				
Tot	tal Lecture Hours	39 Hours			
Tex	xtbooks				
1	Big Data and Analytics ,Seema Acharya, Subhashini Chhellappan , Willey 2nd edition				
2	Professional Hadoop Solutions, Boris lublinsky, Kevin T.Smith, Alexey Yakubovich ,Wiley ISBN: 978-1-118-61193-7 September 2013				
3	Understanding Big data , Chris Eaton, Dirk derooset al. , McGraw Hill 201	1			
4	Big Data and Analytics, Seema Acharya Wiley, 2016				
Ref	ference Books				
1	MongoDB in Action , Kyle Banker, Piter Bakkum, Shaun Verch, Dream to	ech Press			
2	Big Data Analytics with R and Hadoop, Vignesh Prajapati, Packet Publis	hing			
3	Tom White, HADOOP: The definitive Guide, O Reilly, 2012				
4	Learning Spark: Lightning-Fast Big Data Analysis Paperback, Holden Ka	rau			

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VI Semester

23CSE1622: PE-II: Computer Graphics

Course Outcomes:

Upon successful completion of the course the students will be able to:

CO1: Explore the applications of computer graphics in various domains such as design, visualization, and simulation.

CO2: Understand and implement fundamental 2D geometric transformations and clipping algorithms.

CO3: Apply 3D geometric transformations and viewing techniques for object representation and manipulation.

CO4: Describe and construct 3D object representations, including curves, surfaces, polygon rendering methods, and color models.

CO5: Analyze and design animation sequences and apply visible surface detection techniques in 3D graphics.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Computer Graphics & Graphics Systems	7 Hours

Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random-scan systems, graphics monitors and work stations and input devices

Unit:2 Output Primitives & Polygon Filling

7 Hours

Output primitives: Points and lines, line drawing algorithms (DDA and Bresenham's Algorithm) circle generating algorithms and ellipse - generating algorithms Polygon Filling: Scan-line algorithm, boundary-fill and flood-fill algorithms

Unit:3 2-D geometric transformations and viewing

6 Hours

2-D geometric transformations: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems 2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, clipping operations, point clipping, Line clipping-Cohen Sutherland algorithms, Polygon clipping-Sutherland Hodgeman polygon clipping algorithm.

Unit:4 3-D object representation

7 Hours

3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces, Polygon rendering methods, color models and color applications.

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Unit:5

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7 Hours

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3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations,

3-D Geometric transformations and viewing

UIII	Computer animation and Visible surface detection methods	6 Hours
anim detec	puter animation: Design of animation sequence, general computer animation functions ations, computer animation languages, key frame systems, motion specifications. Visition methods: Classification, back-face detection, depth-buffer method, BSP tree method and octree method.	ole surface
	Total Lecture Hours	39 Hours
Textb	ooks	
1	"Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson Educ	ation
Refer	rence Books	
1	Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd	d edition.
2	Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.	
3	Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.	
4	"Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Hughes, Pearson Education.	Feiner and
	Computer Graphics, Steven Harrington, TMH.	
5		
	E e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
	E e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] https://math.hws.edu/graphicsbook/	

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VI Semester

23CSE1623: PE-II: Parallel computing

Course Outcomes:

Upon successful completion of the course the students will be able to:

- 1. Strengthen understanding of parallel programming
- 2. Understand challenges in efficient execution of large-scale parallel applications
- 3. Massive parallelism entails significant hardware and software challenges
- 4. Implement research-based project component

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction	6 Hours
	on: Why parallel computing? Shared memory and distributed memory parallelis	m, Amdahl's
	lup and efficiency, supercomputers.	. ,.

Message Passing:MPI basics, point-to-point communication, collective communication, synchronous/asynchronous send/recv, algorithms for gather, scatter, broadcast, reduce

Unit:2 Parallel Communication 7 Hours

Network topologies, network evaluation metrics, communication cost, routing in interconnection networks, static and adaptive routing, process-to-processor mapping.

Unit:3 Performance 6 Hours

Scalability, benchmarking, performance modeling, impact of network topologies, parallel code analysis and profiling.

Unit :4 Designing Parallel Codes 7 Hours

Domain decomposition, communication-to-computation ratio, load balancing, adaptivity, case studies: weather and material simulation codes.

Unit:5 Parallel I/O 6 Hours

MPI I/O algorithms, contemporary large-scale I/O architecture, I/O bottlenecks, Job scheduling, RDMA, one-sided communication, NVM, extreme scale computing: issues and trends.

Unit:6 Parallel Algorithms: Basic Principles 7Hours

Principles of Parallel Algorithm Design, Basic Communication Operations, Analytical Modeling of Parallel Programs

Total Lecture Hours 39 Hours

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Text	tbooks
1	Peter S Pacheco, An Introduction to Parallel Programming, Morgan Kaufmann, 2011.
2	DE Culler, A Gupta and JP Singh, Parallel Computer Architecture: A Hardware/Software Approach Morgan-Kaufmann, 1998.
3	Marc Snir, Steve W. Otto, Steven Huss-Lederman, David W. Walker and Jack Dongarra, MPI - The Complete Reference, Second Edition, Volume 1, The MPI Core.
4	William Gropp, Ewing Lusk, Anthony Skjellum, Using MPI: portable parallel programming with the message-passing interface, 3rd Ed., Cambridge MIT Press, 2014
Refe	erence Books
1	JL Hennessy and DA Patterson, Computer Architecture: A Quantitative Approach, 4th Ed., Morgan Kaufmann/Els India, 2006.
2	MJ Quinn, Parallel Computing: Theory and Practice, Tata McGraw Hill, 2002.
YCC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Technology/26-2018_Book_IntroductionToParallelComputin.pdf
MO	OCs Links and additional reading, learning, video material
1	https://onlinecourses.nptel.ac.in/noc21_ge20/preview
2	https://onlinecourses.nptel.ac.in/noc22_cs67/preview

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B.Tech in Computer Science and Engineering

VI Semester 23CSE1624: PE-II : Game Theory

Course Outcomes:

Upon successful completion of the course the students will be able to:

CO1: Understanding Game Theory Fundamentals

CO2: Applying Non-Cooperative Game Theory

CO3: Analyzing Games with Perfect Information

CO4: Exploring Games with Imperfect Information

CO5: Designing Mechanisms for Collective Decision-Making

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction	6 Hours

Introduction – Making rational choices: basics of Games – strategy - preferences – payoffs – Mathematical basics - Game theory – Rational Choice - Basic solution concepts-noncooperative versus cooperative games - Basic computational issues - finding equilibria and learning in games - Typical application areas for game theory (e.g. Google's sponsored search, eBay auctions, electricity trading markets).

Unit:2 | Games with Perfect Information

7 Hours

Games with Perfect Information - Strategic games - prisoner's dilemma, matching pennies Nash equilibriatheory and illustrations - Cournot's and Bertrand's models of oligopoly- auctions mixed strategy equilibrium- zero-sum games- Extensive Games with Perfect Information repeated games (prisoner's dilemma)- subgame perfect Nash equilibrium; computational issues.

Unit:3 | Games with Imperfect Information

7 Hours

Games with Imperfect Information - Bayesian Games - Motivational Examples - General Definitions - Information aspects - Illustrations - Extensive Games with Imp erfect -Information - Strategies- Nash Equilibrium - Beliefs and sequential equilibrium - Illustrations - Repeated Games - The Prisoner's Dilemma - Bargaining

Unit:4 | Non-cooperative Game Theory

6 Hours

Non-cooperative Game Theory - Self-interested agents- Games in normal form - Analyzing games: from optimality to equilibrium - Computing Solution Concepts of Normal-Form Games - Computing Nash equilibria of two-player, zero-sum games - Computing Nash equilibria of two-player, general-sum games - Identifying dominated strategies

Unit:5 | Game Theory and Collective Decision-Making

7 Hours

Cournot's Oligopoly, Bertrand's Oligopoly, Electoral Competition, Median Voter Theorem, Auctions, role of knowledge, Decision making and Utility Theory, Mixed Strategy Equilibrium, Extensive Games with Perfect Information, Stackelberg's model of Duopoly, Buying Votes, Committee Decision making

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Unit :6	MECHANISM DESIGN	7 Hours			
systems preferen auctions	ting Preferences-Social Choice – Formal Model- Voting - Existence of social function - Protocols for Strategic Agents: Mechanism Design - Mechanism design with ces- Efficient mechanisms - Vickrey and VCG mechanisms (shortest paths) - Co - profit maximization Computational applications of mechanism design - applications i - Google's sponsored search - eBay auctions	unrestricted ombinatorial			
	Total Lecture Hours	39 Hours			
Textbo	oks				
1.	M. J. Osborne, "An Introduction to Game Theory", Oxford University Press, 2003.				
2.	2. N. Nisan, T. Roughgarden, E. Tardos, and V. V. Vazirani, "Algorithmic Game Theory", Cambridge University Press, 2007				
Refere	nce Books				
1.	Thomas Ferguson, Game Theory, World Scientific, 2018.				
2.	YoavShoham, Kevin Leyton-Brown, "Multi agent Systems: Algorithmic, Game- Theoretic, and Logical Foundations", Cambridge University Press, 2008.				
3	Zhu Han, Dusit Niyato, Walid Saad, Tamer Basar and Are Hjorungnes, "Game Theory in Wireless and Communication Networks", Cambridge University Press, 2012				
YCCE	e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] –				
1	https://egyankosh.ac.in/bitstream/123456789/76109/1/Unit-6.pdf				
2					
MOOO	Ls Links and additional reading, learning, video material				
	https://onlinecourses.nptel.ac.in/noc19_ge32/preview				

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B.Tech in Computer Science and Engineering

VI Semester 23CSE1625: PE-II : Real time system

Course Outcomes:

Upon successful completion of the course the students will be able to:

- 1. Clearly differentiate the different issues that arise in designing soft and hard real-time, concurrent, reactive, safety-critical and embedded systems.
- 2. Explain the various concepts of time that arise in real-time systems.
- 3. Describe the design and implementation of systems that support real-time applications. Justify and critique facilities provided by real-time operating systems and networks.
- 4. Design, construct and analyze a small, concurrent, reactive, real-time system.
- 5. Select and use appropriate engineering techniques, and explain the effect of your design decisions on the behavior of the system.

Unit No.	Contents	Max. Hrs.
Unit:1	Basic Real- Time Concepts, Computer Hardware, Language Issues	7 Hours

Basic component Architecture, Real Time Design Issues, Input- Output, Other Devices Language Features, Survey of Commonly Used Programming Languages, Code Generation.

Unit:2 Software life cycle, Real Time Specification and Design Techniques 7 Hours

software life cycle, Non-temporal Transition in the software life cycle, Spiral model, Natural languages, Mathematical Specification, Flow Charts, Structure Charts, Pseudocode and programmable Design Languages.

Unit:3 Intertask Communication and Synchronization, RealTime memory
Management, SystemPerformance Analysis and Optimization
7 Hours

Buffering Data, Mail boxes Critical Region, Semaphores, Event Flags and Signals, Deadlock, Process Stack Management, Dynamic Allocation, Static Schemes, Response Time Calculation, Interrupt Latency, Scheduling NP Complete, Relocating Response Times And time Loading, Analysis of Memory Requirements, Reducing Memory Loading, I/O Performance.

Unit :4 Queuing Models, Reliability, Testing, And Fault Tolerance, Multiprocessing Systems. 7 Hours

Basic Buffer size Calculation, Classical Queuing Theory, Little's Law, Faults, Failures, bugs AND effects. Reliability, Testing, Fault Tolerence, Classification of Architectures, Distributed Systems, Non Von Neumann Architectures.

Unit:5 Hardware/ Software Integration, Real Time Applications 7 Hours

Goals of Real Time System Integration, Tools, Methodology, Real Time Systems As Complex System, First Real Time Application Real Time Databases, Real time Image Processing Real Time UNIX, building Real Time Applications with Real Time Programming Languages.

Total Lecture Hours 39 Hours

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Tex	tbooks
1	Real Time System, Jane W.S.Liu.
2	Real Time Systems Design and Analysis by Phillip A. Laplante,PHI
Refe	erence Books
1	Hard Real Time Computing Systems Predictable Scheduling Algorithms and applications by GiorgioC. Buttazzo
2	Real Time Design Patterns: Robust Scalable Architecture for Real Time System by BrucePowel Douglass
3	Real Time System: Scheduling, Analysis and Verification by Albert M.K. Change
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/e-opies%20of%20books/7.Information%20Technology/53.Book-Liu- %20Real%20Time%20Systems.pdf
MO	OCs Links and additional reading, learning, video material
1	https://onlinecourses.nptel.ac.in/noc21_cs98/preview

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B.Tech in Computer Science and Engineering

VI Semester

23CSE1626: PE-II: Cloud Computing

Course Outcomes:

Upon successful completion of the course the students will be able to

CO1: An ability to understand software and hardware support for enterprise and cloud computing

CO2: An ability to Perform data modeling for enterprise and cloud knowledge bases.

CO3: An ability to Design enterprise and cloud software applications.

CO4: An ability to Implement and run distributed and cloud applications

CO5: An ability to Ensure security and privacy in enterprise and cloud application while implementing cloud applications methodologies.

Unit:1 Introduction 06 Hours

Defining Cloud Computing; Cloud Types and different models-The NIST model, The Cloud Cube Model, Examining the Characteristics of Cloud Computing; Benefits of cloud computing; Disadvantages of cloud computing; Assessing the Role of Open Standards

Unit:2 | Cloud Delivery Models

07 Hours

Exploring the Cloud Computing Stack, Connecting to the Cloud, Infrastructure as a Service, Platform as a Service, Saas Vs. Paas, Using PaaS Application Frame works, Software as a Service, Identity as a Service, Compliance as a Service

Unit:3 Virtualization

07 Hours

Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hypervisors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Context.

Unit:4 | Cloud native Computing

07 Hours

Introduction of Cloud native Computing, Containers in Cloud Computing and its benefits, Dockers, Kubernetes Managing the Cloud-Administrating the Clouds, Management responsibilities, Lifecycle management Cloud Management Products, Emerging Cloud Management Standards,

Unit:5 | Cloud Security

06Hours

Securing the Cloud, Securing Data, the security boundary, Security service boundary, Security mapping, Brokered cloud storage access, Establishing Identity and Presence, Understanding Service Oriented Architecture-Introducing Service Oriented Architecture

Unit: 6 Advance Clouds, AWS Architecture and Case Studies

06Hours

Cloud Computing Cost Analysis, basic, Selecting an IaaS Provider, Capacity Planning and Disaster, Recovery in Cloud Computing, AWS Cloud architectural principles, basic/core characteristics of deploying and operating in the AWS Cloud, the key services on the AWS Platform and their common use cases, Define the billing, account management, and pricing models, Introduction to Amazon EC2. Case Studies: Microsoft Azure, Dropbox

Total Lecture Hours

39 Hours

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Tex	xtbooks
1	Cloud Computing (Principles and Paradigms), John Wiley & Sons, Inc.
2	Cloud and Distributed Computing: Algorithms and Systems by Rajiv Misra, Yeshwant Singh Patel, Wiley Publications ISBN: 9788126520275
3	Cloud Computing Bible by Barrie Sosinsky John Wiley & Sons
Ref	ference Books
1	Mastering cloud computing, Rajkumar buyya, Christian vecchiola, S Thamarai Selvi, Tata Mc-Graw
	Hill Education Private Limited
2	Cloud Computing a Practical Approach, Anthony T .Velte, Toby J. Velte, Robert Elsenpeter, Tata
	McGraw-HILL
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/DTEL%20Material/7.Information%20Technology/DTEL%20PPTs /18.CC%20PPT ADG.pdf
2	
MC	OOCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/106105167
2	https://onlinecourses.nptel.ac.in/noc21_cs14/preview

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B.Tech in Computer Science and Engineering

VI Semester

23CSE1627: PE-II: Management Information system

Course Outcomes:

Upon successful completion of the course the students will be able to

- CO1- This course introduces the students to existing and upcoming technologies, wide variety of their applications for business and e-Commerce, and issues involved in their management.
- CO2- Study of types of IS, Decision Making Process, Models and approaches to IS
- CO3- Outline the role of the ethical, social, and security issues of information systems.
- CO4- To introduce the fundamental principles of computer-based information systems analysis & design

		8				
Unit No.	Contents	Max. Hrs.				
Unit:1	Basic Concepts of Information System	7 Hours				
Introduction	n to Management Information Systems: Types of MIS, Capabilities, Complem	ents, CCR				
Framework	Framework; Role of manager with respect to IT in an organization.					
Unit:2	Database management system	7 Hours				
Database m	anagement systems, Characters of database Management systems-					
Data proces	sing system, Data Warehousing, Foundations of business intelligence,					
Data Mining and Text Mining.						
Unit:3	Architecture & Design of IS	7 Hours				
A 1 '4 4						

Architecture, development and maintenance of Information Systems, Factors of success and failure. Centralized and Decentralized Information Systems, value and risk of IS.

Unit:4 **Emerging Technologies**

6Hours

Cloud computing, Big Data Technologies, Internet of Things, Bring Your Own Device (BYOD,) Virtual Reality, Augmented Reality, Blockchain, Artificial Intelligence

Unit:5 **Knowledge Management**

6Hours

Decision Support Systems, Expert Systems, Learning Management Systems, Executive Information Systems.

Unit:6 Strategic Enterprise Systems

6 Hours

Business Process Reengineering, Total Quality Management and Enterprise Management System viz. ERP, SCM, CRM and Ecommerce.

Total Lecture Hours

39 Hours

Damele	Mel	Bhami.	July,2023	1.00	Applicable for
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2023-24 Onwards

Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023 (Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering)

SoE No. 23CSE-101

Reference Books 1 Management Information System, W.S Jawadekar, Tata Mc Graw Hill Publication. 2 Management Information System, David Kroenke, Tata Mc Graw Hill Publication 3 MIS: Managing the digital firm, Kenneth C. Landon, Jane P. Landon, Pearson Education 4 Richard T. Watson: "Data Management ", WILEY INDIA Limited, New Delhi, 2008. 5 Kenneth C. Laudon & Jane P. Laudon. "Management Information Systems". Pearson Publish 6 Goyal, D.P.: "Management Information System", MACMILLAN India Limited, New Delhi, YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] 1 MOOCs Links and additional reading, learning, video material - 1 https://onlinecourses.nptel.ac.in/noc20_mg60/preview	xtbook	xs .
Management Information Systems best practices & Applications In business, Adikeshvan, T. Second Edition. Reference Books Management Information System, W.S Jawadekar, Tata Mc Graw Hill Publication. Management Information System, David Kroenke, Tata Mc Graw Hill Publication MIS: Managing the digital firm, Kenneth C. Landon, Jane P. Landon, Pearson Education Richard T. Watson: "Data Management ", WILEY INDIA Limited, New Delhi, 2008. Kenneth C. Laudon & Jane P. Laudon. "Management Information Systems". Pearson Publish Goyal, D.P.: "Management Information System", MACMILLAN India Limited, New Delhi, YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] MOOCs Links and additional reading, learning, video material - https://onlinecourses.nptel.ac.in/noc20_mg60/preview	M	Ianagement Information System, Prasad L.M., Prasad Usha.
Second Edition. Reference Books	Te	extbook on Management Information Systems, D P Nagpal.
Reference Books 1	M	Ianagement Information Systems best practices & Applications In business, Adikeshvan, T. A.
1 Management Information System, W.S Jawadekar, Tata Mc Graw Hill Publication. 2 Management Information System, David Kroenke, Tata Mc Graw Hill Publication 3 MIS: Managing the digital firm, Kenneth C. Landon, Jane P. Landon, Pearson Education 4 Richard T. Watson: "Data Management ", WILEY INDIA Limited, New Delhi, 2008. 5 Kenneth C. Laudon & Jane P. Laudon. "Management Information Systems". Pearson Publish 6 Goyal, D.P.: "Management Information System", MACMILLAN India Limited, New Delhi, YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] 1 MOOCs Links and additional reading, learning, video material - 1 https://onlinecourses.nptel.ac.in/noc20_mg60/preview	Se	econd Edition.
Management Information System, David Kroenke, Tata Mc Graw Hill Publication MIS: Managing the digital firm, Kenneth C. Landon, Jane P. Landon, Pearson Education Richard T. Watson: "Data Management ", WILEY INDIA Limited, New Delhi, 2008. Kenneth C. Laudon & Jane P. Laudon. "Management Information Systems". Pearson Publish Goyal, D.P.: "Management Information System", MACMILLAN India Limited, New Delhi, YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] MOOCs Links and additional reading, learning, video material - https://onlinecourses.nptel.ac.in/noc20_mg60/preview	ference	e Books
Management Information System, David Kroenke, Tata Mc Graw Hill Publication MIS: Managing the digital firm, Kenneth C. Landon, Jane P. Landon, Pearson Education Richard T. Watson: "Data Management ", WILEY INDIA Limited, New Delhi, 2008. Kenneth C. Laudon & Jane P. Laudon. "Management Information Systems". Pearson Publish Goyal, D.P.: "Management Information System", MACMILLAN India Limited, New Delhi, YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] MOOCs Links and additional reading, learning, video material - https://onlinecourses.nptel.ac.in/noc20_mg60/preview	M	Ianagement Information System, W.S Jawadekar, Tata Mc Graw Hill Publication.
MIS: Managing the digital firm, Kenneth C. Landon, Jane P. Landon, Pearson Education Richard T. Watson: "Data Management ", WILEY INDIA Limited, New Delhi, 2008. Kenneth C. Laudon & Jane P. Laudon. "Management Information Systems". Pearson Publish Goyal, D.P.: "Management Information System", MACMILLAN India Limited, New Delhi, YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] MOOCs Links and additional reading, learning, video material - https://onlinecourses.nptel.ac.in/noc20_mg60/preview		
Richard T. Watson: "Data Management ", WILEY INDIA Limited, New Delhi, 2008. Kenneth C. Laudon & Jane P. Laudon. "Management Information Systems". Pearson Publish Goyal, D.P.: "Management Information System", MACMILLAN India Limited, New Delhi, YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] MOOCs Links and additional reading, learning, video material - https://onlinecourses.nptel.ac.in/noc20_mg60/preview		•
 Kenneth C. Laudon & Jane P. Laudon. "Management Information Systems". Pearson Publish Goyal, D.P.: "Management Information System", MACMILLAN India Limited, New Delhi, YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] MOOCs Links and additional reading, learning, video material - https://onlinecourses.nptel.ac.in/noc20_mg60/preview 		
6 Goyal, D.P.: "Management Information System", MACMILLAN India Limited, New Delhi, YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] 1 MOOCs Links and additional reading, learning, video material - 1 https://onlinecourses.nptel.ac.in/noc20_mg60/preview		enneth C. Laudon & Jane P. Laudon. "Management Information Systems". Pearson Publishing.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] 1 MOOCs Links and additional reading, learning, video material - 1 https://onlinecourses.nptel.ac.in/noc20_mg60/preview		oyal, D.P.: "Management Information System", MACMILLAN India Limited, New Delhi, 2008
MOOCs Links and additional reading, learning, video material - 1 https://onlinecourses.nptel.ac.in/noc20 mg60/preview	CCE e-	library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1 https://onlinecourses.nptel.ac.in/noc20_mg60/preview		
	OOCs	Links and additional reading, learning, video material -
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2 http://www.digimat.in/nptel/courses/video/110105148/L01.html	ht	tp://www.digimat.in/nptel/courses/video/110105148/L01.html

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

VI Semester

23CSE1628: PE-II: Digital Marketing Analytics

Course Outcomes:

Upon successful completion of the course the students will be able

- 1. Understand the core concepts of Digital Marketing, Mobile Marketing and Online Marketing.
- 2. Understand the E-mail marketing techniques and Digital Marketing Key Performance Indicators
- 3. Comprehend the Social Media Analytics strategies and Apply Google Analytics for digital marketing
- 4. Apply the fundamental principles and concepts of Search Engine Optimization (SEO).
- 5. Apply strategic digital marketing tools.

Unit No.	('ontents					
Unit:1	Introduction to Digital marketing	6 Hours				
The Co	ncept. Need & Evolution of Digital Marketing, Reason for growing importance	of Digital				

The Concept, Need & Evolution of Digital Marketing, Reason for growing importance of Digital Marketing in India, Digital Marketing: Types & Examples. Case Study on Digital Marketing

Unit:2 | Mobile Marketing | 6 Hours

Meaning, types & Evolution, Mobile – market size and rate of growth, Mobile applications, Types of Mobile Marketing, Advantages and Disadvantages of Mobile marketing, Performance marketing: definition, benefits. Case Study on Mobile Marketing.

Unit:3 Online Marketing and Email Marketing

7 Hours

The concept of Digital Marketing Mix, 7 P's of Online Marketing: Product, Price, Promotion, Place People, Process, Physical evidence, Methods of Online Marketing promotion. Case Study on Online Marketing

Email Marketing: Need for Emails, Types of Emails, options in Email advertising, Do's and Don'ts of an email marketing campaign, Introduction to E-mail marketing tool- Mailchimp. Case Study on Email Marketing

Unit:4 | Key Performance Indicators and Social Media Analytics

7 Hours

Selecting and Preparing KPIs, Pages and Landing Pages, Event Tracking and AdSense, Site Search, Optimizing Your Search Engine Marketing. Types of Analytics in Social Media: Analytics, Listening, Advertising Analytics, Analytics from CMS and CRM, The Analytics Process, Metrics, Dashboards, and Reports.

Unit:5 Google Analytics and Search Engine Optimization(SEO)

7 Hours

Google Analytics Features, Benefits, and Limitations, Google Analytics Reports, Creating custom reports, Dashboard and Segments. Search Engine Optimization Basics, Keyword Research, SEO Tool- SEMrush: Overview and Features, Top Search Engine Ranking Factors. Case Study: Dominos India: Building Traffic

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through	through content propagation.						
Unit :6	DM tools	6 Hours					
Publishii Building	Overview of Hootsuite: Dashboard and Features, Social Media Listening and Monitoring, Social Media Publishing and Scheduling. Campaign using Mailchimp: Overview of Mailchimp Features and Interface, Building Email Lists and Segmentation, Creating Email Campaigns: Templates and Content Design. Advertising tools: Google Ads, Canva Interface.						
	Total Lecture Hours	45 Hours					
Textboo	ks						
1	Damian Ryan& Calvin Jones. Understanding DIGITAL Marketing, 2009, ISBN 9780	749453893					
2	Vandana Ahuja, Digital Marketing, Oxford University Press, New Delhi, 2015, ISBN: 9780199455447.						
3	Jodie the Mom (2023) Email Marketing Planner: Organize and Track Your Emails, 20:B0C5KNF1BM	023, ASIN					
4	The digital marketing Handbook, A step by step guide, Mohit Pawar, 2015 Edition.						
5	Advanced Web Metrics with Google Analytics, SYBEX, Brian Clifton, Second Edition	n					
6	Social Media Analytics Strategy, Alex Goncalves, Apress						
Referen	ce Books						
1	Dave Evans., Susan Bratton, Social Media Marketing: The Next Generation of Engagement. Wiley, 2010, ISBN: 978-0-470-63403-5	of Business					
2	George Pain(2019). Marketing Automation and Online Marketing: Automate You through Marketing Best Practices such as Email Marketing and Search Engine Op 2019, ISBN-10 1922301132						
3	Ian Dodson, The art of Digital Marketing, 2016, Wiley, 978-1-119-26570-2						
4	Vandana Ahuja, Digital Marketing,Oxford University Press,2015,ISBN-10. ISBN:0199455449.						
YCCE e	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]						
1							
2							
MOOCs	Links and additional reading, learning, video material						
1	https://skillshop.exceedlms.com/student/collection/648385-digital%20marketing						
2	https://www.coursera.org/courses?query=digital%20marketing						

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https://www.coursera.org/courses?query=digital%20marketing



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(Department of Computer Science & Engineering)

SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

VI Semester

23CSE1641: PE-III: Financial Data analysis

Course Outcomes:

Upon successful completion of the course the students will be able to

CO1: Understand the structure and types of financial data and the methods used to acquire and preprocess it.

CO2: Perform statistical analysis and visualization of financial data for trend identification.

CO3: Apply time series models for forecasting financial metrics such as stock prices and interest rates.

CO4: Use machine learning techniques to solve problems in risk analysis, fraud detection, and portfolio optimization.

CO5: Evaluate and interpret financial models using appropriate performance metrics.

CO6: Design and present a financial data analytics project using real-world datasets and tools.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Financial Data and Analytics	7Hours
Types	of financial data: market, accounting, economic, alternative data, Sources:	Yahoo Finance,
Bloomb	erg, Quandl, EDGAR, Data collection methods (APIs, web scraping), Data wrang	gling and cleaning
using P	ython/R, Overview of the financial system and markets.	

Unit:2	Exploratory Data Analysis (EDA) in Finance	6 Hours
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Descriptive statistics (mean, volatility, skewness, kurtosis), Visualization techniques for financial data, Correlation analysis, Data normalization and transformation, Case study: Analysis of historical stock prices

Unit:3 Financial Time Series Analysis 6Hours

Characteristics of time series data, Stationarity and differencing, ARIMA and SARIMA models, GARCH models for volatility modeling, Forecasting techniques and model validation.

Unit:4 Predictive Modeling and Machine Learning in Finance 7Hours

Regression models for financial forecasting, Classification models: logistic regression, decision trees, random forests, Clustering and anomaly detection for fraud detection, Sentiment analysis using news and social media data, Model evaluation: RMSE, AUC, confusion matrix

Unit:5 | Portfolio Analysis and Risk Management 7Hours

Modern Portfolio Theory (MPT), Risk-adjusted return metrics: Sharpe Ratio, VaR, Capital Asset Pricing Model (CAPM), Portfolio optimization with constraints, Stress testing and scenario analysis

Unit:6 Financial Analytics Applications and Projects 6Hours

Real-time analytics and dashboards (Power BI/Tableau), Case study: Algorithmic trading and strategy backtesting, Case study: Credit scoring models, Ethics and regulations in financial data usage

Total Lecture Hours | 39 Hours

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

Textbooks

1. Financial Analytics with R, Mark J. Bennett, Dirk L. Hugen, Cambridge University Press

2. Python for Finance: Mastering Data-Driven Finance, Yves Hilpisch, O'Reilly Media

Reference Books

1 Quantitative Financial Analytics, Kenneth L. Grant, Wiley

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1

MOOCs Links and additional reading, learning, video material

1 https://onlinecourses.nptel.ac.in/noc25 mg01/preview

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

VI Semester

23CSE1642: PE-III : Augmented Reality

Course Outcomes:

After completion of this course, students will be able to

- **CO1:** Understand the fundamental concepts, architecture, and evolution of Augmented Reality systems and distinguish them from Virtual Reality and Mixed Reality.
- **CO2:** Demonstrate knowledge of AR development platforms, tools (e.g., Unity, ARKit, ARCore), and technologies (e.g., computer vision, sensor fusion) involved in building AR applications.
- **CO3:** Design and develop simple AR applications by integrating 3D models, animations, and real-world data using mobile or wearable AR devices.
- **CO4:** Analyze and evaluate usability, performance, and user interaction strategies in AR systems for various real-world domains like education, healthcare, and gaming.
- **CO5:** Apply creative and technical skills to propose innovative AR solutions addressing specific industry or societal needs through a capstone project or case study.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Augmented Reality (A.R)	7Hours

What Is Augmented Reality - Defining augmented reality, history of augmented reality, The Relationship Between Augmented Reality and Other Technologies-Media, Technologies, Other Ideas Related to the Spectrum Between Real and Virtual Worlds, applications of augmented reality Augmented Reality Concepts- How Does Augmented Reality Work? Concepts Related to Augmented Reality, Ingredients of an Augmented Reality Experience.

Unit:2 Augmented Reality Hardware 7 Hours

Augmented Reality Hardware – Displays – Audio Displays, Haptic Displays, Visual Displays, Other sensory displays, Visual Perception, Requirements and Characteristics, Spatial Display Model.

Processors – Role of Processors, Processor System Architecture, Processor Specifications.

Tracking & Sensors - Tracking, Calibration, and Registration, Characteristics of Tracking Technology, Stationary Tracking Systems, Mobile Sensors, Optical Tracking, Sensor Fusion

Unit:3 Computer Vision for Augmented Reality & A.R. Software 7Hours

Computer Vision for Augmented Reality - Marker Tracking, Multiple-Camera Infrared Tracking, Natural Feature Tracking by Detection, Simultaneous Localization and Mapping, Outdoor Tracking Augmented Reality Software - Introduction, Major Software Components for Augmented Reality Systems, Software used to Create Content for the Augmented Reality Application.

Unit :4 AR Techniques- Marker based & Markerless tracking 6Hours

Marker-based approach- Introduction to marker-based tracking, types of markers, marker camerapose and identification, visual tracking, mathematical representation of matrix multiplicationMarker types- Template markers, 2D barcode markers, imperceptible markers.Marker-less approach- Localization based augmentation, real world examples Tracking methods- Visual tracking, feature based tracking, hybrid tracking, and initialisation and recovery.

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Unit :5	AR Devices & Components	6Hours			
AR Devices –	AR Components – Scene Generator, Tracking system, monitoring system, display, Game scene AR Devices – Optical See- Through HMD, Virtual retinal systems, Monitor bases systems, Projection displays, Video see-through systems				
Unit :6	Beyond A. R Mixed Reality	7Hours			
Computer Vis	Introduction to mixed reality, Applications of mixed reality, Input and Output in Mixed reality, Computer Vision and Mixed Reality, simultaneous localization and mapping (SLAM), variants of SLAM-dense tracking and mapping (DTAM), parallel tracking and mapping (PTAM) and semi-direct monocular visual odometry (SVO).				
	Total Lectures	39			

Text	books
1	Allan Fowler-AR Game Development , 1st Edition, A press Publications, 2018, ISBN 978-1484236178
2	Augmented Reality:Principles & Practice by Schmalstieg/Hollerer, Pearson Education India; First edition (12 October 2016),ISBN-10: 9332578494
Refe	rence Books
1	Designing for Mixed Reality, Kharis O'Connell Published by O'Reilly Media, Inc., 2016, ISBN: 9781491962381
2	Sanni Siltanen- Theory and applications of marker-based augmented reality. Julkaisija – Utgivare Publisher. 2012. ISBN 978-951-38-7449-0
YCC	TE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	https://www.vttresearch.com/sites/default/files/pdf/science/2012/S3.pdf
2	https://docs.microsoft.com/en-us/windows/mixed-reality/
MO	OCs Links and additional reading, learning, video material
1	https://www.coursera.org/learn/ar
2	https://www.coursera.org/learn/ar

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

VI Semester

23CSE1643: PE-III: Information Retrieval System

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Understand the fundamental principles of Information Retrieval (IR), Understand different Information retrieval models.
- 2. Apply Tolerant Retrieval techniques.
- 3. Evaluate the performance of IR systems and its challenges.
- 4. Implement advanced IR techniques in web and XML retrieval.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Information retrieval	6 Hours
Introduc	tion to Information retrieval: Information retrieval process, Indexing, Information retrieval	eval model,
Boolean	retrieval model Dictionary and Postings: Tokenization, Stop words, Stemming, Inverte	ed, index,
Skip poi	nters, Phrase queries	
Unit:2	Tolerant Retrieval	7 Hours
Tolerant	Retrieval: Wild card queries, Permuterm index, Bigram index, Spelling correction, Ed	dit distance,
Jaccard o	coefficient, Soundex	
Term W	eighting and Vector Space Model: Wild card queries, Permuterm index, Bigram index,	Spelling
correction	n, Edit distance, Jaccard coefficient, Soundex.	
Unit:3	Evaluation	6 Hours
Evaluati	on: Precision, Recall, F-measure, E-measure, Normalized recall, Evaluation problems	
	emantic Indexing: Eigen vectors, Singular value decomposition, Low rank approximat	ion.
	s with Lexical Semantics.	,
Unit:4	Query Expansion	7 Hours
Query E	xpansion: Relevance feedback, Rocchio algorithm, Probabilistic relevance feedback, Control of the Control of th	Query
Expansion	on and its types, Query drift	
Probabil	stic Information Retrieval: Probabilistic relevance feedback, Probability ranking princ	iple,
Binary I	ndependence Model, Bayesian network for text retrieval	
Unit:5	XML Indexing and Search	6 Hours

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B.Tech in Computer Science and Engineering

Unit :6	Web Information Retrieval	7 Hours
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Web Information Retrieval: Hypertext, web crawling, search engines, ranking, link analysis, PageRank, HITS.

Total Lecture Hours

39 Hours

TEXTBOOK

1. Introduction to Information Retrieval , Christopher D. Manning, Raghavan and Schutze, Cambridge University Press, 2008

Reference Books

2. Natural Language Processing And Information Retrieval, Tanveer Siddiqui and U. S. Tiwary, Oxford Higher Education, 2008

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

- 1. http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
- 2. https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

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B.Tech in Computer Science and Engineering

VI Semester

23CSE1644: PE-III: Optimization Techniques

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1 Achieve Knowledge of design and development of problem solving skills.
- 2 Understand the principles of optimization.
- 3 Design and develop analytical skills.
- 4 Summarize the Linear, Non-linear and Geometric Programming
- 5 Understands the concept of Dynamic programming and Genetic Algorithms.

Unit	Contents	Max. Hrs.
No.		
Unit:1	Introduction:	6Hours

Introduction to optimization, engineering applications of optimization, Formulation of structural optimization problems as programming problems. Optimization

Techniques: Classical optimization techniques, single variable optimization, multivariable optimization with no constraints, unconstrained minimization techniques and algorithms constrained optimization solutions by penalty function techniques, Lagrange multipliers techniques and feasibility techniques..

Unit:2 Linear Programming:

7 Hours

Linear programming, standard form of linear programming, geometry of linear programming problems, solution of a system of linear simultaneous equations, pivotal production of general systems of equations, simplex algorithms, revised simpler methods, duality in linear programming.

Unit:3 Non-linear programming:

7 Hours

Non-linear programming, one dimensional minimization methods, elimination methods, Fibonacci method, golden section method, interpolation methods, quadratic and cubic methods, Unconstrained optimization methods, direct search methods, random search methods, descent methods.

Unit:4 | Constrained optimization techniques:

7 Hours

Direct methods, the complex methods, cutting plane method, exterior penalty function methods for structural engineering problems. Formulation and solution of structural optimization problems by different technique

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Unit:5	Geometric programming & Dynamic programming	6 Hours
Geome progran	etric programming: Geometric programming, conversion of NLP as a sequence of L nming.	P/ geometric
Dynam progran	ic programming: Dynamic programming conversion of NLP as a sequence of L nming	LP/ Dynamic
Unit :6	Genetic Algorithm:	6 Hours
-	ation using genetic Algorithm, real coded gas, Advanced Gas, global optimization	n using GA,
•	ation using genetic Algorithm, real coded gas, Advanced Gas, global optimization tions to power system. Total Lecture Hours	39 Hours
-	ations to power system.	_
•	Total Lecture Hours	_
Applica Textbo	Total Lecture Hours	39 Hours
Applica	Total Lecture Hours oks	39 Hours c.,2009.

1	S.S. Rao, "Engineering Optimization – Theory and Practice", John Wiley & Sons, Inc.,2009.			
2	Hamdy A. Taha, Operations Research: An Introduction, 10th Edition, Pearson, 2016.			
3	David G. Luenberger, "Introduction to Linear and Nonlinear Programming", Addison-Wesley, 1973.			
Refere	ence Books			
1	Richard Bronson, "Operation Research"- Schaum's Outline Series			
2	Bhavikatti S.S "Structural optimization using sequential linear programming"- Vikas publishing house			
3	Spunt, "Optimum Structural Design"- Prentice Hall			

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B.Tech in Computer Science and Engineering

VI Semester

23CSE1645: PE-III: Human Computer Interaction

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Understand the basics of Human Computer Interaction.
- 2. Demonstrate the Understanding of Interaction between human and computer Components using screen designing concepts.
- 3. Apply the knowledge of human and computer components for interaction.
- 4. Evaluate System using different tools and techniques.

Unit No.	Contents	Max. Hrs.
Unit:1	The human	7 Hours

The human: Human memory, Thinking reasoning and problem solving, Individual differences, Psychology and the design of interactive systems, Interaction and paradigms: Models of interaction, Frame work and HCI, Ergonomics, Interaction styles, Elements of the WIMP(windows, icons, menus, pointers) interface, interactivity, The context of the interaction, paradigms for interaction.

Unit:2 Interaction Design 7 Hours

Interaction Design: What is interaction design, Good and poor design, The process of design, User focus, Scenarios, Navigation design, Understanding the problem space, Conceptualizing the design space, Theories, models and frameworks, Screen design and layout, Interaction and prototyping.

Unit:3 | HCI in software process and Design rules | 6 Hours

HCI in software process and Design rules: The software life cycle, Usability engineering, Iterative design and prototyping, Design rationale, Principles to support usability, Standards, Guidelines, Golden rules and heuristics, HCI patterns.

Unit:4 Implementation supports and Evaluation techniques 7 Hours

Implementation supports and Evaluation techniques: Elements of windowing system, Programming application, Using toolkits, User interface management systems, What is evaluation? Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, choosing evaluation methods, analytical evaluation.

Unit:5 Universal Design and User Support 6 Hours

Universal Design and User Support: Universal design principles, Multi-modal interaction, Design for diversity, Requirements of user support, Approach to user support, Adaptive help systems, Design user

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support systems.

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Unit :6	Cognitive Models and Distributed Cognition	6 Hours					
Cogniti	ve Models and Distributed Cognition: Goal and task hierarchies, Linguistics models, Cl	nallenges of					
display-	display-based systems, Physical models, Cognitive architectures, Scientific Foundation, Description, Case						
Study.	Study.						
	Total Lecture Hours	39 Hours					
	Total Lecture Hours	39 110urs					
Textbo	nks						
TCALDO	yk.y						
1	Human - Computer Interaction, Alan Dix, Janet Fincay, Gregory D. Abowd and Russell Bealg, Pearson Education, 2003.						
2	Designing the user interface, Ben Shneiderman, Pearson Education Asia, 2004						
Referen	ice Books						
1	Interaction Design, Preece and Rogers, Sharp, Wiley-India, 2008.						
2	The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech, 2009						
YCCE	e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]						
1	http://103.152.199.179/YCCE/e-						
	copies%20of%20books/7.Information%20Technology/25.BOOK1						
	Human_computer_interaction.pdf						
MOOC	s Links and additional reading, learning, video material -						
1	https://onlinecourses.nptel.ac.in/noc19_cs86/preview						

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SoE No. 23CSE-101

B.Tech in Computer Science and Engineering

VI Semester

23CSE1646: PE-III: Blockchain Technology

Course Outcomes:

Upon successful completion of the course the students will be able to

CO1: Recognize a conceptual understanding of blockchain technology and its potential to innovate and improve business processes

CO2: Implement cryptographic hashing techniques required in blockchain systems

CO3: Develop smart contract-based applications by applying the underlying principles

CO4: Design and develop public blockchains using Ethereum and private blockchains using

Hyperledger, demonstrating the ability to analyze requirements and build solutions.

CO5: Select and utilize appropriate tools for building and deploying blockchain applications, assessing their suitability for specific use cases

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Block chain	7 Hours

CIA triangle, What is a blockchain, Origin of blockchain (cryptographically secure hash functions), Foundation of blockchain: Merkle trees, Components of blockchain, Block in blockchain, Types: Public, Private, and Consortium, Consensus Protocol, Limitations and Challenges of blockchain

Cryptocurrency & Bitcoin blockchain Unit:2

7 Hours

Cryptocurrency: Cryptocurrency: Bitcoin, Altcoin, and Tokens (Utility and Security), Cryptocurrency wallets: Hot and cold wallets, Cryptocurrency usage, Transactions in Blockchain, UTXO and double spending problem.

Bitcoin blockchain: Consensus in Bitcoin, Proof-of-Work (PoW), Proof-of-Burn (PoB), Proof-of-Stake (PoS), and Proof-of-Elapsed Time (PoET), Life of a miner, Mining difficulty, Mining pool and its methods

Unit:3 | Programming for Blockchain & Introduction to Programming

7 Hours

Programming for Blockchain: Introduction to Smart Contracts, Types of Smart Contracts, Structure of a Smart Contract, Smart Contract Approaches, Limitations of Smart Contracts.

Introduction to Programming: Solidity Programming – Basics, functions, Visibility and Activity Qualifiers, Address and Address Payable, Bytes and Enums, Arrays-Fixed and Dynamic Arrays. Special Arrays-Bytes and strings, Struct, Mapping, Inheritance, Error handling.

Unit:4 | Public Blockchain

6 Hours

Introduction to Public Blockchain, Ethereum and its Components, Mining in Ethereum, Ethereum Virtual Machine (EVM), Transaction, Accounts, Architecture and Workflow, Comparison between Bitcoin and Ethereum . Types of test-networks used in Ethereum, Transferring Ethers using Metamask, Mist Wallet, Ethereum frameworks.

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Unit:5 | Private Blockchain

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7 Hours

Introdu	ction, Key characteristics, Need of Private Blockchain, Smart Contract in Private	Environment,
State M	Machine Replication, Consensus Algorithms for Private Blockchain - PAXOS and RAI	FT, Byzantine
	Byzantine Fault Tolerant (BFT) and Practical BFT. Introduction to Hyperledge	
	works, Comparison between Hyperledger Fabric & Other Technologies. Hyperledger	
	ecture, Components of Hyperledger Fabric: MSP, Chain Codes, Transaction Flow,	edger rabile
		Z TT
Unit:6	Tools and Applications of Blockchain	6 Hours
Corda	Ripple, Quorum and other Emerging Blockchain Platforms, Blockchain in DeFi: Case	Study on any
	Blockchain Platforms.	Study on any
or the L	Siockchain I lationnis.	
	Total Lecture Hours	39 Hours
	Total Lecture Hours	37 110013
		L
Textbo	noks	
ICALDU	our?	
1 Bl	ockchain Technology, Chandramouli Subramanian, Asha A. George, Abhillash K.	A and Meena
_	arthikeyen Universities Press	i did iviodid
	-	
2 M	astering Ethereum, Building Smart Contract and Dapps, Andreas M. Antonopoulo	s Dr. Gavin
W	ood, O'reilly	
D 6		
Refere	nce Books	
1 Bl	ockchain for Beginners, Yathish R and Tejaswini N, SPD	
I DI	ockenam for Beginners, Yaunish R and Tejaswini N, SPD	
2 B1	ockchain with Hyperledger Fabric, Luc Desrosiers, Nitin Gaur, Salman A. Baset,	Venkatraman
	amakrishna Packet Publishing	v Clikati alliali
Ka	amakrishna Packet Publishing	
VCCE	e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
ICCE	C- IIDIAI Y DOOK IIIKS [ACCESSIDEE FROM COLLEGE CAMITOS]	
1 htt	tp://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-	
	pies%20of%20books/Computer%20Science%20and%20Engineering/	
	pics/02001/020000ks/Computer/020science/020and/020Lingmeering/	
MOOC	Cs Links and additional reading, learning, video material	
MOOC	es Links and additional reading, learning, video material	
1 htt	tps://nptel.ac.in/courses/106105235	
-		
2 htt	tps://onlinecourses.nptel.ac.in/noc22 cs44/preview	
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Unit:5

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SoE No. 23CSE-101

6 Hours

B.Tech in Computer Science and Engineering

VI Semester 23CSE1647: PE-III: Bioinformatics

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. **Explain** the fundamental concepts of bioinformatics including sequencing, genome projects, pattern recognition, and the folding problem.
- 2. **Utilize** biological databases and protein information resources to retrieve and interpret sequence and structure data.
- 3. **Analyze** DNA sequence data and gene structures using genome information resources and EST analysis techniques.
- 4. **Evaluate** sequence alignment techniques including pairwise and multiple sequence alignment to determine identity, similarity, and consensus.
- 5. **Design** a basic drug discovery framework by integrating tools and approaches from bioinformatics to solve case-based problems.

solv	e case-based problems.	
Unit No.	Contents	Max. Hrs.
Unit:1		7 Hours
an pred	ction: Definitions, Sequencing, Biological sequence/structure, Genome Projects, Pattern liction, Folding problem, Sequence Analysis, Homology and Analogy, conversion otes and eukaryotes.	_
Unit:2		7 Hours
database	ew of protein structure Protein Information Resources Biological databases, Primares, Protein Sequence databases, Secondary databases, Protein pattern databases, and eation databases.	• •
Unit:3		7 Hours
analysis analysis	E Information Resources DNA sequence databases, specialized genomic resources DNA importance of DNA analysis, Gene structure and DNA sequences, Features of DNA, EST (Expressed Sequence Tag) searches, Gene hunting, Profile of a cell, EST analysis as on DNA databases.	A sequence
Unit:4		6 Hours
Compar	se alignment techniques Database searching, Alphabets and complexity, Algorithm and two sequences, sub-sequences, Identity and similarity, The Dotplot, Local ty working with BLAST and FASTA	

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Multiple sequence alignment Definition and Goal, The consensus, computational complexity, Manual



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	ods, Simultaneous methods, Progressive methods, Databases of Multiple alignments and	d searching
	ing with DNA microarray, Gene Clustering.	
Unit:	6	6 Hours
D	Discourse To the facility Description Assess that Leavest A. Description	
_	Discovery Technologies, Drug Designing Approaches, Important Parameter In Drug Discovery of Various Tools	covery, And
Case	Study of Various Tools. Total Lecture Hours	39 Hours
	Total Lecture Hours	39 Hours
Textb	ooks	
1.	Introduction to Bioinformatics - by T K Attwood & D J Parry ,Smith Addison Wesley Le Publication	ongman
2.	Bioinformatics Methods And Applications: Genomics Proteomics And Drug Discovery, Rastogi, Parag Rastogi, Namita Mendiratta, PHI Learning Pvt. Ltd	S. C.
3.	Bioinformatics- A Beginner's Guide ,Jean-Michel Claveriw, Cerdric Notredame ,WILEY dreamlech India Pvt. Ltd	Y
Refer	ence Books	
1.	Bioinformatics ,David Mount ,Cold Spring Harbor Laboratory Press	
2.	Introduction to Bioinformatics ,M. Lesk ,OXFORD publishers (Indian Edition	
YCC	E e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1		
MOO	Cs Links and additional reading, learning, video material	
1		

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B.Tech in Computer Science and Engineering

VI Semester

23CSE1648: PE-III: Software Defined Networking

Course Outcomes:

Upon successful completion of the course the students will be able

- CO1 Examine the challenges and opportunities associated with adopting SDN compared to traditional approaches to networking
- CO2 Analyse the functions and components of the SDN architecture
- CO3 Discuss the major requirements of the design of an SDN protocol.
- CO4 Design and create an SDN network consisting of SDN switches and a centralized controller.
- CO5 Analyse the performance of the SDN network by using verification and troubleshooting techniques.

Unit No.	Contents	Max. Hrs.
Unit:1	INTRODUCTION TO SDN	7 Hours

Overview; History and evolution of SDN; Architecture of SDN; SDN Flavours; Scalability (Data Centres, Service provider networks, ISP Automation); Reliability (QoS, and Service Availability); Consistency (Configuration management, and Access Control Violations); Opportunities and Challenges

Unit:2 | ARCHITECTURE | 5 Hours

Network Operating System (NOS). SDN Architecture. Planes - data, management and control. Interfaces - northbound and southbound.

Unit:3 PROTOCOLS 7 Hours

Languages and functions available for programming SDNs, northbound API. Mininet. Software vs. Hardware SDN switch implementations - Open vSwitch, WhiteBox, ONL. Controller implementations - POX, NOX, Beacon, Floodlight. Special Purpose controllers - Flowvisor, RouteFlow.

Unit:4 DESIGN AND DEVELOPMENT 7 Hours

Network Programmability - Network Function Virtualization - NetApp Development, Network Slicing, SDX; Northbound Application Programming Interface, Current Languages and Tools, Composition of SDNs.

Unit:5 PROGRAMMING 7 Hours

Network Virtualization, Network Topology and Topological Information Abstraction, Data Centric Traffic Management, Wide Area Traffic Management, Wireless networks

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U	nit :6 SDN	APPLICATIONS AND USE CASES	6 Hours
		ata Center - SDN in Other Environments - SDN Applications - SDN Use Case	s - The Open
N	etwork Oper	rating System 3	
		Total Lecture Hours	39 Hours
T	extbooks		1
1		, Paul, Chuck Black, and Timothy Culver. Software defined networks: a compress edition, Morgan Kaufmann, 2016.	ehensive
R	eference Bo	oks	
1	•	Villiam. Foundations of modern networking: SDN, NFV, QoE, IoT, and Cloud, 1 (esley Professional, 2015.	st edition,
2	Oswald Col Packt Publi	ker, Siamak Azodolmolky. Software-Defined Networking with OpenFlow - Secoshing, 2017	ond Edition,
Y	CCE e- libr	ary book links [ACCESSIBLE FROM COLLEGE CAMPUS	
1	http://link.s	pringer.com/openurl?genre=book&isbn=978-1-4613-6193-0	
2	https://onlin	nelibrary.wiley.com/doi/book/10.1002/9780470168042	
M	IOOCs Link	cs and additional reading, learning, video material	
1	nptel.ac.in/o	courses/106105183	
2	d=780940A	v.bing.com/videos/riverview/relatedvideo?q=Software+Defined+Networking+N&01AE71CDD241780940A801AE71CDD241&mcid=2159391F7A2C47D39F9	
	ED8E&FO	<u>RM=VIRE</u>	

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B.Tech in Computer Science and Engineering

VI Semester

23CSE1649: PE-III : Soft Computing

Course Outcomes:

Upon successful completion of the course the students will be able

- CO1: Learn about soft computing techniques and their applications
- CO2: Analyze various neural network architectures
- CO3: Apply concepts of fuzzy relations and fuzzification techniques to real-world problems.
- CO4: Design and apply Genetic Algorithms for multi-level optimization problems in diverse application domains.
- CO5: Evaluate and compare the performance of different types of hybrid systems in diverse application areas.

CO6: Understand the concept of LR-type fuzzy numbers and their role in fuzzy neural networks.

Unit No.	Contents	Max. Hrs.
Unit:1 1	Introduction to Soft Computing:	7 Hours
7	What is Soft Computing? Difference between Hard and Soft computing,	
I	Requirement of Soft computing, Major Areas of Soft Computing, Applications of	
S	Soft Computing.	
Unit:2 I	Neural Networks:	7 Hours
	What is Neural Network, Learning rules and various activation functions, Single	
	layer Perceptron's, Back Propagation networks, Architecture of Back propagation	
	(BP) Networks, Back propagation Learning, Variation of Standard Back propagation	
	Neural Network, Introduction to Associative Memory, Adaptive Resonance theory	
	and Self Organizing Map, Recent Applications.	
	Fuzzy Systems:	7 Hours
	Fuzzy Set theory, Fuzzy versus Crisp set, Fuzzy Relation, Fuzzification, Min max	
	Composition, Defuzzification Method, Fuzzy Logic, Fuzzy Rule based systems,	
	Predicate logic, Fuzzy Decision Making, Fuzzy Control Systems, Fuzzy	
	Classification	
	Genetic Algorithm:	6 Hours
	History of Genetic Algorithms (GA), Working Principle, Various Encoding methods,	
	Fitness function, GA Operators- Reproduction, Crossover, Mutation, Convergence of	
	GA, Bit wise operation in GA, Multi-level Optimization.	
	Hybrid Systems:	7 Hours
	Sequential Hybrid Systems, Auxiliary Hybrid Systems, Embedded Hybrid Systems,	
	Neuro-Fuzzy Hybrid Systems, Neuro-Genetic Hybrid Systems, Fuzzy-Genetic	
	Hybrid Systems.	<i>(</i>)
	GA based Back propagation Networks:	6 Hours
	GA based Weight Determination, K - factor determination in Columns. Fuzzy Back	
	Propagation Networks: LR type Fuzzy numbers, Fuzzy Neuron, Fuzzy BP	
	Architecture, Learning in Fuzzy BP, Application of Fuzzy BP Networks.	20 11
	Total Lecture Hours	39 Hours

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Textb	ooks
1	S.N. Sivanandam & S.N. Deepa, Principles of Soft Computing, Wiley Publications, 2nd Edition, 2011.
2	S, Rajasekaran & G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & applications, PHI Publication, 1st Edition, 2009.
Refer	ence Books
1	Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications, S.Rajasekaran, G. A. Vijayalakshami, PHI.
2	Genetic Algorithms: Search and Optimization, E. Goldberg.
3	Neuro-Fuzzy Systems, Chin Teng Lin, C. S. George Lee, PHI.
4	Build Neural Network With MS Excel sample by Joe choong.
YCCI	E e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	
MOO	Cs Links and additional reading, learning, video material
1	https://onlinecourses.nptel.ac.in/noc22_cs54/preview
2	https://onlinecourses.swayam2.ac.in/ntr25_ed63/preview

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VI Semester

23CSE1661: PE IV : GPU architecture and Programming

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Understand CPU vs. GPU architectures and the basics of GPU parallel processing with CUDA.
- 2. Understand OpenCL for heterogeneous computing and its use in high-performance applications like neural networks.
- 3. Analyze CUDA kernel performance, identify bottlenecks (divergence, memory), and apply basic optimizations.
- 4. Evaluate and apply advanced CUDA optimizations (kernel fusion, thread/block config) for better performance.
- 5. Develop basic parallel CUDA algorithms using GPU threads, blocks, and synchronization.

Unit:1 | Fundamentals of Parallel Computer Architecture

6 Hours

Fundamentals of Parallel Computer Architecture : Review of Traditional Computer Architecture: Basic five-stage RISC Pipeline, Cache Memory, Register File, SIMD instructions, Introduction to GPU Architectures: Streaming Multiprocessors (SMs), Cache Hierarchy.

Unit:2 | The GPU Programming Model

6 Hours

The GPU Programming Model: The Graphics Pipeline: Understanding its evolution and relevance to general-purpose GPU computing, Introduction to CUDA Programming: Core concepts and execution model.

Unit:3 | CUDA Programming Basics

6 Hours

CUDA Programming Basics : Multi-dimensional Mapping of Dataspace to GPU threads and blocks, Synchronization in CUDA: Thread and Block level synchronization mechanisms.

Unit:4 CUDA Kernel Optimization- Part 1

7 Hours

CUDA Kernel Optimization - Part 1: Warp Scheduling and Handling Divergence in CUDA kernels, Memory Access Optimization: Understanding and implementing Memory Access Coalescing.

Unit:5 | CUDA Kernel Optimization -- Part 2

7 Hours

CUDA Kernel Optimization - Part 2: Optimization Examples: Detailed analysis and optimization of Reduction Kernels, Optimization Techniques: Kernel Fusion strategies for improved performance, Thread and Block Level Optimizations: Choosing optimal configurations for different scenarios.

Unit: 6 Heterogeneous Computing and Applications

7 Hours

Heterogeneous Computing and Applications: OpenCL Basics: Platform, Device, Context, Command Queue, Kernel, OpenCL for Heterogeneous Computing: Leveraging CPUs, GPUs, and other accelerators, Application Design: Exploring efficient Neural Network Training and/or Inferencing strategies using parallel computing concepts (potentially touching upon both CUDA and OpenCL).

Total Lecture Hours

45 Hours

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Textboo	ks							
1	Professional CUDA C Programming, John Cheng							
2	An Introduction to General-Purpose GPU Programming, Jason Sanders							
Referen	Reference books							
1	CUDA by Example: An Introduction to General-Purpose GPU Programming ,1st Edition,by Jason Sanders (Author), Edward Kandrot (Author)							
MOOCS	Links and additional reading, learning, video material							
1	https://onlinecourses.nptel.ac.in/noc20_cs41/preview							
2	https://enccs.github.io/cuda/3.01 ParallelReduction/							

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B.Tech in Computer Science and Engineering

VI Semester

23CSE1662: PE IV : Quantum Computing

Course Outcomes:

Upon successful completion of the course the students will be able to:

- 1. Understand the basic concepts in Quantum Computing.
- 2. Study and apply various Quantum Algorithms.
- 3. Understand Quantum noise and errors, Fault-tolerance and Cryptography.
- 4. Implement Quantum Algorithms and circuits.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Quantum Computing	6 Hours
Quantui	m bits, Bloch sphere representation of a qubit, multiple qubits.	
Unit:2	Background Mathematics and Physics	7 Hours
Hilbert	space, Probabilities and measurements, entanglement, density operators and correlation	on, basics of
quantun	n mechanics, Measurements in bases other than computational basis.	
Unit:3	Quantum Circuits	7 Hours
	al boolean circuits, Arithmetic circuits, quantum circuits, single qubit gates, multiple of quantum circuits, Ordering of qubits in quantum circuits.	qubit gates,
Unit:4	Quantum Information and Cryptography	7 Hours
_	ison between classical and quantum information theory. Bell states. Introduction , Quantum teleportation. Quantum Cryptography, no cloning theorem.	to Shannon
Unit:5	Quantum Algorithms	6 Hours
Classic	al computation on quantum computers. Relationship between quantum and classical Deutsch's algorithm, Deutsch's-Jozsa algorithm, Shor factorization, Grover search	complexity
10000		
classes.		
classes. Unit:6	Noise and error correction	7 Hours
Unit:6 Graph s		

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Te	xtbooks
1	"Quantum Computation and Quantum Information", Nielsen M. A., Cambridge University Press.
2	"Quantum Computing For Everyone", Chris Bernhardt, MIT Press.
Re	ference Books
1	"Principles of Quantum Computation and Information" Benenti G., Casati G. and Strini G., Vol. I: Basic Concepts, Vol II: Basic Tools and Special Topics, World Scientific., 2004.
Y	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
M	OOCs Links and additional reading, learning, video material
1	https://onlinecourses.nptel.ac.in/noc21_cs103/preview
2	https://onlinecourses.nptel.ac.in/noc19_cy31/preview

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B.Tech in Computer Science and Engineering

VI Semester

23CSE1663: PE IV : Prompt Engineering

Course Outcomes

CO-1: Explain the fundamentals of large language models (LLMs), types of prompting, and associated challenges.

CO-2: Design effective prompts using optimization techniques and appropriate tools for various NLP tasks.

CO-3: Demonstrate advanced prompting strategies such as CoT, ReAct, and Tree of Thoughts to enable multi-step reasoning.

CO-4: Develop prompt-based solutions for specialized applications like creative writing, coding, and data analysis using appropriate tools and techniques.

CO-5: Evaluate prompt effectiveness and apply ethical considerations to mitigate bias, hallucination, and adversarial risks.

Unit No.	Contents	Max. Hrs.
Unit 1	Introduction to Prompt Engineering (Basics of LLMs)	7 Hrs

Evolution of Large Language Models (LLMs): GPT, BERT, T5, What is a Prompt? How LLMs Interpret Prompts, Types of Prompting: Zero-shot, One-shot, Few-shot, Basics of Tokenization, Context Windows, Challenges: Bias, Hallucination, Length Constraints, Tools: OpenAI Playground, Hugging Face models

UNIT 2 | **Prompt Design and Optimization Techniques**

7 Hrs

Components of a Good Prompt: Clarity, Context, Instructions, Techniques: Instruction-based Prompting, Role Prompting, Context Setting, Methods for prompt refinement and optimization, Prompt Iteration, Evaluation, and Debugging, Case Studies: Crafting prompts for different tasks (Summarization, Translation, QA)

UNIT 3 | Advanced Prompting Strategies

6 Hrs

Chain-of-Thought (CoT) Prompting, Self-Consistency Prompting, Tree of Thoughts (ToT) prompting, ReAct (Reasoning + Acting) framework, Meta-Prompting and Automatic Prompt Generation, Multi-step Reasoning and Planning

UNIT 4 | Specialized Prompting Applications

7 Hrs

Prompting for: Creative Writing (Story generation, Poetry), Coding and Code Generation (Codex, Copilot), Data Extraction and Analysis, Image Generation (using DALL-E, MidJourney prompts), Fine-tuning vs

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Prompt-tu	Prompt-tuning: Differences and Practical Considerations, Using Retrieval-Augmented Generation (RAG)						
with Prom	with Prompts						
*******		C * *					
UNIT 5	Evaluation, Bias, and Ethics in Prompt Engineering	6 Hrs					
E 1 .:		. D.					
Evaluation	Metrics for Prompt Effectiveness: Accuracy, Fluency, Factuality, Coherence, Detecti	ing Bias					
and Hallud	cination in LLM outputs, Mitigation strategies for safe prompt design, Adversarial Promp	ting and					
Jailbreakir	ng, Ethical Considerations: Plagiarism, Misinformation						
UNIT 6:	Future of Prompt Engineering and Hands-on Project	7 Hrs					
Trends: A	Trends: Agents, Tool Use, Plugins (e.g., OpenAI Plugins, LangChain), AutoGPT, BabyAGI: Automating						
Prompt Ch	Prompt Chaining, Designing Prompt-based Workflows (Marketing, HR, Legal, etc.)						
	1 6 6 6 1 (*****************************						
	Total No.Of Lectures	39 Hr					

Tex	xt books
1.	"The Art of Prompt Engineering with ChatGPT" by Nathan Hunter
2.	"Prompt Engineering for Generative AI: Harnessing the Power of LLMs" by Sinan Ozdemir (O'Reilly, 2023)
Re	ference Books
1.	Prompt Engineering Guide" (https://www.promptingguide.ai/)
2.	"Chain-of-Thought Prompting Elicits Reasoning in LLMs" (Google Research Paper)
3.	OpenAI Documentation and Best Practices

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B.Tech in Computer Science and Engineering

VI Semester

23CSE1664: PE IV : Nature Inspired Computing

Course Outcomes:

Upon successful completion of the course the students will be able to

CO1: Understand the foundational principles and characteristics of nature-inspired computing including emergence, self-organization, and complexity.

CO2: Apply evolutionary, swarm-based, and immune-inspired algorithms to optimization and problem-solving scenarios.

CO3: Analyze the structure and functioning of DNA computing models and their application to complex computational problems.

CO4: Examine and compare the principles and computational capabilities of natural intelligent computing systems such as cellular automata, biological, and quantum computers.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Nature Computing	6 Hours

INTRODUCTION: From Nature to Nature Computing, Philosophy, Three Branches: A Brief Overview, Individuals, Entities and agents - Parallelism and Distributivity Interactivity, Adaptation-Feedback-Self-Organization-Complexity, Emergence and Bottom-up Vs Top-Down-Determination, Chaos and Fractals.

Unit:2 | Computing Inspired by Nature

7 Hours

Computing Inspired by Nature: Evolutionary Computing, Hill Climbing and Simulated Annealing, Darwin's Dangerous Idea, Genetics Principles, Standard Evolutionary Algorithm -Genetic Algorithms, Reproduction-Crossover, Mutation, Evolutionary Programming, Genetic Programming

Unit:3 | SWARM INTELLIGENCE

6 Hours

Swarm Intelligence: Introduction - Ant Colonies, Ant Foraging Behavior, Ant Colony Optimization, SACO and scope of ACO algorithms, Ant Colony Algorithm (ACA), Swarm Robotics, Foraging for food, Social Adaptation of Knowledge, Particle Swarm Optimization (PSO)

Unit:4 | IMMUNOCOMPUTING

7 Hours

Immunocomputing: Introduction- Immune System, Physiology and main components, Pattern Recognition and Binding, Immune Network Theory- Danger Theory, Evaluation Interaction- Immune Algorithms, Introduction – Genetic algorithms, Bone Marrow Models, Forest's Algorithm, Artificial Immune Networks

Unit:5 | COMPUTING WITH NEW NATURAL MATERIALS

7 Hours

Computing With New Natural Materials: DNA Computing: Motivation, DNA Molecule, Adleman's experiment, Test tube programming language, Universal DNA Computers, PAM Model, Splicing Systems, Lipton's Solution to SAT Problem, Scope of DNA Computing, From Classical to DNA Computing

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Unit:6

NIC COMPUTERS

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6 Hours

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Introduction to NIC Computers, Cellular automata, Biological computers, Quantum computers. Examples

То	tal Lecture Hours	39Hours
Te	xtbooks	
1	Leandro Nunes de Castro, "Fundamentals of Natural Computing, Basic Concepts, Al Applications", Chapman & Hall/CRC, Taylor and Francis Group, 2007.	lgorithms an
Re	ference Books	
1	Floreano D. and Mattiussi C., "Bio-Inspired Artificial Intelligence: Theories, M Technologies", MIT Press, Cambridge, MA, 2008.	Methods, ar
2	Albert Y.Zomaya, "Handbook of Nature-Inspired and Innovative Computing", Springer, 2	2006.
3	Marco Dorrigo, Thomas Stutzle," Ant Colony Optimization", PHI,2005	
YC	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1		
M	OOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_me43/preview	

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B.Tech in Computer Science and Engineering

VI Semester

23CSE1665: PE IV: Distributed Computing

Course Outcomes:

Upon successful completion of the course the students will be able to

CO1: Understand the fundamental concepts and architecture of distributed systems, including communication models, execution types, and system components.

CO2: Apply logical time concepts and global state detection techniques such as vector clocks, leader election algorithms, and snapshot algorithms in distributed environments.

CO3: Analyze and evaluate distributed mutual exclusion and deadlock detection algorithms, including token-based and quorum-based methods.

CO4: Demonstrate knowledge of consensus protocols and fault recovery mechanisms like checkpointing and rollback in both synchronous and asynchronous systems.

CO5: Explore and assess the design and working of distributed shared memory, distributed file systems, and cloud computing technologies with real-world case studies.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction	7 Hours

Introduction: Definition-Relation to Computer System Components – Motivation – Message -Passing Systems versus Shared Memory Systems – Primitives for Distributed Communication – Synchronous versus Asynchronous Executions – Design Issues and Challenges; A Model of Distributed Computations: A Distributed Program – A Model of Distributed Executions – Models of Communication Networks – Global State of a Distributed System.

Unit:2 LOGICAL TIME AND GLOBAL STATE

7 Hours

Logical time – A framework for a system of logical clocks, Scalar time, Vector time. Leader election algorithm – Bully algorithm, Ring algorithm. Global state and snapshot recording algorithms – System model and definitions, Snapshot algorithm for FIFO channels – Chandy Lamport algorithm. Termination detection – System model of a distributed computation, Termination detection using distributed snapshots, Termination detection by weight throwing, Spanning-tree-based algorithm.

Unit:3 DISTRIBUTED MUTEX AND DEADLOCK

7 Hours

Distributed mutual exclusion algorithms – System model, Requirements of mutual exclusion algorithm. Lamport's algorithm, Ricart–Agrawala algorithm, Quorum-based mutual exclusion algorithms – Maekawa's algorithm. Token-based algorithm – Suzuki–Kasami's broadcast algorithm. Deadlock detection in distributed systems – System model, Deadlock handling strategies, Issues in deadlock detection, Models of deadlocks.

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Unit:4 | CONSENSUS AND RECOVERY 7 Hours Consensus and Agreement Algorithms: Problem Definition - Overview of Results - Agreement in a Failure-Free System (Synchronous and Asynchronous) - Agreement in Synchronous Systems with Failures; Checkpointing and Rollback Recovery: Introduction – Background and Definitions – Issues in Failure Recovery - Checkpoint-based Recovery - Coordinated Checkpointing Algorithm -– Algorithm for Asynchronous Checkpointing and Recovery DISTRIBUTED SHARED MEMORY AND FILE SYSTEM 6 Hours Distributed shared memory - Abstraction and advantages. Shared memory mutual exclusion - Lamport's bakery algorithm. Check pointing and rollback recovery – System model, consistent and inconsistent states, different types of messages, Issues in failure recovery, checkpoint-based recovery, log-based roll back recovery. Distributed file system - File service architecture, Case studies: Sun Network File System, Andrew File System, Google File System. Unit:6 CLOUD COMPUTING 6 Hours Definition of Cloud Computing - Characteristics of Cloud - Cloud Deployment Models - Cloud Service Models - Driving Factors and Challenges of Cloud - Virtualization - Load Balancing -Scalability and Elasticity - Replication - Monitoring - Cloud Services and Platforms: Compute Services – Storage Services – Application Services **Total Lecture Hours** 39 Hours **Textbooks** Ajay D. Kshemkalyani and Mukesh Singhal, Distributed Computing: Principles, Algorithms, and Systems, Cambridge University Press, 2011. Mukesh Singhal, Niranjan G Shivaratri, "Advanced Concepts in Operating systems", McGraw Hill Publishers, 1994. **Reference Books** George Coulouris, Jean Dollimore, Time Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012. Pradeep L Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007. Tanenbaum A S, Van Steen M, "Distributed Systems: Principles and Paradigms", Pearson Education, 2007. YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0

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https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

MOOCs Links and additional reading, learning, video material

https://onlinecourses.nptel.ac.in/noc21 cs87/preview



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B.Tech in Computer Science and Engineering

VI Semester

23CSE1666: PE IV: Industry 4.0

Course Outcomes:

Upon successful completion of the course the students will be able to:

CO1: Understand the Fundamentals of Industry 4.0 and IIoT

CO2: Analyze IIoT Architectures and Business Models

CO3: Implement Data Analytics and Machine Learning in Industrial Applications

CO4: Assess Security Challenges and Implement Solutions in IIoT Systems

CO5: Design and Evaluate IIoT Applications Across Various Industries

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction	7 Hours

Introduction to Sensing & Actuation, IoT Connectivity, IoT Networking, Industry 4.0: Globalization and Emerging Issues, The Fourth Revolution, LEAN Production Systems, Smart and Connected business perspective, smart factories.

Unit:2 | Basics of Industry 4.0

7 Hours

Cyber Physical Systems and Next Generation Sensors, Collaborative Platform and Product Lifecycle Management, Augmented Reality and Virtual Reality, Artifical Intelligence, Big Data and Advanced Analysis, Cyber-Security in Industry 4.0, Industrial Processes, Industrial Sensing & Actuation, Industrial Internet Systems.

Unit:3 Business Model and Reference

6 Hours

Business Model and Reference Architecture: IIoT-Business Models, IIoT Reference Architecture, Industrial IoT- Layers: IIoT Sensing, IIoT Processing, IIoT Communication, IIoT Networking.

Unit:4 Business issues in Industry 4.0

6 Hours

Business issues in Industry 4.0:IIoT case studies, Opportunities and Challenges, Future of Works and

Skills for Workers in the Industry 4.0 Era, Strategies for competing in an Industry 4.0 world.

Unit:5 | Security and Fog Computing

7 Hours

Cloud Computing in IIoT, Fog Computing in IIoT, Security in IIoT, Industrial IoT- Application Domains: Factories and Assembly Line, Food Industry, Healthcare, Power Plants, Inventory Management & Quality Control, Plant Safety and Security (Including AR and VR safety applications), Facility Management.

Unit:6 Industrial IOT Case Studies

7 Hours

Industrial IOT- Application domain: Milk Processing and Packaging Industries, Manufacturing Industries, Virtual Reality Lab, Steel Technology Lab, Oil, chemical and pharmaceutical industry, Applications of UAVs in Industries.

Total Lecture Hours

39 Hours

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Textb	ooks
1.	"Industry 4.0: The Industrial Internet of Things", by Alasdair Gilchrist (Apress)
2.	"Industrial Internet of Things: Cybermanufacturing Systems" by Sabina Jeschke, Christian Brecher, Houbing Song, Danda B. Rawat (Springer)
Refere	ence Books
1.	Introduction to IOT Latest S.Misra , A. Mukherjee, A.Roy, 2020
2.	Introduction to Industrial Internet of Things and Industry S. Misra, C. Roy, and A. Mukherjee, 2020.
3.	Industry 4.0 Sustainable Industrial Approach, Bansal Dr. Vikram, Deepthi B., 2025
YCCE	e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] –
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/21.405352151-Industry-4-0-The-Industrial-Internet-of-Things-Apress-2016.pdf
2	
MOO	Cs Links and additional reading, learning, video material
1	https://onlinecourses.nptel.ac.in/noc20_cs69/preview
2	https://onlinecourses.nptel.ac.in/noc21_ee85/preview
3	

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VI Semester

23CSE1667: PE IV: Distributed Database Management System

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Describe the fundamental concepts and architectural models of distributed database systems.
- 2. Compare various data distribution strategies and apply fragmentation and allocation techniques in distributed database design.
- 3. Analyze and decompose distributed queries considering localization and optimization techniques.
- 4. Demonstrate the ability to manage distributed transactions with appropriate concurrency control and deadlock handling mechanisms.
- 5. Evaluate fault tolerance and recovery techniques in distributed and parallel database systems.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction	7 Hours

Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas. **Distributed DBMS Architecture:**-Architectural Models for Distributed DBMS, DDMBS Architecture. **Distributed Database Design:**-Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation.

Unit:2 Data Distribution Alternatives, Fragmentation and Distribution transparency 7 Hours

Data Distribution Alternatives:-Design Alternatives – localized data, distributed data **Fragmentation** – Vertical, Horizontal (primary & derived), hybrid, general guidelines, correctness rules

Distribution transparency – location, fragmentation, replication, Impact of distribution on user queries –

No Global Data, Dictionary(GDD), GDD containing location information, Example on fragmentation

Unit:3 Query processing and decomposition and Distributed query Optimization

7 Hours

Query processing and decomposition:-Query processing objectives, characterization of query processors, layers of query processing, query decomposition, localization of distributed data.

Distributed query Optimization:-Query optimization, centralized query optimization, distributed query optimization algorithms

Unit:4 Transaction Management

7 Hours

Definition, properties of transaction, types of transactions, distributed concurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency control Algorithms, deadlock Management.

Unit:5 Distributed DBMS Reliability and Parallel Database Systems

6 Hours

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Unit:6

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6 Hours

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Distributed DBMS Reliability:-Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols, site failures and network partitioning.

Parallel Database Systems:-Parallel database system architectures, parallel data placement, parallel query processing, load balancing, database clusters.

Distributed Deadlock & Recovery and Recovery in DBMS

Dist	ributed Deadlock & Recovery:- Deadlock concept, Deadlock in Centralized systems, Deadlock in ributed Systems – Detection, Prevention, Avoidance, Wait-Die Algorithm, Wound-Wait algorithm overy in DBMS - Types of Failure, Methods to control failure, Different techniques of recoverability,
	e- Ahead logging Protocol.
	Total Lecture Hours 39 Hours
Text	books
1	M. Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
2	Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGraw Hill.
Refe	erence Books
1	Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: "Database Systems: The Complete Book", Second Edition, Pearson International Edition

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VI Semester 23CSE1668: PE IV : Data Mining

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1. Define **data mining** and understand its significance in business, research, and technology.
- 2. Gain skills in data cleaning, normalization, and transformation, and will learn to perform exploratory data analysis using visualization techniques.
- 3. Apply data mining algorithms on sample datasets.
- 4. Evaluate and validate models using techniques like cross-validation, confusion matrices, and performance metrics such as precision, recall, and F1 score..

Unit No.	Contents	Max. Hrs.
Unit:1	Data Mining Introduction	7 Hours

Introduction to data mining, Process of data mining, Data Mining Functionalities, Data Pre-processing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation, Classification of Data Mining systems, Data Mining Task primitives, Major issues in Data Mining, Applications of Data Mining

Unit:2 Mining Frequent Patterns and Association Rules

5 Hours

Market Basket Analysis, Frequent Item sets and Association rules, APriori Algorithm, Improving the efficiency of Apriori, FP- growth Algorithm

Unit:3 Classification and prediction

6 Hours

Classification: Introduction, decision tree, building a decision tree- the tree induction algorithm, split algorithm based on information theory, gini index, over fitting and pruning, Bayesian Classification – Rule Based Classification – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods.

Unit:4 | Clustering

7 Hours

Types of data in cluster analysis, Categorization of major clustering methods:Partitioning methods, Hierarchical methods, Applications of clustering.

Unit:5 | Mining Web Data, Text mining, Spatial data

7Hours

Mining the World Wide Web: Web Content Mining, Web Structure Mining, Web UsageMining, introduction to Text Mining and Spatial Data Mining

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Unit :6	Sequence Mining & Visualization:.	7 Hours
Pattern o	liscovery and data representation, Identifying frequent sequences in data, time series	data mining,
visualiza data.	ation techniques: Methods like heatmaps, timelines, and network graphs to represent	sequential
uata.	Total Lecture Hours	39 Hours
Textboo	ks	
1.	Introduction to Data Mining, Tan, Steinbach and Vipin Kumar, Pearson Education	, 2016
2.	Data Mining: Concepts and Techniques, Pei, Han and Kamber, Elsevier, 2011	
Referen	ce Books	
1	Data Mining: Practical Machine Learning Tools and Techniques Ian H. Witten & Eibe Frank, latest edition	
2	Mining the Social Web, Matthew A. Russell, O'relly publication, latest edition	
3		
YCCE 6	- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] –	
1		
MOOC	S Links and additional reading, learning, video material -	
1	https://onlinecourses.nptel.ac.in/noc21_cs06/preview	

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VI Semester 23CSE1669: PE IV: Product Development (Industry Aligned)

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SoE No. 23CSE-101

VI Semester

MDM4CSE104: Programming Framework for Computer Vision

Course Outcomes:

001 11 1	ssful completion of the course the students will be able	
CO1 Unde	erstand the role of computer vision and the use of various programming framework	ζs.
CO ₂ App	y image processing techniques using OpenCV to manipulate and analyze images.	
CO3 Impl	ement object tracking and motion detection in real-time applications.	
CO4 Deve	lop deep learning-based solutions for image classification and object detection.	
	nate real-world vision applications and assess ethical implications in deploying sol	lutions.
Unit No.	Contents	Max. Hrs.
Unit:1	Introduction to Computer Vision and Tools	7 Hours
Overview of	l computer vision tasks and applications Software frameworks: OpenCV, TensorFl	ow, PyTorch
– compariso	n and use cases Introduction to Python for CV: NumPy, Matplotlib, and basic ima penCV and Jupyter Notebook/Colab environment	
Unit:2	Image Processing with OpenCV	7 Hours
_	iting, and displaying images and videos, Image transformations: resize, rotate, cross and conversions (RGB, HSV, Grayscale), Image enhancement: filters (blur, sharp histograms	•
Unit:3	Feature Detection and Object Tracking	6 Hours
Edge detect	lon (Sobel, Canny),Corner and keypoint detection: Harris, Shi-Tomasi, Object tra	
based tracki		ıcking: color-
vascu tracki	ng, contour detection, Motion detection using frame differencing	cking: color-
Unit:4	Deep Learning Frameworks for Vision	7Hours
Unit :4 Basics of de	Deep Learning Frameworks for Vision ep learning for vision: CNNs overview, Introduction to TensorFlow and Keras, Us.	7Hours
Unit :4 Basics of de trained mod	Deep Learning Frameworks for Vision	7Hours
Unit :4 Basics of de trained mod Unit :5	Deep Learning Frameworks for Vision ep learning for vision: CNNs overview, Introduction to TensorFlow and Keras, Usels (e.g., MobileNet, ResNet), Transfer learning for image classification	7Hours ing pre-
Basics of de trained mod Unit:5 Object detection	Deep Learning Frameworks for Vision ep learning for vision: CNNs overview, Introduction to TensorFlow and Keras, Usels (e.g., MobileNet, ResNet), Transfer learning for image classification bject Detection and Face Recognition	7Hours ing pre-
Basics of de trained mod Unit:5 Object detection OpenCV + propenCV	Deep Learning Frameworks for Vision ep learning for vision: CNNs overview, Introduction to TensorFlow and Keras, Usels (e.g., MobileNet, ResNet), Transfer learning for image classification bject Detection and Face Recognition tion frameworks: Haar cascades, YOLO (intro level), SSD, Real-time object detective-trained models, Face detection and recognition basics using Dlib or OpenCV ini-projects using OpenCV and deep learning	7Hours ing pre- 7Hours tion with
Basics of de trained mod Unit:5 O Object detect OpenCV + p Hands-on m Unit:6 C	Deep Learning Frameworks for Vision ep learning for vision: CNNs overview, Introduction to TensorFlow and Keras, Usels (e.g., MobileNet, ResNet), Transfer learning for image classification bject Detection and Face Recognition tion frameworks: Haar cascades, YOLO (intro level), SSD, Real-time object detectore-trained models, Face detection and recognition basics using Dlib or OpenCV ini-projects using OpenCV and deep learning ase Studies and Applications	7Hours ing pre- 7Hours tion with
Basics of de trained mod Unit:5 Object detection Mands-on multi-16 Composition Applications	Deep Learning Frameworks for Vision ep learning for vision: CNNs overview, Introduction to TensorFlow and Keras, Usels (e.g., MobileNet, ResNet), Transfer learning for image classification bject Detection and Face Recognition tion frameworks: Haar cascades, YOLO (intro level), SSD, Real-time object detective-trained models, Face detection and recognition basics using Dlib or OpenCV ini-projects using OpenCV and deep learning	7Hours ing pre- 7Hours tion with

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SoE No. 23CSE-101

Tex	tbooks
1	Gary Bradski & Adrian Kaehler – Learning OpenCV 4 (O'Reilly)
2	Pradeep Singh – Hands-On Computer Vision with TensorFlow 2 (Packt)
Ref	erence Books
1	Joseph Howse – OpenCV 4 for Secret Agents (Practical projects with OpenCV)
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/e-
	copies%20of%20books/7.Information%20Technology/54.NLP_Language_processing_jurafsky_
	BOOK.pdf
2	
MO	OCs Links and additional reading, learning, video material
1	https://www.youtube.com/live/FbOCV344iLA?si=IQdy1JM1b4z-Evww

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B.Tech in Computer Science and Engineering

VI Semester

MDM4CSE204: Cryptography **Course Outcomes:**

CO1: Explain the basic concepts and need for cryptography in secure communication. CO2: Analyse and apply classical and modern symmetric encryption techniques. **CO3**: Demonstrate understanding and application of asymmetric encryption and key exchange protocols. CO4: Evaluate cryptographic hash functions and digital signature algorithms for data integrity and authentication. CO5: Apply cryptographic techniques to design secure communication systems and identify potential vulnerabilities. Max. Hrs. Unit No. **Contents** Unit:1 **Introduction to Cryptography** 7 Hours

Upon successful completion of the course the students will be able

Basics of	Cryptography: Definition, Objectives, Importance, Security services as	nd mechanisms,					
Cryptanaly	Cryptanalysis and types of attacks, Historical ciphers: Caesar cipher, Monoalphabetic cipher, Playfair, Hill						
cipher Substitution and transposition techniques							
Unit:2	Mathematical Foundations for Cryptography	7 Hours					

Number theory: modular arithmetic, GCD, Euler's phi function, Prime numbers and p	orimality testing,
Euclidean and Extended Euclidean Algorithm, Finite fields and polynomial arithmetic, Dis	crete logarithms
Unit:3 Symmetric Key Cryptography	6 Hours

Block ciphers vs. Stream ciphers, DES: structure, modes of operation (ECB, CBC, CFB, OFB), Advanced Encryption Standard (AES): architecture, key expansion, rounds, Modern symmetric ciphers (brief

over	view)		
Unit	:4 Asymmetric Key Cryptography	6	Hours

Public key cryptography principles, RSA algorithm: key generation, encryption, decryption, Diffie-Hellman key exchange, ElGamal encryption, Comparison of symmetric and asymmetric cryptography **Unit:5** | Cryptographic Hash Functions and Digital Signatures 6 Hours

					O	C					
Hash fun	ctions: N	MD5,	SHA family,	Message aut	henticati	on codes	(MAC),	HMAC,	Digital	signatures:	
				_							

DSS, RSA-based, Authentication protocols Unit:6 **Applications and Recent Trends in Cryptography** 7 Hours

Email and web security: PGP, S/MIME, SSL/TLS, Cryptography in Blockchain and Cryptocurrency Public Key Infrastructure (PKI), Introduction to Quantum cryptography, Legal, ethical, and policy issues

To	otal Lecture Hours			39 Hours

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1 CX	tbooks
1	Cryptography and Network Security, William Stallings – Principles and Practice", Pearson Education.
2	Cryptography and Network Security, Behrouz A. Forouzan and Debdeep Mukhopadhyay, McGraw Hill
Ref	erence Books
1	Introduction to Modern Cryptography, Jonathan Katz and Yehuda Lindell, 3rd Edition, CRC Press, Taylor & Francis Group
2	Bruce Scheneir: "Applied Cryptography", John Wiley.
3	Network Security and Cryptography, Bernard Menezes, Cengage Learning
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	
2	
MO	DOCs Links and additional reading, learning, video material
1	https://onlinecourses.nptel.ac.in/noc22 cs90/preview

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B.Tech in Computer Science and Engineering

VI Semester

MDM4CSE304: Software Design Patterns

Course Outcomes:

Upon successful completion of the course the students will be able to

- CO1 -Identify the appropriate design patterns to solve object oriented design problems.
- CO2 -Develop design solutions using creational patterns.
- CO3 -Apply structural patterns to solve design problems.
- CO4 -Construct design solutions by using behavioral patterns.

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction	7 Hours

Introduction: What is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

Creational Design Pattern Unit:2

7 Hours

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton.

Unit:3 **Structural Design Pattern**

7 Hours

Structural Patterns: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy.

Unit:4 **Behavioral Design Pattern**

7 Hours

Behavioral Patterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, Strategy, Template Method, Visitor.

Unit 5 A Case Study

6 Hours

Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation

Unit 6 **Complexity Analysis**

6 Hours

Complexity Analysis of Design Patterns, Methods to analyze the complexity of design patterns, Implementation techniques and applications of design pattern in game design, product design

Total Lecture Hours

39 Hours

Textbooks			
1	Design Patterns By Erich Gamma, Pearson Education		
2	Design Patterns Explained By Alan Shalloway, Pearson Education.		
3	Meta Patterns designed by Wolf gang, Pearson		

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Ref	Reference Books					
1	Head First Design Patterns By Eric Freeman-Oreilly-spd					
2	JAVA Enterprise Design Patterns Vol-III By Mark Grand ,Wiley DreamTech.					
3	Pattern"s in JAVA Vol-I By Mark Grand ,Wiley DreamTech.					
4	Pattern"s in JAVA Vol-II By Mark Grand ,Wiley DreamTech.					
YC	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] –					
1						
MO	MOOCs Links and additional reading, learning, video material –					
1	https://nptelvideos.com/video.php?id=916					
2	https://onlinecourses.nptel.ac.in/noc24_cs40/preview					

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B.Tech in Computer Science and Engineering

VI SEMESTER

Mandatory Learning Course (MLC)

MLC2126: YCAP6

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