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

1st to 8th Semester

(Department of Information Technology)

B. Tech in Computer Science and Design (CSD)

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 Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1106	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1107	**Lab :** Engineering Chemistry	P	0	0	2	2	1		60	40	
4	1	HS	GE	23GE1113	Technical Communication	T	2	0	0	2	2	30	20	50	2
5	11	HS	GE	23GE1114	**Lab :** Technical Communication	P	0	0	2	2	1		60	40	
6	1	**HS/IKS**	GE	23GE1115	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
7	1	BES	CV	23CV1101	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
8	1	BES	CV	23CV1102	**Lab :** Engineering Mechanics	P	0	0	2	2	1		60	40	
9	1	BES	IT	23IT1103	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
10	1	BES	IT	23IT1104	**Lab :** Programming for Problem Solving	P	0	0	2	2	1		60	40	
11	1	**VSEC1**	GE	23GE1117	Get Set Go	…	…	…	…	…	2		60	40	
12	1	**LLC1**	GE		**Liberal Learning Course (LLC1)**	…	…	…	…	…	2		60	40	
					TOTAL FIRST SEM		**15**	**0**	**15**	**23**	**23**				
MANDATORY LEARNING COURSES															
1	1	HS		GE2301	Disaster Management and Preparedness	**A**	2	0	0	2	0				
SECOND SEMESTER (GROUP-A)															
1	2	BS	GE	23GE1203	Differential Equations and Complex Analysis	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1210	Applied Physics	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1211	**Lab :** Applied Physics	P	0	0	2	2	1		60	40	
4	2	BES	ME	23ME1203	Engineering Design	T	1	0	0	1	1	30	20	50	3
5	2	BES	ME	23ME1204	**Lab :** Engineering Design	P	0	0	4	4	2		60	40	
6	2	BES	EL	23EL1201	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	2	PC	IT	23IT1201	Basics of Python Programming	T	3	0	0	3	3	30	20	50	3
8	2	PC	IT	23IT1202	**Lab :** Basics of Python Programming	P	0	0	2	2	1		60	40	
9	2	**VSEC2**	GE	23GE1218	Functional English	…	…	…	…	…	2		60	40	
10	2	**LLC2**	GE		**Liberal Learning Course (LLC2)**	…	…	…	…	…	2		60	40	
					TOTAL SECOND SEM		**13**	**0**	**8**	**21**	**21**				
MANDATORY LEARNING COURSES															
1	2	HS		GE2131	**Universal Human Values (UHV)**	**A**	2	0	0	2	**0**				

Chairperson	Dean (Acad. Matters)	**July, 2026**	**1.01**
		Date of Release	**Version**

Applicable for AY 2026-27 Onwards

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 Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	

Liberal Learning Course

SN	Sem	Type	BoS / Deptt	Sub. Code	Subject
1	2	CC2	GE	LLC1201	Music (Vocal)
2	2	CC2	GE	LLC1202	Music (Instrumental)
3	2	CC2	GE	LLC1203	Indian Classical Dance
4	2	CC2	GE	LLC1204	Folk Dances
5	2	CC2	GE	LLC1205	Painting
6	2	CC2	GE	LLC1206	Theatre and acting
7	2	CC2	GE	LLC1207	Photography
8	2	CC2	GE	LLC1208	Yoga
9	2	CC2	GE	LLC1209	Chess
10	2	CC2	GE	LLC1210	Athletics
11	2	CC2	GE	LLC1211	Basket Ball
12	2	CC2	GE	LLC1212	Judo
13	2	CC2	GE	LLC1213	Elements of Japanese Language
14	2	CC2	GE	LLC1214	Elements of German Language
15	2	CC2	GE	LLC1215	Elements of French Language
16	2	CC2	GE	LLC1216	Elements of Spanish Language
17	2	CC2	GE	LLC1217	Basics of Vedic Maths
18	2	CC2	GE	LLC1218	Skilling in Microsoft Visio and Inkscape
19	2	CC2	GE	LLC1219	Art of Public Speaking
20	2	CC2	GE	LLC1220	Kabbadi
21	2	CC2	GE	LLC1221	Kho-Kho
22	2	CC2	GE	LLC1222	Volley Ball
23	2	CC2	GE	LLC1223	Holistic Wellness
24	2	CC2	GE	LLC1224	Nutrition and Diet

Liberal Learning Course

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	1	CC1	GE	LLC1101	Music (Vocal)
2	1	CC1	GE	LLC1102	Music (Instrumental)
3	1	CC1	GE	LLC1103	Indian Classical Dance
4	1	CC1	GE	LLC1104	Folk Dances
5	1	CC1	GE	LLC1105	Painting
6	1	CC1	GE	LLC1106	Theatre and acting
7	1	CC1	GE	LLC1107	Photography
8	1	CC1	GE	LLC1108	Yoga
9	1	CC1	GE	LLC1109	Chess
10	1	CC1	GE	LLC1110	Athletics
11	1	CC1	GE	LLC1111	Basket Ball
12	1	CC1	GE	LLC1112	Judo
13	1	CC1	GE	LLC1113	Elements of Japanese Language
14	1	CC1	GE	LLC1114	Elements of German Language
15	1	CC1	GE	LLC1115	Elements of French Language
16	1	CC1	GE	LLC1116	Elements of Spanish Language
17	1	CC1	GE	LLC1117	Basics of Vedic Maths
18	1	CC1	GE	LLC1118	Skilling in Microsoft Visio and Inkscape
19	1	CC1	GE	LLC1119	Art of Public Speaking
20	1	CC1	GE	LLC1120	Kabbadi
21	1	CC1	GE	LLC1121	Kho-Kho
22	1	CC1	GE	LLC1122	Volley Ball
23	1	CC1	GE	LLC1123	Holistic Wellness
24	1	CC1	GE	LLC1124	Nutrition and Diet

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**

Chairperson	Dean (Acad. Matters)	July, 2026	1.01	Applicable for AY 2026-27 Onwards
		Date of Release	Version	

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B.Tech. in Computer Science and Design

SoE No. 23CSD-101

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							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	**HSSM1**	GE	23GE1301	Fundamentals of Management & Economics	T	2	0	0	2	2	30	20	50	3
2	3	PC	CSD	23CSD1301	Discrete Mathematics and Graph Theory	T	3	0	0	3	3	30	20	50	3
3	3	PC	CSD	23CSD1302	Data Structures	T	3	0	0	3	3	30	20	50	3
4	3	PC	CSD	23CSD1303	**Lab :** Data Structures	P	0	0	2	2	1		60	40	
5	3	PC	CSD	23CSD1304	Microprocessors and Microcontrollers	T	3	0	0	3	3	30	20	50	3
6	3	PC	CSD	23CSD1305	**Lab :** Microprocessors and Microcontrollers	P	0	0	2	2	1		60	40	
7	3	PC	CSD	23CSD1306	Computer Systems Organization	T	3	0	0	3	3	30	20	50	3
8	3	**VEC-2**	CSD	23CSD1307	Open Source Design Tool	T	2	0	0	2	2	30	20	50	3
9	3	CEP	CSD	23CSD1308	**Lab :** Community Engagement Project	P	0	0	4	4	2		60	40	
10	3	**OE-1**	OE-1		**Open Elective - I**	T	2	0	0	2	2	30	20	50	3
11	3	MDM	MDM		**MD Minor Course - I**	T	2	0	0	2	2	30	20	50	3
					TOTAL		**20**	**0**	**8**	**28**	**24**				

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

Open Elective - I

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 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	23OE1311	OE-I : Value Engineering
12	3	OE1	MGT	23OE1312	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
23	3	OE1	MGT	23OE1323	OE-I : Designated approved online NPTEL/KKSU Course
24	3	OE1	MGT	23OE1324	OE-I : Indian Archeology
25	3	OE1	MGT	23OE1325	OE-I : Social & Positive Psychology
26	3	OE1	MGT	23OE1326	OE-I : Seismology & Earthquake

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

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

(Department of Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FOURTH SEMESTER															
1	4	BS	GE	23GE1403	Linear Algebra	T	3	0	0	3	3	30	20	50	3
2	4	HSSM-2	GE	23GE1401	Entrepreneurship Development	T	2	0	0	2	2	30	20	50	3
3	4	AEC-2	GE	23GE1405 23GE1406	Marathi Language / Hindi Language	T	2	0	0	2	2	30	20	50	3
4	4	VEC-1	CV	23CV1411	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
5	4	PC	CSD	23CSD1401	Object Oriented Programming	T	3	0	0	3	3	30	20	50	3
6	4	PC	CSD	23CSD1402	**Lab :** Object Oriented Programming Lab	P	0	0	2	2	1		60	40	
7	4	PC	CSD	23CSD1403	Computer Networks	T	3	0	0	3	3	30	20	50	3
8	4	PC	CSD	23CSD1404	**Lab :** Computer Networks	P	0	0	2	2	1		60	40	
9	4	PC	CSD	23CSD1405	Software Lab	P	0	0	2	2	1		60	40	
10	4	VSEC-3	CSD	23CSD1406	**Lab :** Adv. Python Programming	P	0	0	4	4	2		60	40	
11	4	OE-2	OE		**Open Elective -II**	T	2	0	0	2	2	30	20	50	3
12	4	MDM	MDM		**MD Minor Course-II**	T	2	0	0	2	2	30	20	50	3
					TOTAL		**19**	**0**	**10**	**29**	**24**				
List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	**YCAP4 :** YCCE Communication Aptitude	**A**	3	0	0	3	**0**				

Open Elective - II

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	23OE2411	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	23OE2414	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
23	4	OE2	MGT	23OE2423	OE-II : Designated approved online NPTEL/KKSU Course
24	4	OE2	MGT	23OE2424	OE-II : Indian Archeology
25	4	OE2	MGT	23OE2425	OE-II : Social & Positive Psychology
26	4	OE2	MGT	23OE2426	OE-II : Seismology & Earthquake

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

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(Department of Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIFTH SEMESTER															
1	5	PC	CSD	23CSD1501	Theoretical Foundation of Computer Science	T	3	0	0	3	3	30	20	50	3
2	5	PC	CSD	23CSD1502	Operating System	T	3	0	0	3	3	30	20	50	3
3	5	PC	CSD	23CSD1503	**Lab :** Operating System	P	0	0	2	2	1		60	40	
4	5	PC	CSD	23CSD1504	Machine Learning	T	3	0	0	3	3	30	20	50	3
5	5	PC	CSD	23CSD1505	**Lab :** Machine Learning	P	0	0	2	2	1		60	40	
6	5	PE	CSD		**Professional Elective-I**	T	3	0	0	3	3	30	20	50	3
7	5	PE	CSD		**Professional Elective-II**	T	3	0	0	3	3	30	20	50	3
8	5	MDM	MDM		**MD Minor Course-III**	T	2	0	0	2	3	30	20	50	3
9	5	OE-3	OE		**Open Elective-III**	T	3	0	0	3	3	30	20	50	3
10	5	STR	CSD	23CSD1506	Internship, Seminar and Report	P	0	0	1	1	1		60	40	
					TOTAL		**20**	**0**	**5**	**25**	**24**				

List of Mandatory Learning Course (MLC)															
1	5	HS	T&P	MLC2125	**YCAP5 :** YCCE Communication Aptitude	**A**	3	0	0	3	**0**				

Professional Elective - I					
1	5	PE-I	CSD	23CSD1521	**PE-I :** Graphics Design
2	5	PE-I	CSD	23CSD1522	**PE-I :** Introduction to Cloud Computing
3	5	PE-I	CSD	23CSD1523	**PE-I :** Artificial Intelligence
4	5	PE-I	CSD	23CSD1524	**PE-I :** Software Architecture and Design
Coursera Elective					
1	5	PE-I	CSD	23CSD1525	**PE-I :** Mobile Application Design

Professional Elective - II					
1	5	PE-II	CSD	23CSD1541	**PE-II :** Motion Graphics
2	5	PE-II	CSD	23CSD1542	**PE-II :** Sales Force
3	5	PE-II	CSD	23CSD1543	**PE-II :** Business Intelligence
4	5	PE-II	CSD	23CSD1544	**PE-II :** Design Pattern

Open Elective - III

SN	Sem	Type	BoS/Deptt	Sub. Code	Subject	FACULTY
1	5	OE3	CSE	23OE3501	OE-III : Social Reformers in Modern Maharashtra	ARTS
2	5	OE3	CSE	23OE3502	OE-III : Independent India 1948-2010	ARTS
3	5	OE3	CT	23OE3503	OE-III : Introduction To Cognitive Psychology	ARTS
4	5	OE3	CT	23OE3504	OE-III : Introduction To Engineering Psychology	ARTS
5	5	OE3	CT	23OE3505	OE-III : Introduction To Behavioural Psychology	ARTS
6	5	OE3	CT	23OE3506	OE-III : Introduction To Emotional Psychology	ARTS
7	5	OE3	EL	23OE3507	OE-III : Elements of Public Administration	ARTS
8	5	OE3	ETC	23OE3508	OE-III : Ancient Indian History	ARTS
9	5	OE3	IT	23OE3509	OE-III : Consciousness Studies	ARTS
10	5	OE3	IT	23OE3510	OE-III : Psychology for Professionals	ARTS
11	5	OE3	IT	23OE3511	OE-III : Introduction to Sociology and Human Behavior	ARTS
12	5	OE3	GE	23OE3512	OE-III : Economics of Money and Banking	ARTS
13	5	OE3	GE	23OE3513	OE-III : Economics of Capital Market	ARTS
14	5	OE3	GE	23OE3514	OE-III : Digital Humanities	ARTS
15	5	OE3	GE	23OE3515	OE-III : Introduction to Political Science	ARTS
16	5	OE3	CT	23OE3516	OE-III : Bhagwat Geeta - An Engineer's Interpretation	ARTS - IKS
17	5	OE3	CT	23OE3517	OE-III : Artha shastra by Kautiliya	ARTS - IKS
18	5	OE3	CSD	23OE3518	OE-III : Glimpses of Ancient science and Technology	ARTS - IKS
19	5	OE3	CV	23OE3519	OE-III : Indian taxation system	COMMERCE
20	5	OE3	CV	23OE3520	OE-III : Elements of share trading	COMMERCE
21	5	OE3	EE	23OE3521	OE-III : Introduction to Fintech	COMMERCE
22	5	OE3	EE	23OE3522	OE-III : Financial Analytics	COMMERCE
23	5	OE3	ETC	23OE3523	OE-III : Fundamentals of Investments	COMMERCE
24	5	OE3	EE	23OE3524	OE-III : Lifestyle Diseases	HEALTHCARE & MEDICINE
25	5	OE3	EE	23OE3525	OE-III : Holistic Nutrition	HOME SCIENCE
26	5	OE3	EL	23OE3526	OE-III : Community Organization & Development	HOME SCIENCE
27	5	OE3	CSE	23OE3527	OE-III : Human Rights & International Laws	LAW
28	5	OE3	CSE	23OE3528	OE-III : Cyber Crime Administration	LAW
29	5	OE3	MATHS	23OE3529	OE-III : Finite Differences & Numerical Methods	SCIENCE
30	5	OE3	MATHS	23OE3530	OE-III : Business Statistics	SCIENCE
31	5	OE3	PHY	23OE3531	OE-III : Crystalline Solids: Properties and Applications.	SCIENCE
32	5	OE3	PHY	23OE3532	OE-III : Nanotechnology: Fundamental to Applications	SCIENCE
33	5	OE3	CHE	23OE3533	OE-III : Chemistry in daily life	SCIENCE
34	5	OE3	CHE	23OE3534	OE-III : Battery Systems and Management	SCIENCE
35	5	OE3	NPTEL	23OE3535	OE-III : Designated approved online NPTEL Course	NPTEL

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Chairperson	Dean (Acad. Matters)	Date of Release	Version

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(Department of Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SIXTH SEMESTER															
1	6	PC	CSD	23CSD1601	Database and Information System	T	3	0	0	3	3	30	20	50	3
2	6	PC	CSD	23CSD1602	**Lab :** Database and Information System	P	0	0	2	2	1		60	40	
3	6	PC	CSD	23CSD1603	Design & Analysis of Algorithm	T	3	0	0	3	3	30	20	50	3
4	6	PC	CSD	23CSD1604	**Lab :** Design & Analysis of Algorithm	P	0	0	2	2	1		60	40	
5	6	PC	CSD	23CSD1605	Compiler Design	T	3	0	0	3	3	30	20	50	3
6	6	PC	CSD	23CSD1606	**Lab :** Compiler Design	P	0	0	2	2	1		60	40	
7	6	PC	CSD	23CSD1607	Design Thinking and Research Methdology	T	2	0	0	2	2	30	20	50	3
8	6	PE	CSD		**Professional Elective-III**	T	3	0	0	3	3	30	20	50	3
9	6	PE	CSD		**Lab : Professional Elective-III**	P	0	0	2	2	1		60	40	
10	6	MDM	MDM		**MD Minor Course-IV**	T	3	0	0	3	3	30	20	50	3
11	6	**VSEC-4**	CSD	23CSD1608	**Lab :** Digital Marketing	P	0	0	4	4	2		60	40	
12	6	STR	CSD	23CSD1609	Project Phase-I	P	0	0	4	4	2		60	40	
					TOTAL		**17**	**0**	**16**	**33**	**25**				

List of Mandatory Learning Course (MLC)															
1	5	HS	T&P	MLC2125	**YCAP6:**	**A**	3	0	0	3	**0**				

Professional Elective - III					
1	6	PE-III	CSD	23CSD1621	**PE-III :** Game Theory
2	6	PE-III	CSD	23CSD1622	**PE-III : Lab :** Game Theory
3	6	PE-III	CSD	23CSD1623	**PE-III :** Cloud Security
4	6	PE-III	CSD	23CSD1624	**PE-III : Lab :** Cloud Security
5	6	PE-III	CSD	23CSD1625	**PE-III :** Data Mining
6	6	PE-III	CSD	23CSD1626	**PE-III : Lab :** Data Mining
7	6	PE-III	CSD	23CSD1627	**PE-III :** Java Fullstack Development
8	6	PE-III	CSD	23CSD1628	**PE-III : Lab :** Java Fullstack Development
9	6	PE-III	CSD	23CSD1629	**PE-III :** Generative AI
10	6	PE-III	CSD	23CSD1630	**PE-III : Lab :** Generative AI
11	6	PE-IV	CSD	23CSD1633	**PE-III :** Dot Net Fullstack Development
12	6	PE-IV	CSD	23CSD1634	**PE-III : Lab :** Dot Net Fullstack Development
Coursera Elective					
1	6	PE-III	CSD	23CSD1631	**PE-III :** Software Testing
2	6	PE-III	CSD	23CSD1632	**PE-III : Lab :** Software Testing

#VALUE!		July, 2023	1.00	Applicable for AY 2023-24 Onwards
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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 Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SEVENTH SEMESTER															
1	7	PC	CSD	23CSD1701	Augmented and Virtual Reality	T	3	0	0	3	3	30	20	50	3
2	7	PC	CSD	23CSD1702	**Lab :** Augmented and Virtual Reality	P	0	0	2	2	1		60	40	
3	7	PC	CSD	23CSD1703	Product Design	T	3	0	0	3	3	30	20	50	3
4	7	PC	CSD	23CSD1704	**Lab :** Product Design	P	0	0	2	2	1		60	40	
5	7	PE	CSD		**Professional Elective-IV**	T	3	0	0	3	3	30	20	50	3
6	7	PE	CSD		**Lab : Professional Elective-IV**	P	0	0	2	2	1		60	40	
7	7	PE	CSD		**Professional Elective-V**	T	3	0	0	3	3	30	20	50	3
8	7	MDM	MDM		**MD Minor Course-V**	T	2	0	0	2	2	30	20	50	3
9	7	STR	CSD	23CSD1705	Project Phase-II	P	0	0	8	8	4		60	40	
10	7	STR	CSD	23CSD1706	Campus Recrutment Training (CRT)	P	0	0	0	0	2			100	
11	7	STR	CSD	23CSD1707	Comprehensive Evaluation of Core Knowledge	P	0	0	2	2	1		60	40	
					TOTAL		**14**	**0**	**16**	**30**	**24**				

Professional Elective - IV

1	7	PE-IV	CSD	23CSD1721	**PE-IV :** Computer Game Design and Programming
2	7	PE-IV	CSD	23CSD1722	**PE-IV : Lab :** Computer Game Design and Programming
3	7	PE-IV	CSD	23CSD1723	**PE-IV :** Cloud Web Services
4	7	PE-IV	CSD	23CSD1724	**PE-IV : Lab :** Cloud Web Services
5	7	PE-IV	CSD	23CSD1725	**PE-IV :** Deep Learning
6	7	PE-IV	CSD	23CSD1726	**PE-IV : Lab :** Deep Learning
7	7	PE-IV	CSD	23CSD1727	**PE-IV :** Software Construction and Maintenance
8	7	PE-IV	CSD	23CSD1728	**PE-IV : Lab :** Software Construction and Maintenance

Professional Elective - V

1	7	PE-V	CSD	23CSD1741	**PE-V :** Artificial Intelligence for Games
2	7	PE-V	CSD	23CSD1742	**PE-V :** Quantum Computing
3	7	PE-V	CSD	23CSD1743	**PE-V :** Big Data Analytics
4	7	PE-V	CSD	23CSD1744	**PE-V :** Software Project Management

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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 Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
EIGHTH SEMESTER															
1	8	PC	CSD	23CSD1801	Multimedia Design	T	2	0	0	2	2	30	20	50	3
2	8	MDM	MDM	23CSD1802	**MD Minor Course-VI**	T	2	0	0	2	2	30	20	50	3
3	8	STR	CSD	23CSD1803	Intership / On Job training	P	0	0	14	14	7			100	
					TOTAL		**4**	**0**	**14**	**18**	**11**				
					GRAND TOTAL		**122**	**0**	**92**	**207**	**176**				

Multidisciplinary Minor Courses

		Track 1	
Courses	**Sem**	**MDMT1CSD101 : Game Technology**	
MDM-I	3	(MDM1CSD101) Graphics Design	
MDM-II	4	(MDM2CSD102) Motion Graphics	
MDM-III	5	(MDM3CSD103) Computer Game Design and Programming	
MDM-IV	6	(MDM4CSD104) Human Computer Interaction	
MDM-V	7	(MDM5CSD105) Basics of AR & VR	
MDM-VI	8	(MDM6CSD106) Game Design	

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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

1st Semester

(Department of Information Technology)

B. Tech in Computer Science and Design (CSD)

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 Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1106	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1107	**Lab :** Engineering Chemistry	P	0	0	2	2	1		60	40	
4	1	HS	GE	23GE1113	Technical Communication	T	2	0	0	2	2	30	20	50	2
5	11	HS	GE	23GE1114	**Lab :** Technical Communication	P	0	0	2	2	1		60	40	
6	1	**HS/IKS**	GE	23GE1115	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
7	1	BES	CV	23CV1101	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
8	1	BES	CV	23CV1102	**Lab :** Engineering Mechanics	P	0	0	2	2	1		60	40	
9	1	BES	IT	23IT1103	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
10	1	BES	IT	23IT1104	**Lab :** Programming for Problem Solving	P	0	0	2	2	1		60	40	
11	1	**VSEC1**	GE	23GE1117	Get Set Go	…	…	…	…	…	2		60	40	
12	1	**LLC1**	GE		**Liberal Learning Course (LLC1)**	…	…	…	…	…	2		60	40	
					TOTAL FIRST SEM		**15**	**0**	**15**	**23**	**23**				
MANDATORY LEARNING COURSES															
1	1	HS		GE2301	Disaster Management and Preparedness	**A**	2	0	0	2	0				
SECOND SEMESTER (GROUP-A)															
1	2	BS	GE	23GE1203	Differential Equations and Complex Analysis	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1210	Applied Physics	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1211	**Lab :** Applied Physics	P	0	0	2	2	1		60	40	
4	2	BES	ME	23ME1203	Engineering Design	T	1	0	0	1	1	30	20	50	3
5	2	BES	ME	23ME1204	**Lab :** Engineering Design	P	0	0	4	4	2		60	40	
6	2	BES	EL	23EL1201	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	2	PC	IT	23IT1201	Basics of Python Programming	T	3	0	0	3	3	30	20	50	3
8	2	PC	IT	23IT1202	**Lab :** Basics of Python Programming	P	0	0	2	2	1		60	40	
9	2	**VSEC2**	GE	23GE1218	Functional English	…	…	…	…	…	2		60	40	
10	2	**LLC2**	GE		**Liberal Learning Course (LLC2)**	…	…	…	…	…	2		60	40	
					TOTAL SECOND SEM		**13**	**0**	**8**	**21**	**21**				
MANDATORY LEARNING COURSES															
1	2	HS		GE2131	**Universal Human Values (UHV)**	**A**	2	0	0	2	**0**				

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B.TECH SCHEME OF EXAMINATION 2023

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(Department of Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	

Liberal Learning Course

SN	Sem	Type	BoS / Deptt	Sub. Code	Subject
1	2	CC2	GE	LLC1201	Music (Vocal)
2	2	CC2	GE	LLC1202	Music (Instrumental)
3	2	CC2	GE	LLC1203	Indian Classical Dance
4	2	CC2	GE	LLC1204	Folk Dances
5	2	CC2	GE	LLC1205	Painting
6	2	CC2	GE	LLC1206	Theatre and acting
7	2	CC2	GE	LLC1207	Photography
8	2	CC2	GE	LLC1208	Yoga
9	2	CC2	GE	LLC1209	Chess
10	2	CC2	GE	LLC1210	Athletics
11	2	CC2	GE	LLC1211	Basket Ball
12	2	CC2	GE	LLC1212	Judo
13	2	CC2	GE	LLC1213	Elements of Japanese Language
14	2	CC2	GE	LLC1214	Elements of German Language
15	2	CC2	GE	LLC1215	Elements of French Language
16	2	CC2	GE	LLC1216	Elements of Spanish Language
17	2	CC2	GE	LLC1217	Basics of Vedic Maths
18	2	CC2	GE	LLC1218	Skilling in Microsoft Visio and Inkscape
19	2	CC2	GE	LLC1219	Art of Public Speaking
20	2	CC2	GE	LLC1220	Kabbadi
21	2	CC2	GE	LLC1221	Kho-Kho
22	2	CC2	GE	LLC1222	Volley Ball
23	2	CC2	GE	LLC1223	Holistic Wellness
24	2	CC2	GE	LLC1224	Nutrition and Diet

Liberal Learning Course

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	1	CC1	GE	LLC1101	Music (Vocal)
2	1	CC1	GE	LLC1102	Music (Instrumental)
3	1	CC1	GE	LLC1103	Indian Classical Dance
4	1	CC1	GE	LLC1104	Folk Dances
5	1	CC1	GE	LLC1105	Painting
6	1	CC1	GE	LLC1106	Theatre and acting
7	1	CC1	GE	LLC1107	Photography
8	1	CC1	GE	LLC1108	Yoga
9	1	CC1	GE	LLC1109	Chess
10	1	CC1	GE	LLC1110	Athletics
11	1	CC1	GE	LLC1111	Basket Ball
12	1	CC1	GE	LLC1112	Judo
13	1	CC1	GE	LLC1113	Elements of Japanese Language
14	1	CC1	GE	LLC1114	Elements of German Language
15	1	CC1	GE	LLC1115	Elements of French Language
16	1	CC1	GE	LLC1116	Elements of Spanish Language
17	1	CC1	GE	LLC1117	Basics of Vedic Maths
18	1	CC1	GE	LLC1118	Skilling in Microsoft Visio and Inkscape
19	1	CC1	GE	LLC1119	Art of Public Speaking
20	1	CC1	GE	LLC1120	Kabbadi
21	1	CC1	GE	LLC1121	Kho-Kho
22	1	CC1	GE	LLC1122	Volley Ball
23	1	CC1	GE	LLC1123	Holistic Wellness
24	1	CC1	GE	LLC1124	Nutrition and Diet

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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I SEMESTER

23GE1101: 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	**(6 Hrs.)**
Successive differentiation, n^{th} derivative of rational function, Trigonometrical transformations, n^{th} 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	**(7 Hrs.)**
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. **(Contemporary Issues related to Topic)**	
Unit III: Integral Calculus	**(6 Hrs.)**
Improper integrals: Gamma and Beta functions, applications of integral calculus in computing area, length, volumes, and surface of solids of revolutions. **(Contemporary Issues related to Topic)**	
Unit IV: Multiple integrals	**(6 Hrs.)**
Double integral, change of order of integral, change of variables, triple integrals and its applications. **(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)**	
Unit VI: Vector Integration & Applications	**(7 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	**39 Hours**

Textbooks:	
1.	Erwin Kreyzig, Advance Engineering Mathematics, 10th Edition, John Wiley and Sons, INC.
2.	H.K. Dass, Engineering Mathematics, 11th 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, 42th edition, Khanna Publishers.
5.	P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4th Edition, Vidyarthi GrihaPrakashan.

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 2nd edition, Wiley.
3.	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]	
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

I SEMESTER

23GE1106 : Engineering Chemistry

Course Outcomes:

Upon successful completion of the course students will be able to

1. **Illustrate** qualitative and quantitative aspects of water for industrial and domestic applications. (L3)
2. **Apply** concepts of electrochemistry for energy storage devices and corrosion. (L3)
3. **Explain** basic principles of spectroscopy and its applications. (L3)
4. **Establish** insight into advanced engineering materials. (L3)

Unit:1	**Water Chemistry** 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	**7 Hours**
Unit:2	**Electrochemistry** Introduction, metallic and electrolytic conductance. Electrode and electrode potential. Nernst Equation, numericals and applications. Faraday's laws and numericals. Industrial applications: Electroplating, Electrolytic refining, Corrosion- Definition, Causes, theories of corrosion- dry, wet and differential aeration. Contemporary issues related to the topic	**7 Hours**
Unit:3	**Energy storage device** Introduction, Characteristics, and general applications. Lithium-ion battery, Glass battery, H_2-O_2 Fuel cell. Differences between battery and a fuel cell. Supercapacitors: Definition, types, characteristics, and application. **H_2 as a green fuel:** Introduction, production, storage, and utilization. Contemporary issues related to the topic	**6 Hours**
Unit:4	**Drugs & Polymer chemistry** **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, Glass transition temperature. Contemporary issues related to the topic	**6 Hours**

Unit:5	**Spectroscopic Techniques and Applications** Introduction, fundamentals, types, principles, and selection rules of spectroscopy. Basic principle and applications of UV- Visible, IR, NMR Spectroscopy and numericals. Contemporary issues related to the topic	**6 Hours**
Unit :6	**Advanced Materials** **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	**7 Hours**
	Total Lecture Hours	**39 Hours**

Text 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.
Reference 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.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/CHEMISTRY/
MOOCs 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

I SEMESTER

23GE1107 : Lab. Engineering Chemistry

Course Outcomes:

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

1. **Illustrate** qualitative and quantitative aspects of water for industrial and domestic applications. (L3)
2. **Apply** concepts of electrochemistry for energy storage devices and corrosion. (L3)
3. **Explain** basic principles of spectroscopy and its applications. (L3)
4. **Establish** insight into advanced engineering materials. (L3)

Total 10 experiments are to be performed.

(4 each from Phase I and Phase II and two demonstration experiments)

SN	Experiments based on
	List of Experiments-Phase I
1	Determination of total hardness of water sample.
2	Determination of alkalinity present in the water sample.
3	Estimation of Fe^{2+} ions by redox titration
4	Determination of copper by iodometric titration
5	Estimation of Nickel.
6	To determine the strength of a given potassium dichromate solution with N/20 sodium thiosulphate solution
7	Determination of COD of water sample.
8	Synthesis of urea formaldehyde & phenol formaldehyde resin.
9	Determination of rate of the reaction of hydrolysis of ethyl acetate at room temperature and analysis of experimental data using Computational Software.
	List of Experiments-Phase II
1	Determination of viscosity of lubricating oil by Redwood Viscometer I or II
2	Determination of Cation exchange capacity of an ion exchange resin
3	Determination of molecular weight of a polymer.
4	Oil Testing for Flash Point / Cloud Point/Pour Point/Aniline Point
5	Proximate analysis of coal
6	Determination of surface tension of liquids using stalagmometer.
7	Determination of electrochemical equivalence of copper using Faradays Law
8	To determine the heat of solution of potassium nitrate calorimetrically.

9	Determination of strength of the given acid conductometrically.
10.	To verify Beer-Lambert law for $KMnO_4$ colorimetrically and determine the concentration of the given solution of $KMnO_4$.
	List of Demonstration Experiments
1	Determination of pH of water sample by pH meter
2	Synthesis of polyaniline.

I SEMESTER

23GE1113 : Technical 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	**(6 Hrs.)**
Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Barriers to communication- Intrapersonal, Interpersonal, Organizational	
Unit II: English Phonetics	**(7 Hrs.)**
Speech Mechanism, Organs of speech, Consonant and Vowels sounds symbols, word stress rules	
Unit III: Presentation & Visual Communication , Reading & Listening Skills	**(6 Hrs.)**
Presentation-Purpose, Analysing Audience & Locale, Organizing Contents, Nuances of presentation- Kinesics, Proxemics, Chronemics, Vocalics, Modes of Presentation, Visual Communication –Introduction & importance, Role & Psychology of color in visual communication, **Listening Skills** -definition types and traits	
Unit IV: Research Paper & Technical Communication	**(7 Hrs.)**
Research Paper - Characteristics, components, Title, Abstract, Introductory Paragraph, Body of Presentation Conclusion, Acknowledgements , List of Symbols, References Memo- Objectives, Types, Structure and Layout **Email-**Etiquettes, acronyms	
Total Lecture	**26 Hours**

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

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

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

I SEMESTER

23GE1114 : Lab. Technical Communication

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. Apply different modes for effective communication 2. competently use the phonology of English language 3. Apply nuances of LSRW skills 4. Communicate through different channels

Lab I	**(2 Hrs.)**
Handson for Consonants and vowel sounds **(Contemporary issues related to topic)**	
Lab II	**(2 Hrs.)**
Identifying the pragmatic meaning of the text **(Contemporary issues related to topic)**	
Lab III	**(2 Hrs.)**
Sessions for Interview **(Contemporary issues related to topic)**	
Lab IV	**(2 Hrs.)**
Grooming session for effective use of body language **(Contemporary issues related to topic)**	
Lab V	**(2 Hrs.)**
Visual Media – preparing poster boards, advertising product **(Contemporary issues related to topic)**	
Lab VI	**(2 Hrs.)**
Group Discussion **(Contemporary issues related to topic)**	
Total Lecture	**12 Hours**

Textbooks:	
1.	Technical Communication, 3rd Edition, Raman & Sharma, Oxford University Press
2.	Textbook of English Phonetics for Indian Students,3rd Edition, T. Balasubramaniam, Macmillan India Ltd

Reference Books:	
1.	How to Develop Self – Confidence & Influence People by Public Speaking,1st Edition, Dale Carnegie
2.	Communication Skills, 2nd Edition, Asha Kaul
3.	Body Language,1st Edition, Allen Peas
4.	Technical Communication, January 2003, Gerson's Gerson

MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/XoVLa6Dqd5I
2.	https://youtu.be/45uNWLmAZR8

I SEMESTER

23GE1115 : Indian Knowledge System

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Apply primary requirements pertaining towards awareness of Indian Knowledge System.
2. Analyze various Indian society, culture and literature to enhance their traditions.
3. Evaluate structure of Indian art.
4. Understand Indian heritage and architectural skills.

Unit:1	**Introduction to Indian Civilization**	**6 Hours**
Development of Human Civilization with specific reference: Stone age: Tool Technology and Cultural Development, Indus Valley civilization, Vedic Civilization. **(Contemporary Issues related to Topic)**		
Unit:2	**Indian Society, Culture and Literature**	**6 Hours**
Society and its types, Culture and its Characteristics, Foundational Literature. **(Contemporary Issues related to Topic)**		
Unit:3	**Tradition of Indian Art and Painting**	**7 Hours**
Indian Traditional Painting, Art style folk, mural with Gandhara and Mathura school of art. **(Contemporary Issues related to Topic)**		
Unit:4	**Indic Traditions of Architecture, Design and Planning**	**7 Hours**
Monumental studies of architectural skill: Rock Cut Caves, Stupa and Temple Architecture, The Ancient cities of Indus Saraswati region. Town Planning and drainage system. **(Contemporary Issues related to Topic)**		
	Total Lecture Hours	**26 Hours**

Textbooks	
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

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_CULTURAL_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

I SEMESTER

23CV1101 : 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**

			July,2026	1.00	Applicable for AY 2026-27 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Textbooks:	
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.
Reference 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.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/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
2	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf
3	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf
MOOCs 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

I SEMESTER

23CV1102 : 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,

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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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-101.1

B.Tech in Computer Science and Design

I SEMESTER

23IT1103 : 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**

			July,2026	1.00	Applicable for AY 2026-27 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

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

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

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=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5hMt

Nagar Yuwak Shikshan Sanstha's

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B. Tech SoE and Syllabus 2023

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

(Department of Information Technology)

B.Tech in Computer Science and Design

SoE No. 23IT-101.1

I SEMESTER

23IT1104 : 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

			July,2026	1.00	Applicable for AY 2026-27 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

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

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

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=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5hMt

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**

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**

			July,2026	1.00	Applicable for AY 2026-27 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Reference Books	
1	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

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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(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 Information Technology)

B. Tech in Computer Science and Design (CSD)

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 Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1106	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1107	**Lab :** Engineering Chemistry	P	0	0	2	2	1		60	40	
4	1	HS	GE	23GE1113	Technical Communication	T	2	0	0	2	2	30	20	50	2
5	11	HS	GE	23GE1114	**Lab :** Technical Communication	P	0	0	2	2	1		60	40	
6	1	**HS/IKS**	GE	23GE1115	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
7	1	BES	CV	23CV1101	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
8	1	BES	CV	23CV1102	**Lab :** Engineering Mechanics	P	0	0	2	2	1		60	40	
9	1	BES	IT	23IT1103	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
10	1	BES	IT	23IT1104	**Lab :** Programming for Problem Solving	P	0	0	2	2	1		60	40	
11	1	**VSEC1**	GE	23GE1117	Get Set Go	…	…	…	…	…	2		60	40	
12	1	**LLC1**	GE		**Liberal Learning Course (LLC1)**	…	…	…	…	…	2		60	40	
					TOTAL FIRST SEM		**15**	**0**	**15**	**23**	**23**				
MANDATORY LEARNING COURSES															
1	1	HS		GE2301	Disaster Management and Preparedness	**A**	2	0	0	2	0				
SECOND SEMESTER (GROUP-A)															
1	2	BS	GE	23GE1203	Differential Equations and Complex Analysis	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1210	Applied Physics	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1211	**Lab :** Applied Physics	P	0	0	2	2	1		60	40	
4	2	BES	ME	23ME1203	Engineering Design	T	1	0	0	1	1	30	20	50	3
5	2	BES	ME	23ME1204	**Lab :** Engineering Design	P	0	0	4	4	2		60	40	
6	2	BES	EL	23EL1201	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	2	PC	IT	23IT1201	Basics of Python Programming	T	3	0	0	3	3	30	20	50	3
8	2	PC	IT	23IT1202	**Lab :** Basics of Python Programming	P	0	0	2	2	1		60	40	
9	2	**VSEC2**	GE	23GE1218	Functional English	…	…	…	…	…	2		60	40	
10	2	**LLC2**	GE		**Liberal Learning Course (LLC2)**	…	…	…	…	…	2		60	40	
					TOTAL SECOND SEM		**13**	**0**	**8**	**21**	**21**				
MANDATORY LEARNING COURSES															
1	2	HS		GE2131	**Universal Human Values (UHV)**	**A**	2	0	0	2	**0**				

Chairperson	Dean (Acad. Matters)	**July, 2026** Date of Release	**1.01** Version	**Applicable for AY 2026-27 Onwards**

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 Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101.1

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	

Liberal Learning Course

SN	Sem	Type	BoS / Deptt	Sub. Code	Subject
1	2	CC2	GE	LLC1201	Music (Vocal)
2	2	CC2	GE	LLC1202	Music (Instrumental)
3	2	CC2	GE	LLC1203	Indian Classical Dance
4	2	CC2	GE	LLC1204	Folk Dances
5	2	CC2	GE	LLC1205	Painting
6	2	CC2	GE	LLC1206	Theatre and acting
7	2	CC2	GE	LLC1207	Photography
8	2	CC2	GE	LLC1208	Yoga
9	2	CC2	GE	LLC1209	Chess
10	2	CC2	GE	LLC1210	Athletics
11	2	CC2	GE	LLC1211	Basket Ball
12	2	CC2	GE	LLC1212	Judo
13	2	CC2	GE	LLC1213	Elements of Japanese Language
14	2	CC2	GE	LLC1214	Elements of German Language
15	2	CC2	GE	LLC1215	Elements of French Language
16	2	CC2	GE	LLC1216	Elements of Spanish Language
17	2	CC2	GE	LLC1217	Basics of Vedic Maths
18	2	CC2	GE	LLC1218	Skilling in Microsoft Visio and Inkscape
19	2	CC2	GE	LLC1219	Art of Public Speaking
20	2	CC2	GE	LLC1220	Kabbadi
21	2	CC2	GE	LLC1221	Kho-Kho
22	2	CC2	GE	LLC1222	Volley Ball
23	2	CC2	GE	LLC1223	Holistic Wellness
24	2	CC2	GE	LLC1224	Nutrition and Diet

Liberal Learning Course

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	1	CC1	GE	LLC1101	Music (Vocal)
2	1	CC1	GE	LLC1102	Music (Instrumental)
3	1	CC1	GE	LLC1103	Indian Classical Dance
4	1	CC1	GE	LLC1104	Folk Dances
5	1	CC1	GE	LLC1105	Painting
6	1	CC1	GE	LLC1106	Theatre and acting
7	1	CC1	GE	LLC1107	Photography
8	1	CC1	GE	LLC1108	Yoga
9	1	CC1	GE	LLC1109	Chess
10	1	CC1	GE	LLC1110	Athletics
11	1	CC1	GE	LLC1111	Basket Ball
12	1	CC1	GE	LLC1112	Judo
13	1	CC1	GE	LLC1113	Elements of Japanese Language
14	1	CC1	GE	LLC1114	Elements of German Language
15	1	CC1	GE	LLC1115	Elements of French Language
16	1	CC1	GE	LLC1116	Elements of Spanish Language
17	1	CC1	GE	LLC1117	Basics of Vedic Maths
18	1	CC1	GE	LLC1118	Skilling in Microsoft Visio and Inkscape
19	1	CC1	GE	LLC1119	Art of Public Speaking
20	1	CC1	GE	LLC1120	Kabbadi
21	1	CC1	GE	LLC1121	Kho-Kho
22	1	CC1	GE	LLC1122	Volley Ball
23	1	CC1	GE	LLC1123	Holistic Wellness
24	1	CC1	GE	LLC1124	Nutrition and Diet

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**

Chairperson	Dean (Acad. Matters)	July, 2026	1.01	Applicable for AY 2026-27 Onwards
		Date of Release	Version	

II SEMESTER
23GE1203: 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	**(7 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	**(6 Hrs.)**
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	**(6 Hrs.)**
Partial Differential Equations of first order, first degree i.e. Lagrange's form, linear homogeneous equations of 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	**(7 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	**(6 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	**39 Hours**

Textbooks:	
1.	Erwin Kreyzig, Advance Engineering Mathematics, 6th Edition, John Wiley and Sons, INC.
2.	H.K. Dass, Engineering Mathematics, 11th 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, 42th edition, Khanna Publishers.
5.	P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4th Edition, Vidyarthi GrihaPrakashan.

Reference Books:	
1.	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]	
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/111103070
2.	https://onlinecourses.nptel.ac.in/noc19_ma28/preview
3.	https://nptel.ac.in/courses/111/106/111106100/

II SEMESTER
23GE1210 : 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	**(6 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	**(7 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	**(7 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)**	

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	**40 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	
1	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]	
1	chrome-http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Eisberg%20&%20Resnick%20-%20Quantum%20Physics.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/2016_Book_ThePhysicsOfSemiconductors.pdf

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/115106066 - Quantum Physics
2	https://archive.nptel.ac.in/courses/115/105/115105121/ -CRO
3	www.digimat.in/nptel/courses/video/115102124/L36.html- Laser

II SEMESTER

23GE1211 : 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 Experiments :

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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B. Tech SoE and Syllabus 2023

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

(Department of Information Technology)

B.Tech in Computer Science and Design

SoE No. 23IT-101.1

II SEMESTER

23ME1203 : Engineering Design

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. Understand different CAD tools to perform 2D drawing and 3D modelling. 3. Construct 3D and Wireframe Models and Distinguish between them. 4. Design and Assemble different CAD parts.

Unit I: Theory of Orthographic Projections (CO 1)	**(3 Hrs.)**
Introduction, Quadrant system, Theory of orthographic projection, Projection method and principal planes,First and Third angle projections. Orthographic Drawing on CAD software.	
Unit II: Theory of Isometric Projections (CO 1)	**(2 Hrs.)**
Theory of isometric projection, Method for drawing isometric views, Different problems on isometric projections. Isometric Drawing on CAD software.	
Unit III: CAD Tools and Sketcher (CO 2)	**(2 Hrs.)**
Introduction to Menu Bars, Modules, Sketcher: Circle, Spline, Conic, Line, Axis, Point. Corner, Chamfer, Transformation, 3-D geometry. Constraint- Geometrical constraint.	
Unit IV: Part Design (Solid Modeling) (CO 2)	**(3 Hrs.)**
3D Reference Elements (Point, Line, Plane), Pad, Pocket, Shaft, Groove, Hole, Rib, Slot, Loft, Fillet, Chamfer, Draft, Shell, Thickness, Thread/ Tap, filleted pocket, Patterning, Scaling, Mirror	
Unit V: Surface Modeling (CO 3)	**(2 Hrs.)**
Extrude, Revolve, Sphere, Offset, Trim, Split, Boundary, Extract, Join, Translate, Rotate, Extrapolating Sweep, Loft, Blend, Intersection, 3D Circle, Corner, Helix, Fill, Connect Curve, Spline etc.	
Unit VI: Assembly Modeling (CO 4)	**(3 Hrs.)**
Solid Modelling: Insert Component, Product, Part, Existing component, Replace component, Manipulation, Snap, Smart move, Coincidence, Contact creation, Offset, Angle, Fix, Fix together, Quick constraint, Change constraint, Reuse pattern etc.	
Total Lecture	**15 Hours**

Reference Books:

1. Engineering graphics with AUTOCAD by A. K. Sarkar, A. P. Rastogi, and D. M. Kulkarni.
2. Engineering Drawing by N. D. Bhatt.

			July,2026	1.00	Applicable for AY 2026-27 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

II SEMESTER

23ME1204 : Lab. Engineering Design

Course Outcomes :

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

5. Construct orthographic drawing and isometric drawing of a given object.
6. Understand different CAD tools to perform 2D drawing and 3D modelling.
7. Construct 3D and Wireframe Models and Distinguish between them.
8. Design and Assemble different CAD parts.

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

Expt. No	Name of Experiment
1	Basic introduction to geometrical entities and CAD tools.
2	Creation of isometric views to orthographic views using any CAD software.
3	Creation of orthographic views to isometric views using any CAD software.
4	Creation of solid modelling objects using any CAD software.
5	Modification of solid modelling objects using special geometrical features.
6	Creation surface modelling objects using any CAD software.
7	Modification of surface modelling objects using special geometrical features.
8	Assembly of solid modelling objects using any CAD software.
9	Constraint modifications in assembly modelling.
10	Drafting of solid model on different layouts.

II SEMESTER

23EL1201 : 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, Thevenin's 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. **(ContemporaryIssues related to Topic)**	
Total Lecture	**40 Hours**

Textbooks:	
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

Reference 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

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

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

II SEMESTER

23IT1201 : Basics of Python Programming

Course Outcomes :

After completion of the course:

1. Understand fundamentals, syntax, and semantics of Python programming
2. Apply concepts of different data structure, control flow statements, Arrays, lists, dictionaries, tuples and sets.
3. Analyze and present the data by utilizing various data visualization tools
4. Design & Develop programs to offer solutions using basics of Python.

Unit I: Introduction	**(9 Hrs.)**

Generationsofcomputer,computerlanguages.IntroductiontoPythonProgrammingLanguage,Identifiers,Keywords,StatementsandExpressions,Variables,Operators,PrecedenceandAssociativity,DataTypes,Indentation,Comments,ReadingInput,PrintOutput,TypeConversions,Thetype()FunctionandIsOperator,DynamicandStronglyTypedLanguage,ControlFlowStatements,TheifDecisionControlFlowStatement,Theif…else Decision Control Flow Statement, The if…elif…else Decision Control Statement, Nested if Statement,(Contemporary Issues related to Topic)

Unit II: Control Structure and Functions	**(8 Hrs.)**

The while Loop, The for Loop, The continue and break Statements, Catching Exceptions Using try and except Statement, Functions, Built-In Functions, Commonly Used Modules, Function Definition and Calling the Function, Thereturn Statement and void Function, Scopeand Life time of Variables, Default Parameters, Keyword Arguments,*argsand **kwargs, Command Line Argument **(Contemporary Issues related to Topic)**

Unit III: Strings and Lists	**(8 Hrs.)**

Strings, Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings, Lists, Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Use don Lists, List Methods, The del Statement. (Contemporary Issues related to Topic)

Unit IV: Dictionaries	**(8 Hrs.)**

Dictionaries, Creating Dictionary, Accessing and Modifying key: value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, The del Statement, **Tuples and Sets**, Creating Tuples, Basic Tuple Operations, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Tuple Methods, Using zip() Function, Sets, Set Methods, Traversing of Sets, Frozen set. **(Contemporary Issues related to Topic)**

Unit V: Files	(8 Hrs.)
Files, Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, The Pickle Module, Reading and Writing CSV Files, Python os and os. path Modules, **Regular Expression Operations,** Using Special Characters, Regular Expression Methods, Named Groups in Python Regular Expressions, Regular Expression with glob Module **(Contemporary Issues related to Topic)**	
Unit VI: Visualizing Information	**(8 Hrs.)**
Visualizing Information: what is data visualization, use of Pyplot Matplotlib Library, Creating Line charts and scatter plot, Creating bar charts and Pie Charts, Customizing the plots, Creating Histogram with PyPlot and other library, Creating Frequency Polygons, Creating Box plot, Plotting data from Dataframe. **(Contemporary Issues related to Topic)**	
Total Lecture	**49 Hours**

Text Books:	
1	"Introduction to Python Programming", 1st Edition, Gowrishankar S, Veena ACRCPress/Taylor&Francis

ReferenceBooks:	
1	"PythonDataScienceHandbook:EssentialToolsforWorkingwithData",1stEdition,JakeVanderPlas,O'Reilly Media
2	"Hands-On Machine Learning with Scikit- Learnand Tensor Flow :Concepts, Tools, and Techniques to Build Intelligent Systems", 2ndEdition, Aurelien Geron O'Reilly Media.
3	"CorePythonApplicationsProgramming",3rdEdition,WesleyJChun,PearsonEducation

YCCE e-library book links[ACCESSIBLEFROM COLLEGECAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/5._DataStructuresAndAlgorithmsWith%20Python.pdf
2	http://103.152.199.179/YCCE/DTEL%20Material/7.Information%20Technology/DTEL%20PPTs/

MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/106/106/106106182/
2.	https://archive.nptel.ac.in/courses/106/106/106106145/

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(Department of Information Technology)

SoE No. 23IT-101.1

B.Tech in Computer Science and Design

II SEMESTER

23IT1202 : Lab. Basics of Python Programming

Course Outcomes
Upon successful completion of the course the students will be able to 1. Comprehend programming constructs operators, command line Arguments, Strings etc. 2. Design application by using Python for real world problems.

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

<table>
<tr><th>SN</th><th>Experiments based on</th></tr>
<tr><td>1</td><td>A. Write a python program to demonstrate different number data types in Python.
B. Write a python program to perform different arithmetic operators on numbers.</td></tr>
<tr><td>2</td><td>A. Write a python program to find largest of three numbers.
B. Write a python program to convert temperature to and from Celsius to Fahrenheit</td></tr>
<tr><td>3</td><td>A. Write a python program to print for a score between 0.0 to 1.0. If the score is out of range print an error message. if the score is between 0.0 to 1.0 print a grade using a following grade using following table
<table>
<tr><th>Score</th><th>Grade</th></tr>
<tr><td>>= 0.9</td><td>A</td></tr>
<tr><td>>= 0.8</td><td>B</td></tr>
<tr><td>>= 0.7</td><td>C</td></tr>
<tr><td>>=0.6</td><td>D</td></tr>
<tr><td><0.6</td><td>E</td></tr>
</table>
B. Write a python program to check if given year is leap year or not.</td></tr>
<tr><td>4</td><td>A. Write a python program to print Fibonacci series.
B. Write a python program to find the GCD of two positive numbers.</td></tr>
<tr><td>5</td><td>A. Write a python program to demonstrate command line argument in python.
B. Write a python program to check whether a particular character is present or not in the string using command line argument</td></tr>
<tr><td>6</td><td>A. Write a python program to create, concatenate, and print a string and access sub string
B. Write a python program to create append, and remove from list.</td></tr>
</table>

7	A. Write a python program to count vowels, consonant and blank from a string.
8	Write a python program to input information of n students as given below: a. name b. registration number c. total marks The user has to specify a value for n numbers of student. The program should output the registration number and marks of specified student given his name.
9	Write a python program for reading a CSV files using CSV reader() to read a CSV file in python
10	A. Draw a line chart by using Pyplot matplotlib library of data visualization B. Draw a bar graph of the given data for the production of apples and oranges of a field of toranto using pyplot matplotlib library. range(2000,2006) apples=[0.35,0.6,0.9,0.8,0.65,0.8] oranges=[0.4,0.8,0.9,0.7,0.6,0.8]

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.		

Assignment Presentation on Mad Ads, Quiz on Tenses and social media-Internet Communication Topic: Activity Extempore			
EVALUATION			**1 Hour**
WRITTEN TEST	**TA=60**	**ESE=40**	**TOTAL=100**
Total Lecture Hours			**24 Hours**

Reference Books	
1	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

Nagar Yuwak Shikshan Sanstha's

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(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 Information Technology)

B. Tech in Computer Science and Design (CSD)

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 Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	**HSSM1**	GE	23GE1301	Fundamentals of Management & Economics	T	2	0	0	2	2	30	20	50	3
2	3	PC	CSD	23CSD1301	Discrete Mathematics and Graph Theory	T	3	0	0	3	3	30	20	50	3
3	3	PC	CSD	23CSD1302	Data Structures	T	3	0	0	3	3	30	20	50	3
4	3	PC	CSD	23CSD1303	**Lab :** Data Structures	P	0	0	2	2	1		60	40	
5	3	PC	CSD	23CSD1304	Microprocessors and Microcontrollers	T	3	0	0	3	3	30	20	50	3
6	3	PC	CSD	23CSD1305	**Lab :** Microprocessors and Microcontrollers	P	0	0	2	2	1		60	40	
7	3	PC	CSD	23CSD1306	Computer Systems Organization	T	3	0	0	3	3	30	20	50	3
8	3	**VEC-2**	CSD	23CSD1307	Open Source Design Tool	T	2	0	0	2	2	30	20	50	3
9	3	CEP	CSD	23CSD1308	**Lab :** Community Engagement Project	P	0	0	4	4	2		60	40	
10	3	**OE-1**	OE-1		**Open Elective - I**	T	2	0	0	2	2	30	20	50	3
11	3	MDM	MDM		**MD Minor Course - I**	T	2	0	0	2	2	30	20	50	3
					TOTAL		**20**	**0**	**8**	**28**	**24**				

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

Open Elective - I

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 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	23OE1311	OE-I : Value Engineering
12	3	OE1	MGT	23OE1312	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
23	3	OE1	MGT	23OE1323	OE-I : Designated approved online NPTEL/KKSU Course
24	3	OE1	MGT	23OE1324	OE-I : Indian Archeology
25	3	OE1	MGT	23OE1325	OE-I : Social & Positive Psychology
26	3	OE1	MGT	23OE1326	OE-I : Seismology & Earthquake

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B.Tech in Computer Science and Design

SoE No. 23CSD-101

III SEMESTER

23GE1301: Fundamentals of Economics & Management

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: Principles of Management	**(8 Hrs.)**
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: Marketing and Financial Management	**(8 Hrs.)**
Marketing and Financial Management –Marketing Theories and Concept-Marketing Mix, Market Segmentation, Targeting and Positioning and Functions	
Unit III: Introduction to Microeconomics	**(8 Hrs.)**
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: Nature and Scope of Macroeconomics	**(6Hrs.)**
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**

Textbooks:	
1.	Principle of Management, 9thedition , 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, 7th edition, Mankiw N. Gregory, Thomson, 2013

Reference books:	
1.	Foundations of Financial Markets and Institutions, 3rd Edition, Fabozzi, Pretice Hall
2.	Fundamentals of Financial Instruments , 2nd Edition, Parameshwaran, Wiley India
3.	Marketing Management , 3rd Edition , RajanSaxena, Tata McGraw Hill
4.	Advance Economic Theory, 17th Edition, H. L. Ahuja, S. Chand Publisher, 2009

5.	International Trade, 12th edition, M. L. Zingan, Vindra Publication, 2007
6.	Macro Economics, 11th edition, M. L. Zingan, Vindra Publication, 2007
7.	Monitory Economics:,1st Edition, M. L. Sheth, Himayalaya Publisher, 1995
8.	Economics of Development and Planning, 12th edition, S. K. Misra and V. K. Puri, Himalaya Publishing House, 2006.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
2	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology
3	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0

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

III SEMESTER

23CSD1301: Discrete Mathematics & Graph Theory

Course Outcomes :
Upon successful completion of the course the students will be : 1. Identify the importance of statements in deriving valid inferences 2. Use relations and ordering methods to identify the relationship among the inferences 3. Select suitable algebraic systems to find solution for real time problems. 4. Find the suitable computing methods and applying graph theory concepts to solve complex problems.

Unit I: Mathematical, Logic & Set Theory	**(7 Hrs.)**
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 , mathematical induction. Propositions, Predicate logic.	
Unit II: Relations and Functions:	**(7 Hrs.)**
Relations and Ordering, Relation Matrix and Graphs, Partition and Covering of a set, Equivalence relation, Partial order relation, Partially Ordered sets, Functions, Composition of functions, Inverse Functions, Characteristics function of a set.	
Unit III: Group Theory	**(7 Hrs.)**
Groups, Subgroups and Homomorphism, Cosets and Lagrange's theorem, Normal subgroups. Semi groups and Monoids Homomorphism of semigroups and monoids, Homomorphism of Sub semi groups and monoids. semigroups and monoids, Sub semi groups and monoids.	
Unit IV:Rings	**(8 Hrs.)**
Definitions and Examples, sub ring, Integral domain, ring homomorphism, ideal of ring polynomial	
Unit V: Field and Lattices	**(8 Hrs.)**
Definitions and Examples, Finite Field, Ordered sets, Hasse Diagrams of partially Ordered sets. Lattices, Bounded Latices, Complements Latices, Definitions and Examples of Finite Field, Ordered sets, Hasse Diagrams of partially Ordered sets. Lattices, Bounded Latices, Complements Latices.	
Unit VI: Graph theory	**(8 Hrs.)**
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 Lecture **45 Hours**

Textbooks:	
1.	J. P. Tremblay & R. Manohar, Discrete Mathematics Structure with application to Computer Science, 23rd re-print, 2005, Tata McGraw-Hills Publication Company Limited, New Delhi.
2.	Lipschutz Schaums's , Outline series ,Discrete Mathematics, 2nd edition, Tata McGraw-Hills Publication Company Limited, New Delhi.
3	J K Shrma "Discrete Mathematics" 4th edition

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

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/
2	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.nptel.ac.in/noc22_ma10/preview
2.	https://onlinecourses.nptel.ac.in/noc20_cs82/preview
3.	https://nptel.ac.in/courses/111106102

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III SEMESTER

23CSD1302: Data Structure

Course Outcomes :

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

1. Comprehend programming constructs like function, array, string, pointer, structure, file and also understand basic data structures like list, stack, queue.
2. Apply appropriate data structures in problem solving.
3. Analyze the performance of operations performed on data structures.
4. Design application by using data structures for real world problems.

Unit I	**(8 Hrs.)**
Introduction to DS, Introduction to Time and Space Complexity, ADT,Aarry and Strings, representation of 1D in memory, pointers and dynamic allocation, Structure ,Union	
Unit II	**(6 Hrs.)**
Stack:-Application and Operations of Stack. Queue:- Application and Operations of Stack, Types: Priority Queues, Circular Queue, Dequeue	
Unit III	**(8 Hrs.)**
Link List: Implementation of linked list using arrays and pointers, operations on singly ,Doubly and Circular linked list	
Unit IV	**(6 Hrs.)**
Trees: Binary trees: Representations in memory and Traversals, Binary search trees(BST), B-Tree, B+Trees, AVL Trees, Threads and its Operations.	
Unit V	**(6 Hrs.)**
Graphs: Graphs and diagraphs: Representations and its operations, Breadth and Depth First Searches, Spanning Trees.	
Unit VI	**(6 Hrs.)**
2D array, sparse matrix, storage classes, File handling, Hashing	
Total Lecture	**45 Hours**

Textbooks:	
1.	Data Structures & Program Design in C,Robert Kruse, G. L. Tondo and,B. Leung,PHI-EEE
2.	Data Structures and Algorithms Jeffrey D. Ullman, Alfred V. Aho

Reference Books:	
1.	Robert Kruse, G. L. Tondo and B. Leung PHI-EEE Data Structures & Program Design in C
2.	Seymour Lipschutz Data Structures Tata McGraw-Hill
3.	Ellis Horowitz, Satraj Sahni and Susan Anderson-Freed Fundamentals of Data Structures in C W. H. Freeman and Company.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1.	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

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MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/6VF2Q0pgUFI?feature=shared
2.	https://youtu.be/zWg7U0OEAoE
3.	https://youtu.be/g1USSZVWDsY
4.	https://youtu.be/tORLeHHtazM

III SEMESTER

23CSD1303: Lab: Data Structure

Course Outcomes
Upon successful completion of the course the students will be able to 1. Comprehend programming constructs like function, array, string, pointer, structure, file and also understand basic data structures like list, stack, queue. 2. Apply appropriate data structures in problem solving. 3. Analyze the performance of operations performed on data structures. 4. Design application by using data structures for real world problems.

SN	Experiments based on
1	Based on Array
2	Structure
3	Stack
4	Queue
5	Singly Link List
6	Doubbly and Circular Link List
7	Tree Traversing
8	Satck and Queue in Tree
9	Graph
10	Mini project

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III SEMESTER

23CSD1304: Microprocessors and Microcontrollers

Course Outcomes :
Upon successful completion of the course the students will be able to 5. Identify a detailed software & hardware structure of the Microprocessor and microcontroller 6. Determine the addressing modes and instruction sets related to programming of 8086 and 8051 7. Analyze assembly language programs; select appropriate assemble into machine a cross assembler utility of a microprocessor and microcontroller. 8. Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices.

Unit I: 8086 architecture	**(7 Hrs.)**
Internal architecture & pin diagram of 8086/8088 microprocessor, Minimum & Maximum mode, even & odd memory banks, Accessing memory & I/O ports, Memory mapping in minimum mode.	
Unit II : Programming with 8086/8088	**(7 Hrs.)**
Addressing Modes, Instruction set, Instruction encoding format, Timing diagram Assembler directives, 8086 programming examples, String operations, File I/O processing, Far & Near procedures, Macros	
Unit III: Interfacing with 8086/8088	**(7 Hrs.)**
Memory interfacing, Intel 8255 PPI, Block diagram & interfacing with ADC DAC, Modes & initialization.	
Unit IV : 8051 Microcontroller	**(8 Hrs.)**
Overview of 8051 Microcontroller family, Introduction to MCS 51 family, Architecture, Memory organization, Internal RAM, Flag Register, Register Banks, SFRs , Functional pin description and various resources of MCS 51. Hardware Overview	
Unit V: Addressing modes, Instruction set	**(8Hrs.)**
Addressing modes, Instruction set and Assembly language programming Programs using look up table, Bit manipulation, 8051 I/O programming, Delay Programs	
Unit VI: I/O Interfacing	**(8Hrs.)**
I/O Interfacing such as LED, switches, 7segment display, keyboard matrix programming, 8051 programming in C: Data types and time delay, I/O programming, Logic operations, Data conversion programs, Lookup table access.	
Total Lecture	**45 Hours**

Textbooks:	
1.	A.K ray and K.M.Bhurchandani Advanced microprocessors and peripherals 2nd edition 2006 TMH
2.	Muhammad Ali Mazidi The 8051 Microcontroller and Embedded systems using assembly & C 2nd edition Pearson Education Asia LPE

Reference Books:	
1.	K.Uma Rao, Andhe Pallavi The 8051 Microcontrollers, Architecture and programming and Applications Pearson, 2009.
2.	Douglas V.Hall Microprocessors and Interfacing: Programming and Hardware Third edition TMH
3.	Kenneth.J.Ayala The 8051 microcontroller 3rd edition Cengage learning,2010

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MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=YqrFeU90Coo
2.	https://www.youtube.com/watch?v=Si9MzFqBs8E
3.	https://www.youtube.com/watch?v=6VF2Q0pgUFI

III Semester

23CSD1305: Lab: Microprocessors and Microcontrollers

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Identify a detailed software & hardware structure of the Microprocessor and microcontroller 2. Determine the addressing modes and instruction sets related to programming of 8086 and 8051 3. Analyze assembly language programs; select appropriate assemble into machine a cross assembler utility of a microprocessor and microcontroller. 4. Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices.

S.N.	Name Of The Practical
1	To Study the architecture of 8086 Microprocessor.
2	To study Pin Diagram of 8086 Microprocessor.
3	Write an assembly language Program to perform arithmetic operation on 8bit & 16 bit.
4	Write an assembly language program to find largest number from an unordered list/array of 8 bit numbers The program starts at location 1000H:500H.The result will be obtained at 1000H:600H..
5	Write An Assembly Language Program performs one byte BCD addition.
6	Write an assembly language program To find Out the number of even and odd numbers from a given series of 16 bit hexadecimal numbers.
7	Write an ALP to determine Average of n-bytes stored in internal RAM locations using 8051 Microprocessor.
8	Write an ALP to generate Square Waveform with 50% duty ratio using 8051 Microprocessor.
9	Write an 8051 C program to read the P1.0 and P1.1 bits and issue an ASCII character to P0 according to the following table.
10	Write an 8051 C program to toggle all the bits of P0 and P2 continuously with delay.

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SoE No. 23CSD-101

III SEMESTER

23CSD1306: Computer System Organization

Course Outcomes :
Upon successful completion of the course the students will be able to: **1.** Describe fundamentals of computer architecture and organization and able to design control sequence for instructions. **2.** Apply mathematical techniques and perform computer arithmetic operations along with the understanding of processor design. 3. Design memory organization and understand the concept of cache mapping techniques, Input/output subsystem interfaces and buses

Unit I: Structure of Computer	**(7 Hrs.)**
Basic Structure of Computer Hardware and Software: Functional Units, Basic Operational Concepts, addressing methods and machine program sequencing: Memory Locations, addressing and encoding of information, Main memory operation. Instruction Format, limitations of Short word- length machines, High level language considerations	
Unit II :Processing Unit	**(8 Hrs.)**
Some fundamental concepts, Single, two, three bus organization, Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instruction, Instruction sequencing, addressing modes. **Case study – instruction sets of some common CPUs.**	
Unit III: Hardwired Control Design	**(7 Hrs.)**
Micro-programmed Control: Microinstructions, Grouping of control signals, Micro program sequencing, Micro Instructions with next Address field, Perfecting microinstruction, Emulation, Bit Slices. **Case study – design of a simple hypothetical CPU**	
Unit IV :Arithmetic	**(8 Hrs.)**
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, fast Multiplication, Booth's Algorithm, Integer Division, Floating point numbers and operations.	
Unit V :The main Memory:	**(8 Hrs.)**
Some basic concepts, semiconductor RAM memories, Memory system consideration, semiconductor ROM memories, Multiple module memories and interleaving, Cache Memory, Mapping techniques, Replacement algorithms, write policies Virtual memories, memory management requirements.	
Unit VI :Computer Peripherals	**(7 Hrs.)**
I/O Devices, I/O device interface, DMA, Interrupt handling Role of interrupts in process state transitions, I/O device interfaces – SCII, USB Introduction to Pipelining, Throughput and speedup, pipeline hazards Introduction to parallel processors.	
Total Lecture	**45 Hours**

Textbooks:	
1.	David A. Patterson and John L. Hennessy Computer Organization and Design: The Hardware/Software Interface 5th Edition Elsevier
2.	Carl Hamacher Computer Organization and Embedded Systems McGraw Hill Higher Education 6th Edition

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Reference Books:	
1.	John P. Hayes, Computer Architecture and Organization WCB/McGraw-Hill 3rd Edition
2.	by William Stallings, Computer Organization and Architecture: Designing for Performance 10th Edition Pearson Education
3.	Vincent P. Heuring and Harry F. Jordan Computer System Design and Architecture 2nd Edition Pearson Education

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MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/106/105/106105163/
2.	https://archive.nptel.ac.in/courses/106/106/106106092
3.	https://www.youtube.com/watch?v=Ol8D69VKX2k
4.	https://www.youtube.com/watch?v=4nEr2Z2tItg
5.	https://www.youtube.com/watch?v=-Bwiv5EGucs

III SEMESTER

23CSD1307: Open Source Design Tool

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Know different Open Source Tools for Graphics Design 2. Understand features and usage of different Open Source Tools for Graphics Design 3. Use the tools for different graphics designing problems in real time situations.

Unit I: Introduction to Graphic Design	**(8Hrs.)**
Overview of graphic design principles and elements, Introduction to open-source graphics software (GIMP, Inkscape, etc.),Setting up the software environment	
Unit II : Digital Imaging	**(8Hrs.)**
Basic image editing techniques using GIMP, Working with layers, filters, and effects, Image manipulation and retouching	
Unit III: Inkscape	**(8Hrs.)**
As drawing and painting tool, Professional vector graphics editor, Scalable Vector Graphics (SVG), Objects creation and manipulation, Fill and stroke, Rendering,	
Unit IV : Blender	**(6Hrs.)**
Open Source 3D creation suite, 3D pipeline- modelling, Sculpting, Rigging, 3D and 2D animation,	
Total Lecture	**30 Hours**

Textbooks	
1.	Kenneth J. Hiebert "Graphics Design Sources"
2.	Sandeep Koranne " Handbook of Open Source Tools"

Reference Books :	
1.	Grid systems in graphic design' by Josef Müller-Brockmann
2.	Thinking with Type by Ellen Lupton,2nd Edition
3.	100 Ideas That Changed Design by Peter Fiell & Charlotte Fiell

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://www.youtube.com/watch?v=JozESuPcVpg&embeds_referring_euri=https%3A%2F%

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=C8bq90idey0
2.	https://www.youtube.com/watch?v=vkSOIkNWCww

B. Tech. in
Computer Science and Design

Multidisciplinary Minor Courses

TRACK-I

Game Technology

Nagar Yuwak Shikshan Sanstha's

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)

B.Tech in Computer Science and Design

SoE No. 23CSD-101

III Semester

MDM1CSD101: MDM-I : Graphics Design

COURSE OUTLINE :
Upon successful completion of the course the students will be able to: 1. Understand the fundamental principles of graphic design (e.g., hierarchy, balance, contrast, color theory) 2. Utilize design software for creating basic graphic elements 3. Develop skills in visual communication through projects 4. Analyze and critique graphic design solutions

Unit-I: Introduction to Graphic Design	**(8Hrs)**
Definition and history of graphic design, The design process (research, ideation, sketching, prototyping, refinement), The elements and principles of design, Typography basics (anatomy of type, choosing fonts),Introduction to design software (e.g., Adobe Photoshop, Illustrator)	
UNIT-II: Visual Communication	**(8Hrs)**
Color Theory (color psychology, color harmonies), Image manipulation and editing (using design software) , Visual hierarchy and composition, Designing for different media (print, web, social media), Introduction to branding and identity	
UNIT- III : Design Applications	**(8Hrs)**
Poster design, Logo and brand identity design, Brochure and flyer design, Basic layout design principles, Introduction to user interface (UI) design	
UNIT-V: Design Critique and Portfolio Development	**6(Hrs)**
Design critique principles (giving and receiving feedback), Analyzing and critiquing existing, graphic design works, Portfolio building (selecting and presenting best work), The role of graphic design in society, Career exploration in graphic design	
Total Lecture	**30 Hours**

Textbooks:	
1	Graphic Design School: The Principles and Practice of Graphic Design 6th Edition by David Dabner, Sandra Stewart, Abbie Vickress, Willy publication

Reference Books:	
1	Thinking with Type by Ellen Lupton, Princeton Architectural Press
2	Non-Designer's Design Book, The 4th Edition by Robin Williams, Peachpit Press
3	Graphic Design School: The Principles and Practice of Graphic Design 4th Edition by David Dabner, Sheena Calvert, Anoki Casey, Willy publication

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YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material
https://archive.nptel.ac.in/courses/124/107/124107002/
https://www.youtube.com/channel/UC-b3c7kxa5vU-bnmaROgvog
https://www.youtube.com/playlist?list=PL2FaTykxt17-syO9FGzgpS9VfUKVGgoKd
https://www.youtube.com/@phlearn
https://www.reddit.com/r/youtube/comments/pvv2s6/why_is_all_text_on_youtube_now_in_italics/

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(Department of Information Technology)

B.Tech in Computer Science and Design

SoE No. 23CSD-101

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	23OE1311	OE-I : Value Engineering
12	3	OE1	MGT	23OE1312	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 syllabus: https://ycce.edu/syllabus/

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B.Tech in Computer Science and Design

SoE No. 23CSD-101

III SEMESTER

Mandatory Learning Course (MLC)

MLC2123 : YCAP3

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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

4th Semester

(Department of Information Technology)

B. Tech in Computer Science and Design (CSD)

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 Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FOURTH SEMESTER															
1	4	BS	GE	23GE1403	Linear Algebra	T	3	0	0	3	3	30	20	50	3
2	4	HSSM-2	GE	23GE1401	Entrepreneurship Development	T	2	0	0	2	2	30	20	50	3
3	4	AEC-2	GE	23GE1405 23GE1406	Marathi Language / Hindi Language	T	2	0	0	2	2	30	20	50	3
4	4	VEC-1	CV	23CV1411	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
5	4	PC	CSD	23CSD1401	Object Oriented Programming	T	3	0	0	3	3	30	20	50	3
6	4	PC	CSD	23CSD1402	**Lab :** Object Oriented Programming Lab	P	0	0	2	2	1		60	40	
7	4	PC	CSD	23CSD1403	Computer Networks	T	3	0	0	3	3	30	20	50	3
8	4	PC	CSD	23CSD1404	**Lab :** Computer Networks	P	0	0	2	2	1		60	40	
9	4	PC	CSD	23CSD1405	Software Lab	P	0	0	2	2	1		60	40	
10	4	VSEC-3	CSD	23CSD1406	**Lab :** Adv. Python Programming	P	0	0	4	4	2		60	40	
11	4	OE-2	OE		**Open Elective -II**	T	2	0	0	2	2	30	20	50	3
12	4	MDM	MDM		**MD Minor Course-II**	T	2	0	0	2	2	30	20	50	3
					TOTAL		**19**	**0**	**10**	**29**	**24**				
List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	**YCAP4 :** YCCE Communication Aptitude	**A**	3	0	0	3	**0**				

Open Elective - II

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	23OE2411	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	23OE2414	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
23	4	OE2	MGT	23OE2423	OE-II : Designated approved online NPTEL/KKSU Course
24	4	OE2	MGT	23OE2424	OE-II : Indian Archeology
25	4	OE2	MGT	23OE2425	OE-II : Social & Positive Psychology
26	4	OE2	MGT	23OE2426	OE-II : Seismology & Earthquake

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B.Tech in Computer Science and Design

SoE No. 23CSD-101

IV Semester

23GE1403: Linear Algebra

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Solve systems of linear equations using rank of matrix 2. Determine eigenvalues and eigenvectors and solve eigenvalue problems solve Mathematical equations. 3. Explain the concepts of vector space and subspace, span and basis. 4. Apply principles of matrix algebra to linear transformations and inner product.

Unit I: Vector Space	**(7 Hrs.)**
Vector Space, Subspace, Sum of Sub space, linear combination, Linear Span and basis, Spanning sets, Generators.	
Unit II: Linear Transformation	**(7 Hrs.)**
Linear transformation, Ranges and Kernel (null space) of linear transformation, Inverse of linear transformation, Algebra of linear transformation, Singular and non-singular linear transformation.	
Unit III: Matrix Algebra	**(7 Hrs.)**
Matrix Representation of linear transform, composition of Linear Transform, and Matrix Multiplication, Matrix associated with linear Map, linear map associated with Matrix, Inevitability and Isomorphism's, the change of coordinate matrix.	
Unit IV: Elementary matrix operations	**(8 Hrs.)**
Matrix Representation of linear transform, composition of Linear Transform and Matrix Multiplication, Matrix associated with linear Map, linear map associated with Matrix, Inevitability and Isomorphism's, the change of coordinate matrix.	
Unit V: Diagonalization of matrix	**(8 Hrs.)**
Eigen Values and Eigen vectors, Linear dependence and independence of Eigen Vectors, Orthogonal Eigen vector, Diagonalization of matrix, Cayley-Hamilton Theorem and Sylvester's Theorem.	
Unit VI: Inner product Spaces	**(8 Hrs.)**
Inner product space and Norms, orthogonal vector, the Gram Schamidt orthogonalization Process , orthogonal compliment, Adjoint of Linear operator, Normal and self adjoint operator, Unitary and orthogonal operator, Bilinear and Quadratic form.	
Total Lecture	**45 Hours**

Textbooks:	
1.	Kreyszig. Wiley Advance Engineering Mathematics9th Edition, September 2009.
2.	B.S. Grewal Higher Engineering Mathematics 40th edition, (2010) Khanna Publishers (2006)
3.	H.K. Dass Publisher: S.Chand and Company Limited Advanced Engineering Mathematics 8th revised edition, 2007
4.	Hoffman and Kunze Linear Algebra prentice Hall of India, New Delhi

Reference Books:	
1.	Chandrika Prasad. John wiley& Sons Mathematics for Engineers 19th edition, 2007.
2.	Chandrika Prasad John wiley& Sons Advanced Mathematics for Engineers 4th edition, 2006.
3.	L.A. Pipes and Harville McGraw Hill. Applied Mathematics for Engineers 3rd edition, 1970
	N.P. Bali and Manish Goyal A text book of Engineering Mathematics Reprint 2008 Laxmi Prakashan

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/12..2013_Book_ProbabilityTheory.pdf
2	03.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/14.2015_Book_LinearAlgebra.pdf
3	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/8.2004_Book_AllOfStatistics.pdf
4	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/9.2008_Book_IntroductoryStatisticsWithR.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=P7gVp333B6M&list=PL562D06BCD5F9B956
2.	https://www.youtube.com/watch?v=PMKZbiqVTq8
3.	https://www.youtube.com/watch?v=d7NF-8vVv4&list=PLyqSpQzTE6M8gnapvdLN92hs_4F75OSuH

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B.Tech in Computer Science and Design

SoE No. 23CSD-101

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 startup.
3. Stimulate to innovate, develop prototypes or ideas by applying theory into practice.
4. Identify the Support rendered by various Government Agencies.

Unit I: Entrepreneur & Entrepreneurship	**(7 Hrs.)**
Meaning of Entrepreneur, Evolution of the concept – Theories and Models, Types of Entrepreneur, Stages in entrepreneurial process- Idea Generation, Screening, Selection and Managing Resources.	
Unit II: Legal Compliances for Incorporating Start up	**(8 Hrs.)**
Fundamentals of choosing the Business 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: Entrepreneurship and IP Strategy	**(7 Hrs.)**
Intellectual Property: Definition and Concept of Trade Mark, Patent, Copyright, Industrial Design, IP Strategy and Entrepreneurship.	
Unit IV: Support to Entrepreneurs	**(8 Hrs).**
Financing new ventures, Business Incubators – Government Policy for Small Scale Enterprises, Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Subcontracting.	
Total Lecture	**30Hours**

Textbooks:

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.

Reference 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

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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

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs 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
4.	https://onlinecourses.swayam2.ac.in/cec23_mg24/course- entrepreneurship development

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
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	गद्य विभाग	8 Hours

१.	भारतीय लोकशाहीचे भवितव्य काय?	- डॉ. बाबासाहेब आंबेडकर
२.	काळी आई	- व्यंकटेश माडगूळकर
३.	संत तुकारामांचे अभंग	- निर्मलकुमार फडकुले
४.	माझी शाळा	- प्रकाश खरात
५.	समतेचे वारकरी संत गाडगेबाबा आणि राष्ट्रसंत तुकडोजी महाराज	- अशोक राणा
६.	लोककल्याणकारी राजा :	- शरयू तायवाडे

Unit:2	पद्य विभाग	8 Hours

१.	ज्ञानेश्वरांचे अभंग	- संत ज्ञानेश्वर
२.	वनसुधा	- वामन पंडित
३.	नवा शिपाई	- केशवसुत
४.	मेंढरं	- विठ्ठल वाघ
५.	पोरी	- अनुराधा पाटील
६.	गाव	- हेमंतकुमार कांबळे

Unit:3	व्यावहारिक मराठी	7 Hours

१. म्हणी

२. मुलाखतलेखन - डॉ. वैशाली धनविजय

३. वाक्प्रचार

४. जाहिरातलेखन - डॉ. अजय देशपांडे

Unit:4	रोजगाराभिमुख मराठी व्यावहारिक कौशल्ये	7 Hours

१. प्रत्यक्ष मुलाखत कौशल्य

२. वाचन कौशल्य - (अ) बातमी वाचन (ब) कथा वाचन

३. ऑनलाईन कौशल्य - (अ) ग्राहक सेवा केंद्राशी संवाद, (ब) ऑनलाईन अर्ज करणे

Reference Books

1. पाठ्यपुस्तक **: शब्दसाधना - भाग १**
2. रोजगाराभिमुख मराठी व्यावहारिक कौशल्ये

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B.Tech in Computer Science and Design

SoE No. 23CSD-101

IV SEMESTER

23GE1406 : Hindi Language

Course Objectives

6. विद्यार्थियों में देशभक्तिपरक एवं पारिवारिक मूल्यों 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
२. स्मृति (निबंध) - श्रीराम शर्मा
३. गिल्लू (रेखाचित्र) - महादेवी वर्मा
४. अभाव (कहानी) - विष्णु प्रभाकर
५. महाभारत की साँझ (एकांकी) - भारतभूषण
६. उखड़े खंबे (व्यंग्य)। - हरिशंकर परसाई

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Unit:2	पद्य विभाग	8 Hours

१. कबीर के दोहे - कबीरदास

२. ले चल यहाँ भुलावा देकर - जयशंकर प्रसाद

३. स्नेह-निर्झर बह गया - हैसूर्यकांत त्रिपाठी "निराला"

४. प्रथम रश्मि - सुमित्रानंदन पंत

५. जीवन का झरना - आरसीप्रसाद सिंह

६. कविता के साथ - दामोदर खड़से

Unit:3	अन्य पाठ्य सामग्री	7 Hours

१. मुहावरे और लोकोक्तियाँ: पाठ्यपुस्तक में मुहावरे और लोकोक्तियाँ का अर्थ एवं वाक्य प्रयोग

२. विज्ञापन कला : अर्थ, परिभाषा, प्रकार, शीर्षक का महत्त्व, विज्ञापन के प्रयोजन, सत्य, लक्ष्य, विज्ञापन की भाषा, अच्छे विज्ञापन के गुण इत्यादि ।

Unit:4	कौशल्य आधारित घटक	7 Hours

१. वाचन कौशल्य (समाचार-वाचन, कहानी-वाचन)

२. सोशल मीडिया के शिष्टाचार

३. ऑनलाइन आवेदन, ग्राहक-सेवा केंद्र से संवाद

Reference Books

3. पाठ्यपुस्तक : **"पलाश"**

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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**

Text 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

Reference 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
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
MOOCs Links and additional reading, learning, video material	
1	

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SoE No. 23CSD-101

IV SEMESTER

23CSD1401 : Object Oriented Programming

Course Outcomes :

Upon successful completion of the course the students will be

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 a small programs using java classes

Unit I OOP concepts:	**(7 Hrs.)**
OOP concepts: Classes and objects, data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, procedural and object oriented programming paradigm. Java programming: History of java, comments data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow statements, jump statements, simple java standalone programs, console input and output, formatting output, constructors ,methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection	
Unit II : Inheritance	**(7 Hrs.)**
Inheritance: Inheritance hierarchies, super and subclasses, member access rules, super keyword, preventing inheritance: final classes and methods, the object class and its methods; Polymorphism: dynamic binding, method overriding, abstract classes and methods; Interface: Interfaces VS Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface; Packages: Defining, creating and accessing a package, understanding CLASSPATH, importing packages	
Unit III : Arrays	**(8 Hrs.)**
Arrays, Strings Arrays, One Dimensional Arrays, Two Dimensional Arrays, variable size arrays, Strings and String Buffer classes, Wrapper Classes, Collection Vector and Framework: Introduction to collection framework, Vectors, Array List, Linked list, Hashset, Treeset, Hashmap	
Unit IV: Exception Handling	**(8 Hrs.)**
Exception Handling: Benefits of exception handling, the classification of exceptions , exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, exception specification, built in exceptions, creating own exception sub classes. Multithreading: Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter thread communication.	
Unit V: Files	**(7 Hrs.)**
Files: streams, byte streams, character stream, text input/output, binary input/output, random access file operations, file management using file class: Connecting to Database, querying a database and processing the results, updating data with JDBC.	
Unit VI : Virtual memory	**(8 Hrs.)**
GUI Programming with Java: The AWT class hierarchy, introduction to swing, swings Vs AWT, hierarchy for swing components. Containers: JFrame, JApplet, JDialog, Jpanel, overview of some swing components: JButton, JLabel, JTextField, JTextArea, simple applications. Layout management: Layout manager types, border, grid and flow. Applets: Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters to applets	
Total Lecture	**45 Hours**

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Textbooks:	
1	David J. Eck " introduction to Programming Using Java
2	R. Nageswara Rao " Core Java"2nd edition

Reference books:	
1.	Herbert Schildt Java2 Complete Reference McGraw-Hill
2.	E. Balagurusamy Programming with Java TATA McGraw-Hill
3.	Amritendu De, "Spring 4 and Hibernate 4: Agile Java Design and Development", McGraw-Hill Education
4.	Ninth Edition, Tata McGraw Hill, 2014 3. Joyce Farrell, "Java Programming", Cengage Learning, Seventh Edition, 2014

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=O5hShUO6wxs
2.	https://www.youtube.com/watch?v=7q3zXRuctQ8&list=PLd3UqWTnYXOnT6p6dll1oiKsDu96QGANk
3.	https://www.youtube.com/watch?v=P5tFJ9umhvk

IV SEMESTER

23CSD1402: Lab: Object Oriented Programming

Course Outcomes :
Upon successful completion of the course the students will be 1. Demonstrate the understanding of Object oriented concepts. 2. Apply the programming language JAVA efficiently in object oriented software development 3. Able to analyse problem statement and identify appropriate objects and methods 4. Design and implement a small programs using classes

Sr. No	**Experiments Base On**
1.	Introduction of JAVA Programming Environment
2	Data Types and Control Structures
3	Class and constructor
4	Overloading
5	Overriding
6	Interface
7	Arrays and String
8	Exception
9	Collection
10	Applet

IV SEMESTER

23CSD1403: Computer Networks

Course Outcomes :

Upon successful completion of the course the students will be

1. Understand the fundamental of Computer Network, data link layer issues, protocols, devices, and application level layer concepts.
2. Analyze different error detection mechanism in network layer.
3. Apply different routing algorithm for solving computer network Problem.
4. Analyze the performance of computer Networks and elements of protocol.

Unit I : Computer networks	**(7 Hrs.)**
The use of computer networks, LAN"s, MAN"s, WAN"s. topologies and their characteristics, wireless networks, protocol hierarchies, design issues for layers, interfaces and services, connection oriented and connectionless services, service primitives relationship of services to protocols. The Network Core ,Packet Switching, Circuit Switching, A Network of Networks ,Delay, Loss, and Throughput in Packet-Switched Networks , Overview of Delay in Packet-Switched Networks, Queuing Delay and Packet Loss, End-to-End Delay, Throughput in Computer Networks, Protocol Layers and Their Service Models, Layered Architecture Encapsulation The OSI reference model. TCP/IP reference model, Comparison of OSI & TCP/IP reference model	
Unit II: Physical layer	**(7 Hrs.)**
Physical layer: theoretical basis for data communication, Guided transmission media, wireless transmission: electromagnetic spectrum, radio transmission, infrared transmission. Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.	
Unit III : Data Link Layer	**(7 Hrs.)**
Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Switched Local Area Networks, Link-Layer Addressing and ARP, Ethernet, Link-Layer Switches, Virtual Local Area Networks (VLANs)	
Unit IV: Network Layer	**(8 Hrs.)**
Network layer: design issues, Classful and classless Internet Addresses, subnet addressing, implementation of subnet with mask, supernetting, Address block and CIDR notation, examples. Routing algorithms, congestion control algorithms, quality of service, internetworking, network layer in Internet: IP protocol, Input Processing ,Switching ,Output Processing, Where Does Queuing Occur, The Routing Control Plane ,The Internet Protocol (IP): Forwarding and Addressing in the Internet ,Datagram Format,IPv4 Addressing, Internet Control Message Protocol (ICMP) ,IPv6 ,A Brief Foray into IP Security	
Unit V : Transport Layer	**(8 Hrs.)**
Connection-Oriented Transport: TCP , The TCP Connection Segment Structure , Round-Trip Time Estimation and Timeout , Reliable Data Transfer, Flow Control Connection Management , Principles of Congestion Control, The Causes and the Costs of Congestion, Approaches to Congestion Control , Network-Assisted Congestion, Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm. Performance issues: performance problems in networks, network performance measurement.	

Unit VI : Application Layer	**(8 Hrs.)**
Principles of Network Applications , Network Application Architectures Processes Communicating 88, Transport Services Available to Applications ,Transport Services Provided by the Internet , Application-Layer Protocols, The Web and HTTP, Overview of HTTP, Non-Persistent and Persistent Connections , HTTP Message Format, User-Server Interaction: Cookies , Web Caching ,The Conditional GET, Firewalls, Network security: cryptography, introduction to symmetric and public key algorithms, digital signatures, authentication protocols, e-mail and web security.	
Total Lecture	**45 Hours**

Textbooks:	
1.	Kurose & Ross computer networking a top-down approach Pearson Prentice Hall 6th Edition
2.	Andrew Tanenbaum Computer Networks Pearson Prentice Hall 5th Edition.
3.	Behrouz Forouzan Data Comminication & Networking TMH 4th Edition (2007).

Reference Books:	
1.	William Stallings Data & Computer Communication PHI 8th Edition.
2.	Douglas Comer Internetworking with TCP/IP Prentice Hall of India 5th Edition.
3.	Behrouz Forouzan TCP/IP protocol Suite TMH 4th Edition.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1.	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/39.Guide%20to%20computer

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=uSKdjjw5zow
2.	https://www.youtube.com/watch?v=wvPe4Zb0tUA
3.	https://www.youtube.com/watch?v=LdSAaSHfK3M

IV SEMESTER

22CSD1404: Lab: Computer Networks

Course Outcomes :

Upon successful completion of the course the students will be

1. Understand the fundamental of Computer Network, data link layer issues, protocols, devices, and application level layer concepts.
2. Analyze different error detection mechanism in network layer.
3. Apply different routing algorithm for solving computer network Problem.
4. Analyze the performance of computer Networks and elements of protocol.

SN	**Experiments based on**
1	To Study different types of network & networking commands in Linux.
2	To Configure DNS Server using CISCO Packet Tracer
3	To implement client-server application using java network programming.
4	Write a program to perform Bit stuffing.
5	Write a program to implement CRC.
6	Write a program to implement Hamming .
7	To Configure DHCP using CISCO Packet Tracer
8	To Configure RIP server using CISCO Packet Tracer.
9	To Configure Simple VLAN server using CISCO Packet Tracer.
10	To Study campus networking of YCCE.
11	To Study different types of network & networking commands in Linux.
12.	To Configure DNS Server using CISCO Packet Tracer
13.	To implement client-server application using java network programming.

IV SEMESTER

22CSD1405: Lab: Software Lab

Course Outcomes
Upon successful completion of the course the students will be able to 1. To gain knowledge on designing static and dynamic web pages. 2. Able to validate web pages at client-side. 3. Design and validate XML documents. 4. Gain knowledge on server side scripting.

Minimum 10 problems to be performed on each topic

S. N	Experiments Base On
1.	To design 1) HOME PAGE 2)LOGING PAGE
2.	To design 1) CATOLOGUE PAGE 2) CART PAGE
	To design 5) REGISTRATION PAGE
3.	JavaScript
4.	Design a web page using CSS (Cascading Style Sheets) which includes the different font, styles:
5.	XML file
6.	Document Type Definition (DTD) to validate the above XML file
7.	Use XML schemas XSL and CSS for the above purpose.
8.	User Authentication.
9.	Servlet that displays a message.
10.	Servlet for creating a cookie and retrieving it

Reference Books:	
1.	HTML Black Book – Steve Holzner,
2.	The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH
3.	Java Server Pages –Hans Bergsten, SPD O'Reilly

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MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/krfUjg0S2uI
2.	https://youtu.be/k103bbhTdXY
3.	https://nptel.ac.in/courses/106105084

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IV SEMESTER

22CSD1406: Lab: Ad. Python Programming

Course Outcomes :

At the end of the Course the student shall be able to

- Apply exception handling and user defined exception(s)
- .Develop Module(s) and Package(s) in python
- Make use of Pandas and Numpy Libraries
- Implement Object Oriented concepts in programming
- Apply Collection modules for the data types

(Minimum 10 problem statements on each topic)

S. N	Experiments Base On
1.	Assertion
2	Decorators
3.	Generators
4.	Threading in Python
5.	Introduction to GUI building libraries
6.	Widgets
7.	Basic image processing using Python
8.	Basic numerical processing using Python
9.	Basic data visualization using Python
10.	Python Collections

Textbooks:

1. Martin C. Brown (Author), "Python: The Complete Reference" McGraw Hill Education, Fourth edition , 2018

Reference Books:

1. R. Nageswara Rao, "Core Python Programming"Dreamtech Press India Pvt Ltd 2018.

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1. http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material

1. http://www.digimat.in/nptel/courses/video/106106182/L01.html
2. https://youtu.be/HK8kMpjEkB4

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B. Tech. in

Computer Science and Design

Multidisciplinary Minor Courses

TRACK-I

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IV Semester

MDM2CSD102:MDM-II : Motion Graphics

Course Outcome
On completion of this course, the student will be able to: 1. Understand the principles of animation (timing, spacing, anticipation, follow-through, exaggeration, etc.) 2. Apply design principles (hierarchy, balance, contrast, color theory) to motion graphics projects 3. Utilize industry-standard software (e.g., Adobe After Effects) for animation and compositing 4. Develop storyboarding and concept development skills 5. Create engaging and effective motion graphics projects

UNIT-I : Introduction to Motion Graphics	**(8Hrs)**
Definition and history of motion graphics, Applications of motion graphics (branding, explainers, titles, advertising, etc.), The animation workflow (pre-production, production, post-production), Design principles for motion graphics, Introduction to industry-standard software interface and tools	
UNIT-II : Animation Fundamentals	**(8Hrs)**
Timing and spacing in animation, Keyframe animation and interpolation methods (linear, bezier, etc.), Motion paths and animation presets, Text animation techniques, Introduction to character animation	
UNIT-III : Motion Graphics Techniques	**(7Hrs)**
Compositing techniques (layers, blending modes, masks), Using vector graphics and illustrations in motion graphics, Working with footage (importing, editing, color correction), Sound design and music integration, Introduction to basic 2D animation principles	
UNIT-IV: Project Development and Portfolio Building	**(7Hrs)**
Storyboarding and concept development for motion graphics, Project planning and timeline management, Advanced animation techniques (expressions, scripting), Refining and polishing final projects, Building a motion graphics portfolio	
Total Hrs.	**(30Hrs.)**

Textbooks:	
1.	The Animator's Survival Kit" by Richard Williams
2.	"Motion Graphics: Principles and Practices from the Ground Up" by Ian Crook and Peter Beare
3.	After Effects Apprentice: Real-World Skills for the Aspiring Motion Graphics Artist" by Trish and Chris Meyer

Reference Books:	
1.	"The Art of Motion: Motion Graphics Design Projects and Techniques" by Austin Shaw
2.	"Creating Motion Graphics with After Effects" by Chris and Trish Meyer
3.	"Motion Graphic Design: Applied History and Aesthetics" by Jon Krasner

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MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/playlist?list=PL6-tgzjzoo5brvdut_jz4zvtBxrtZzLG9
2.	http://www.youtube.com/playlist?list=PLBX8qMBSjy2oTdZbPTnL8sQgJX97Sd2CQ
3.	http://www.youtube.com/playlist?list=PL5E9ny14GDRiEMFw69KvC3LxoGuJ-6RMy
4.	https://www.svgator.com/blog/motion-graphic-design-tips-and-tricks/

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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	23OE2411	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	23OE2414	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/

IV SEMESTER

Mandatory Learning Course (MLC)

MLC2124 : YCAP4

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Bachelor of Technology

SoE & Syllabus 2023

5th Semester

(Department of Information Technology)

B. Tech in Computer Science and Design (CSD)

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B.TECH SCHEME OF EXAMINATION 2023

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SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIFTH SEMESTER															
1	5	PC	CSD	23CSD1501	Theoretical Foundation of Computer Science	T	3	0	0	3	3	30	20	50	3
2	5	PC	CSD	23CSD1502	Operating System	T	3	0	0	3	3	30	20	50	3
3	5	PC	CSD	23CSD1503	**Lab :** Operating System	P	0	0	2	2	1		60	40	
4	5	PC	CSD	23CSD1504	Machine Learning	T	3	0	0	3	3	30	20	50	3
5	5	PC	CSD	23CSD1505	**Lab :** Machine Learning	P	0	0	2	2	1		60	40	
6	5	PE	CSD		**Professional Elective-I**	T	3	0	0	3	3	30	20	50	3
7	5	PE	CSD		**Professional Elective-II**	T	3	0	0	3	3	30	20	50	3
8	5	MDM	MDM		**MD Minor Course-III**	T	2	0	0	2	3	30	20	50	3
9	5	OE-3	OE		**Open Elective-III**	T	3	0	0	3	3	30	20	50	3
10	5	STR	CSD	23CSD1506	Internship, Seminar and Report	P	0	0	1	1	1		60	40	
					TOTAL		**20**	**0**	**5**	**25**	**24**				

List of Mandatory Learning Course (MLC)															
1	5	HS	T&P	MLC2125	**YCAP5 :** YCCE Communication Aptitude	**A**	3	0	0	3	**0**				

Professional Elective - I					
1	5	PE-I	CSD	23CSD1521	**PE-I :** Graphics Design
2	5	PE-I	CSD	23CSD1522	**PE-I :** Introduction to Cloud Computing
3	5	PE-I	CSD	23CSD1523	**PE-I :** Artificial Intelligence
4	5	PE-I	CSD	23CSD1524	**PE-I :** Software Architecture and Design
Coursera Elective					
1	5	PE-I	CSD	23CSD1525	**PE-I :** Mobile Application Design

Professional Elective - II					
1	5	PE-II	CSD	23CSD1541	**PE-II :** Motion Graphics
2	5	PE-II	CSD	23CSD1542	**PE-II :** Sales Force
3	5	PE-II	CSD	23CSD1543	**PE-II :** Business Intelligence
4	5	PE-II	CSD	23CSD1544	**PE-II :** Design Pattern

Open Elective - III

SN	Sem	Type	BoS/Deptt	Sub. Code	Subject	FACULTY
1	5	OE3	CSE	23OE3501	OE-III : Social Reformers in Modern Maharashtra	ARTS
2	5	OE3	CSE	23OE3502	OE-III : Independent India 1948-2010	ARTS
3	5	OE3	CT	23OE3503	OE-III : Introduction To Cognitive Psychology	ARTS
4	5	OE3	CT	23OE3504	OE-III : Introduction To Engineering Psychology	ARTS
5	5	OE3	CT	23OE3505	OE-III : Introduction To Behavioural Psychology	ARTS
6	5	OE3	CT	23OE3506	OE-III : Introduction To Emotional Psychology	ARTS
7	5	OE3	EL	23OE3507	OE-III : Elements of Public Administration	ARTS
8	5	OE3	ETC	23OE3508	OE-III : Ancient Indian History	ARTS
9	5	OE3	IT	23OE3509	OE-III : Consciousness Studies	ARTS
10	5	OE3	IT	23OE3510	OE-III : Psychology for Professionals	ARTS
11	5	OE3	IT	23OE3511	OE-III : Introduction to Sociology and Human Behavior	ARTS
12	5	OE3	GE	23OE3512	OE-III : Economics of Money and Banking	ARTS
13	5	OE3	GE	23OE3513	OE-III : Economics of Capital Market	ARTS
14	5	OE3	GE	23OE3514	OE-III : Digital Humanities	ARTS
15	5	OE3	GE	23OE3515	OE-III : Introduction to Political Science	ARTS
16	5	OE3	CT	23OE3516	OE-III : Bhagwat Geeta - An Engineer's Interpretation	ARTS - IKS
17	5	OE3	CT	23OE3517	OE-III : Artha shastra by Kautiliya	ARTS - IKS
18	5	OE3	CSD	23OE3518	OE-III : Glimpses of Ancient science and Technology	ARTS - IKS
19	5	OE3	CV	23OE3519	OE-III : Indian taxation system	COMMERCE
20	5	OE3	CV	23OE3520	OE-III : Elements of share trading	COMMERCE
21	5	OE3	EE	23OE3521	OE-III : Introduction to Fintech	COMMERCE
22	5	OE3	EE	23OE3522	OE-III : Financial Analytics	COMMERCE
23	5	OE3	ETC	23OE3523	OE-III : Fundamentals of Investments	COMMERCE
24	5	OE3	EE	23OE3524	OE-III : Lifestyle Diseases	HEALTHCARE & MEDICINE
25	5	OE3	EE	23OE3525	OE-III : Holistic Nutrition	HOME SCIENCE
26	5	OE3	EL	23OE3526	OE-III : Community Organization & Development	HOME SCIENCE
27	5	OE3	CSE	23OE3527	OE-III : Human Rights & International Laws	LAW
28	5	OE3	CSE	23OE3528	OE-III : Cyber Crime Administration	LAW
29	5	OE3	MATHS	23OE3529	OE-III : Finite Differences & Numerical Methods	SCIENCE
30	5	OE3	MATHS	23OE3530	OE-III : Business Statistics	SCIENCE
31	5	OE3	PHY	23OE3531	OE-III : Crystalline Solids: Properties and Applications.	SCIENCE
32	5	OE3	PHY	23OE3532	OE-III : Nanotechnology: Fundamental to Applications	SCIENCE
33	5	OE3	CHE	23OE3533	OE-III : Chemistry in daily life	SCIENCE
34	5	OE3	CHE	23OE3534	OE-III : Battery Systems and Management	SCIENCE
35	5	OE3	NPTEL	23OE3535	OE-III : Designated approved online NPTEL Course	NPTEL

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

V SEMESTER

23CSD1501: Theoretical Foundation of Computer Science

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Understand Formal Languages and Automata theory. 2. Evaluate and asses the powers of different models. 3. Analyze whether a problem is computable or not. 4. Design regular expression, context free grammar, Finite Automata, Push Down Automata, Turing Machine and other Computational Models.

Unit I:	**6 Hrs.**
Introduction: Alphabet, Symbols, Sets, Strings, Language, Operations, Relations, Finite Automata: Design of Finite Automata, Acceptance of strings and languages, Deterministic Finite Automation , Non-Deterministic Finite Automation, Equivalence between NFA and DFA , NFA with ε-transition, Minimization of FA.	
Unit II	**7 Hrs.**
Regular sets, Regular expressions, Manipulation of regular expressions, Equivalence between RE and FA. Pumping Lemma for regular languages, closure properties of regular sets, properties of regular languages, Chomsky hierarchy of languages, Regular grammars, Right linear and left linear regular grammars, interconversion, Equivalence between regular grammar and FA, Interconversion between RE and RG.	
Unit III	**7 Hrs.**
Context free grammar, Derivation trees Parse tree, Syntax tree , Ambiguous Grammar, Context Free Language CFL, Closure properties of CFL, Simplification of CFG, Normal Forms of grammar: Chomsky Normal Form CNF, Greibach Normal Form GNF, CYK algorithm.	
Unit IV	**6 Hrs.**
Push down automata, definition and model, acceptance of CFL by empty Stack and by final state, Design of PDA for the CFL, equivalence CFG and PDA, Inter conversion, DPDA & NDPDA..	
Unit V	**6 Hrs.**
Turing machine, Definition, Model of TM, Design of Turing Machine, Computable functions, Recursive enumerable language, Recursive Language, Properties of Recursive enumerable language, Variants of Turing machines, non deterministic TMs and equivalence with deterministic TMs, context sensitive language CSG, Linear bounded automata.	
Unit VI	**7 Hrs.**
Undecidability: Church-Turing thesis, Undecidable Problems related to Recursive enumerable language and Turing Machine, post correspondence problem PCP, Universal Turing Machine, The universal and diagonalization languages, reduction between languages and Rice's theorem, Recursive function: Basis functions and operations on them. Bounded minimization, unbounded minimization, preemptive recursive function and μ recursive function.	
Total Lecture	**39 Hours**

Textbooks:	
1.	John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman T1: Introduction to Automata Theory, Languages and computation Pearson Education Asia 2nd edition, 2000
2.	John C. Martin T2: Introduction to languages and the Theory of Automata Tata McGraw Hill 3rd edition, 2003.

Reference books:	
1.	Harry R. Lewis and Christos H. Papadimitriou R1: Elements of the Theory of Computation Pearson Education Asia
2.	Michael Sipser R2: Introduction to the Theory of Computation PWS Publishing
3.	O.G. Kakde R3: Theory of Computation USP 2008

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=xgyI7K6mkAc
2.	https://www.youtube.com/watch?v=9idnQ2C6HfA
3.	https://www.youtube.com/watch?v=G_mCqJakvYk

V SEMESTER

23CSD1502: Operating System

Course Outcomes :
Upon successful completion of the course the students will be 1. Demonstrate fundamental concepts of operating system and its functions. 2. Analyze various algorithms and techniques for managing OS resources 3. Apply and evaluate the performance of algorithms for managing various OS resources based on the given data about processes and resources. 4. Simulate algorithms/techniques for managing various OS resources using computer programs.

Unit I: Introduction to OS	7 Hrs.
Evolution of OS, basic hardware support necessary for modern operating systems, Layered Structural of OS, Services provided by OS, system calls, Dual mode of operation. Input-output Management : Basics of I/O hardware, Polling, Interrupts and DMA.	
Unit II: Process management	**6 Hrs.**
Introduction, process control block, process states, process context switch, introduction to threads, CPU scheduling, goals of scheduling, Algorithmic evaluation of CPU scheduling algorithms.	
Unit III: Inter-process communication	**7 Hrs.**
Process cooperation and synchronization, race condition, critical region, mutual exclusion and implementation, semaphores, classic problems of Synchronization using semaphores. **Deadlocks**: necessary conditions, deadlock detection, deadlock avoidance, deadlock prevention, recovery from deadlock.	
Unit IV: File systems	**7 Hrs.**
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	
Unit V: Memory management techniques	**6 Hrs.**
Contiguous allocation, static and dynamic partitioning, and non-contiguous, paging and segmentation, translation look aside buffer TLB and overheads	
Unit VI: Virtual memory and File System	**6 Hrs.**
Demand paging, page replacement algorithms LRU, Optimal, FIFO, thrashing, and working set model. File System: File Concepts, access methods, file allocation methods, directory structure.	
Total Lecture	**39 Hours**

Textbooks:	
1.	Silberchatz & galvin Operating system concepts 8th Edition Wiley Student Edition
2.	William Staling Operating System 5th Edition Pearson

Reference books:	
1.	A.S. Tanenbaum Modern operating systems 2nd Edition
2.	Milan MilenKovic Operating system concepts 2nd Edition McGraw-Hill Education ISE Editions

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1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=YwqexcfbucE&list=PLmXKhU9FNesSFvj6gASuWmQd23Ul5omtD
2.	https://www.youtube.com/watch?v=UDPYpf-nsDY
3.	https://www.youtube.com/watch?v=KjTea8sFDiI

V SEMESTER

23CSD1503: Lab.: Operating Systems

Course Outcomes
Upon successful completion of the course the students will be able to 1. Explain fundamental concepts of operating system and its functions. 2. Explain various algorithms and techniques for managing OS resources 3. Apply and evaluate the performance of algorithms for managing various OS resources based on the given data about processes and resources. 4. Simulate algorithms/techniques for managing various OS resources using computer programs.

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

SN	**Experiments based on**
1	Study of Advanced Linux shell commands Process management, Memory management, Networking, etc.
2	Study of Window task manager about its applications, processes, services, networking, performance 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 any two of the following CPU Scheduling Algorithms One each from preemptive and non-preemptive types : FCFS, SJF, SRTN, Round Robin, Preemptive priority, Non-preemptive priority
6	Simulate any one of the following Dynamic Memory allocation algorithms First Fit, Best Fit, Worst Fit.
7	Simulate any one of the following Page replacement algorithms: FIFO, LRU, Optimal
8	Write a program to perform Inter-Process-Communication using shared memory OR, pipes OR message queues.
9	Write a program that gives a deadlock and starvation free solution to the Dining philosophers problem using semaphores
10	Write a program to simulate Banker's Deadlock avoidance algorithm.

V SEMESTER
23CSD1504: Machine Learning

Course Outcomes :
Upon successful completion of the course the students will be 1. Understand supervised and unsupervised machine learning algorithms 2. Analyze a problem and identify the machine learning algorithm appropriate for its solution 3. Apply supervised/ unsupervised learning for the given set of labelled samples and design the model to achieve the desired performance 4. Evaluate the performance of ML models using appropriate performance measures

Unit I	**7 Hrs.**
Introduction to machine learning. What Is Machine Learning, Examples of Machine Learning Applications, Learning Associations, Classification, Regression, Supervised and Unsupervised Learning, Reinforcement Learning, linear Models for regression and classification, logistic regression.	
Unit II	**6 Hrs.**
Supervised Learning-1: Concept of gradient descent, k-Nearest Neighbors KNN for classification and regression, Naive Bayes Classifiers, Generalization, Bias and Variance, Over-fitting, and Under-fitting	
Unit III	**6 Hrs.**
Supervised Learning-2: Decision Trees, Kernelized Support Vector Machines, classification and regression using SVM, Multiclass Classification using One-vs-Rest OvR, and One-vs-One OvO	
Unit IV	**6 Hrs.**
Unsupervised Learning: k-Means Clustering, Hierarchical Clustering: agglomerative and divisive clustering, dendrogram, Choosing the Number of Clusters, semi supervised learning.	
Unit V	**7 Hrs.**
Design and Analysis of Machine Learning Experiments: Factors, Response, and Strategy of Experimentation, Randomization, Replication, and Blocking, Guidelines for Machine Learning Experiments, Cross-Validation and Resampling Methods, K-Fold Cross-Validation, Comparing Two Classification Algorithms.	
Unit VI	**7 Hrs.**
Advances in Machine Learning: Introduction to learning using Neural networks, Models of neurons: McCulloch Pit's Model, discrete and continuous perceptron, neuron activation functions, concept of feedforward and feedback neural networks, backpropagation training algorithm, introduction to deep learning, Convolutional Neural Networks.	
Total Lecture	**39 Hrs**

Textbooks:	
1.	Ethem Alpaydın, Introduction to Machine Learning, Second Edition, The MIT Press
2.	Applied Machine Learning, M. Gopal, Mc Graw Hill

Reference books:	
1.	Deep Learning, M. Gopal, Pearson
2.	Andreas C. Müller and Sarah Guido Introductionto Machine Learning with Python, A Guide for Data Scientists ORIELLY

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1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.nptel.ac.in/noc23_cs18/preview
2.	https://archive.nptel.ac.in/courses/106/106/106106139/
3.	https://archive.nptel.ac.in/courses/106/106/106106139

V SEMESTER

23CSD1505: Lab.: Machine Learning

Course Outcomes
Upon successful completion of the course the students will be able to 1. Develop a ML model for solving a given real-world problem 2. Evaluate the performance of ML Models using appropriate performance measures

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

SN	Experiments based on
1	a) Linear Univariate regression with Ordinary least squares method implementing from scratch bUsing Linear Multivariate regression with Ordinary least squares method using library function
2	Implementing linear classifier using Linear Machine concept.
3	Program for Classification using KNN algorithm.
4	KNN algorithm for regression implemented from scratch without using a library.
5	Implementing Naïve Bayes Classification.
6	Implementing multi-class classifier using Decision Trees
7	Implementing K-means clustering or Hierarchical clustering.
8	Implementing SVM Classification with k-fold cross validation.
9	Implementing a multi-layer feed forward Neural Network based estimation.
10	Experiment on classification using deep network.

V SEMESTER

23CSD1521: - PE-I : Graphics Design

Course Outcomes:
On completion of this course, the student will be able to 1. Demonstrate a comprehensive understanding of graphic design principles, including composition, typography, color theory, and visual communication. 2. Apply design tools and software Adobe Illustrator, Photoshop, InDesign, etc. effectively to create digital and print design solutions. 3. Design and develop brand identities, including logos, brand guidelines, and corporate collateral, while understanding the connection between brand strategy and design. 4. Produce professional-quality digital and print media, including brochures, posters, websites, and packaging, through conceptualization, prototyping, and final production.

UNIT-I : Introduction to Graphic Design	**7 Hrs**
History of graphic design and its influence on modern practices, Basic design principles: Balance, alignment, contrast, repetition, and proximity, Introduction to typography: Typefaces, font pairing, and readability, Overview of graphic design tools: Adobe Illustrator, Photoshop, and InDesign.	
UNIT-II : Visual Communication & Concept Development	**6 Hrs**
Visual language and how design communicates messages, The design thinking process: Empathy, ideation, prototyping, and testing, Advanced color theory: Emotional and cultural significance of color, Developing design concepts based on client needs and project objectives.	
UNIT-III : Digital Illustration and Image Manipulation	**6 Hrs**
Difference between vector and raster graphics, Advanced Photoshop techniques: Layering, masking, retouching, and photo manipulation, Vector illustration in Adobe Illustrator: Tools, paths, shapes, and pen tool, Techniques for creating digital assets for both print and web use.	
UNI UNIT-IV : Branding and Identity Design	**6 Hrs**
Principles of logo design: Simplicity, scalability, and versatility, Developing visual brand identity: Color palettes, typography, and tone, Corporate identity systems: Business cards, letterheads, and brand guidelines, Designing for consistency across all brand touch points.	
UNIT-V : Print Design & Production	**7 Hrs**
Overview of print processes: Types of print media and production techniques, Understanding file preparation for print: Resolution, color modes, bleed, and crop marks. Brochure, flyer, and poster design strategies, Packaging design: Creating dielines and working with 3D packaging structures.	
UNIT-VI : Web and Mobile Design	**7 Hrs**
Introduction to web design: HTML, CSS basics, and responsive design principles, User Interface UI design: Creating wireframes and prototypes, User Experience UX principles: User flows, usability testing, and interaction design, Designing for mobile: Mobile-first approach, touch interfaces, and optimizing user experience across devices.	
Total Lecture	**39 Hours**

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

Text Books:	
1.	Stephen J. Eskilson, "Graphic Design: A New History",Yale University Press.
2.	Timothy Samara, "Design Elements: A Graphic Style Manual", Rockport Publishers.

Reference Books:	
1.	Timothy Samara, "Design Elements: A Graphic Style Manual", Rockport Publishers.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://ebooks.papacambridge.com/directories/AQA/AQA-ebooks/upload/epdf-pub_the-fundamentals-of graphic-design.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://cloud.google.com/free?utm_source=PMAX&utm_medium=display&utm_campaign=FY24-H2-apac-gcp-DR-campaign-IN&utm_content=in en&gad_source=5&gclid=EAIaIQobChMItvyM1qupiwMVGUqdCR1yxRCmEAEYASAAEgK-_vD_BwE&gclsrc=aw.ds
2.	https://www.youtube.com/watch?v=GQS7wPujL2k

V SEMESTER

23CSD1522: PE-I : Introduction to Cloud Computing

Course Outcomes
Upon successful completion of the course the students will be able to 1. Students will be Understand the basics of IoT and basics of Industry 4.0. 2. Students will be Understand Business Model and Reference Architecture 3. Students will be able to understand the different Business issues in Industry 4.0 and how to solve them. 4. Students will be able to understand the need of Security and Fog Computing and applications of IIoT.

Unit I	**6 Hrs.**
Overview of Computing Paradigm, Recent trends in Computing, Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing, Evolution of cloud computing, Business driver for adopting cloud computing, Introduction to Cloud Computing, Cloud Computing NIST Model, History of Cloud Computing, Cloud service providers, Properties, Characteristics & Disadvantages of Cloud Computing, Benefits of Cloud Computing, Role of Open Standards.	
Unit II	**7 Hrs.**
Cloud Computing Architecture, Cloud computing stack, Comparison with traditional computing architecture client/server, Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services, Service Models XaaS, Infrastructure as a ServiceIaaS, Platform as a ServicePaaS, Software as a ServiceSaaS. Deployment Models, Public cloud Private cloud, Hybrid cloud, Community cloud.	
Unit III	**6 Hrs.**
Virtualization Technology: Fundamental concepts of compute, storage, networking, desktop and Application virtualization. Types of Virtualization, Virtualization benefits, server virtualization, Block and file level storage virtualization, Hypervisors, Hypervisor management software, Infrastructure Requirements, Virtual LAN VLAN and Virtual SAN VSAN and their benefits.	
Unit IV	**6 Hrs.**
Service Management in Cloud Computing, Service Level AgreementsSLAs, Billing & Accounting, Comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling: Benefitting enormously, Managing Data: Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing	
Unit V	**7 Hrs.**
Cloud Security, Infrastructure Security: Network level security, Host level security, Application level security, Data security and Storage: Data privacy and security Issues, Jurisdictional issues raised by Data location, Identity & Access Management, Access Control, Trust, Reputation, Risk, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations	
Unit VI	**7 Hrs.**
Cloud Security, Infrastructure Security: Network level security, Host level security, Application level security, Data security and Storage: Data privacy and security Issues, Jurisdictional issues raised by Data location, Identity & Access Management, Access Control, Trust, Reputation, Risk, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations	
Total Lecture	**39 Hours**

Textbooks:	
1.	Barrie Sosinsky, Cloud Computing Bible Wiley-India, 2010
2.	Rajkumar Buyya, James Broberg, Andrzej M. Goscinski Cloud Computing: Principles and Paradigms WileY, 2011.

Reference Books:	
1.	Nikos Antonopoulos, Lee Gillam, Cloud Computing: Principles, Systems and Applications, Springer, 2012
2.	Ronald L. Krutz, Russell Dean Vines Cloud Security: A Comprehensive Guide to Secure Cloud Computing Wiley-India, 2010
3.	Kumar Saurabh Cloud Computing Wiley Pub

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MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=lOh2xUACaU&list=PLShJJCRzJWxhz7SfG4hpaBD5bKOloWx9J&index=3
2.	https://www.youtube.com/watch?v=4xrYN2Ecmas&list=PLShJJCRzJWxhz7SfG4hpaBD5bKOloWx9J&index=5

Nagar Yuwak Shikshan Sanstha's

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

B.Tech in Computer Science and Design

SoE No. 23CSD-101

V SEMESTER

23CSD1523 : PE-I: Artificial Intelligence

Course Outcomes :

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

1. Explain the basics of artificial intelligence, uninformed and informed search algorithms to solve complex problems efficiently.
2. comprehend propositional and first-order logic to represent knowledge and perform logical inference in AI systems.
3. explain adversarial search algorithms, approaches to deal with constraint satisfaction problems, and reasoning with uncertainty.
4. Explain reinforcement learning algorithms for performing intelligent action in real world environments
5. apply the AI techniques and generative AI to solve complex problems efficiently.

Unit I	**6 Hrs.**
Introduction: -: What is AI?, History, Overview, Intelligent Agents, Performance Measure, Rationality, structure of agents, problem solving agents, Problem Formulation, searching for solutions – uniformed search.	
Unit II	**6 Hrs.**
Informed Heuristic Search and Exploration: Greedy best first search, A* search, Memory bounded heuristic search, Heuristic functions, inventing admissible heuristic functions, Local Search algorithms, Hill-climbing, Simulated Annealing	
Unit III	**7 Hrs.**
Constraint Satisfaction Problems: Backtracking Search, variable and value ordering, constraint propagation, intelligent backtracking, local search for CSPs, Adversarial Search, Games, The minimax algorithm, Alpha-Beta pruning	
Unit IV	**7 Hrs.**
Knowledge Based Agents: Logic, Propositional Logic, Inference, Equivalence, Validity and Satisfiability, Resolution, Forward and Backward Chaining, Local search algorithms, First Order Logic, Models for first order logic, Symbols and Interpretations, Terms, Atomic sentences, complex sentences, Quantifiers, Inference in FOL, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.	
Unit V	**6 Hrs.**
Reinforcement learning: agents, environments, rewards, and Markov Decision Processes. core algorithms: Q-learning, SARSA, Deep Q-Learning and Policy Gradient methods. exploration vs. exploitation, RL applications in real-world systems, ethical considerations.	
Unit VI	**7 Hrs.**
Introduction to Generative AI : What is Generative AI, Difference between Discriminative and Generative Models, Applications of Generative AI Text, Images, Music, , etc., **Basic Architectures in Generative AI :** Variational Autoenrs VAEs, Generative Adversarial Networks GANs, Transformer-based Models GPT, BERT, etc. **Prompt Engineering Basics** Structured vs. Unstructured Prompts, Crafting effective prompts for AI models text, images, , **Training and Challenges in Generative AI:** Data requirements and training process, Mode collapse in GANs **Ethical concerns:** Bias, Deepfakes, and Copyright Issues	
Total Lecture	**39 Hrs**

Textbooks:	
1.	Russel and Norvig Artificial Intelligence a Modern Approach Pearson Education, 2nd edition
2.	Patterson Artificial Intelligence – A Practical Approach Tata McGraw Hill, 3rd edition

Reference Books:	
1.	E.Rich and K.Knight Artificial Intelligence McGraw-Hill, 2nd edition
2.	D.W Patterson Introduction to Artificial Intelligence & Expert System PHI, 2nd edition

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MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/106106226
2.	https://nptel.ac.in/courses/106102220

V SEMESTER

23CSD1524: PE-I: Software Architecture and Design

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Analyze and evaluate the different software process model and appropriate architectural style while developing a software 2. Understand and Apply the software testing techniques in a variety of ways to test the software. 3. Analyze and design various UML diagram and UML based design and analysis with the help of various diagrams. 4. Demonstrate an ability to use the techniques and tools necessary for engineering practice

Unit I	**7 Hrs.**
Introduction to Software Engineering :A Generic View of process, and project management, Process model, CMM, Requirement Engineering : Eliciting Requirement ,Developing Use Case ,Analysis Model, Negotiation, Validation , Building the Analysis model : Requirement Analysis ,Analysis Modeling Approaches, Data Modeling	
Unit II	**7 Hrs.**
Design Engineering : Design Concept, Design Model, Pattern Based Software Design, Architectural Design: Software Architecture., Data Design, Architectural style, Architectural design , Mapping Data Flow into a Software Architecture ,Component Level Design , User Interface Analysis and Design ,Interface Analysis, Interface Design steps, Design Evaluation	
Unit III	**7 Hrs.**
Testing Strategies: Strategic Approach, Strategic issues, Strategies for conventional Software, Validation Testing, Testing Tactics: White Box Testing, basic Path testing, Control Structure Testing, Black Box Testing, Object Oriented Testing Method, Testing Method applicable at class Level, Interclass Test Case Design. Metrics: Software Quality	
Unit IV	**6 Hrs.**
Project Management, KPES for project management, Metrics for Process and Projects, Project Estimation, Project Scheduling, Risk Management, Quality Management and Change Management.	
Unit V	**6 Hrs.**
Overview of UML, Conceptual Models of the UML, UML and Design Patterns, Applying the UML, UML Diagrams for Payroll processing systems, ATMS, small companies etc	
Unit VI	**6 Hrs.**
Advanced Topics in Software Engineering: Case studies based on recent Trends, Reengineering, and CASE tools, client server software Engineering. CORBA, Introduction to Jira Tool	
Total Lecture	**39 Hours**

Textbooks:	
1.	Software Engineering –A Practitioner's Approach Seventh Edition
2.	Lethbridge and Pearson Object Oriented Software Engineering 2nd Edition,2005 Pearson Education

Reference Books:	
1.	I. Somerville Software Engineering 10th Edition, 2014, Oxford University Press
2.	Dr. Pankaj Jalota An integrated approach to software Engineering 3rd Edition,1991, Narosa Pub

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=AN5I6fFxyfs
2.	https://www.youtube.com/watch?v=w0LQh0vCeqI

Nagar Yuwak Shikshan Sanstha's

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B. Tech SoE and Syllabus 2023

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

Department of Information Technology

B.Tech in Computer Science and Design

SoE No. 23CSD-101

V SEMESTER

23CSD1541 : PE-II: Motion Graphics

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Understand and apply foundational principles of motion graphics and design. 2. Demonstrate proficiency in industry-standard motion graphics software and tools. 3. Integrate visual effects, 3D elements, and sound design to create comprehensive motion graphics projects. 4. Plan, develop, and present a complete motion graphics project, showcasing the ability to manage a project from concept to final product.

Unit I: Foundations of Motion Graphics and Design Principles	**6 Hrs.**
Introduction to Motion Graphics: Definition and scope, Historical overview and evolution. Principles of Animation: The twelve principles of animation, Timing and spacing, Key frames and tweening. Design Principles for Motion Graphics: Composition and layout, Color theory and application, Typography in motion graphics.	
Unit II: Storyboarding and Planning for Motion Graphics	**6 Hrs.**
Concept Development: Idea generation and brainstorming. Storyboard Creation: Visualizing and organizing concepts. Scriptwriting for Motion Graphics: Crafting scripts for effective storytelling.	
Unit III: Industry-Standard Software Basics	**7 Hrs.**
Introduction to Motion Graphics Software: Overview of industry-standard tools e.g., Adobe After Effects, Cinema 4D, Interface and basic functionalities. Basic Techniques in Motion Graphics Software: Creating and managing compositions, Working with layers and masks, Basic animation techniques. Introduction to unity software : Basics of Unity, Unity vs other game enginesUnreal, Godot,etc	
Unit IV: Advanced Motion Graphics Techniques	**6 Hrs.**
Advanced Techniques in Motion Graphics Software: Effects and presets, Motion tracking and stabilization, Expressions and automation.3D Motion Graphics: Introduction to 3D concepts, Integrating 3D elements with 2D compositions, Lighting and rendering techniques.	
Unit V:Integration of Visual Effects, 3D Elements, and Sound Design	**7 Hrs.**
Visual Effects VFX: Basics of visual effects, Compositing techniques, Green screen and Chroma keying.3D Motion Graphics: Advanced 3D techniques, Texturing and shading, Camera movement and scene management.Sound Design and Integration: Basics of sound design, Synchronizing audio with visuals, Audio effects and enhancement	
Unit VI: Advanced Concepts and Trends in Motion Graphics	**7 Hrs.**
Exploration of Advanced Motion Graphics Trends: Emerging styles, techniques, and tools in motion graphics. Interactive Motion Graphics: Creating user-engaging graphics using interactive elements. Innovations in 3D Motion Graphics: Real-time rendering, virtual production techniques, and advanced texturing.	
Total Lecture	**39 Hours**

Textbooks:	
1.	The Animator's Survival Kit" by Richard Williams
2.	"Motion Graphics: Principles and Practices from the Ground Up" by Ian Crook and Peter Beare
3.	After Effects Apprentice: Real-World Skills for the Aspiring Motion Graphics Artist" by Trish and Chris Meyer

			July,2023	1.00	Applicable for AY 2023-24 Onwards
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Reference Books:	
1.	"The Art of Motion: Motion Graphics Design Projects and Techniques" by Austin Shaw
2.	"Creating Motion Graphics with After Effects" by Chris and Trish Meyer
3.	"Motion Graphic Design: Applied History and Aesthetics" by Jon Krasner

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=5tQ0hf2SCeo

V SEMESTER
23CSD1542: PE-II: Salesforce

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Analyze the components of cloud computing 2. To Understand Cloud Computing Fundamental and Forece.com platform 3. Evaluate information storage management design in a cloud environment and how it relates to the business objectives of an organization 4. Analyze the role technology plays in the design of a storage solution in a cloud architecture

Unit I: Introduction to Sales Cloud	**6 Hrs.**
Introduction sales objects, Leads, Account, Contacts , Opportunity, Product , Price books, Quote	
Unit II: Cloud Computing Fundamentals	**7 Hrs.**
Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud; Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery; next generation Cloud Applications	
Unit III: Cloud Applications	**6 Hrs.**
Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages	
Unit IV: Introducing the Force.com Platform	**7 Hrs.**
The Basics of an App's User Interface. The Benefits of a Force.com Data-Centric, Collaborative Apps, The Technologies Behind a Force.com Platform App, Multitenant Architecture, A Metadata-Driven Development Model, Apex .Custom User Interface Mobile, AppExchange.	
Unit V: Objects and Tabs	**7 Hrs.**
Introduction to Objects , ,Introduction to Fields , Introduction to Picklists , Field Dependencies , Dependent Picklist ,Custom Formula Fields , Dynamic Default Values , Validation Rules, Page Layouts , Page Layout Editor Group Fields Edit Field Properties , Page Layouts , Compact Layouts	
Unit VI: Relationships	**6 Hrs.**
Introduction to Relationship Custom Fields, Page Layout Properties, Record Highlights, Introduction to Search Layouts, Introduction to Roll-Up Summary Fields, Many-to-Many Relationship	
Total Lecture	**39 Hours**

Textbooks:	
1.	Phil Choi Chris McGuire Caroline Roth Force.com Platform Fundamentals An Introduction to Custom Application Development in the Cloud salesforce.com
2.	Wes Nolte , Jeff Douglas Salesforce Handbook Paperback Publisher: Lulu.com
3.	Jim Webber, Savas Parastatidis, Ian Robinson O'Reilly REST in Practice Media; 1 edition, [ISBN: 978-0596805821] 2010.
4.	Eugenio Pace, Dominic Betts, Scott Densmore, Ryan Dunn, Masashi Narumoto, MatiasWoloski Developing Applications for the Cloud on the Microsoft Windows Azure Platform Microsoft Press; 1 edition, [ISBN: 9780735656062] 2010

Reference Books:	
1.	Salesforce CRM: The Definitive Admin Handbook Paperbac Paul Goodey, 2nd edition Publisher: Packt Publishing Limited

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	chromeextension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/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%201.pdf
2	Chrome extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf
3	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=CKllqKLOgSI&list=PLgW8Fj5TGrpoW08kOfbG6yfXbExyL0EB
2.	https://www.youtube.com/watch?v=v6kD9J39dys&list=PLgW8Fj5TGrpoW08kOfbG6yfXbExyL0EB&index=3
3.	https://www.youtube.com/watch?v=yv1IMYYTnrs&list=PLgW8Fj5TGrpoW08kOfbG6yfXbExyL0EB&index=3

V SEMESTER
23CSD1543: PE-II: Business Intelligence

Course Outcomes :

Upon successful completion of the course the students will be

1. Assemble BI as a Process, identify its application in various domains and functional area, its roles and responsibilities, Identify functions of building blocks in N_tier BI ecosystem,Identify different stages in Lifecycle of a BI project,Differentiate between traditional BI and self-service BI PO1-2
2. Apply SQL as a universal language for BI PO23
3. Model a business scenario; identify the metrics, indicators, various dimensions, and aggregation strategies and make recommendations to achieve the business goal PO3-3
4. Obtain hands on experience with some popular BI software for analysis, reporting, visualization of results

Unit I	**7 Hrs.**
Introduction to Business Intelligence:What is business intelligence, why do we need BI, EIS, MIS, DSS& BI, information pyramid-data, information, Knowledge & intelligence? Basis For operational, tactical & strategic decision making, OLTP vs. OLAP, Requirement gathering in BI through business question BI in various domains and functional area.	
Unit II	**7 Hrs.**
SQL the universal language for Business Intelligence,Introduction to RDBMS, Language for retrieving data from a database, various clauses in a SQL retrieving data from multiple tables- joins filtering, sorting & grouping datasets, Introduction to DDL & DML statements, various built- in functions in SQL, Use of sub-queries, data dictionary and dynamic SQL.	
Unit III	**6** Hrs.
Principles of Dimensional modeling :Foundation for fact based decision making, star and snowflake schema, Pros& cons of the star/snowflake schema dimensional model, Slowly changing dimension tables, Fact-less fact strategy, Time dimension.	
Unit IV	**6 Hrs.**
Business Intelligence system architecture, Need for enterprise class business intelligence infrastructure, The BI ecosystem, Building blocks of a n- tier BI system-servers & communication protocols, The central repository-metadata, Information consumption user interfaces-desktop vs. web vs. Mobile. Open architecture, Scalability, performance in BI-in memory analytics.	
Unit V	**7 Hrs.**
BI Project Lifecycle :Typical BI project lifecycle, Requirements gathering & analysis-functional & non-functional requirements, reports and dashboards design- mock – up and storyboarding, Testing in a BI project, BI project deployment, Post production support, Applications of BI, BI best practices	
Unit VI	**6 Hrs.**
Self-service Analytics: What is Self-service Analytics, What are the use cases of self-service analytics, Business Paradigm vs IT paradigm and the Paradigm Shift with self-service analytics, Challenges of Self-service Analytics, Introduction to MicroStrategy Desktop – Overview	
Total Lecture	**39 Hrs**

Textbooks:	
1.	Ralph Kimball and Margy Ross, Data Warehousing ETL toolkit, Indian edition.
2.	R. N. Prasad, Seema Acharya, Fundamentals of Business Analytics2nd edition
3.	Business Intelligence: The Savvy Manager's Guide,2nd Edition

Reference Books:	
1.	Mike Biere, Business intelligence for the enterprise, IBM

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=Ol8D69VKX2k
2.	https://www.youtube.com/watch?v=4nEr2Z2tItg
3.	https://www.youtube.com/watch?v=-Bwiv5EGucs

V SEMESTER

23CSD1544 : PE-II: Design Pattern

Course Outcomes :
Upon successful completion of the course the students will be 1. Understand the concepts of design patterns and their significance in software design. 2. Learn to identify, implement, and apply design patterns to solve software development challenges. 3. Analyze real-world scenarios and map them to appropriate design patterns. 4. Explore the use of design patterns in enhancing maintainability, scalability, and reusability of software.

Unit I	**7 Hrs.**
Introduction to Design Patterns : Definition and Need: What are design patterns ,Principles: SOLID principles and their role in patterns. Classification of Patterns: Creational, Structural, and Behavioral patterns. Pattern Catalogs: Overview of Gang of Four GoF design patterns. Benefits and Pitfalls of Patterns	
Unit II	**6 Hrs.**
Creational Patterns :Introduction to object creation mechanisms. Patterns: Singleton Pattern, Factory Method Pattern, Abstract Factory Pattern, Prototype Pattern, Builder Pattern,Real-world examples and use cases	
Unit III	**6 Hrs.**
Structural Patterns :Simplifying relationships between objects. Patterns: Adapter Pattern, Bridge Pattern, Composite Pattern, Decorator Pattern, Facade Pattern, Flyweight Pattern, Proxy Pattern, Examples in GUI design and system frameworks.	
Unit IV	**7 Hrs.**
Behavioral Patterns :Defining communication between objects. Patterns: Chain of Responsibility Pattern, Command Pattern, Iterator Pattern, Mediator Pattern, Memento Pattern, Observer Pattern, State Pattern, Strategy Pattern, Template Method Pattern, Visitor Pattern, Real-world scenarios such as event handling and workflows.	
Unit V	**7 Hrs.**
Advanced Topics in Design Patterns :Anti-Patterns and Smells, Refactoring with Design Patterns, Patterns in Enterprise Applications e.g., MVC, Dependency Injection, Patterns in Emerging Technologies e.g., Cloud Design Patterns, Microservices, Application of Patterns in Frameworks like Spring, Hibernate, and React	
Unit VI	**6 Hrs.**
Case Studies and Project Work :Analysis of large-scale software systems and mapping patterns, Implementation of a project with multiple integrated patterns, Design pattern usage in real-world software systems e.g., e-commerce, gaming, and enterprise systems.	
Total Lecture	**39 Hours**

Textbooks:	
1.	Design Patterns: Elements of Reusable Object-Oriented Software" by Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides GoF.
2.	"Head First Design Patterns" by Eric Freeman and Elisabeth Robson.
3.	"Refactoring: Improving the Design of Existing " by Martin Fowler

Reference Books:	
1.	Patterns of Enterprise Application Architecture" by Martin Fowler.

MOOCs Links and additional reading, learning, video material
youtube.com/watch?v=NU_1StN5Tkk
https://www.youtube.com/watch?app=desktop&v=beI_xOkABs0
https://www.coursera.org/learn/design-patterns

Nagar Yuwak Shikshan Sanstha's

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B. Tech SoE and Syllabus 2023

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

Department of Information Technology

B.Tech in Computer Science and Design

SoE No. 23CSD-101

V SEMESTER

MDM3CSD103 : Computer Game Design and Programming

Course Outcome :
On completion of this course, the student will be able to 1. Understand different types/genres of video games and the components thereof. 2. Able to write scripts which control the behavior of different game components. 3. Able to create realistic scenes and environments. 4. Able to design, write and deploy 2D video games 5. Apply hands-on experience with game engines, e.g., Unity.

Unit 1: Motivation; Types of games	**7 Hrs.**
Motivation; Types of games, Different aspects of game design; Different components in a game; Game Engines; Geometric primitives, 2D and 3D linear transforms, Homogeneous matrices; Examples of games.	
Unit 2: Different image formats	**7 Hrs.**
Different image formats; Polygon file formats; Creating sprites; Rigging; Animations using sprite-sheets; Animations using key frames; Animation controllers. Setting up a project, Scene View, Game View, Inspector, Console, Hierarchy, Game Objects, Prefabs, and Components.	
Unit 3: Scenes	**7 Hrs.**
Scenes; Tiles, visual continuity in tiles; Adding objects to scene; Prefabs; Lighting, RGB space, transparency, texture mapping; Collectibles; Navigation and path finding, Input Methods, invoke,Start and Awake, Game Loops, Update, FixedUpdate and LateUpdate,Singletons,Coroutines, Enumerators.	
Unit 4: Physics engines	**6 Hrs.**
Physics engines; Gravity simulation; Rigid body interaction; Collisions. Rigid body, Components, Unity Colliders, Physics Materials, Scripting Collision Events.	
Unit 5: Layout	**6 Hrs.**
Layout; Menu system; Visual components; Event system, Skins,Canvas,Buttons,Anchors ,Pivots RectTransform vs Transforms, I Design Concepts.	
Unit 6: Audio assets	**6 Hrs.**
Audio assets; Different audio formats; Audio mixing.	
Total Lectures	**39 Hrs.**

Text Books	
1	Game Programming Patterns 3rd edition Nystrom Robert Genever Benning
2	Introduction to Game Analysis , 2nd Edition, Clara Fernandex-vara

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

Reference Books	
1	Unity Game Development Cookbook: Essentials for Every Game 1st Edition Paris Buttfield-Addison O'Reilly Media

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.ltu.se/en/education/programme/tkdpg-computer-game-development-and-programming
2.	https://www.youtube.com/watch?v=w0LQh0vCeqIhttps://youtu.be/MFL9QggMqGw
3.	https://onlinecourses.nptel.ac.in/noc22_cs77/preview
4.	https://www.classcentral.com/course/swayam-games-and-information-269709

V SEMESTER

23OE3518 : Open Elective -III Glimpses of ancient Science and Technology

Course Outcomes :
Upon successful completion of the course the students will be able to 1. To provide information about great mathematicians and to help students to trace, identify, practice, and develop the significant Indian mathematics 2. To understand the concept of motion and its application in Indian ancient physics literature. 3. To understand the concepts of basic chemical & metallurgical process of ancient and medieval India.

Unit I: Mathematics in Ancient India	**7 Hrs.**
Inception of Mathematics from Vedic periods Contributions of great mathematicians: Aryabhata, Bhaskara I, Bhaskara II, Brahmagupta, Ramanujan, Pingala Sulbhasutras and the Pythagoras theorem Mathematical concepts: Square, Square root, Square root of imperfect squares, Magic squares Early approximations of the value of Pi	
Unit II: Advanced Contributions in Mathematics	**6 Hrs.**
In-depth study of Bhaskara II and his works: Lilavati and its contributions Ramanujan's contributions to number theory ,Historical context and applications of ancient Indian mathematical theories.	
Unit III: Physics in Ancient India – Theories and Concepts	**7 Hrs.**
Vaisheshikadarshan: Atomic theory and laws of motion, Theory of Panchmahabhoota Bhaskaracharya's contributions: Introduction to the theory of gravity Surya Siddhanta and Siddhanta Shiromani. Brihat Shataka: Divisions of time and units of distance	
Unit IV: Chemistry in Ancient India – Knowledge and Practices	**7 Hrs.**
Contributions of ancient scholars: Vatsyayana, Nagarjuna, and Vagbhata Building of Ras-Shala laboratory: Working arrangements, materials, and equipment used Yaśodhara Bhaṭṭa's contributions: Process of distillation and apparatus development	
Unit V: Metallurgy in Ancient India	**6 Hrs.**
Study of metals in ancient India: Gold Survarna and its different types and properties Silver Rajata, Copper Tamra, Iron Loha, Zinc Jasta, Lead Naga/Sisa, Brass Pittala Ancient techniques of metal extraction, processing, and applications	
Unit VI: Integrated Scientific Knowledge of Ancient India	**6 Hrs.**
Synthesis of knowledge from mathematics, physics, and chemistry, Contributions of interdisciplinary approaches in ancient Indian science, Impact of ancient Indian scientific contributions on modern advancements.	
Total Lecture	**39 Hours**

Reference Books:	
1.	Kapur K and Singh A.K Eds 2005. Indian Knowledge Systems, Vol. 1. Indian Institute of Advanced Study, Shimla. Tatvabodh of Sankaracharya, Central Chinmay Mission Trust, Bombay, 1995.
2.	Dharmpal, Indian Science and Technology in the eighteen century, Rashtrottahana sahitya, 1983.

Textbooks:	
1.	AK Pathak, Science and Technology in India, Anshika prakashan pratapgarh, 2016.
2.	PB Sharma, S. Narain, Doctors Scientists and Engineers of Ancient India, Kalpaz Publications 2017.

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B. Tech SoE and Syllabus 2023

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Department of Information Technology

B.Tech in Computer Science and Design

SoE No. 23CSD-101

V SEMESTER

Open Elective -III : Basket

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	FACULTY
1	5	OE3	CSE	23OE3501	OE-III : Social Reformers in Modern Maharashtra	ARTS
2	5	OE3	CSE	23OE3502	OE-III : Independent India 1948-2010	ARTS
3	5	OE3	CT	23OE3503	OE-III : Introduction To Cognitive Psychology	ARTS
4	5	OE3	CT	23OE3504	OE-III : Introduction To Engineering Psychology	ARTS
5	5	OE3	CT	23OE3505	OE-III : Introduction To Behavioural Psychology	ARTS
6	5	OE3	CT	23OE3506	OE-III : Introduction To Emotional Psychology	ARTS
7	5	OE3	EL	23OE3507	OE-III : Elements of Public Administration	ARTS
8	5	OE3	ETC	23OE3508	OE-III : Ancient Indian History	ARTS
9	5	OE3	IT	23OE3509	OE-III : Consciousness Studies	ARTS
10	5	OE3	IT	23OE3510	OE-III : Psychology for Professionals	ARTS
11	5	OE3	IT	23OE3511	OE-III : Introduction to Sociology and Human Behavior	ARTS
12	5	OE3	GE	23OE3512	OE-III : Economics of Money and Banking	ARTS
13	5	OE3	GE	23OE3513	OE-III : Economics of Capital Market	ARTS
14	5	OE3	GE	23OE3514	OE-III : Digital Humanities	ARTS
15	5	OE3	GE	23OE3515	OE-III : Introduction to Political Science	ARTS
16	5	OE3	CT	23OE3516	OE-III : Bhagwat Geeta - An Engineer's Interpretation	ARTS - IKS
17	5	OE3	CT	23OE3517	OE-III : Artha shastra by Kautiliya	ARTS - IKS
18	5	OE3	CSD	23OE3518	OE-III : Glimpses of Ancient science and Technology	ARTS - IKS
19	5	OE3	CV	23OE3519	OE-III : Indian taxation system	COMMERCE
20	5	OE3	CV	23OE3520	OE-III : Elements of share trading	COMMERCE
21	5	OE3	EE	23OE3521	OE-III : Introduction to Fintech	COMMERCE
22	5	OE3	EE	23OE3522	OE-III : Financial Analytics	COMMERCE
23	5	OE3	ETC	23OE3523	OE-III : Fundamentals of Investments	COMMERCE
24	5	OE3	EE	23OE3524	OE-III : Lifestyle Diseases	HEALTHCARE & MEDICINE
25	5	OE3	EE	23OE3525	OE-III : Holistic Nutrition	HOME SCIENCE
26	5	OE3	EL	23OE3526	OE-III : Community Organization & Development	HOME SCIENCE
27	5	OE3	CSE	23OE3527	OE-III : Human Rights & International Laws	LAW
28	5	OE3	CSE	23OE3528	OE-III : Cyber Crime Administration	LAW
29	5	OE3	MATHS	23OE3529	OE-III : Finite Differences & Numerical Methods	SCIENCE
30	5	OE3	MATHS	23OE3530	OE-III : Business Statistics	SCIENCE
31	5	OE3	PHY	23OE3531	OE-III : Crystalline Solids: Properties and Applications.	SCIENCE
32	5	OE3	PHY	23OE3532	OE-III : Nanotechnology: Fundamental to Applications	SCIENCE
33	5	OE3	CHE	23OE3533	OE-III : Chemistry in daily life	SCIENCE
34	5	OE3	CHE	23OE3534	OE-III : Battery Systems and Management	SCIENCE
35	5	OE3	NPTEL	23OE3535	OE-III : Designated approved online NPTEL Course	NPTEL

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

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

V SEMESTER

Mandatory Learning Course (MLC)

MLC2125 : YCAP5

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

6th Semester

(Department of Information Technology)

B. Tech in Computer Science and Design (CSD)

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 Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SIXTH SEMESTER															
1	6	PC	CSD	23CSD1601	Database and Information System	T	3	0	0	3	3	30	20	50	3
2	6	PC	CSD	23CSD1602	**Lab :** Database and Information System	P	0	0	2	2	1		60	40	
3	6	PC	CSD	23CSD1603	Design & Analysis of Algorithm	T	3	0	0	3	3	30	20	50	3
4	6	PC	CSD	23CSD1604	**Lab :** Design & Analysis of Algorithm	P	0	0	2	2	1		60	40	
5	6	PC	CSD	23CSD1605	Compiler Design	T	3	0	0	3	3	30	20	50	3
6	6	PC	CSD	23CSD1606	**Lab :** Compiler Design	P	0	0	2	2	1		60	40	
7	6	PC	CSD	23CSD1607	Design Thinking and Research Methdology	T	2	0	0	2	2	30	20	50	3
8	6	PE	CSD		**Professional Elective-III**	T	3	0	0	3	3	30	20	50	3
9	6	PE	CSD		**Lab : Professional Elective-III**	P	0	0	2	2	1		60	40	
10	6	MDM	MDM		**MD Minor Course-IV**	T	3	0	0	3	3	30	20	50	3
11	6	**VSEC-4**	CSD	23CSD1608	**Lab :** Digital Marketing	P	0	0	4	4	2		60	40	
12	6	STR	CSD	23CSD1609	Project Phase-I	P	0	0	4	4	2		60	40	
					TOTAL		**17**	**0**	**16**	**33**	**25**				

List of Mandatory Learning Course (MLC)															
1	5	HS	T&P	MLC2125	**YCAP6:**	**A**	3	0	0	3	**0**				

Professional Elective - III					
1	6	PE-III	CSD	23CSD1621	**PE-III :** Game Theory
2	6	PE-III	CSD	23CSD1622	**PE-III : Lab :** Game Theory
3	6	PE-III	CSD	23CSD1623	**PE-III :** Cloud Security
4	6	PE-III	CSD	23CSD1624	**PE-III : Lab :** Cloud Security
5	6	PE-III	CSD	23CSD1625	**PE-III :** Data Mining
6	6	PE-III	CSD	23CSD1626	**PE-III : Lab :** Data Mining
7	6	PE-III	CSD	23CSD1627	**PE-III :** Java Fullstack Development
8	6	PE-III	CSD	23CSD1628	**PE-III : Lab :** Java Fullstack Development
9	6	PE-III	CSD	23CSD1629	**PE-III :** Generative AI
10	6	PE-III	CSD	23CSD1630	**PE-III : Lab :** Generative AI
11	6	PE-IV	CSD	23CSD1633	**PE-III :** Dot Net Fullstack Development
12	6	PE-IV	CSD	23CSD1634	**PE-III : Lab :** Dot Net Fullstack Development
Coursera Elective					
1	6	PE-III	CSD	23CSD1631	**PE-III :** Software Testing
2	6	PE-III	CSD	23CSD1632	**PE-III : Lab :** Software Testing

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Chairperson	Dean (Acad. Matters)	Date of Release	Version	

VI SEMESTER

23CSD1601: Database and Information System

Course Outcomes :
Upon successful completion of the course the students will be able to 1. To obtain sound knowledge in the theory, principles and applications of database management system. 2. Design and develop data model given their specifications and within performance and cost constraints. 3. Acquire and understand new knowledge, use them to develop data centric application and to understand the importance of lifelong learning. 4. Perform experiments in different disciplines of database management system.

Unit I	**6 Hrs.**
Introduction to Database Management System: General File System vs. DBMS, Data Abstraction, Data Independence, Keys, Data Modeling using the Entity RelationshipER Model, The enhanced Entity RelationshipEER model.	
Unit II	**7 Hrs.**
Relational Model: Structure of Relational Databases, The Relational Algebra and Relational CalculusTRC & DRC Introduction to SQL Programming: DDL, DML, Joins, Nested Queries/Sub Queries/Inner Queries Integrity Constraints, NO SQL: MongoDB installation, CRUD operation	
Unit III	**6 Hrs.**
Database Design: Functional Dependency and Normalization for Relational Databases, Desirable properties of decomposition	
Unit IV	**7 Hrs.**
Query Processing: Overview, Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions. Query Optimization: Overview, Transformation of Relational Expressions, Estimating Statistics of Expression Results.	
Unit V	**7 Hrs.**
Transaction Processing: Introduction to Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels	
Unit VI	**6 Hrs.**
Concurrency control Techniques: Lock-Based Protocols, Deadlock Handling, Multiple Granularity, and Timestamp-Based Protocols. Data Control Language: GRANT, REVOKE; Concept of Triggers and Views.	
Total Lecture	**39 Hours**

Textbooks:	
1.	Elmasri & Navathe , Fundamentals of Database System, 5th Edition2006
2.	McGraw-Hill Education, Abraham Silberschatz, Henry F. Korth and S. Sudarsha, Database System Concepts, 6th Edition, 2010
3.	McGraw-Hill, 2002, Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, Second Edition

Reference Books:	
1.	C.J. Date, Database in Depth – Relational Theory for Practitioners, O`Reilly Media, 2005
2.	Michael Mannino, 4th Edition2008, Database design, Application Development and Administration

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1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/106/105/106105175
2.	https://www.youtube.com/watch?v=OWX4RvijwLw

VI SEMESTER
23CSD1602: Lab: Database and Information System

Course Outcomes
Upon successful completion of the course the students will be able to 1. To obtain sound knowledge in the theory, principles and applications of database management system concepts, its structures and query language. 2. Apply various techniques of SQL Query writing, Normalization techniques, query processing and techniques involved in query optimization useful in transaction. 3. To Analyze the given problem statement and give robust and cost effective solution. 4. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

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

SN	Experiments based on
1	Database design using E-R Model, Payroll processing system, Banking system Library Information System Student Information System, etc.
2	Mapping of E-R model to relational Schema and creation of Tables using DDL Data Defination Language.
3	Modification of Database objects using DDL and DML.
4	Querying the Database based on various inbuilt functions,Date Function, Numeric Function, Character Function, Conversion Function, Miscellaneous Function, etc..
5	Querying the Database based on Set, Arithmetic and Logical operator
6	Implementation of Joins all types.
7	Queries based on Data Grouping Restricting and sorting
8	To create and manipulate various database objects of the Table using Views
9	Querying the Database based on to create triggers for various events such as insertion, updating, etc.
10	Exploring NOSQL Database

VI SEMESTER
23CSD1603: Design & Analysis of Algorithm

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Understand asymptotic analysis of iterative and recursive algorithms, complexity of algorithms 2. Apply important algorithmic design techniques for problem solving 3. Analyze the performance of algorithms 4. Synthesize and design efficient algorithms for real world problems

Unit I	**6 Hrs.**
Mathematical foundations, summation of arithmetic and geometric series, recurrence relations, solutions of recurrence relations using technique of characteristic equation and generating functions	
Unit II	**6 Hrs.**
Asymptotic notations of analysis of algorithms, analyzing control structures, worst case and average case analysis, amortized analysis, External Sorting, lower bound proof.	
Unit III	**7 Hrs.**
Divide and conquer basic strategy, quick sort, merge sort etc. Greedy method – basic strategy, application to job sequencing with deadlines problem, minimum cost spanning trees, single source shortest path etc.	
Unit IV	**7 Hrs.**
Dynamic Programming basic strategy, multistage graphs, all pair shortest path, optimal binary search trees, Matrix-chain Multiplication, traveling salesman problem.	
Unit V	**6 Hrs.**
Connected components, Branch and bound, Backtracking basic strategy, 8 – Queen's problem, graph coloring, Hamiltonian cycles etc.	
Unit VI	**7 Hrs.**
NP-hard and NP-complete problems, basic concepts, non-deterministic algorithms, NP-hard and NP-complete, Cook's Theorem, decision and optimization problems, polynomial reduction	
Total Lecture	**39 Hrs**

Textbooks:	
1.	Horowitz, Sahani, Rajsekharan, Computer Algorithms, 2nd Edition, Silicon Press
2.	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to Algorithm, 3rd Edition, 2009, MIT press
3.	Brassard, Bratley, Fundamentals of Algorithms, 1st edition,1995, Prentice Hall

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B. Tech SoE and Syllabus 2023

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

Department of Information Technology

B.Tech in Computer Science and Design

SoE No. 23CSD-101

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Chairperson	Dean Acad. Matters	Dean OBE	Date of Release	Version	

Reference Books:	
1.	S. Dasgupta, C. H. Papadimitriou, and U. V. Vazirani ,Algorithms, Application Development and Administration, 1st Edition, 2006

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MOOCs Links and additional reading, learning, video material	
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2.	https://www.youtube.com/watch?v=uUhOEj4z8Fo

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VI SEMESTER

23CSD1604: Lab: Design & Analysis of Algorithm

Course Outcomes
Upon successful completion of the course the students will be able to 1. Understand different analysis method and analyze it. 2. Understand different techniques and apply it.

No..	Problem Statements
1	Implement and analyze different sorting algorithms.
2	Practical Based on Amortized Analysis
3	Practical Based on Minimum Cost Spanning Tree
4	Practical Based on An Activity Scheduling Problem
5	Practical Based on Single Source Shortest Path
6	Practical Based on Dynamic Programming
7	Practical Based on divide and conquer

VI SEMESTER

23CSD1605: Compiler Design

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Understand different phases of compilation process, lexical analyzer tool "Lex" Or "Flex" and YACC or Bison tool. 2. Apply parsing techniques, syntax directed translation scheme for source program. 3. Apply different optimization techniques. 4. Design and implement syntax analyzer for given CFG.

Unit I	**7 Hrs.**
Introduction to Abstract Model & Grammar, Introduction to Compilation Process, Compilers & Translators, Phase structure of Compiler, Role of Lex, Design of Lexical Analysis. **Parser:** Specifying Syntactic Structure of Programming Language using Context Free Grammars, The role of Parser, Top-down Parsing, and Bottom up Parsing, Predictive Parsers, and Recursive Decent Parser	
Unit II	**6 Hrs.**
Bottom Up Parser: Construction of efficient LR Parsers SLR, CLR & LALR, Canonical Collection of set of items and construction of Parsing table, Implementation of LR Parsing table	
Unit III	**7 Hrs.**
Syntax Directed Translation: Intermediate , Postfix notation, Parse tree and Syntax Trees, Three address s, quadruples, triples, Translation of Arithmetic Expression, Boolean expressions, Control Statements. Array references, Procedure Calls, Declarations, Case Statements, Use of Compiler writing tools Lex/Flex, Yacc /Biason.	
Unit IV	**6 Hrs.**
Symbol Tables: Contents, Representing scope information. Error detection and Recovery: Error handling, Lexical-phase, Syntactic phase and semantic phase.	
Unit V	**7 Hrs.**
Introduction to Optimization: The principle sources of optimization, Loop optimization, The DAG representation, Introductory Data Flow analysis.	
Unit VI	**6 Hrs.**
Introduction to Generation: Object programs, Problems in Generation, Register allocation and assignment, generation from DAG, Peephole optimization.	
Total Lecture	**39 Hours**

Textbooks:	
1.	Compilers Principles, Techniques & Tools, Alfred V. Aho, Ravi Sethi , Jeffrey D, Addison Wesley. 2nd Edition
2.	Principles of Compiler Design, Alfred V. Aho Jeffrey D. Ullman, Addison Wesley, 2nd Edition

Reference Books:	
1.	Compiler Design, O.G. Kakde, Laxmi Publication, 4th edition
2.	Introduction to Compiling Techniques: First Course Using ANSI C, LEX and YACC, J.P. Bennett, Alfred Waller Ltd

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1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/117/105/117105135/
2.	https://www.youtube.com/watch?v=fC7V8QsPBec

VI Semester

23CSD1606: Lab: Compiler Design

Course Outcomes
Upon successful completion of the course the students will be able to 1. Understand different phases of compilation process, lexical analyzer tool "Lex" Or "Flex" and YACC or Bison tool. 2. Apply parsing techniques, syntax directed translation scheme for source program. 3. Apply different optimization techniques. 4. Design and implement a compiler for a source program.

Sr. No	Experiments Base On
1	LEX TOOL
2	YACC TOOL
3.	Practical Based on Top down parser design
4.	Practical Based on Bottom up parser
5.	Practical Based on optimization

VI SEMESTER

23CSD1607: Design Thinking and Research Methodology

Course Outcomes
Upon successful completion of the course the students will be able to 1. Understand the core concepts, methods of Design Thinking and Research. 2. Apply Design Thinking tools to address real-world CSD challenges by fostering creativity and innovation in product or service development, and enhancing user experience through empathetic and iterative design. 3. To develop understanding of the research process & design and to impart knowledge on data collection, analysis, and interpretation. 4. To prepare students to write technical research reports & papers and Gain insights into ethics in engineering research.

Unit 1	**6 Hrs**
Introduction to design thinking: Fundamental of Design Thinking: Definition, Origin and evolution of design thinking, Importance of design thinking in CSD, Software and digital innovations, design thinking Vs traditional problem solving. Five stage design process: Empathize-Understanding user through interviews, observations, Define- Framing the problem, Ideate- Brainstorming, SCAMPER, mind mapping techniques, Prototype-low fidelity and high fidelity prototyping in CSDe.g. Wireframes, mockup, Test- Usability testing, feedback integration, agile loops.	
Unit 2	**6 Hrs**
Tools & Techniques: Empathy maps, customer journey maps, personas, Brainstorming, storyboarding, rapid prototyping, Wireframing with tools like Figma, Adobe XD. Application to CSD Projects: Case Studies-Design Thinking in UI/UX, app development, Cloud Systems, Agile+ Design thinking, Digital transformation projects using design thinking, Capstone Projects: Group project applying the full design thinking cycle to solve a CSD challenge	
Unit 3	**7 Hrs**
Research Fundamentals, Research Problem and Design, Literature Review **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	7 Hrs
Sampling and Data Collection, Data Analysis and Interpretation, Technical Writing, Research Ethics **Sampling and Data Collection:** Sampling techniques: Probability and Non-probability sampling, 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. Use of software tools e.g.,Excel/SPSS/MATLAB for analysis, Interpretation of results **Data Analysis and Interpretation:** Processing and analyzing data, Statistical tools: Measures of central tendency, Dispersion, Correlation, Regression, Hypothesis testing: Nulland 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	
Total Lecture Hours	**26 Hrs**

VI SEMESTER

23CSD1621: PE-III : Game Theory

Course Outcomes :
Upon successful completion of the course the students will be able to **1.** Understand the core concepts of Game Theory and its applications in diverse fields like economics, politics, biology, and game design. **2.** Apply Game Theory concepts in strategic decision-making and analyze game scenarios, including cooperative and non-cooperative games in game design. **3.** Synthesize Game Theory and game design principles to create practical applications, analyzing player behavior, strategy formulation, and optimal payoffs. **4.** Evaluate the impact of Game Theory principles on game design elements such as physics, layout, and audio, and how they affect player behavior and the overall game experience.

Unit I : Introduction To Game Theory And Types Of Games	**7 Hrs.**
Motivation: Elements of Game theory , Why game theory is important in economics, politics, biology, and other fields. Types of Games: Cooperative vs. Non-cooperative, Symmetric vs. Asymmetric, and Simultaneous vs. Sequential games, examples, Strategic Games, 2 Player Strategy Games. Elements of a Game: Players, strategies and information. Examples of Games: Battle , Coordination Games.	
Unit II : Types Of File Formatting	**6 Hrs.**
Different image formats, Different Audio formats, Different video formats, Polygon file formats, Equilibrium Concepts for Games	
Unit III : Games with Communication	**7 Hrs.**
Repeated Games Strategies, payoffs, folk theorems. Recursive and stochastic games: stationary strategies, Shapley's theorem, Games with Communication Correlated equilibrium, Two-person bargaining. Game Scenes & Tiles, Navigation and Path finding.	
Unit IV: Physics in Game Theory	**6 Hrs.**
Physics Engines, Gravity Simulation, Rigid Body Interaction, Collisions, Rigid Body & Components, scripting Collision Events	
Unit V: Game Layouts	**6 Hrs.**
Menu System and Visual Components, Event System and Skins, Canvas.	
Unit VI: Audio Assets in Game Theory	**7 Hrs.**
Strategic Decision-Making, Payoff Structures, Game States and Information Asymmetry, Decision Trees and Game States, Signaling and Audio Cues,Mixed Strategies in Audio DesignCoordination Games and Player Behavior	
Total Lecture	**39 Hrs**

Textbooks:	
1.	An Introduction to Game Theory" Martin J. Osborne, Oxford University Press 2004 2nd Edition
2	"Game Theory: An Introduction" Steven Tadelis, Pearson 2013

Reference Books:	
1.	"Strategy: An Introduction to Game Theory", Joel Watson, W.W. Norton & Company 2008.
2.	"The Theory of Games and Economic Behavior" John von Neumann, Oskar Morgenstern, Princeton University Press, 1944 60th Anniversary Edition, 2004
3	M. J. Osborne, "An Introduction to Game Theory", Oxford University Press, 2003

MOOCs Links and additional reading, learning, video material	
1.	https://www.gametheory.net/
2.	https://www.youtube.com/watch?v=QnFPZUPr658
3.	https://www.youtube.com/user/gametheoryonline
4.	https://enine.digimat.in/nptel/courses/video/106101237/L29.html

VI SEMESTER

23CSD1622: PE-III :Lab: Game Theory

Course Outcomes
Upon successful completion of the course the students will be able to 1. Understand the foundational principles of game theory and its applications across different fields. 2. Analyze strategic decision-making and equilibrium concepts in game-based scenarios. 3. Implement interactive game systems with a focus on media formats, user interfaces, and audio-visual elements. 4. Develop interactive game layouts and user interfaces.

Sr. No.	Problem Statements
1	Introduction to Game Theory and Types of Games
2	Demonstrate basic understanding by writing a simple C# program with variables and conditions.
3	Write a Program of C# by using Loops, Arrays, Enums.
4	To Install Unity and Visual Studio, set up for game design, review documentation, and conceptualize the game theme.
5	To create and animate 2D characters.
6	To implement movement and character control mechanics, enabling interactive gameplay through actions like walking, jumping.
7	Case Study

VI SEMESTER

23CSD1623 : PE-III :Cloud Security

Course Outcomes
Upon successful completion of the course the students will be able to 1. Understand fundamental concepts of cloud security, including principles of data encryption, network security, and access control. 2. Compare and contrast conventional security practices with cloud-native security paradigms, identifying key differences and implications for risk management. 3. Assess risks associated with cloud-based assets and formulate effective risk mitigation strategies tailored to cloud environments. 4. Implement robust data security measures in cloud environments, including encryption, data masking, and secure data transfer protocols.

Unit I	**7 Hrs.**
Cloud Computing Fundamentals- Definition, Evolution, Essential characteristics, Cloud Deployment Models, Cloud Service Models, Benefits, Cloud Architecture, Virtualization in Cloud, Cloud Data Centre, SLA, Cloud Applications.	
Unit II	**7 Hrs.**
Cloud Security Challenges, Cloud Information Security Objectives, Cloud Security Services, Secure Cloud Software Requirements, Cloud Security Policy Implementation, Infrastructure Security, Data Security and Storage, Privacy in Cloud.	
Unit III	**7 Hrs.**
Threats and Vulnerabilities to Infrastructure, Data, and Access Control; Risk Management and Risk Assessment in Cloud, Cloud Service Provider Risks, Virtualization Security Management in the Cloud, Trusted Cloud Computing, Identity Management and Access Control..	
Unit IV	**6 Hrs.**
Cloud Computing and Business Continuity Planning/Disaster Recovery, Cloud Audit and Compliance: Internal Policy Compliance, Regulatory/External Compliance, Cloud Security Alliance.	
Unit V	**6 Hrs.**
Standards for Security: SAML OAuth, OpenID, SSL/TLS, Encrypting Data and Key Management, Creating a Cloud Security Strategy, The Future of Security in Cloud Computing.	
Unit VI	**6 Hrs.**
Dive In and Threat Model, Learning to Threat Model. Strategies for Threat Modeling, Brainstorming Your Threats, Structured Approaches to Threat Modeling, Models of Software,	
Total Lecture	**39 Hours**

Textbooks:	
1.	Barrie Sosinsky, Cloud Computing Bible Wiley-India, 2010
2.	Tim Mather, SubraKumaraswamy, and ShahedLatif, " Cloud Security and Privacy", Published by O'Reilly Media, Inc., 2009

Reference Books:	
1.	Nikos Antonopoulos, Lee Gillam, Cloud Computing: Principles, Systems and Applications, Springer, 2012
2.	Ronald L. Krutz, Russell Dean Vines Cloud Security: A Comprehensive Guide to Secure Cloud Computing Wiley-India, 2010
3.	Kumar Saurabh Cloud Computing Wiley Pub

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MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=lOh2xUACaU&list=PLShJJCRzJWxhz7SfG4hpaBD5bKOloWx9J&index=3
2.	https://www.youtube.com/watch?v=Qt9lhzFhW_c

VI SEMESTER

23CSD1624 : Lab: PE-III :Cloud Security

Course Outcomes
Upon successful completion of the course the students will be able to 1. Demonstrate proficiency in deploying and securing cloud infrastructure using virtualization and cloud service models. 2. Apply security mechanisms and threat modeling techniques to identify and mitigate vulnerabilities in cloud environments. 3. Implement and evaluate data protection strategies, encryption standards, and compliance frameworks in a cloud-based system.

Sr. No.	Problem Statements
1	Introduction to Cloud Platforms and Deployment Models
2	Virtualization Setup and Demonstration
3	SLA Simulation and Analysis
4	Implementing Cloud Storage and Security Settings
5	Identity and Access Management IAM
6	Threat Modeling using STRIDE Methodology
7	Cloud Risk Assessment and Vulnerability Analysis
8	Cloud Disaster Recovery and Business Continuity Simulation
9	Securing APIs with OAuth and OpenID
10	Encrypting Data in Cloud and Key Management

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SoE No. 23CSD-101

VI SEMESTER

23CSD1625: PE-III: Data Mining

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Describe and explain the fundamentals of data mining, data warehouse, OLAP, OLTP. Data pre-processing, data cleaning, performance evaluation and visualization methods. Apply different data mining algorithms on given data set. 2. Describe and explain the concepts related to data preparation, data modelling, classification, clustering, association rule mining, and anomaly detection for extraction of knowledge. 3. Apply supervised and unsupervised data mining techniques for knowledge extraction based on different types of data. 4. Analyze the data to apply appropriate data modelling and mining techniques to retrieve an appropriate result.

Unit I:	**7 Hrs.**
Introduction to data mining: Data mining definitions & task, data mining on what kind of data, Knowledge Discovery vs. Data mining, DBMS vs. Data Mining, Data mining functionalities, data mining task primitives , Major issues in data mining , Data Preprocessing Data cleaning, integration, transformation, Feature selection and dimensionality reduction, Handling missing, noisy, and outlier data, Normalization and discretization	
Unit II:	**7 Hrs.**
Association Rule Mining: what is Frequent item sets, closed item sets, and association rules, frequent pattern mining, applications of Association Rule mining, Market Basket Analysis. The Apriority algorithm for finding frequent item set using candidate generation, generating association rules from frequent item sets. Improving efficiency of Apriority, FP- growth algorithm.	
Unit III:	**6 Hrs.**
Cluster Analysis: What is cluster analysis, its applications, clustering paradigms, Partioning algorithms: K-means, K-medoids, Hierarchical clustering: Agglomerative and Divisive hierarchical clustering, Density based clustering -DBSCAN	
Unit IV:	**6 Hrs.**
Web Mining: Introduction, web content mining, web structure mining, web usage mining, mining, Link analysis: HITS, PageRank, Graph-based models, Clickstream analysis, Session identification and user profiling.	
Unit V:	**6 Hrs.**
Text mining: Text data analysis and Information retrieval, Unstructured texts, text mining approaches, text pre-processing, Feature Representation, Text Mining Techniques Text classification, Clustering of documents, Sentiment Analysis and Opinion Mining, Topic Modeling	
Unit VI:	**7 Hrs.**
Social Data Mining: Introduction to Social Data and its Challenges, *Social Network Analysis SNA* Graph theory: nodes, edges, degree, centrality Community detection *Mining Social Media Platforms* data extraction via APIs, Hashtag and trend analysis, Sentiment and emotion mining in social platforms, *Ethical and Legal Considerations* Data privacy, misinformation, bias in social data, *Tools for Social Mining*	
Total Lecture	**39 Hours**

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Textbooks:	
1.	Jiawei Han, Micheline Kamber and Jian Pei Data Mining: Concepts and Techniques, 3rd ed. Morgan Kaufmann Publishers
Reference Books:	
1.	Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining First impression Pearson Addison Wesley
2.	Daniel T. Larose Discovering Knowledge in Data An Introduction to Data Mining Wiley
3.	Chapman and Hall Data mining with R 2nd CRC press

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MOOCs Links and additional reading, learning, video material
httpshttps://www.outube.com/watch?v=_mSkA-wA2Wk

VI SEMESTER

23CSD1626 : Lab: Data Mining

Course Outcomes
Upon successful completion of the course the students will be able to 1. Use popular data mining tool and apply the principle algorithms and techniques used in data mining, on different types of dataset, analyze their results, interpret the results using different visualization techniques. 2. Apply various techniques of SQL Query writing, Normalization techniques, query processing and techniques involved in query optimization useful in transaction.

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

SN	Practicals based on
1	Introduction to R - fundamentals and basic data types, import / export data and Pre-processing on data set using R
2	Implementation of association rule mining in R
3	Implementation of Data Classification using Bayes classification in R
4	Implementation of Data Classification using decision tree in R
5	Implementation of Data Clustering using K-means in R
6	Implementation to PREDICT DATA using linear regression methods.
7	Mining text data using R
8	Data exploration and visualization
9	Develop one Application eg sentiment analysis

VI SEMESTER

23CSD1627 : PE IV: Java Full Stack Development

Course Outcomes :
Upon successful completion of the course the students will be 1. Understand the core, advance java, cloud and virtualization concepts. 2. Apply the concepts for full stack development. 3. Design different web applications using UI components and Spring framework. 4. Develop fully functional web applications using different frameworks and tools. 5. Implementation of web application using different tools.

Unit I	**6 Hrs.**
Java Basics OOP Concepts, Data Structures, Collection Framework, File handling, JDBC, Introduction to JUnit	
Unit II	**7 Hrs.**
Advance Java Features Introduction to Java 8 Features, Interface Enhancements, Functional Interfaces, Lambda Expression, ForEach , Method References, Streams API, JavaDocs	
Unit III	**7 Hrs.**
User Interface Design Building Responsive Web Pages HTML5, CSS3 and JavaScript, Basic Single Page Applications Using Angular OR React	
Unit IV	**6 Hrs.**
Spring Framework Working with Spring Core, Dependency Injection, Spring MVC, Spring Boot, Introduction to Hibernate and Spring Microservices	
Unit V	**7 Hrs.**
Cloud and Virtualization Virtualization Basics, Introduction to Cloud, RDB Cloud Fundamentals SaaS, PaaS, IaaS, Introduction to AWS S3 Buckets, RDS, AWS Cloudfront	
Unit VI	**6 Hrs.**
Full Stack Development Tools:Introduction to Maven, Jacoco, SonarLint,Jira Swagger, Mockito, Docker, Gitrunner	
Total Lecture	**39 Hours**

Textbooks:	
1.	The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Developer Chris Northwood First Edition
2.	Full Stack Web Development For Beginners: Learn Ecommerce Web Development using HTML5,CSS3,Bootstrap, JavaScript,MySQL and PHP By Riaz Ahmed

Reference Books:	
1.	Full Stack Java Development with Spring MVC, Hibernate, jQuery, and Bootstrap Mayur Ramgir First Edition
2.	Java for Web Development: Create Full-Stack Java Applications with Servlets, JSP Pages, MVC Pattern and Database Connectivity Sarika Agarwal and Vivek Gupta First Edition

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/106106156
2.	https://www.coursera.org/learn/introduction-to-web-development-with-html-css-javacript?trk_location=query-summary-list-link
3.	https://ict.iitk.ac.in/product/full-stack-developer-html5-css3-javascript-bootstrap-php-with-mysql-demo/

VI SEMESTER

23CSD1628 : - Lab: PE IV Java Full Stack Development

Course Outcomes :

Upon successful completion of the course the students will be

1. Understand the core, advance java, cloud and virtualization concepts.
2. Apply the concepts for full stack development.
3. Design different web applications using UI components and Spring framework.
4. Develop fully functional web applications using different frameworks and tools.
5. Implementation of web application using different tools.

List of Practical's

Sr. No	Problem Statements
1	Practical based on Collection
2	Practical based on File Handling
3	Practical based on JDBC
4	Practical based on Junit
5	Practical based on Java 8 features
6	Practical based on Streams API
7	Practical based on User Interface Design
8	Practical based on Spring Microservices
9	Web Application Development
10	Web Application Deployment

VI SEMESTER
23CSD1629 : PE:III Generative AI

Course Outcomes
Upon successful completion of the course the students will be able to 1. Understand the fundamental concepts of Artificial Intelligence AI and Generative AI, and historical development and key milestones in the evolution of Generative AI. 2. Able to write effective prompts , understand the various techniques to write a prompt , identify the advantages of using text prompts in generative AI, recognize and address common Challenges in Generating Meaningful and Coherent Prompts. 3. Understand the Fundamental Math Concepts in Generative Modeling, various probability and sampling techniques and comprehend the principles of maximum likelihood estimation MLE and different types of Model 4. Understand GANs and VAEs, including their architectures, training processes, variants, and practical applications. 5. Understanding of GAI platforms, their features, capabilities, applications, and the challenges Associated with their use, various generation techniques, including text-to-text, text-to-image.

Unit 1	6 Hours
Introduction to Generative AI: Overview of AI and Generative AI, Historical context and evolution of Generative AI, Key concepts in Generative AI, Applications of Generative AI.	
Unit 2	**7 Hours**
Prompt Engineering Techniques and Approaches :Prompt Creation -Writing effective prompts -Techniques for using text prompts: Zero shot and few-shot prompt techniques – Prompt engineering approaches: Interview pattern, Chain-of Thought, Tree-of Thought - Benefits of using text prompts - Challenges in generating meaningful and coherent prompts.	
Unit 3	**6 Hours**
Models For Generative AI :Mathematical foundations of generative model, Probability distributions and sampling, Maximum likelihood estimation and Bayesian inference, Latent variable models and Gaussian Mixture Models GMMs, Hidden Markov Models HMMs.	
Unit:4	**7 Hours**
Advancements in Generative AI using GANs and VAEs : Introduction to GANs - Architecture and Training, Loss functions and common issues in GANs, Variants of GANs - Conditional GANs and DCGANs, Introduction to VAEs - Architecture and Training, Loss functions in VAEs and Conditional VAEs, Hierarchical VAEs and Disentangled VAEs, Applications of VAEs	
Unit 5	**6 Hours**
Platforms For Generative AI :Introduction to Platforms – Features of platforms – Capabilities -Applications - Pre-trained Models - Challenges – Generation of Text to Text – Generation of Text to Image – Text to Generation – Explainable AI – Benefits – Use cases.	

Unit 6	7 Hours
Ethical Issues and Limitations of Generative AI :Limitations of Generative AI, Issues and concerns, Considerations for Responsible Generative AI , Economic Implications, Social Implications, Case study on- Microsoft ChatGPT, Google Gemini, IBM Watson ,Facebook Lama2 and other generative models.	
Total Lecture Hours	**39 Hours**

Textbooks:
Generative AI for Beginners: A Comprehensive Handbook for Teachers and Students of Computer Science by Dr. Vivek K. Jagtap

Reference Books:	
1.	Hands-on Generative Adversarial Networks with Keras, Rafael Valle. Packt Publisher, 2019

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=XuW7WBjgNfc

VI SEMESTER
23CSD1630 : - Lab : PE III Generative AI

Course Outcomes :
Upon successful completion of the course the students will be **1.** To implement fundamental and advanced generative AI models. **2.** To apply prompt engineering strategies for text generation. **3.** To work with real-world generative platforms and APIs. **4.** To assess ethical considerations and societal impacts via AI tools.

List of Practical's

Sr.	**Problem Statements**
1	Use GPT to generate basic content; Visualize basic ML vs Generative AI
2	Mini Demos: Text completion, image generation, generation via OpenAI/HuggingFace APIs
3	Implement zero-shot and few-shot prompts for Q&A, summarization, and generation
4	Apply Chain-of-Thought CoT, Interview-style, and Tree-of-Thought prompts for logical reasoning tasks
5	Evaluate prompt quality relevance, coherence, bias; Build prompt evaluation matrix
6	Implement multinomial sampling; visualize Gaussian/normal distributions; basic text generation using sampling
7	Use sklearn.mixture.GaussianMixture to classify synthetic data into clusters
8	Use hmmlearn to model sequences such as weather patterns, part-of-speech tagging
9	Train a basic GAN on MNIST dataset; visualize real vs generated images
10	Implement label-based GAN generation or use DCGANs for complex image synthesis

VI SEMESTER

23CSD1633 : - Lab : PE III Dot Net Full Stack Development

Course Outcomes :
Upon successful completion of the course the students will be 1. Understand the concept of .NET full Stack Development using C#, ASP, MVC Controller. 2. Apply the concept in NET full Stack Development. 3. Design various applications using .NET framework.

Unit I	**8 Hrs.**
HTML Basics, Browser Environment, Semantic & Non-Semantic Elements : headers, para, div, Table, Lists, Forms, Graphics, Embedded Elements, APIs, Image and attributes. HTML Security	
Unit II	**8 Hrs.**
CSS Basics, Selectors, Borders, Color Model Padding, Borders, Box Model, Fonts, Table styling, @keyframes, CSS Animations, Transformations, Transisitions, CSS Grid, Responsive Web Design, float, width, height, @media, Bootstrap basics, margin, padding, width, height, colors, buttons, cards, CSS Security Building Single Page Applications Using Angular OR React	
Unit III	**8 Hrs.**
Java ScriptVariables, Arrays, Looping and Conditional statements, Functions, Strings, Numbers, Eventhandling-Eventlisteners,EventPropogation",LambdaExpressionsCallbacksDates	
Unit IV	**7 Hrs.**
What is MVC, components, Creating first app in MVC, understanding the folder structure and conventions	
Unit V	**7 Hrs.**
what is API, create project, test API, API Controllers, configure Web API, routing, parameter binding, return types, request and response formats, API filters	
Unit VI	**7 Hrs.**
Importance of DevOps, about infrastructure automation, Continuous Integration, continuous deliver	
Total Lecture	**45 Hours**

Textbooks:	
1.	The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Developer Chris Northwood First Edition
2.	Full Stack Web Development For Beginners: Learn Ecommerce Web Development using HTML5,CSS3,Bootstrap, JavaScript,MySQL and PHP By Riaz Ahmed

Reference Books:	
1.	Full Stack Java Development with Spring MVC, Hibernate, jQuery, and Bootstrap Mayur Ramgir First Edition
2.	Java for Web Development: Create Full-Stack Java Applications with Servlets, JSP Pages, MVC Pattern and Database Connectivity Sarika Agarwal and Vivek Gupta First Edition

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/8ew1LgfWV6s

VI SEMESTER

23CSD1634: - Lab: PE IV Lab: Dot Net Full Stack Development

Course Outcomes :
Upon successful completion of the course the students will be 1. Understand the concept of .NET full Stack Development using C#, ASP, MVC Controller. 2. Apply the concept in NET full Stack Development. 3. Design various applications using .NET framework.

Sr.No.	Name of Practical
1	Program Based on object oriented programming concepts in C#
2	Program Based on Exceptional Handling
3	Program Based on Delegates and Events
4	Program Based on LINQ
5	Program Based on SQL Server database objects
6	Program Based on SQL Triggers
7	Program Based on ADO.Net for connectivity with database
8	Program Based on MVC Validations and Exception Handling
9	Web Application project

VI SEMESTER

MDM4CSD104: Human Computer Interaction

Course Outcomes :
Upon successful completion of the course the students will be 1. Apply the knowledge of human components for interaction with computer 2. To understand basics of Computer components functions regarding interaction with human 3. Demonstrate Understanding of Interaction between the human and computer Components using screen designing concept. 4. To Produce Implementation supports for HCI by using various tools.

Unit I	**7 Hrs.**
Introduction: 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 WIMPwindows, icons, pointers, menus interface, interactivity, The context of the interaction, paradigms for interaction	
Unit II	**7 Hrs.**
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 III	**6 Hrs.**
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 IV	**7 Hrs.**
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 V	**6 Hrs.**
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 support systems	
Unit VI	**6 Hrs.**
Cognitive Models and Distributed Cognition: Goal and task hierarchies, Linguistics models, The challenge of display-based system, Physical and device models, Cognitive architectures, Scientific Foundation, Description, Case Study	
Total Lecture	**39 Hours**

Textbooks:	
1.	"Human - Computer Interaction" Alan Dix, Janet Fincay, Gregory D. Abowd and Russell Bealg, 3rd Edition Pearson Education, 2003.
2.	"Designing the user interface", Ben Shneiderman 3 rd Edition Pearson Education Asia, 2004

Reference Books:	
1.	"Interaction Design", Preece and Rogers, Sharp 2nd Edition Wiley-India, 2008.
2.	"The essential guide to user interface design", Wilbert O Galitz Wiley DreamTech, 2009
3.	"User Interface Design", Soren Lauesen Pearson Education, 2005.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=azk99gD_2Io&list=PLwdnzlV3ogoX3iArOKRq4RHSPrZyxhkrI

VI SEMESTER

23CSD1608: Lab: Digital Marketing

Course Outcomes :
Upon successful completion of the course the students will be able to 1. To learn digital marketing tools like search engine optimization and associated analytics. 2. To apply digital marketing to improve websites' rankings and optimize it in the process. 3. To analyze relative importance of digital marketing strategies to optimize digital marketing campaign. 4. To evaluate the performance of different social media in conjunction with overall.

Unit I : Website Development and Optimization	**7 Hrs.**
Creating a Webstore: Steps to set up an online store, Domain Name Registration and Web Hosting: Process of registering domains and choosing hosting platforms, Search Engine Basics: Search engine applications, search engine optimization SEO, SEO Techniques: Use of keywords, backlinks, directory submissions	
Unit II: Search Engine Marketing SEM	**6 Hrs.**
Search Engine Marketing Concepts: Overview of SEM and its importance, AdWords and Campaign Planning: Using AdWords, AdWords Planner, and bidding for keywords, Ad Rank Optimization: Factors influencing ad rank and strategies for improvement	
Unit III: Social Media Marketing - Platforms and Strategies	**6 Hrs.**
Facebook Marketing: Strategies and implementation, creating banners for Facebook. YouTube Marketing: Strategies, implementation, and creating YouTube videos. Twitter Marketing: Strategies, tweets, retweets, and hashtags for marketing	
Unit IV: Advanced Social Media Marketing	**7 Hrs.**
LinkedIn Marketing: Strategies, creating LinkedIn pages for companies .Instagram Marketing: Strategies, creating banners and videos for Instagram marketing. Cross-Platform Social Media Integration: Leveraging multiple social media platforms for cohesive marketing	
Unit V: Web Analytics and Tracking Tools	**6 Hrs.**
Introduction to Web Analytics: Basics and importance of analytics in digital marketing. Google Analytics: Application and interpretation of data. Social Media Analytics: Facebook, Twitter, YouTube, and Instagram analytics tools.	
Unit VI: Performance Metrics and Optimization	**6 Hrs.**
Analyzing Key Metrics: Exit rate, bounce rate, and click-through rate CTR. A/B Testing: Conducting and analyzing A/B tests for marketing campaigns. Optimization Techniques: Iterative improvements based on analytics data.	
Total Lecture	**39 Hours**

Textbooks:	
1.	Marketing Essentials – Integrating Traditional Business Strategies with Digital Marketing by Vibrant Publishers and Callie Daum
2.	Digital Marketing for Dummies by Ryan Deiss and Russ Henneberry

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=Gl6mJFvlKgI

Sr. No	Name of Experiment
1	To understand the fundamentals of digital marketing and select a suitable business case for implementing digital marketing strategies.
2	To create a basic web store and configure domain and hosting. Tools: WordPress /Wix /Shopify, Hosting Provider.
3	To optimize website SEO setup and on-page SEO. Tools: Yoast SEO, Keyword Planner.
4	To improve website visibility through off-page SEO. Backlinks and Directory Submission Tools: Online directories, blogs.
5	To analyze website performance and web analytics. Tools: Google Analytics , Google Webmster /Bing Webmaster
6	To create a blog and publish content to understand the role of content marketing. Blog Creation & Content Writing
7	To design digital marketing creative using Canva for effective promotion. Content Creation using Canva
8	To run social media campaigns Facebook & Twitter Marketing
9	To optimize YouTube videos for marketing. YouTube Marketing
10	To create business presence Instagram & LinkedIn Marketing
11	To analyze SERP and design SEO strategies Case Study
12	To design and execute an email marketing campaign Email Marketing Campaign
13	To create short-form video content to improve audience engagement. Fun Practical – Reel / Short Video Campaign
14	**[Overall Course Mini-project]** Integrated digital marketing campaign for online business.coverage website SEO,SEM, Social media, Analytics

VI SEMESTER

Mandatory Learning Course (MLC)

MLC2126 : YCAP6 - YCCE Communication Aptitude Preparation

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

7th & 8th Semester

(Department of Information Technology)

B. Tech in Computer Science and Design (CSD)

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 Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SEVENTH SEMESTER															
1	7	PC	CSD	23CSD1701	Augmented and Virtual Reality	T	3	0	0	3	3	30	20	50	3
2	7	PC	CSD	23CSD1702	**Lab :** Augmented and Virtual Reality	P	0	0	2	2	1		60	40	
3	7	PC	CSD	23CSD1703	Product Design	T	3	0	0	3	3	30	20	50	3
4	7	PC	CSD	23CSD1704	**Lab :** Product Design	P	0	0	2	2	1		60	40	
5	7	PE	CSD		**Professional Elective-IV**	T	3	0	0	3	3	30	20	50	3
6	7	PE	CSD		**Lab : Professional Elective-IV**	P	0	0	2	2	1		60	40	
7	7	PE	CSD		**Professional Elective-V**	T	3	0	0	3	3	30	20	50	3
8	7	MDM	MDM		**MD Minor Course-V**	T	2	0	0	2	2	30	20	50	3
9	7	STR	CSD	23CSD1705	Project Phase-II	P	0	0	8	8	4		60	40	
10	7	STR	CSD	23CSD1706	Campus Recrutment Training (CRT)	P	0	0	0	0	2			100	
11	7	STR	CSD	23CSD1707	Comprehensive Evaluation of Core Knowledge	P	0	0	2	2	1		60	40	
					TOTAL		**14**	**0**	**16**	**30**	**24**				

Professional Elective - IV

1	7	PE-IV	CSD	23CSD1721	**PE-IV :** Computer Game Design and Programming
2	7	PE-IV	CSD	23CSD1722	**PE-IV : Lab :** Computer Game Design and Programming
3	7	PE-IV	CSD	23CSD1723	**PE-IV :** Cloud Web Services
4	7	PE-IV	CSD	23CSD1724	**PE-IV : Lab :** Cloud Web Services
5	7	PE-IV	CSD	23CSD1725	**PE-IV :** Deep Learning
6	7	PE-IV	CSD	23CSD1726	**PE-IV : Lab :** Deep Learning
7	7	PE-IV	CSD	23CSD1727	**PE-IV :** Software Construction and Maintenance
8	7	PE-IV	CSD	23CSD1728	**PE-IV : Lab :** Software Construction and Maintenance

Professional Elective - V

1	7	PE-V	CSD	23CSD1741	**PE-V :** Artificial Intelligence for Games
2	7	PE-V	CSD	23CSD1742	**PE-V :** Quantum Computing
3	7	PE-V	CSD	23CSD1743	**PE-V :** Big Data Analytics
4	7	PE-V	CSD	23CSD1744	**PE-V :** Software Project Management

		July, 2023	1.00
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

Applicable for AY 2023-24 Onwards

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 Information Technology)

B.Tech. in Computer Science and Design

SoE No. 23CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
EIGHTH SEMESTER															
1	8	PC	CSD	23CSD1801	Multimedia Design	T	2	0	0	2	2	30	20	50	3
2	8	MDM	MDM	23CSD1802	**MD Minor Course-VI**	T	2	0	0	2	2	30	20	50	3
3	8	STR	CSD	23CSD1803	Intership / On Job training	P	0	0	14	14	7			100	
					TOTAL		**4**	**0**	**14**	**18**	**11**				
					GRAND TOTAL		**122**	**0**	**92**	**207**	**176**				

Multidisciplinary Minor Courses

		Track 1	
Courses	**Sem**	**MDMT1CSD101 : Game Technology**	
MDM-I	3	(MDM1CSD101) Graphics Design	
MDM-II	4	(MDM2CSD102) Motion Graphics	
MDM-III	5	(MDM3CSD103) Computer Game Design and Programming	
MDM-IV	6	(MDM4CSD104) Human Computer Interaction	
MDM-V	7	(MDM5CSD105) Basics of AR & VR	
MDM-VI	8	(MDM6CSD106) Game Design	

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

VII Semester

23CSD1701: Augmented and Virtual Reality

Course Outcome
On completion of this course, the student will be able to 1. Describe how VR systems work and list the applications of VR. 2. Understand the design and implementation of the hardware that enables VR systems to be built. 3. Understand the system of human vision and its implication on perception and rendering. 4 Explain the concepts of motion and tracking in VR systems.

Unit I : Introduction to Virtual Reality	**8 Hrs.**
Defining Virtual Reality, History of VR, Human Physiology and Perception, Key Elements of Virtual Reality Experience, Virtual Reality System, Interface to the Virtual World-Input & output- Visual, Aural & Haptic Displays, Applications of Virtual Reality.	
Unit II : Virtual Environment	**6 Hrs.**
Input: Tracker, Sensor, Digital Gloves, Movement Capture, Video-based Input, 3D Menus & 3D Scanner etc. Output: Visual /Auditory / Haptic Devices. Generic VR system: Introduction, Virtual environment, Computer Environment, VR technology, Model of interaction, VR Systems. Animating the Virtual Environment: Introduction, The dynamics of numbers, Linear and Nonlinear interpolation, the animation of objects, linear and non-linear translation, shape & object in between, free from Deformation, particle system. Physical Simulation: Introduction, Objects falling in a gravitational field, Rotating wheels, Elastic collisions, projectiles, simple pendulum, Springs, Flight dynamics of an aircraft	
Unit III Augmented Reality	**6 Hrs.**
Taxonomy, technology and features of augmented reality, difference between AR and VR, Challenges with AR, AR systems and functionality, Augmented reality methods, visualization techniques for augmented reality, enhancing interactivity in AR environments, evaluating AR systems.	
Unit IV : Development Tools and Frameworks:	**7 Hrs.**
Human factors: Introduction, the eye, the ear, the somatic senses Hardware: Introduction, sensor hardware, Head-coupled displays, Acoustic hardware, Integrated VR systems. Software: Introduction, Modeling virtual world, Physical simulation, VR toolkits, Introduction to VRML	
Unit V : Motion & Tracking	**7 Hrs.**
Motion in Real and Virtual Worlds- Velocities and Accelerations, The Vestibular System, Physics in the Virtual World, Mismatched Motion and Vection Tracking- Tracking 2D & 3D Orientation, Tracking Position and Orientation, Tracking Attached Bodies	
Unit VI: Interaction & Audio	**6 Hrs.**
Interaction - Motor Programs and Remapping, Locomotion, Manipulation, Social Interaction. Audio -The Physics of Sound, The Physiology of Human Hearing, Auditory Perception, Auditory Rendering	
Total Lecture	**45 Hrs**

Textbook:	
1	"Designing Virtual Systems: Gerard Jounghyun Kim, The Structured Approach", 2005
3	"Spatial Augmented Reality: Oliver Bimber and Ramesh Raskar, Merging Real and Virtual Worlds", 2005.
4	Understanding Augmented Reality, Concepts and Alan B. Craig Applications, Morgan Kaufmann, 2013.

Reference Books	
1	"3D User Interfaces, Theory and Practice", Doug A Bowman, Ernest Kuijff, Joseph J LaViola, Jr and Ivan Poupyrev Addison Wesley, USA, 2005.

YCCE e- library book links	
1	file:///C:/Users/Admin/Downloads/102-506-1-PB.pdf
2	file:///C:/Users/Admin/Downloads/628401.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=04AMaTsXFJU

VII Semester
23CSD1702: : Lab: Virtual and Augmented Reality

Course Outcomes
On completion of this course, the student will be able to 1. Describe how VR systems work and list the applications of VR. 2. Understand the design and implementation of the hardware that enables VR systems to be built. 3. Understand the system of human vision and its implication on perception and rendering. 4 Explain the concepts of motion and tracking in VR systems.

Sr. No.	List of Practical
1	Installation of Unity and Visual Studio, setting up Unity for VR development, understanding documentation of the same.
2	Demonstration of the working of HTC Vive, Google Cardboard, Google Daydream and Samsung gear VR.
3	Develop a scene in Unity that includes: i. A cube, plane and sphere, apply transformations on the 3 game objects. ii. Add a video and audio source.
4	Develop a scene in Unity that includes a cube, plane and sphere. Create a new material and texture separately for three Game objects. Change the colour, material and texture of each Game object separately in the scene. Write a C# program in visual studio to change the colour and material/texture of the game objects dynamically on button click.
5	Develop a scene in Unity that includes a sphere and plane. Apply Rigid body component, material and Box collider to the game Objects. Write a C# program to grab and throw the sphere using vr controller.
6	Develop a simple UI User interface menu with images, canvas, sprites and button. Write a C# program to interact with UI menu through VR trigger button such that on each successful trigger interaction display a score on scene.
7	Create an immersive environment living room/ battlefield/ tennis court with only static game objects. 3D game objects can be created using Blender or use available 3D models.
8	Include animation and interaction in the immersive environment created in Assignment 7.
9	Mini-Projects/ Case Study Create a virtual environment for any use case. The application must include at least 4 scenes which can be changed dynamically, a good UI, animation and interaction with game objects. e.g. VR application to visit a zoo

VII Semester
23CSD1703: Product Design

Course Outcomes :
Upon successful completion of the course the students will be 1. Understand the definition and principles of UI/UX Design in order to design with intention. 2. Achieve a deep understanding of the entire life-cycle of design—the process, purpose, and tools. 3. Learn the basics of HCI human-computer interaction and the psychology behind user decision-making. 4. Discover the industry-standard tools and specific project deliverables in UI/UX.

UNIT I: Introduction to Product Design in Tech	**6 Hrs.**
Introduction to Product Design, Product life-cycle, Product policy of an organization. Selection of a profitable product, Product design process, Product analysis	
UNIT II: Value engineering in product design	**7 Hrs.**
Advantages, Applications in product design, Problem identification and selection, Analysis of functions, Anatomy of function. Primary versus secondary versus tertiary/unnecessary functions, Functional analysis: Functional Analysis System Technique FAST, Case studies.	
UNIT III: Information Architecture & Interaction Design	**6 Hrs.**
Content hierarchy, user flows, site maps, Wireframing tools e.g., Figma, Adobe XD,UI patterns and design conventions, Responsive and adaptive design, Navigation models for web and mobile	
Unit IV: Visual Design and Prototyping	**7 Hrs.**
Principles of visual design: alignment, contrast, hierarchy, consistency, Design systems and components e.g., Material Design, Apple HIG,High-fidelity UI mockups,Interactive prototyping, Accessibility WCAG standards	
Unit V : Design Tools and Front-End Handoff	**6 Hrs.**
Tools: Figma, Adobe XD, Zeplin, Framer,Design Tokens and versioning,Developer handoff best practices,Collaboration with developers,HTML/CSS basics and role of frontend frameworks e.g., React, Flutter	
UNIT VI: Testing, Feedback, and Iteration	**7 Hrs.**
Usability testing methods: A/B testing, heuristic evaluation, remote testing,Analytics tools e.g., Google Analytics, Hotjar, Mixpanel,Design sprints and agile integration,Continuous improvement cycles,Case studies: Successful tech product journeys	
Total Lecture	**39 Hours**

Textbooks:	
1.	1.Product Design and Development", McGraw-Hill,Karl T. Ulrich & Steven D. Eppinger
2.	2. "The Design of Everyday Things",Don Norman,Basic Books

Reference Books:	
1.	Alan Cooper, The Essential Of User Interface Design", 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

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=Ol8D69VKX2k
2.	https://www.youtube.com/watch?v=4nEr2Z2tItg
3.	https://www.youtube.com/watch?v=-Bwiv5EGucs

VII Semester
23CSD1703: Lab: Product Design

Course Outcome :
On completion of this course, the student will be able to 1. Describe the fundamentals of product design and the product development process. 2. Apply value engineering principles and functional analysis in product design. 3. Design user-centered interfaces using information architecture, wireframing, and visual design principles. 4. Develop interactive prototypes and collaborate with developers using modern design tools and handoff practices. 5. Evaluate and improve product usability through testing, analytics, and iterative design methods.

Sr. No.	Problem Statements
1	Study the design process of a successful technology product.
2	Perform product analysis using Value Engineering.
3	Draw a FAST diagram for a selected product.
4	Design Information Architecture IA for a website or mobile application.
5	Create user flows for a mobile or web application.
6	Create wireframes for a mobile or web application.
7	Design responsive layouts.
8	Design a complete user interface.
9	Build an interactive prototype.
10	Evaluate UI accessibility using WCAG guidelines.
11	Design and Prototype a Complete Tech Product

VII Semester

23CSD1721 : PE-IV: Computer Game Design and Programming

Course Outcome :
On completion of this course, the student will be able to 1. Understand different types/genres of video games and the components thereof. 2. Able to write scripts which control the behavior of different game components. 3. Able to create realistic scenes and environments. 4. Able to design, write and deploy 2D video games 5. Apply hands-on experience with game engines, e.g., Unity.

Unit 1: Motivation; Types of games	**8 Hrs.**
Motivation; Types of games, Different aspects of game design; Different components in a game; Game Engines; Geometric primitives, 2D and 3D linear transforms, Homogeneous matrices; Examples of games.	
Unit 2: Different image formats	**8 Hrs.**
Different image formats; Polygon file formats; Creating sprites; Rigging; Animations using sprite-sheets; Animations using key frames; Animation controllers. Setting up a project, Scene View, Game View, Inspector, Console, Hierarchy, Game Objects, Prefabs, and Components.	
Unit 3: Scenes	**8 Hrs.**
Scenes; Tiles, visual continuity in tiles; Adding objects to scene; Prefabs; Lighting, RGB space, transparency, texture mapping; Collectibles; Navigation and path finding, Input Methods, invoke,Start and Awake, Game Loops, Update, FixedUpdate and LateUpdate, Singletons,Coroutines, Enumerators.	
Unit 4: Physics engines	**7 Hrs.**
Physics engines; Gravity simulation; Rigid body interaction; Collisions. Rigid body, Components, Unity Colliders, Physics Materials, Scripting Collision Events.	
Unit 5: Layout	**7 Hrs.**
Layout; Menu system; Visual components; Event system, Skins,Canvas,Buttons,Anchors ,Pivots RectTransform vs Transforms, I Design Concepts.	
Unit 6: Audio assets	**7 Hrs.**
Audio assets; Different audio formats; Audio mixing.	
Total Lectures	**45 Hrs.**

Text Books	
1	Game Programming Patterns 3rd edition Nystrom Robert Genever Benning
2	Introduction to Game Analysis , 2nd Edition, Clara Fernandex-vara

Reference Books	
1	Unity Game Development Cookbook: Essentials for Every Game 1st Edition Paris Buttfield-Addison O'Reilly Media

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1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.ltu.se/en/education/programme/tkdpg-computer-game-development-and-programming
2.	https://www.youtube.com/watch?v=w0LQh0vCeqIhttps://youtu.be/MFL9QggMqGw
3.	https://onlinecourses.nptel.ac.in/noc22_cs77/preview
4.	https://www.classcentral.com/course/swayam-games-and-information-269709

VII Semester

23CSD1722: Lab: PE-IV: Computer Game Design and Programming

Course Outcome :
On completion of this course, the student will be able to 1. Understand different types/genres of video games and the components thereof. 2. Able to write scripts which control the behavior of different game components. 3. Able to create realistic scenes and environments. 4. Able to design, write and deploy 2D video games 5. Apply hands-on experience with game engines, e.g., Unity.

Sr. No.	Problem Statements
1	Introduction of C#, Variables, If else
2	Program by using Loops, Arrays, Enums
3	Installation of a game engine, e.g., Unity, familiarization of the GUI. Conceptualize the theme for a 2D game
4	Character design, sprites.
5	Movement and character control
6	Level design: design of the world in form of tiles along with interactive and collectible objects
7	Design of interaction between the player and the world, optionally using the physics engine.
8	Design of menus and user interaction in mobile platform.
9	Project

VII Semester

23CSD1723: PE-IV: Cloud Web Services

Course Outcome :
On completion of this course, the student will be able to 1. Explain cloud service architecture, cloud infrastructure services, and cloud service management concepts. 2. Analyze cloud platforms, cloud security mechanisms, governance models, and cloud service deployment strategies. 3. Apply cloud services for deploying, managing, monitoring, and securing applications using leading cloud platforms. 4. Design cloud-native applications using containers, server less computing, cloud databases, and micro-services.

UNIT-I	**8 Hrs.**
Cloud Service Architecture and Infrastructure - Cloud Service Architecture, Cloud Service Provisioning, Compute Services, Storage Services, Networking Services, Virtual Machines and Containers, Resource Provisioning Resource Scheduling, Introduction to AWS, Microsoft Azure, and Google Cloud Platform	
UNIT-II	**8 Hrs.**
Cloud Storage, Database and Networking Services: Object Storage, Block Storage, File Storage, Database as a Service DBaaS, Relational and NoSQL Databases, Virtual Private Cloud VPC ,DNS Services ,Load Balancing ,Auto Scaling, Content Delivery Network CDN	
UNIT-III	**8 Hrs.**
Cloud Service Management and Governance: Cloud Service Management, IT Service Management ITSM ,Cloud Service Lifecycle, Service Level Agreements SLA, Cloud Governance, Billing and Pricing Models ,Cost Optimization ,Performance Metrics, High Availability and Fault Tolerance	
UNIT-IV	**7 Hrs.**
Cloud Security Services : Shared Responsibility Model, Identity and Access Management IAM, Authentication and Authorization, Multi-Factor Authentication MFA ,Encryption and Key Management, Public Key Infrastructure PKI ,Security Groups and Firewalls ,Backup and Disaster Recovery ,Compliance and Risk Management	
UNIT-V	**7 Hrs.**
Cloud Automation and Monitoring: Infrastructure as IaC, Configuration Management, CI/CD Pipelines ,Cloud Monitoring ,Logging Services, CloudWatch ,Azure Monitor, Resource Automation, Cloud Migration ,Cost Monitoring and Optimization	
UNIT-VI	**7 Hrs.**
Advanced Cloud Services: Docker Containers, Kubernetes ,Serverless Computing, AWS Lambda, Azure Functions, Google Cloud Functions ,API Gateway ,Microservices Architecture ,Cloud Databases ,Emerging Cloud Services AI/ML, IoT, Edge Computing.	
Total Lectures	**45 Hrs.**

Textbooks:	
1.	Enamul Haque, **Cloud Service Management and Governance**, Enel Publications, 2020.
2.	Thomas Erl, Ricardo Puttini, Zaigham Mahmood, **Cloud Computing: Concepts, Technology & Architecture**, Pearson
3.	Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, Mastering Cloud Computing, McGraw-Hill.

Reference Books:	
1.	Michael Wittig and Andreas Wittig, **Amazon Web Services in Action**, Manning Publications
2	Barrie Sosinsky, Cloud Computing Bible, Wiley.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://www.oreilly.com/library/view/designing-web-apis/9781492026912/
2.	https://books.google.com/books/about/Cloud_Computing.html?id=Orn7jwEACAAJ

MOOCs Links and additional reading, learning, video material	
1.	https://www.coursera.org/specializations/cloud-computing
2.	https://www.edx.org/course/introduction-to-cloud-computing
3.	https://www.udemy.com/course/aws-certified-solutions-architect-associate/

VII Semester
23CSD1724: Lab: PE-IV Cloud Web Services

Course Outcome :

On completion of this course, the student will be able to

1. Explain cloud service architecture, cloud infrastructure services, and cloud service management concepts.
2. Analyze cloud platforms, cloud security mechanisms, governance models, and cloud service deployment strategies.
3. Apply cloud services for deploying, managing, monitoring, and securing applications using leading cloud platforms.
4. Design cloud-native applications using containers, serverless computing, cloud databases, and microservices.

S. No.	Practical List
1	To create an IAM user and assign permissions to access AWS services.
2	To host a static website using S3 bucket.
3	To create a custom Virtual Private Cloud with public and private subnets.
4	To provide internet access to instances in the private subnet
5	To distribute incoming traffic across multiple EC2 instances.
6	To automatically increase or decrease EC2 instances based on demand.
7	To establish communication between two VPC networks
8	To create and execute a serverless function
9	ToCreate Serverless Application using Lambda
10	To map a domain name to AWS resources.
11	Project

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VII Semester
23CSD1725: PE-IV: Deep Learning

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Analyze the key differences between deep learning and traditional machine learning techniques 2. Demonstrate proficiency in applying various optimization methods to improve model performance 3. Design, implement, and evaluate neural network architectures for solving complex problems 4. Apply advanced optimization techniques to train and fine-tune Convolutional Neural Networks CNNs and Recurrent Neural Networks RNNs. 5. Investigate the use of word embedding's in natural language processing applications.

Unit I:	**7 Hrs.**
Introduction: History of Deep Learning, Deep Learning Success Stories, Deep learning in current scenario, Deep learning Vs Machine Learning, Linear regression, Overfitting and underfitting problem, Hyperparameter and model validation, Estimators, Bias and Variance	
Unit II:	**7 Hrs.**
Introduction to neural network: McCulloch Pitts Neuron, Thresholding Logic, Perceptron's, Perceptron Learning Algorithm, Multilayer Perceptrons MLPs, Representation Power of MLPs, Activation functions, Feedforward Neural Networks.	
Unit III:	**8 Hrs.**
Introduction to optimization: Gradient Descent, Model regularization, Stochastic gradient descent, Minibatch gradient descent, Backpropagation.	
Unit IV:	**7 Hrs.**
Deep Learning for images: CNN architecture, training CNN. Learning new tasks with pre-trained CNNS, data transformation using PCA, Deep learning for Computer vision.	
Unit V:	**8 Hrs.**
Deep learning for sequences: Recurrent layers, Simple RNN and Backpropagation, Training RNN, dealing with vanishing and exploding gradients.	
Unit VI:	**8 Hrs.**
Unsupervised representation learning: Autoenrs, autoenrs applications, Word embeddings, Generative Models, Generative Adversarial Networks, Applications of Adversarial approach.	
Total Lecture	**45 Hours**

Textbooks:	
1.	Ian Goodfellow, Yoshua Bengio, and Aaron Courville – *Deep Learning*, MIT Press
2.	Francois Chollet – *Deep Learning with Python*, Manning Publications

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Reference Books:	
1.	Aurelien Geron – *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow*, O'Reilly
2.	Michael Nielsen – *Neural Networks and Deep Learning* Online Book
3.	Andrew Ng – *Deep Learning Specialization*, Coursera

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1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=W3_yaf3HvHU
2.	https://www.youtube.com/watch?v=aPfkYu_qiF4

VII Semester

23CSD1726: Lab: PE-IV: Deep Learning

Course Outcome:

On completion of this course, the student will be able to

1. Comprehend the neural networks as means for computational learning and to analyze the basic network architectures and algorithms for supervised and unsupervised learning.
2. Recognize the characteristics of deep learning models that are useful to solve real-world problems.
3. Understand the motivation for different neural network architectures and select the appropriate architecture for a given problem.
4. Build deep learning models and interpret the result.

Sr .No.	Problem Statements
1	Implementation of different activation functions to Deep Learning
2	Implementation of different Learning Rules
3	Implementation of Adeline network for system identification.
4	Implementation of Madeline network
5	Project related to application of machine learning in healthcare.
6	Implementation of Perceptron Networks
7	Application of machine learning in business analysis
8	Application of machine learning in sports analytics

VII Semester
23CSD1727 : PE -IV: Software Construction and Maintenance

Course Outcomes :
Upon successful completion of the course the students will be able to 1) Apply the fundamentals of software construction and appreciate the challenges in software construction. 2) Interpret key practical construction considerations such as design, languages, coding, testing, quality and reuse. 3) Understand and recognize the importance of modern construction technologies 4) Learn about Construction Tools including development environments, GUI Builders etc.

Unit I: Software Construction Fundamentals and Managing Construction	**8 Hrs.**
Software Construction Fundamentals: Minimizing Complexity; Anticipating Change; Constructing for Verification; Reuse; Standards in Construction, Managing Construction: Construction in Life Cycle Models; Construction Planning; Construction Measurement	
Unit II: Practical Considerations	**8 Hrs.**
Construction Design; Construction Languages; Coding; Construction Testing; Construction for Reuse; Construction with Reuse; Construction Quality; Integration	
Unit III: Construction Technologies	**8 Hrs.**
API Design and Use, Object-Oriented Runtime Issues, Parameterization and Generics; Assertions, Design by Contract, and Defensive Programming; Error Handling, Exception Handling, and Fault Tolerance; Executable Models; State-Based and Table-Driven Construction Techniques; Runtime Configuration and Internationalization - Development Environments; GUI Builders; Unit Testing Tools; Profiling, Performance Analysis and Slicing Tools	
Unit IV: Software Maintenance Basics	**7 Hrs.**
Software Maintenance; customer's View point; Economic of Maintenance; A Bird's Eye view of Maintenance; Different type of software products; An Overview of corrective Maintenance; Other forms of Maintenance; Adaptive Maintenance; Enhancement Requests; Maintenance Processes; Customer side preliminary Activities; Skill sets needed for the various Roles During Problem Reporting.	
Unit V: Problem Resolution &Fix Distribution	**7 Hrs.**
Problem Resolution: High Level Overview of Activities in problem Resolution; Categorizing the problem; Identifying the Right Developer for fixing the problem; Reproducing the problem; Scheduling for release. Fix Distribution: High Level Overview of Activities in problem Resolution; Categorizing the problem; Identifying the Right Developer for fixing the problem; Reproducing the problem; Scheduling for release.	
Unit VI: Contemporary issues	**7 Hrs.**
Applications of software construction and maintenance in industry.	
Total Lecture	**45 Hours**

Textbooks:	
1.	McConnell, Steve, complete: A practical handbook of software construction, 2nd Edition, Microsoft Press, 2012.
2.	Gopalaswamy Ramesh and Ramesh Bhattiprolu, Software Maintenance - Effective Practices for Geographically Distributed Environments, Tata McGraw-Hill Education, 2012.

Reference books:	
1.	A. Hunt and D. Thomas, The Pragmatic Programmer – from journey man to master, Addison-Wesley, 2010.
2.	B.W. Kernighan and R. Pike, The Practice of Programming, Pearson Eductaion India, 2012.
3.	SWEBOK V3.0, Guide to the Software Engineering Body of Knowledge, A Project of the IEEE Computer Society, 2014.

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=nulFv99VBGs
2.	https://www.youtube.com/watch?v=OjRmMP1zGuQ
3.	https://www.youtube.com/watch?v=0FX7ThtwPVE

VII Semester

23CSD1728: Lab: PE-IV: Software Construction and Maintenance

Course Outcomes
Upon successful completion of the course the students will be able to 1. Describe principles like minimizing complexity, anticipating change, and constructing for verification. 2. Apply modular and object-oriented programming principles 3. Design and implement unit, integration, and regression tests.

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

SN	Practical's based on
1	Write a program to implement a calculator using modular functions each operation in its own function
2	Write a program to implement a plugin system where new features can be added without modifying core logic.
3	Write a program with unit tests using a testing framework e.g., JUnit, pytest
4	Write a shell script to auto-generate a sprint task breakdown from a CSV file.
5	Write a script to count lines of , comment ratio, and cyclomatic complexity.
6	Write a program using SOLID principles e.g., single-responsibility and open/closed.
7	Design and implement a library for common mathematical operations and reuse it in multiple scripts.
8	Write a program with intentional bugs and fix them using debugging tools and static analysis.
9	Write a program with bugs, have peers file bug reports, and fix them based on severity.
10	Modify a program to work on a new OS or library version.

VII Semester

23CSD1741: PE-V: Artificial Intelligence for Games

Course Outcomes :
Upon successful completion of the course the students will be able to 1: Explain the fundamental concepts, architectures, and AI techniques used in modern game development to create intelligent game agents. 2: Apply movement, navigation, pathfinding, and decision-making algorithms to design intelligent NPC behaviors and game AI systems. 3: Develop AI-enabled game modules using Unity/Unreal Engine by integrating behavior models, machine learning, and reinforcement learning techniques. 4: Analyze, optimize, and evaluate AI-driven game systems by applying procedural content generation, multi-agent techniques, and emerging AI technologies for real-time game development.

UNIT I: Introduction to AI in Games	**8 Hrs**
Evolution of AI in Games , Game AI Architecture , Types of Game AI , Game Loop and AI Update Cycle , Intelligent Agents , Game States , AI Components , Deterministic vs Non-deterministic AI , Finite State Machines (FSM) , Introduction to Unity AI Framework	
UNIT II: Movement and Pathfinding	**7 Hrs**
Kinematic and Dynamic Movement , Steering Behaviors (Seek, Flee, Arrive, Pursue, Evade, Wander), Collision Avoidance , Navigation Mesh (NavMesh) , Waypoints, Graph Search, Dijkstra Algorithm, A* Algorithm	
UNIT III: Decision Making for Intelligent NPCs	**8 Hrs**
Rule-Based Systems, Decision Trees, Behavior Trees, Goal-Oriented Action Planning, (GOAP), Utility AI, Blackboard Architecture, Team AI, Squad Coordination, Enemy Strategy	
UNIT IV: Machine Learning in Games	**7 Hrs**
Introduction to Machine Learning in Games, Supervised Learning for NPC Behavior, Reinforcement Learning, Q-Learning, Deep Reinforcement Learning (Overview) , Player Modeling, Difficulty Adaptation, Opponent Learning, AI-based Personalization	
UNIT V: Procedural Content Generation & Computational Creativity	**8 Hrs**
Procedural Level Generation, Dungeon Generation, Maze Generation, Terrain Generation, Random Number Generation, Evolutionary Algorithms, Genetic Algorithms, Procedural Storytelling, AI-based Game Balancing	
UNIT VI: Advanced Game AI & Industry Applications	**7 Hrs**
Multi-Agent Systems, Swarm Intelligence, Game Analytics, AI Testing and Debugging, AI Optimization Techniques, AI Ethics in Games, Explainable AI in Games, Generative AI for NPC Dialogue, Large Language Models (LLMs) in Games, Future Trends in Game AI	
Total Lecture	**45 Hours**

Textbooks:

1. Ian Millington & John Funge, **Artificial Intelligence for Games**, 3rd Edition, CRC Press.
2. Mat Buckland, **Programming Game AI by Example**, Jones & Bartlett.
3. David Bourg & Glenn Seemann, **AI for Game Developers**, O'Reilly.

Reference Books:
1. Steve Rabin, **Game AI Pro Series**, CRC Press. 2. Georgios Yannakakis & Julian Togelius, **Artificial Intelligence and Games**, Springer. 3. Stuart Russell & Peter Norvig, **Artificial Intelligence: A Modern Approach**, Pearson.

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MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/106/105/106105191
2.	https://www.youtube.com/playlist?list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho

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VII Semester

23CSD1742: PE-V: Quantum Computing

Course outcomes:
Upon completion of this course the student will be able to: 1. Understand the concept behind quantum physics and the mathematical computations lies in it. 2. Explain the postulates and representation of a Qubit. 3. Explain the different basis in Quantum phenomena and its measurements. 4. Explain the working model of Quantum computing as teleportation and function finding 5. Explain the various factors that affect a qubit and handling methods

Unit 1 Physical Properties of Quantum Particles and basic Mathematics of Quantum Computing	**6Hrs**
Physical properties: Double Slit Experiment; Light: Particle Vs Wave; Heisenberg Uncertainty Principle. Linear Algebra: Vector spaces – basis; Inner product; Outer product; Tensor product; Linear operators.	
Unit II Quantum Mechanics for Quantum Computing	**6Hrs**
Review of postulates, Bloch sphere, Single qubit states and gates, superposition; Two Qubit States and Gates - Bell States, Entanglement, CNOT gate, Phase oracles, Phase kickback, Entanglement generation	
Unit III Notation and Basis in QC Quantum gates and circuits	**6hrs**
Detailed exposure of one and two qubit gates and states, Examples of Dirac's notation for quantum computing, Computational Basis, Orthonormality, Pauli Gates, Hadamard and Phase Gates- building quantum circuits	
Unit IV : Fundamental Algorithms in QC-1	**8Hrs**
Teleportation Algorithm, Deutsch–Josza Algorithm, Grover search algorithm: Problem definition, Amplitude amplification, Grover oracle, diffuser, multiple solutions in the search space	
Unit V: Fundamental Algorithms in QC-2	**8Hrs**
Quantum Fourier Transform QFT, and efficient representation of QFT as a quantum circuit. Application of the QFT to enable Quantum Phase Estimation QPE. Order-finding problem – eigenvalue estimation approach to order finding – Shor's algorithm for order finding/factoring	
UNIT-VI: Measurements and Errors	**8Hrs**
Computational complexity – black-box model – lower bounds for searching – general black-box lower bounds – polynomial method – block sensitivity – adversary methods – classical error correction – classical three-bit – fault tolerance – quantum error correction – three- and nine-qubit quantum s – fault-tolerant quantum computation	

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Reference Books :
1.Qiskit basic Quantum Computation course - https://qiskit.org/learn/intro-qc-qh/
2. Kasirajan, Venkateswaran. Fundamentals of quantum computing. Springer International Publishing, 2021.
3. Chris Bernhardt, Quantum Computing for Everyone, The MIT Press, Cambridge, 2020
4. Nielsen, Michael A., and Isaac L. Chuang, "Quantum Computation and Quantum Information" Cambridge University Press 5 April 2013

Text Book	
1.	Chuck Easttom, "Quantum Computing Fundamentals", 1st edition, Published by Addison-Wesley Professional June 1st 2021
2.	2 Qiskit TextBook - https://qiskit.org/textbook/preface.html 2022

VII SEMESTER

23CSD1743 : PE-V: Big Data Analytics

Course Outcomes
Upon successful completion of the course the students will be able to 1. Understand Concept, characteristics, types of big data and its application. 2. Build and maintain reliable, scalable, distributed systems with Apache Hadoop. 3. Apply Hadoop ecosystem components to solve real world problems. 4. Apply machine learning algorithm for big data analysis.

UNIT I : Big Data Fundamentals	**08 Hrs.**
Evolution of Big Data, Characteristics of Big Data 5Vs and beyond, Types of Data and Sources of Big Data, Traditional Data Environment vs. Big Data Environment, Challenges and Applications of Big Data, Information Product Pipeline, Information Product Value Chain, Big Data Management Architecture, Big Data Analytics Lifecycle.	
UNIT II : Big Data Analytics Process	**08 Hrs.**
Introduction to Big Data Analytics, Types of Analytics Descriptive, Diagnostic, Predictive and Prescriptive, Big Data Analytics Workflow, Data Acquisition and Data Ingestion, Data Cleaning and Data Preprocessing, Data Integration, Data Transformation, Data Quality, Data Governance, Batch Processing vs. Stream Processing, Business Intelligence vs. Big Data Analytics, Industrial Applications of Big Data.	
UNIT III : Hadoop Ecosystem	**07 Hrs.**
Apache Hadoop Architecture, Hadoop Distributed File System HDFS, NameNode, DataNode and Secondary NameNode, Hadoop Cluster Architecture, YARN Architecture, Hadoop Ecosystem Components: Hive, Apache NiFi Overview, Sqoop, Flume, Oozie and ZooKeeper.	
UNIT IV : Distributed Data Processing using Hadoop and Spark	**07 Hrs.**
MapReduce Programming Model, Mapper, Reducer, Combiner, Partitioner, Input and Output Formats, Data Serialization, Avro, Parquet and ORC File Formats, Apache Spark Architecture, Resilient Distributed Datasets RDDs, DataFrames.	
UNIT V : NoSQL Databases	**07 Hrs.**
Need for NoSQL Databases, CAP Theorem, BASE Properties, Types of NoSQL Databases Key-Value, Document, Column Family and Graph Databases, MongoDB Architecture, HBase, Cassandra Overview.	
UNIT VI : Advanced Big Data Analytics	**08 Hrs.**
Spark SQL, Spark Streaming Overview, Apache Kafka Introduction, Distributed Machine Learning: Need, Challenges, Data Parallelism, Model Parallelism, Spark MLlib Overview, Cloud-Based Big Data Platforms AWS EMR, Azure HDInsight and Google BigQuery, Data Lakes and Lakehouse Architecture, Big Data Security and Privacy, Data Governance, Industrial Case Studies, Emerging Trends: Integration of Big Data with Generative AI, Vector Databases and Retrieval-Augmented Generation Overview.	
Total Lecture	**45 Hours**

Textbooks:
1. Tom White, Hadoop: The Definitive Guide, 4th Ed., O'Reilly, 2015.
2. Seema Acharya and Subhasini Chellappan, Big Data Analytics, Wiley India, 2015.
3. Bill Chambers and Matei Zaharia, Spark: The Definitive Guide, O'Reilly, 2018.
4. Pramod J. Sadalage and Martin Fowler, NoSQL Distilled, Addison-Wesley, 2012.

Reference Books:	
1.	EMC Education Services, Data Science and Big Data Analytics, Wiley, 2015.
2.	Martin Kleppmann, Designing Data-Intensive Applications, O'Reilly, 2017.
3.	Holden Karau et al., Learning Spark, 2nd Ed., O'Reilly, 2020.
4.	Donald Miner and Adam Shook, MapReduce Design Patterns, O'Reilly, 2012.
5.	Judith Hurwitz et al., Big Data for Dummies, Wiley, 2013.

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MOOCs Links and additional reading, learning, video material	
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2.	https://archive.nptel.ac.in/courses/106/104/106104189/

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VII Semester

23CSD1744 : Software Project Management

Course Outcomes :
Upon successful completion of the course the students will be able to
1.Explain the fundamental concepts and principles of software project management. 2.Apply project management techniques such as scheduling, risk management, and cost estimation. 3.Analyze the impact of project management decisions on project performance and success. 4. Design a software project plan using appropriate tools and methodologies.

Unit 1: Introduction to Software Project Management	**8Hrs**
Definition and scope of software project management, Project vs. product, Characteristics of software projects, Stakeholders and project roles, Project life cycle models Waterfall, Iterative, Agile, Overview of project planning	
Unit 2: Project Evaluation and Estimation	**8Hrs**
Project selection models, Cost-benefit analysis, Software estimation techniques: Expert judgment, Function Point Analysis, COCOMO I & II,Resource estimation	
Unit 3: Project Scheduling and Staffing	**8Hrs**
Work Breakdown Structure WBS,Scheduling techniques: Gantt charts, PERT and CPM, Resource leveling and allocation, Team formation and staffing plans, Effort distribution	
Unit 4: Risk, Configuration, and Quality Management	**8Hrs**
Risk management process: Identification, assessment, mitigation, Configuration management: Version control, change control, Software quality assurance, Metrics for quality measurement	
Unit 5: Project Monitoring and Control	**7Hrs**
Project tracking techniques, Milestones and deliverables, Earned Value Analysis EVA Performance indicators, Change management and handling scope creep	
Unit 6: Project Closure and Tools	**7Hrs**
Project closure activities: Final report, documentation, lessons learned, Post-project analysis, Introduction to project management tools e.g., MS Project, JIRA, Real-life case studies and industry practices	
Total Hrs.	**46Hrs.**

Textbooks:	
1.	Bob Hughes, Mike Cotterell, Rajib Mall
2.	Software Engineering: A Practitioner's Approach by Roger S. Pressman
3.	Applied Software Project Management by Andrew Stellman, Jennifer Greene

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Reference Books:	
1.	"The Mythical Man-Month: Essays on Software Engineering" by Frederick P. Brooks Jr.
2.	"Software Engineering: Theory and Practice", Shari Lawrence Pfleeger
3.	"Managing the Software Process" by Watts S. Humphrey

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1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/106/105/106105191
2.	https://www.youtube.com/playlist?list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho

VII Semester

MDM5CSD105 : Basics of AR & VR

Course Outcome
On completion of this course, the student will be able to 1. Understand the fundamental concepts of Virtual Reality, its history, human perception, key components, interfaces, display technologies, and application areas. 2. Apply VR development tools, hardware, software, VRML, modeling techniques, and physical simulation concepts to develop basic virtual environments. 3. Analyze the influence of human factors, sensor hardware, head-mounted displays, acoustic systems, and integrated VR systems on the performance and usability of VR applications. 4. Evaluate interaction techniques, locomotion, manipulation, social interaction, motion, vestibular effects, and auditory rendering for designing effective and immersive VR experiences.

Unit I : Introduction to Virtual Reality:	**7 Hrs.**
Introduction and Definition of Virtual Reality, History and Evolution of Virtual Reality, Human Physiology and Perception in Virtual Reality, Key Elements of Virtual Reality Experience, Components of a Virtual Reality System, Interface to the Virtual World Input and Output Visual, Aural and Haptic Displays, Applications of Virtual Reality in Engineering, Healthcare, Education, Entertainment and Industry.	
Unit II : Virtual Environ ment & Motion Tracking:	**6 Hrs.**
Input Devices: Trackers, Sensors, Digital Gloves, Motion Capture Systems and 3D Scanners Output Devices: Visual, Auditory and Haptic Displays Generic Virtual Reality System Architecture, Model of Interaction in Virtual Environments, Design of Virtual Environments, Basics of Animation, Linear and Non-linear Interpolation Object Animation, Particle Systems.	
Unit III Development Tools, Hardware & Software:	**6 Hrs.**
Human Factors: Eye, Ear and Somatic Senses Sensor Hardware, Head Mounted Displays HMD, Acoustic Hardware, Integrated Virtual Reality Systems, Modeling Virtual Worlds, Physical Simulation, Virtual Reality Development Toolkits, Introduction to VRML.	
Unit IV : Interaction, Audio & Advanced VR Concepts:	**7 Hrs.**
Motion in Real and Virtual Worlds, Velocity and Acceleration in Virtual Reality, Vestibular System and Motion Perception, Physics in Virtual Environments, Interaction Techniques, Motor Programs and Remapping, Locomotion, Manipulation, Social Interaction, Audio in Virtual Reality, Physics of Sound, Human Hearing, Auditory Perception, Auditory Rendering.	
Total Lecture	**26 Hours**

Textbook:	
1	"Designing Virtual Systems: Gerard Jounghyun Kim, The Structured Approach", 2005
3	"Spatial Augmented Reality: Oliver Bimber and Ramesh Raskar, Merging Real and Virtual Worlds", 2005.
4	Understanding Augmented Reality, Concepts and Alan B. Craig Applications, Morgan Kaufmann, 2013.

Reference Books	
1	"3D User Interfaces, Theory and Practice", Doug A Bowman, Ernest Kuijff, Joseph J LaViola, Jr and Ivan Poupyrev Addison Wesley, USA, 2005.

YCCE e- library book links	
1	file:///C:/Users/Admin/Downloads/102-506-1-PB.pdf
2	file:///C:/Users/Admin/Downloads/628401.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=04AMaTsXFJU

Syllabus

VIII Semester
B. Tech. in

Computer Science and Design

VIII SEMESTER

23CSD1801 : Multimedia Design

Course Outcomes :
Upon successful completion of the course the students will be 1. Define what is multimedia and how it works. 2. Understand multimedia components using various tools and techniques. 3. Discuss about different types of media format and their properties. And justify the right way of manipulating multimedia systems. 4. To design Multimedia Application.

Unit I : Introduction to Multimedia	**8 Hrs.**
Definition of Multimedia, Multimedia objects: Text, Graphics, Animation, Audio, images, Video. Definition of HyperText and HyperMedia. Multimedia Applications in Education, Entertainment. Advertising world etc. Components of a Multimedia System, Desirable Features for a Multimedia System, requirements of Multimedia Communication, Applications of multimedia – benefits and problems.	
Unit II : Representation of Multimedia Objects	**7 Hrs.**
Representation of Analog Signals, A/D: Sampling and quantization. 'ont and their representation bitmap, true type Graphics: Raster & Vector representation, aliasing problems Image: bit depth, resolution, color RGB, CMYK, HSB, introduction to BMP, GIF, TIFF, PNG and JPEG formats Audio speech and wideband audio, sampling rate and aliasing, quantization, introduction to MP3, WMA, WAV, MIDI etc. Video frame rate and resolution, interlaced and non-interlaced video, colour planes YCBCR, YUV, Video broadcast standards PAL, NTSC, SECAM, HD Video, 3D TV, Video representation: AVI, MPEG, Quick Time, real video .rm	
Unit III: Concepts of Multimedia Editing:	**8 Hrs.**
Digital Audio, Music Sequencing and Notation, Image/Graphics Editing, Video Editing Linear, Non-linear, Subtitling	
Unit IV: Introduction to Compression Technology :	**8 Hrs.**
Concept of lossy and lossless compression. Concept of rate-distortion characteristics, Basics image compression JPEG, JPEG 2000, Basics of Audio compression MP3, MP4, Basics of Video Compression MPEG, H.264	
Unit V: Multimedia Application Design:	**7 Hrs.**
Content design, technical design, visual design, design metaphors, example studies, interactivity	
Unit VI : Multimedia Authoring and Publishing	**7 Hrs.**
Definition of an Authoring System, uses of an authoring system, Definition an function of Authoring Metaphor, Different Metaphors. Offline Publishing: Flash, Power Point. Online Publishing: HTML5, Dreamweaver.	
Total Lecture	**45 Hours**

Textbooks:	
1.	Li & Drew, Fundamentals of Multimedia, Pearson Education, 2009
2.	Rajneesh Aggarwal & B. B Tiwari, Multimedia Systems, Excel Publication, New Delhi, 2007
3.	Tay Vaughan, Multimedia making it work, Tata McGraw-Hill, 2008.

Reference Books:	
1.	Parekh Ranjan, Principles of Multimedia, Tata McGraw-Hill, 2007
2.	Anirban Mukhopadhyay and Arup Chattopadhyay, Introduction to Computer Graphics and Multimedia, Vikas Publishing House, Second Edition

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MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/117105083
2.	https://archive.nptel.ac.in/courses/124/107/124107002/

VIII SEMESTER

MDM6CSD106 : Artificial Intelligence for Games

Course Outcomes :
Upon successful completion of the course the students will be
CO1: Explain game design principles, game mechanics, storytelling concepts, GDevelop features, and the role of AI in game design.
CO2: Design and develop interactive 2D game prototypes using GDevelop by integrating game objects, scenes, animations, user interfaces, and event-driven logic.
CO3: Design intelligent gameplay using AI techniques such as NPC behavior, pathfinding, finite state machines, procedural content, and adaptive game mechanics.
CO4: Analyze, test, optimize, document, and deploy AI-based game designs while applying usability, playtesting, and project management principles.

Unit I : Fundamentals of Game Design and GDevelop	**8 Hrs.**
Introduction to Game Design, Elements of Game Design, Game Genres and Mechanics, Storytelling and Level .Design, Player Experience UX and Engagement, Introduction to Artificial Intelligence in Games, Overview of GDevelop Open-Source Game Engine, Installation and Interface, Scenes, Objects, Layers, Variables, and Assets, Event-Based Visual Programming.	
Unit II: Designing Interactive Games using GDevelop	**8 Hrs.**
Designing Game Levels, Object Creation and Management, Behaviors and Extensions, Platformer and Top-Down Game Design, Collision Detection and Physics, Animation and Visual Effects, Audio Design User Interface Design ,Score, Health, Inventory, and HUD; Event Functions and Modular Game Logic, Saving and Loading Game Progress	
Unit III : Artificial Intelligence for Game Design	**8 Hrs.**
Fundamentals of Game AI; AI for Player Engagement; Non-Player Characters NPCs; Enemy Patrol, Chase, and Attack Behaviors; Finite State Machine FSM; Pathfinding and Navigation; Line-of-Sight Detection; Adaptive Difficulty Systems; Procedural Content Generation Introduction; Random Events and Intelligent Game Mechanics; AI-Based Decision Making in Event Systems.	
Unit IV : Game Evaluation, Optimization, and Deployment	**8 Hrs.**
Playtesting Techniques; Debugging and Troubleshooting; Game Balancing; Performance Optimization; User Experience Evaluation; Accessibility in Game Design; Documentation and Version Control; Exporting Games to Windows, Android, HTML5, and Mobile Platforms; Publishing and Distribution; Capstone Project: AI-Based Game Design using GDevelop.	

Textbooks:	
1.	The Art of Game Design: A Book of Lenses – Jesse Schell, CRC Press, 4th Edition, 2019.
2.	Game Programming Algorithms and Techniques – Sanjay Madhav, Addison-Wesley Professional, 3rd Edition, 2024.
3.	Artificial Intelligence for Games – Ian Millington and John Funge, CRC Press, 3rd Edition, 2019.

Reference Books:	
1.	Level Up! The Guide to Great Video Game Design – Scott Rogers, Wiley, 3rd Edition, 2022.
2.	Introduction to Game Design, Prototyping, and Development – Jeremy Gibson Bond, Addison-Wesley Professional.
3.	Rules of Play: Game Design Fundamentals – Katie Salen and Eric Zimmerman, MIT Press.

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2.	https://www.youtube.com/playlist?list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho