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 6th Semester

(Department of Electronics Engineering)

B. Tech in CSE (IoT)

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 Electronics Engineering)

B. Tech in CSE (IOT)

SoE No. 23IoT-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-B)															
1	1	BS	GE	23GE1102	Differential Equations, Matrices and Statistics	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1110	Applied Physics	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1111	**Lab:** Applied Physics	P	0	0	2	2	1		60	40	
4	1	BES	EE	23EE1101	Basic Electronics	T	3	0	0	3	3	30	20	50	3
5	1	BES	EE	23EE1102	**Lab : Basic Electronics**	P	0	0	2	2	1		60	40	
6	1	BES	EL	23EL1102	Basic Electrical Engineering	T	3	0	0	3	3	30	20	50	3
7	1	PC	EE	23EE1103	Digital Logic Design	T	3	0	0	3	3	30	20	50	3
8	1	PC	EE	23EE1104	**Lab :** Digital Logic Design	P	0	0	2	2	1		60	40	
9	1	VSEC	GE	23GE1117	Get Set Go	…	…	…	…	…	2		60	40	
10	1	CC2	GE		**Liberal Learning Course (LLC2)**	…	…	…	…	…	2		60	40	
					TOTAL FIRST SEM		**15**	**0**	**6**	**21**	**22**				
MANDATORY LEARNING COURSES															
1	1	HS		GE2131	Universal Human Values (UHV)	**A**	2	0	0	2	0				
SECOND SEMESTER (GROUP-B)															
1	2	BS	GE	23GE1201	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1206	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1207	**Lab:** Engineering Chemistry	P	0	0	2	2	1		60	40	
4	2	HS/AEC1	GE	23GE1212	Professional Communication	T	2	0	0	2	2	30	20	50	2
5	2	HS/IKS	GE	23GE1215	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
6	2	BES	EE	23EE1205	Electronics Device and Circuit	T	3	0	0	3	3	30	20	50	3
7	2	BES	EE	23EE1206	**Lab:** Electronics Device and Circuit	P	0	0	2	2	1		60	40	
8	2	BES	IT	23IT1203	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
9	2	BES	IT	23IT1204	**Lab:** Programming for Problem Solving	P	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English	…	…	…	…	…	2		60	40	
11	2	CC1	GE		**Liberal Learning Course (LLC1)**	…	…	…	…	…	2		60	40	
					TOTAL SECOND SEM		**15**	**0**	**6**	**21**	**22**				

Liberal Learning Course

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

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B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Electronics Engineering)

B. Tech in CSE (IOT)

SoE No. 23IoT-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	1	CC1	GE	23LLC1101	Music (Vocal)
2	1	CC1	GE	23LLC1102	Music (Instrumental)
3	1	CC1	GE	23LLC1103	Indian Classical Dance
4	1	CC1	GE	23LLC1104	Other forms of Dances
5	1	CC1	GE	23LLC1105	Painting
6	1	CC1	GE	23LLC1106	Theatre and acting
7	1	CC1	GE	23LLC1107	Photography
8	1	CC1	GE	23LLC1108	Yoga
9	1	CC1	GE	23LLC1109	Chess
10	1	CC1	GE	23LLC1110	Athletics
11	1	CC1	GE	23LLC1111	Basket Ball
12	1	CC1	GE	23LLC1112	Judo
13	1	CC1	GE	23LLC1113	Elements of Japanese Language
14	1	CC1	GE	23LLC1114	Elements of German Language
15	1	CC1	GE	23LLC1115	Elements of French Language
16	1	CC1	GE	23LLC1116	Elements of Spanish Language
17	1	CC1	GE	23LLC1117	Basics of Vedic Maths
18	1	CC1	GE	23LLC1118	Skilling in Microsoft Visio and Inkscape

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

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

TA = for Practical : MSPA will be 15 marks each**

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

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(Department of Computer Technology)

B. Tech in Computer Science and Engineering (IOT)

SoE No. 23IoT-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	HSSM-I	GE	23GE1301	Fundamentals of Economics & Management	T	2	0	0	2	2	30	20	50	3
2	3	PC	EE	23IOT1301	Microcontroller & Interfacing	T	3	0	0	3	3	30	20	50	3
3	3	PC	EE	23IOT1302	**Lab :** Microcontroller & Interfacing	P	0	0	2	2	1		60	40	
4	3	PC	EE	23IOT1303	Computer Architecture Organization	T	3	0	0	3	3	30	20	50	3
5	3	PC	CT	23IOT1304	Data Structures	T	3	0	0	3	3	30	20	50	3
6	3	PC	CT	23IOT1305	**Lab.:** Data Structures	P	0	0	2	2	1		60	40	
7	3	PC	CT	23IOT1306	**Lab:** Computer Workshop	P	0	0	2	2	1		60	40	
8	3	VEC--2	CT	23IOT1307	Basics of Python Programming	T	2	0	0	2	2	30	20	50	3
9	3	CEP	CT	23IOT1308	Community Engagement Project	P	0	0	2	4	2		60	40	
10	3	OE-1	OE		**Open Elective-I**	T	2	0	0	2	2	30	20	50	3
11	3	MDM	CT		**MD Minor Course-I**	T	2	0	0	2	2	30	20	50	3
					TOTAL		**17**	**0**	**8**	**27**	**22**				

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

Chairperson	Dean (Acad. Matters)	July, 2023	1.00	Applicable for AY 2023-24 Onwards
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B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Computer Technology)

B. Tech in Computer Science and Engineering (IOT)

SoE No. 23IoT-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	23GE1404	Probability Theory and Sampling Theory	T	3	0	0	3	3	30	20	50	3
2	4	HS	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	CT	23IOT1401	Introduction to Internet of Things	T	3	0	0	3	3	30	20	50	3
		PC	CT	23IOT1402	Lab : Introduction to Internet of Things	P	0	0	2	2	1		60	40	
6	4	PC	CT	23IOT1403	Object Oriented Programming	T	3	0	0	3	3	30	20	50	3
7	4	PC	CT	23IOT1404	**Lab :** Object Oriented Programming	P	0	0	2	2	1		60	40	
8	4	VSEC-3	CT	23IOT1405	**Lab :** Vocational & Skill Enhancement Data Analysis using R	P	0	0	2	4	2		60	40	
9	4	OE-2	OE		**Open Elective-II**	T	2	0	0	2	2	30	20	50	3
10	4	MDM	CT		**MD Minor Course-II**	T	2	0	0	2	2	30	20	50	3
					TOTAL		**19**	**0**	**6**	**27**	**23**				

List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	**YCAP4 :** YCCE Communication Aptitude Preparation	**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 Engineering (IOT)

SoE No. 23IoT-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	CSE(IOT)	23IOT1501	Database Management System	T	3	0	0	3	3	30	20	50	3
2	5	PC	CSE(IOT)	23IOT1502	**Lab :** Database Management System	P	0	0	2	2	1		60	40	
3	5	PC	CSE(IOT)	23IOT1503	Operating Systems	T	3	0	0	3	3	30	20	50	3
4	5	PC	CSE(IOT)	23IOT1504	**Lab :** Operating Systems	P	0	0	2	2	1		60	40	
5	5	PC	CSE(IOT)	23IOT1505	Design Analysis and Algorithms	T	3	0	0	3	3	30	20	50	3
6	5	PC	CSE(IOT)	23IOT1506	**Lab :** Design Analysis and Algorithms	P	0	0	2	2	1		60	40	
7	5	PC	CSE(IOT)	23IOT1507	Therotical Foundations Computer Science	T	2	0	0	2	2	30	20	50	3
8	5	PE	CSE(IOT)		**Professional Elective-I**	T	3	0	0	2	2	30	20	50	3
9	5	PE	CSE(IOT)		**Lab :** Professional Elective-I	P	0	0	2	2	1		60	40	
10	5	OE-3	OE		**Open Elective-III**	T	3	0	0	3	3	30	20	50	3
11	5	MDM	CSE(IOT)		**MD Minor Course-III**	T	3	0	0	3	3	30	20	50	3
12	5	STR	CSE(IOT)	23IOT1508	Internship, Seminar and Report	P	0	0	2	2	1		60	40	
					TOTAL		**20**	**0**	**10**	**29**	**24**				
List of Mandatory Learning Course (MLC)															
1	5	HS	T&P	MLC2125	**YCAP5 :**YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Professional Electives -I

1	5	PE-I	CSE(IOT)	23IOT1521	**PE-I :** Computer Vision
	5	PE-I	CSE(IOT)	23IOT1522	**PE-I : Lab :** Computer Vision
2	5	PE-I	CSE(IOT)	23IOT1523	**PE-I :** Geo-Intelligence for Smart IoT Devices
	5	PE-I	CSE(IOT)	23IOT1524	**PE-I : Lab :** Geo-Intelligence for Smart IoT Devices
3	5	PE-I	CSE(IOT)	23IOT1525	**PE-I :** Mathematical Foundations for Data Analysis
	5	PE-I	CSE(IOT)	23IOT1526	**PE-I : Lab :** Mathematical Foundations for Data Analysis

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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							L	T	P	Hrs		MSEs*	TA**	ESE	
SIXTH SEMESTER															
1	6	PC	CSE(IOT)	23IOT1601	Computer Networks	T	2	0	0	3	3	30	20	50	3
2	6	PC	CSE(IOT)	23IOT1602	**Lab :** Computer Networks	P	0	0	2	2	1		60	40	
3	6	PC	CSE(IOT)	23IOT1603	Artificial Intelligence and Machine Learning	T	3	0	0	3	3	30	20	50	3
4	6	PC	CSE(IOT)	23IOT1604	**Lab :** Artificial Intelligence and Machine Learning	P	0	0	2	2	1		60	40	
5	6	PC	CSE(IOT)	23IOT1605	**Lab :** Competitive Coding	P	0	0	2	2	1		60	40	
6	6	PC	CSE(IOT)	23IOT1606	Design Thinking and Research Methodology	T	2	0	0	2	2	30	20	50	3
7	6	PE	CSE(IOT)		**Professional Elective-II**	T	3	0	0	3	3	30	20	50	3
8	6	PE	CSE(IOT)		**Lab :** Professional Elective-II	P	0	0	2	2	1		60	40	
9	6	PE	CSE(IOT)		**Professional Elective-III**	T	3	0	0	3	3	30	20	50	3
10	6	MDM	CSE(IOT)		**MD Minor Course-IV**	T	3	0	0	3	3	30	20	50	3
11	6	VSEC-4	CSE(IOT)	23IOT1607	**Lab : Java FSD**	P	0	0	2	2	1		60	40	
12	6	STR	CSE(IOT)	23IOT1608	Project Phase-I	P	0	0	4	4	2		60	40	
					TOTAL		**16**	**0**	**14**	**31**	**24**				
List of Mandatory Learning Course (MLC)															
1	6	HS		MLC126	**YCAP6 :**	**A**	3	0	0	3	**0**				

Professional Electives -II

1	6	PE-II	CSE(IOT)	23IOT1621	**PE-II :** Bussiness Intelligence
2	6	PE-II	CSE(IOT)	23IOT1622	**PE-II : Lab :** Bussiness Intelligence
3	6	PE-II	CSE(IOT)	23IOT1623	**PE-II :** Mobile and Web Application for IoT
4	6	PE-II	CSE(IOT)	23IOT1624	**PE-II : Lab :** Mobile and Web Application for IoT
5	6	PE-II	CSE(IOT)	23IOT1625	**PE-II :** UI/UX Design
6	6	PE-II	CSE(IOT)	23IOT1626	**PE-II : Lab :** UI/UX Design

Professional Electives -III

1	6	PE-III	CSE(IOT)	23IOT1641	**PE-III :** Industrial IoT
2	6	PE-III	CSE(IOT)	23IOT1642	**PE-III :** IoT Sensors and devices
3	6	PE-III	CSE(IOT)	23IOT1643	**PE-III :** Optimization Techniques

Chairperson	Dean (Acad. Matters)	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)

(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 Electronics Engineering)

B. Tech in CSE (IoT)

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 Electronics Engineering)

B. Tech in CSE (IOT)

SoE No. 23IoT-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-B)															
1	1	BS	GE	23GE1102	Differential Equations, Matrices and Statistics	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1110	Applied Physics	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1111	**Lab:** Applied Physics	P	0	0	2	2	1		60	40	
4	1	BES	EE	23EE1101	Basic Electronics	T	3	0	0	3	3	30	20	50	3
5	1	BES	EE	23EE1102	**Lab : Basic Electronics**	P	0	0	2	2	1		60	40	
6	1	BES	EL	23EL1102	Basic Electrical Engineering	T	3	0	0	3	3	30	20	50	3
7	1	PC	EE	23EE1103	Digital Logic Design	T	3	0	0	3	3	30	20	50	3
8	1	PC	EE	23EE1104	**Lab :** Digital Logic Design	P	0	0	2	2	1		60	40	
9	1	VSEC	GE	23GE1117	Get Set Go	…	…	…	…	…	2		60	40	
10	1	CC2	GE		**Liberal Learning Course (LLC2)**	…	…	…	…	…	2		60	40	
					TOTAL FIRST SEM		**15**	**0**	**6**	**21**	**22**				
MANDATORY LEARNING COURSES															
1	1	HS		GE2131	Universal Human Values (UHV)	**A**	2	0	0	2	0				
SECOND SEMESTER (GROUP-B)															
1	2	BS	GE	23GE1201	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1206	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1207	**Lab:** Engineering Chemistry	P	0	0	2	2	1		60	40	
4	2	HS/AEC1	GE	23GE1212	Professional Communication	T	2	0	0	2	2	30	20	50	2
5	2	HS/IKS	GE	23GE1215	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
6	2	BES	EE	23EE1205	Electronics Device and Circuit	T	3	0	0	3	3	30	20	50	3
7	2	BES	EE	23EE1206	**Lab:** Electronics Device and Circuit	P	0	0	2	2	1		60	40	
8	2	BES	IT	23IT1203	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
9	2	BES	IT	23IT1204	**Lab:** Programming for Problem Solving	P	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English	…	…	…	…	…	2		60	40	
11	2	CC1	GE		**Liberal Learning Course (LLC1)**	…	…	…	…	…	2		60	40	
					TOTAL SECOND SEM		**15**	**0**	**6**	**21**	**22**				

Liberal Learning Course

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

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Electronics Engineering)

B. Tech in CSE (IOT)

SoE No. 23IoT-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	1	CC1	GE	23LLC1101	Music (Vocal)
2	1	CC1	GE	23LLC1102	Music (Instrumental)
3	1	CC1	GE	23LLC1103	Indian Classical Dance
4	1	CC1	GE	23LLC1104	Other forms of Dances
5	1	CC1	GE	23LLC1105	Painting
6	1	CC1	GE	23LLC1106	Theatre and acting
7	1	CC1	GE	23LLC1107	Photography
8	1	CC1	GE	23LLC1108	Yoga
9	1	CC1	GE	23LLC1109	Chess
10	1	CC1	GE	23LLC1110	Athletics
11	1	CC1	GE	23LLC1111	Basket Ball
12	1	CC1	GE	23LLC1112	Judo
13	1	CC1	GE	23LLC1113	Elements of Japanese Language
14	1	CC1	GE	23LLC1114	Elements of German Language
15	1	CC1	GE	23LLC1115	Elements of French Language
16	1	CC1	GE	23LLC1116	Elements of Spanish Language
17	1	CC1	GE	23LLC1117	Basics of Vedic Maths
18	1	CC1	GE	23LLC1118	Skilling in Microsoft Visio and Inkscape

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

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

TA = for Practical : MSPA will be 15 marks each**

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B. Tech SoE and Syllabus 2023

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

(Department of Mathematics & Humanities)

B.Tech First Year

SoE No. 23FY-101

I SEMESTER

23GE1102 : Differential Equations, Matrices and Statistics

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 solution of engineering problems.
2. Use Matrix method to solve linear system of equations, evaluate eigen values - eigen vectors and its applications.
3. Make use of probability distributions to solve real life problems.
4. Inspect scientific data, use proper curve fitting and find correlation, regression of variables.

Unit I: Differential Equations I	**(7 Hrs.)**
Linear differential equations of first order and first degree, Differential equation reducible to linear form, Exact differential equations (excluding the case of integrating factor) and their applications to various fields. **(Contemporary Issues related to Topic)**	
Unit II: Differential Equations II	**(8 Hrs.)**
Higher order linear differential equations with constant coefficients, Complementary functions and Particular Integral for different cases, Method of variation of parameters, Examples on application to various fields. **(Contemporary Issues related to Topic)**	
Unit III: Differential Equations III	**(7 Hrs.)**
Cauchy's homogeneous linear differential equations, Legendre's linear differential equation, Applications of differential equations to various fields (only up to second order). **(Contemporary Issues related to Topic)**	
Unit IV: Partial Differential Equations	**(8 Hrs.)**
Partial Differential Equations of first order, first degree i.e. Lagrange's form, linear homogeneous equations 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 IV: Matrices	**(8 Hrs.)**
Rank of a matrix, Consistency of system of equations using rank, Characteristics equations, Eigen values and Eigen vectors, Cayley Hamilton Theorem (without proof) statement and verification, Sylvester's theorem-statement and its application. **(Contemporary Issues related to Topic)**	
Unit VI: Statistics	**(7 Hrs.)**
Fitting of straight line, $y = a + bx$, a parabola $y = a + bx + cx^2$, exponential curves and power curves by method of least squares; Lines of regression and correlation; Rank correlation. **(Contemporary Issues related to Topic)**	
Total Lecture	**45 Hours**

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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/

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B. Tech SoE and Syllabus 2023

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

(Department of Physics)

B.Tech First Year

SoE No. 23FY-101

I SEMESTER

23GE1110 : Applied Physics

Course Outcomes :

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

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

Unit I: Quantum Physics	**(8 Hrs.)**
Wave particle duality, Davisson and Germer experiment, Wave packet, Heisenberg's uncertainty principle, thought experiment, Significance, Applications. **(Contemporary Issues related to Topic)**	
Unit II: Introduction to Quantum Computing	**(7 Hrs.)**
Introduction of complex numbers, operators, Eigen values, Eigen functions. Wave function and its probability interpretation, Schrodinger Equation, Particle in infinite and finite potential well, quantum tunneling, Introduction to Bits and Qubits. **(Contemporary Issues related to Topic)**	
Unit III: Band Theory of Solids	**(8 Hrs.)**
Formation of energy bands in solids; Classification of solids, Energy band diagram of Si and Ge, Intrinsic and extrinsic semiconductors, Conductivity, Law of mass action, Hall effect, Direct and Indirect band gap semiconductors. **(Contemporary Issues related to Topic)**	
Unit IV: Electron Ballistics and Devices	**9 Hrs.)**
Motion of a charged particle in uniform electric and magnetic field, Cross field configuration; Electron refraction, Electron lens. Cathode ray oscilloscope and its application. **(Contemporary Issues related to Topic)**	
Unit V: Lasers	**(7 Hrs.)**
Coherence and its types, Interaction of radiation with matter, Population Inversion, Pumping: methods and schemes, Optical resonant cavity, Ruby laser, He-Ne laser, diode laser, Properties and engineering applications of laser. **(Contemporary Issues related to Topic)**	

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Unit VI: Optical Fibres	(6 Hrs.)
Principle, structure and classification, Acceptance angle, Numerical aperture, Losses in optical fibers, Applications as sensors. **(Contemporary Issues related to Topic)**	
Total Lecture	**45 Hours**

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

Reference Books	
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

I SEMESTER

23GE1111 : Lab. Applied Physics

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

List of 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.

I SEMESTER

23EE1101 : Basic Electronics

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Understand, define and explain the fundamental concepts of Analog Electronic Circuits 2. Apply the concepts of Electronic Circuits to obtain the desired parameter 3. Analyze Electronic Circuits to arrive at suitable Conclusions. 4. Design simple circuits using fundamentals of Electronic circuit for given application

Unit:1	**Diode and its Applications**	**7 Hours**
Characteristics of materials based on Energy band theory, Intrinsic and extrinsic semiconductors, P-N junction diodes, Biasing & Characteristics of diodes. Diode Circuits - Half wave rectifier, full wave rectifier, bridge rectifier		
Unit:2	**Bipolar Junction Transistor**	**7 Hours**
Introduction to BJT- NPN and PNP, biasing, Modes of operation, Configuration and its Characteristics		
Unit:3	**BJT Applications**	**7 Hours**
Amplifiers: Various classes of operation (Class A, B, AB, C etc.), Oscillators: Review of the basic concept, Barkhausen criterion, RC & LC oscillators		
Unit:4	**OPAMP & its Applications**	**6 Hours**
Introduction to Op-Amp, Inverting and Non-Inverting Amplifier, Linear Applications of OP-AMP, Comparator.		
Unit:5	**Measurement Systems**	**7 Hours**
Introduction to Measurement System, Generalized block diagram of Measurement System, Static & dynamic characteristics of measurement system, Types of errors & their sources, Statistical analysis		
Unit :6	DAC & ADC	**7 Hours**
Digital-to-Analog converters: Weighted resistor, R-2R ladder, etc. Analog-to-Digital converters: Single slope, dual slope, etc		
	Total Lecture Hours	**41 Hours**

Text books	
1	Electronics Devices and circuits, Millman Jacob, McGraw Hill Education, Fourth Edition (2015)
2	A.S. Sedra and K.C. Smith, Microelectronic Circuits, sixth edition, Oxford University Press
Reference Books	
1	OP-AMP and Linear Integrated Circuit, by Ramakant A. Gayakwad, Prentice Hall India Learnin Private Limited, Published in 2002
2	J.V. Wait, L.P. Huelsman and GA Korn, Introduction to Operational Amplifier theory and applications, McGraw Hill, 1992.
3	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
2	https://nptel.ac.in/courses/108106084

I SEMESTER

23EE1102 : Lab. Basic Electronics

Course Outcomes:

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

1. Understand, define and explain the fundamental concepts of Analog Electronic Circuits
2. Apply the concepts of Electronic Circuits to obtain the desired parameter
3. Analyze Electronic Circuits to arrive at suitable Conclusions.
4. Design simple circuits using fundamentals of Electronic circuit for given application

Sr. No.	Experiments based on
1	To verify characteristics of PN Junction under Forward and Reverse bias
2	To study Half Wave Rectifier and Full wave rectifier
3	To verify Input and Output characteristics of Transistor in Common Emitter configuration
4	To verify Input and Output characteristics of Transistor in Common Base configuration
5	To verify Inverting and Non-inverting Operational amplifiers
6	To study Summing Operational amplifier
7	To study Generalized block diagram of Measurement System
8	To study Static & dynamic characteristics of measurement system
9	To study Analog to Digital converter
10	To study Digital to Analog converter

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B. Tech SoE and Syllabus 2023

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

(Department of Electrical Engineering)

B.Tech in Electrical Engineering

SoE No. 23EL-101

I SEMESTER

23EL1102 : Basic Electrical Engineering

Course Outcomes:

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

1. Reproduce fundamentals of dc circuits.
2. Explain, construction, working and applications of various electrical machines.
3. Analyze performance of various electrical machines

Unit:1	D.C. Circuits	7 Hours

D.C. Circuits: Basics of electrical circuits. Equivalent resistance, Kirchhoff's Laws. Current and Voltage divisionrule. Mesh and Nodal analysis of dc circuits. Superposition Theorem.
(Contemporary Issues related to Topic)

Unit:2	AC Circuits	7 Hours

A.C. Fundamentals: Values of alternating quantity. Concept of power factor, reactive power and apparent powerwith power triangle, R, L,C Series circuit and Parallel circuit, Resonance condition.
(Contemporary Issues related to Topic)

Unit:3	Three Phase AC Circuits	7 Hours

Advantages of three – phase system over single – phase system. Generation of three phase a.c. supply. Phasesequence. Interconnection of three phases.
Star or Wye (Y) connection. Phase and line voltages/currents in star connection and their relationships.Delta or Mesh connection. Phase and line voltages/currents in delta connection and their relationships. Concept of balanced load. Active, reactive, and apparent power in balanced three phase circuits. **(Contemporary Issues related to Topic)**

Unit:4	Single Phase Transformer	6 Hours

Working principle. EMF equation. Voltage ratio and turns ratio. Step up and step down transformers. Construction of single phase transformer. Ideal transformer. Transformer on no load and equivalent circuit. Practical transformer and its equivalent circuit. Referred values. Voltage Regulation. Losses in transformer. Open circuit and Short circuit tests on transformer. Efficiency and condition for maximum efficiency.
(Contemporary Issues related to Topic)

Unit:5	DC Motor	7 Hours

Principle, Torque Equation, Characteristics and applications of various types of D.C. Motors, Starting of D.C. Motors, Speed control of Series and Shunt motors, Power flow in DC machines, Losses and Efficiency in D.C. machines.
(Contemporary Issues related to Topic)

Unit :6	Three Phase Induction Motor	7 Hours
Construction, Production of rotating magnetic field. Principle of operation. Speed and slip. Frequency of rotor voltage and current. Applications of three phase induction motor. **(Contemporary Issues related to Topic)**		
	Total Lecture Hours	**39 Hours**

Textbooks	
1	T. K. Nagsarkar and M. S. Sukhija, Basic Electrical Engineering, 1st Edition, Oxford Higher Education,2005
2	V. N. Mittle and A. K. Mittal, Basic Electrical Engineering, 2nd Edition,2006, The McGraw HillCompanies, New Delhi
3	B.L.Theraja, Electrical Technology, S.Chand, 2005
4	T. Kenjo and S. Nugatory, Permanent Magnet and Brushless DC motors, England, Clarendon OxfordPress, 1989

Reference Books	
1	I J Nagrath and D. P.Kothari, Basic Electrical Engineering, 2nd Edition,2002, McGraw Hill, New Delhi
2	Vincent Del Toro, Electrical Engineering Fundamentals, 2nd Edition,2002, Prentice Hall India, New Delhi

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-642-25904-3
2	http://link.springer.com/openurl?genre=book&isbn=978-1-4614-0399-9

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/108105155

I SEMESTER

23EE1103 : Digital Logic Design

Course Outcomes:

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

1. Apply the laws of Boolean algebrato simplify logical equations and combination logic circuits.
2. Understand and demonstrate the various codes and illustrate their addition substraction.
3. Solve logical functions using K- map to implement combinational logic circuits.
4. Design and analyze Synchronous and Asynchronous sequential Circuits.

Unit:1	**Number system and codes**	**7 Hours**
Binary, Octal, hexadecimal and decimal Number systems andtheir inter conversion, BCD numbers (8421-2421), Gray code, ASCII codes. Binary addition and subtraction, signed and unsigned binary numbers, 1's and 2'scomplement representation.		
Unit:2	**Boolean Algebra**	**7 Hours**
Basic logic circuits: Logic gates(AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR and their truth tables),Universal Gates, Laws of Boolean algebra, De-Morgan's theorem.		
Unit:3	**Minimization Techniques**	**7 Hours**
Minterm, Maxterm, POS, SOP, K-Map, Simplification by Boolean theorems, don't care condition.		
Unit:4	**Combinational Logic**	**7 Hours**
Half adder, Full adder, Subtractor circuit. Multiplxer demultiplexer, decorder, BCD to seven segment Decoder, encoders, code converters.		
Unit:5	**Sequential Circuits**	**7 Hours**
Flipflop, set-reset laches, R-S flip-flop, D-flipflop, J-KFlip-flop, Master slave Flipflop, T flip-flop, excitation table of flip-flops. Flip-Flop to flip-flop conversion		
Unit :6	**Registers&Counters**	**7 Hours**
Serial in/Serial out shift register, Serial in/parallel out shift register, parallel in/parallel out shift register, parallel in/Serial out shift register, Bi-directional register, Synchronous/Asynchronous counter: Ring Counter, Ripple Counter Johnson's Counter operation,Up/downsynchronous counter, application of counter.		
Total Lecture Hours		**42 Hours**

Textbooks	
1	Modern Digital Electronics , RP Jain, Tata McGraw Hill, 3rd Edition
2	M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.
3	Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 6thEdition, TMH, 2003.
4	Anandkumar- fundamental of digital circuit. 3rd edition. PHI
Reference Books	
1	Fundamentals of Logic Design, C.H.Roth, Public Work & Services, 3rd edition 2007.
2	Engg Approach to Digital Design, Fletcher, Prentice Hall of India 1993.
3	Digital Circuits & Microprocessors, Hebert Taub, Mc Graw Hill, 1988.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html
MOOCs Links and additional reading, learning, video material	
1	https://www.digimat.in/nptel/courses/video/108105132/L01.html
2	https://www.digimat.in/nptel/courses/video/108105113/L01.html
3	https://www.coursera.org/learn/digital-systems

I SEMESTER

23EE1104 : Lab. Digital Logic Design

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Apply the laws of Boolean algebra to simplify logical equations and combination logic circuits. 2. Understand and demonstrate the various codes and illustrate their addition subtraction. 3. Design and exhibit the methods to solve logical functions using K- map to implement combinational logic circuits. 4. Design and analyze Synchronous and Asynchronous sequential Circuits.

Sr. No.	Experiments based on
1	Basic logic circuits: Logic gates verification using kit.
2	Introduction to Bread Board and Verify Truth Tables of basic Logic gates using BreadBoard.
3	Construction of half/full adder using XOR and NAND gates and verification of its operation.
4	Verify Binary to Gray and Gray to Binary conversion using NAND gates only.
5	Implementation of 4x1 multiplexer and 1x4 demultiplexer using logic gates.
6	Verify the truth table of D-flip-flops and JK- flip-flops.
7	Design and verify the 4-Bit Synchronous Counter.
8	Introduction to SPICE Digital model and commands. Verify Truth Tables of basic Logic gates & Universal Gates using **using SPICE.**
9	Design & verify Truth Table of Half adder & Full adder circuits **Logic simulator.**
10	Design & verify Truth Table of 4:1 Multiplexer & 1:4 Demultiplexer circuits **using SPICE.**

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 Civil Engineering)

B.Tech in FYC

SoE No. 23FY-101

I SEMESTER

23GE1117-Get Set Go

Course Outcomes:

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

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

Unit:1	Build a foundation for success	6 Hours
Explain the Importance of Process of improvement, stating your Name with Impact, Recall and Use Names, Name Remembering Formula o LIRA o PACE – Individual Activity o BRAMMS o Chaining Method, Introduce "My Vision" Communication Fundamentals for Building Trust- Be a good listener, use conversation links, show genuine interest Hi-Five of Success ♣ Build on Memory Skills and Enhance Relationships ♣ PEG words ♣ Explain Permanent PEG Memory System, energize our Communications – Explain 3Vs of communication – Visual-Vocal-Verbal Activity – Practice Conversations, Pause-Part-Punch, Group Activity		
Unit:2	**Increase Self Confidence**	**6 Hours**
Use our experiences to communicate more confidently • Communicate with clarity and conciseness • Discover how past experiences influence behaviour ,Motivate Others and Enhance Relationships- • Learning Objectives • Explain Gain Willing Cooperation Principles • Group Presentation • Explain Demonstration of Leadership Principles • Explain "Evidence" critical in establishing credibility Individual Activity – Sharing of defining moment, Skit to demonstrate Leadership Principles, Stranded on Island .		
Unit:3	**Fundamentals of Communication**	**6 Hours**
Fundamentals of Communication (Earn the right – Excite -Eagerness) ♣ Elevator Pitch ♣ Develop more Flexibility, ♣ Recap and Summarize Activities - – Individual Presentation, Flexibility Drills, Individual Presentations – My Vision Assignment		
Unit:4	**Team Management and Organization skills**	**5 Hours**
Team Management and Organization skills, Leadership Styles, Effective Communication Activity- Team Presentation, Team building activities.		
EVALUATION	**1 Hour**	**EVALUATION**
WRITTEN TEST		
Total Lecture Hours		**24 Hours**

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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

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

(Accredited 'A++' Grade by NAAC with a score of 3.6)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

2nd Semester

(Department of Electronics Engineering)

B. Tech in CSE (IoT)

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 Electronics Engineering)

B. Tech in CSE (IOT)

SoE No. 23IoT-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-B)															
1	1	BS	GE	23GE1102	Differential Equations, Matrices and Statistics	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1110	Applied Physics	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1111	**Lab:** Applied Physics	P	0	0	2	2	1		60	40	
4	1	BES	EE	23EE1101	Basic Electronics	T	3	0	0	3	3	30	20	50	3
5	1	BES	EE	23EE1102	**Lab : Basic Electronics**	P	0	0	2	2	1		60	40	
6	1	BES	EL	23EL1102	Basic Electrical Engineering	T	3	0	0	3	3	30	20	50	3
7	1	PC	EE	23EE1103	Digital Logic Design	T	3	0	0	3	3	30	20	50	3
8	1	PC	EE	23EE1104	**Lab :** Digital Logic Design	P	0	0	2	2	1		60	40	
9	1	VSEC	GE	23GE1117	Get Set Go	…	…	…	…	…	2		60	40	
10	1	CC2	GE		**Liberal Learning Course (LLC2)**	…	…	…	…	…	2		60	40	
					TOTAL FIRST SEM		**15**	**0**	**6**	**21**	**22**				
MANDATORY LEARNING COURSES															
1	1	HS		GE2131	Universal Human Values (UHV)	**A**	2	0	0	2	0				
SECOND SEMESTER (GROUP-B)															
1	2	BS	GE	23GE1201	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1206	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1207	**Lab:** Engineering Chemistry	P	0	0	2	2	1		60	40	
4	2	HS/AEC1	GE	23GE1212	Professional Communication	T	2	0	0	2	2	30	20	50	2
5	2	HS/IKS	GE	23GE1215	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
6	2	BES	EE	23EE1205	Electronics Device and Circuit	T	3	0	0	3	3	30	20	50	3
7	2	BES	EE	23EE1206	**Lab:** Electronics Device and Circuit	P	0	0	2	2	1		60	40	
8	2	BES	IT	23IT1203	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
9	2	BES	IT	23IT1204	**Lab:** Programming for Problem Solving	P	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English	…	…	…	…	…	2		60	40	
11	2	CC1	GE		**Liberal Learning Course (LLC1)**	…	…	…	…	…	2		60	40	
					TOTAL SECOND SEM		**15**	**0**	**6**	**21**	**22**				

Liberal Learning Course

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

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Electronics Engineering)

B. Tech in CSE (IOT)

SoE No. 23IoT-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	1	CC1	GE	23LLC1101	Music (Vocal)
2	1	CC1	GE	23LLC1102	Music (Instrumental)
3	1	CC1	GE	23LLC1103	Indian Classical Dance
4	1	CC1	GE	23LLC1104	Other forms of Dances
5	1	CC1	GE	23LLC1105	Painting
6	1	CC1	GE	23LLC1106	Theatre and acting
7	1	CC1	GE	23LLC1107	Photography
8	1	CC1	GE	23LLC1108	Yoga
9	1	CC1	GE	23LLC1109	Chess
10	1	CC1	GE	23LLC1110	Athletics
11	1	CC1	GE	23LLC1111	Basket Ball
12	1	CC1	GE	23LLC1112	Judo
13	1	CC1	GE	23LLC1113	Elements of Japanese Language
14	1	CC1	GE	23LLC1114	Elements of German Language
15	1	CC1	GE	23LLC1115	Elements of French Language
16	1	CC1	GE	23LLC1116	Elements of Spanish Language
17	1	CC1	GE	23LLC1117	Basics of Vedic Maths
18	1	CC1	GE	23LLC1118	Skilling in Microsoft Visio and Inkscape

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

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

TA = for Practical : MSPA will be 15 marks each**

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Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

(Department of Mathematics & Humanities)

B.Tech First Year

SoE No. 23FY-101

II SEMESTER

23GE1201: Calculus and Vector

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

Unit I: Differential Calculus	**(7 Hrs.)**
Successive differentiation, 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	**(8 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	**(7 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	**(8 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	**(8 Hrs.)**
Vector integration: Line, surface and volume integrals, Statement of Stoke's theorem, Gauss divergence theorem and Green's theorem (without proof), Simple applications of these theorems. **(Contemporary Issues related to Topic)**	
Total Lecture	**45 Hours**

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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

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 Applied Chemistry)

B.Tech First Year

SoE No. 23FY-101

I/II SEMESTER

23GE1106/23GE1206: Engineering Chemistry

Course Outcomes :

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

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

Unit I: Water Chemistry **(8 Hrs.)**

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

Unit II: Electrochemistry **(8 Hrs.)**

Introduction, Redox reactions, EMF of a cell, standard electrode potential, Nernst equation, numerical and applications to chemical cells. Conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Electrolysis, laws of electrolysis and numerical.
Industrial applications: Electroplating, Electrolytic refining.
Corrosion: Definition, Causes, theories of corrosion- dry, wet and differential aeration.
Contemporary issues related to the topic.

Unit III: Energy storage devices **(7 Hrs.)**

Battery: Introduction, Characteristics, and General applications
Lithium-ion battery, Glass battery, H_2-O_2 Fuel cell. Differences between Battery and Fuel cell. Recycling and safe disposal of batteries.
Supercapacitors: Definition, Types, Characteristics,and Application.
H_2 as a green fuel: Introduction, Production, Storage, and Utilization.Contemporary issues related to the topic.

Unit IV: Spectroscopic Techniques and Applications **(7 Hrs.)**

Introduction, fundamentals, types, principles, and selection rules of spectroscopy.
Basic principle and applications of UV- Visible, IR, NMR Spectroscopy and numerical.
Contemporary issues related to the topic.

Unit V: Drugs & Polymer chemistry **(8 Hrs.)**

Drugs: Introduction, types of drugs, synthesis of commonly used drug molecules such as aspirin and paracetamol.
Polymer: Introduction, Classification of polymers, Use and disposal of polymers.
Properties of polymers - Solubility, Molecular Weight, Crystallinity and Glass transition temperature.
Synthesis of conducting polymers: Polyaniline, Polypyrole. Contemporary issues related to the topic.

Unit VI: Advanced Materials **(7 Hrs.)**

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Nanomaterials: Definition, Carbon Nanotubes and types. Applications of Nanomaterials in Electronics, Environment and Medicine. **Chemical sensors:** Types and application. **Liquid Crystal Polymers:** Introduction**,** General properties and applications. **Polymers in electronic industries**: Introduction**,** Piezo, Pyroelectric, Ferroelectric polymers. **Smart materials:** Introduction**,** Properties and applications of Chromoactive, Photoactive and Magneto rheological materials. Contemporary issues related to the topic

Total Lecture	**45 Hours**

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/II SEMESTER

23GE1107/23GE1207: Engineering Chemistry Lab

Course Objectives (PR)

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

Course Outcomes

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

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

Total 9 experiments are to be performed

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

SN	**Experiments based on**
	List of Experiments-Lab- I
1	Estimation of Nickel.
2	Estimation of Fe^{2+} ions by redox titration
3	Determination of copper by iodometric titration
4	Determination of Cation exchange capacity of an ion exchange resin
5	To determine the strength of a given potassium dichromate solution with N/20 sodium thiosulphate solution
6	Determination of COD of water sample.
	List of Experiments-Lab- II
1	Determination of viscosity of lubricating oil by Redwood Viscometer I or II
2	Determination of molecular weight of a polymer.
3	Proximate analysis of coal
4	Determination of electrochemical equivalence of copper using Faradays Law
5	Determination of strength of the given acid conductometrically.
6	To verify Beer-Lambert law for $KMnO_4$ calorimetrically and determine the concentration of the given solution of $KMnO_4$.
	List of Demonstration Experiments
1	Synthesis of urea formaldehyde.

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

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B. Tech SoE and Syllabus 2023

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

(Department of Mathematics & Humanities)

B.Tech First Year

SoE No. 23FY-101

II SEMESTER

23GE1212 : Professional Communication

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

Unit I: Basics of Communication	**(7 Hrs.)**
Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Classification of Barriers (Intrapersonal, Interpersonal, Organizational).	
Unit II: English Phonetics	**(8 Hrs.)**
Speech Mechanism, Organs of speech, Consonant and Vowels sounds symbols, word stress rules	
Unit III: Presentation & Interview Skills	**(7 Hrs.)**
Presentation-Nuances of presentation- Kinesics, Proxemics, Chronemics, Vocalics, Modes of Presentation, Interview-Purpose , expectations of employer and preparation for Interview, Types, Types of Questions &Answering Techniques, Telephonic Interviews – preparation and guidelines	
Unit IV: Technical Reports, Memo & E-Mail Etiquettes	**(8 Hrs.)**
Report -Types, Characteristics, prewriting aspects of report and preparing writing of reports Memo- Objectives, Types, Structure and Layout Email-Etiquettes, acronyms.	
Total Lecture	**30 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
3.	

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

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

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(Department of Mathematics & Humanities)

B.Tech First Year

SoE No. 23FY-101

II SEMESTER

23GE1215 : 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**	**7 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**	**7 Hours**
Society and its types, Culture and its Characteristics, Foundational Literature. **(Contemporary Issues related to Topic)**		
Unit:3	**Tradition of Indian Art and Painting**	**8 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**	**8 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	**30 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

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

	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

II SEMESTER

23EE1205 : Electronics Device and Circuit

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Understand the principles of semiconductor Physics and apply it to electronic devices 2. Appreciate different devices for different applications. 3. Understand and utilize the mathematical models of semiconductor devices for circuits. 4. Understand the basic processes required for fabrication of electronic devices.

Unit:1	**Introduction to Semiconductor Physics**:	**7 Hours**
Review of Quantum Mechanics, Electrons in periodic Lattices, E-k diagrams. Energy bands in intrinsic and extrinsic silicon; Carrier transport: diffusion current, drift current, mobility and resistivity.		
Unit:2	**Semiconductor Physics for devices**:	**7 Hours**
Generation and recombination of carriers; Poisson and continuity equation, P-N junction characteristics, I-V characteristics, and small signal switching models; Avalanche breakdown, Zener diode, Schottky diode.		
Unit:3	**Diode Circuits and applications**	**7 Hours**
Rectifiers, Clippers, Clampers, zener Voltage regulators, LED, photodiode and solar cell.		
Unit:4	**Transistors**	**7 Hours**
Bipolar Junction Transistor, I-V characteristics, Ebers Moll Model, MOS capacitor, MOSFET, I-V characteristics, and small signal models of MOS transistor.		
Unit:5	**Transistors Biasing**	**7 Hours**
Biasing schemes for BJT and FET amplifiers, bias stability, various configurations (such as CE/CS, CB/CG, CC/CD) and their features.		
Unit :6	**Integrated circuit fabrication process:**	**6 Hours**
Oxidation, diffusion, ion implantation, photolithography, etching, chemical vapor deposition, sputtering, twin-tub CMOS process.		
Total Lecture Hours		**41 Hours**

Textbooks	
1	G. Streetman, and S. K. Banerjee, Solid State Electronic Devices, 7th edition, Pearson,2014.
2	Donald Neamen , DhrubesBiswas "Semiconductor Physics and Devices" McGraw-Hill Education
3	Jacob Millman, Christos Halkias&Chetan D Parikh ," Integrated Electronics", 2nd Edition,McGraw Hill India, 2017
Reference Books	
1	S. M. Sze and K. N. Kwok, Physics of Semiconductor Devices, 3rd edition, John Wiley &Sons, 2006.
2	Y. Tsividis and M. Colin, Operation and Modeling of the MOS Transistor. Oxford Univ. Press, 2011.
3	A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College Publishing, Edition IV
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/117103063
2	https://nptel.ac.in/courses/108108112
3	https://onlinecourses.nptel.ac.in/noc23_ee120/preview
4	https://nptel.ac.in/courses/108107142

II SEMESTER
23EE1206 : Lab. Electronics Device and Circuit

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Understand the principles of semiconductor Physics and apply it to electronic devices
2. Appreciate different devices for different applications.
3. Understand and utilize the mathematical models of semiconductor devices for circuits.
4. Understand the basic processes required for fabrication of electronic devices.

Sr. No.	Experiments based on
1	To plot the V- I characteristics of PN junction diode (Si and Ge) using breadboard and on experimental kit.
2	To plot the V- I characteristics of Zener diode.
3	To study half wave and full wave rectifier with and without capacitive filter.
4	To perform the clipper and clamper circuit using breadboard.
5	To plot I/P & O/P Characteristics of Common Base Transistor Configuration. Find I/P & O/P Resistance and Current Gain.
6	To plot I/P & O/P Characteristics of Common Emitter Transistor Configuration. Find I/P & O/P Resistance and Current Gain.
7	To perform the Drain and Transfer characteristics of Field Effect Transistor (FET).
8	To perform the Fixed Bias circuit of transistor.
9	To perform the Self Bias circuit of transistor

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 Information Technology

SoE No. 23IT-101

II SEMESTER

23IT1203 : Programming for Problem Solving

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

Unit I: Computer System Basics:	**(3 Hrs.)**
Basics of programming and problem solving. Introduction to algorithms and flowcharts, Types of programming errors, basic input/output statements and functions (scanf, printf, getch, putch, gets, puts), Introduction to library functions,	
Unit II: Basic of C Programming	**(6 Hrs.)**
Basic building blocks of C: Character set, variables, identifiers & keywords, Data types, Operators: arithmetic, logical and relational operators, , bitwise operators, precedence of operators, Expressions, sizeof() operator, constants, typedef statement, writing straight line programs. Decision control statements: if, if - else and nested if-else statements, else-if ladder statement, switch-case control statement.	
Unit III: Loop Structures:	**(5 Hrs.)**
While, do while and for loops, break and continue statement, "goto" statement, real life programming examples based on these loop structures, real life programming examples.	
Unit IV: Modular Programming:	**(6 Hrs.)**
Concept of functions, user defined functions, function prototypes, formal parameters, actual parameters, return types, call by value , call by reference, C programs using functions, Recursive functions, comparing recursion against iteration, C programs using recursive functions, real life programming examples	
Unit V: Arrays:	**(6 Hrs.)**
One dimensional array, array manipulation, insertion, deletion of an element, searching techniques- Linear and binary search, sorting technique – Bubble sort. Two-dimensional arrays: matrix representation, programs for basic matrix operations such as addition, multiplication and transpose, Array as function arguments. real life programming examples	
Unit VI: String, Structure and Union:	**(4 Hrs.)**
Strings: string representation and string handling functions, Introduction to pointer, structure and union. real life programming examples	
Total Lecture	**30 Hours**

			July,2023	1.00	Applicable for AY 2023-24 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

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 Information Technology

SoE No. 23IT-101

II SEMESTER

23IT1204 : Lab. Programming for Problem Solving

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

Unit I: Computer System Basics:	**(3 Hrs.)**
Basics of programming and problem solving. Introduction to algorithms and flowcharts, Types of programming errors, basic input/output statements and functions (scanf, printf, getch, putch, gets, puts), Introduction to library functions,	
Unit II: Basic of C Programming	**(6 Hrs.)**
Basic building blocks of C: Character set, variables, identifiers & keywords, Data types, Operators: arithmetic, logical and relational operators, , bitwise operators, precedence of operators, Expressions, sizeof() operator, constants, typedef statement, writing straight line programs. Decision control statements: if, if - else and nested if-else statements, else-if ladder statement, switch-case control statement.	
Unit III: Loop Structures:	**(5 Hrs.)**
While, do while and for loops, break and continue statement, "goto" statement, real life programming examples based on these loop structures, real life programming examples.	
Unit IV: Modular Programming:	**(6 Hrs.)**
Concept of functions, user defined functions, function prototypes, formal parameters, actual parameters, return types, call by value , call by reference, C programs using functions, Recursive functions, comparing recursion against iteration, C programs using recursive functions, real life programming examples	
Unit V: Arrays:	**(6 Hrs.)**
One dimensional array, array manipulation, insertion, deletion of an element, searching techniques- Linear and binary search, sorting technique – Bubble sort. Two-dimensional arrays: matrix representation, programs for basic matrix operations such as addition, multiplication and transpose, Array as function arguments. real life programming examples	
Unit VI: String, Structure and Union:	**(4 Hrs.)**
Strings: string representation and string handling functions, Introduction to pointer, structure and union. real life programming examples	
Total Lecture	30 Hours

			July,2023	1.00	Applicable for AY 2023-24 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
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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**

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 Mathematics & Humanities)

B.Tech First Year

SoE No. 23FY-101

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

Yeshwantrao Chavan College of Engineering

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

(Accredited 'A++' Grade by NAAC with a score of 3.6)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

3rd Semester

(Department of Electronics Engineering)

B. Tech in CSE (IoT)

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Computer Technology)

B. Tech in Computer Science and Engineering (IOT)

SoE No. 23IoT-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	HSSM-I	GE	23GE1301	Fundamentals of Economics & Management	T	2	0	0	2	2	30	20	50	3
2	3	PC	EE	23IOT1301	Microcontroller & Interfacing	T	3	0	0	3	3	30	20	50	3
3	3	PC	EE	23IOT1302	**Lab :** Microcontroller & Interfacing	P	0	0	2	2	1		60	40	
4	3	PC	EE	23IOT1303	Computer Architecture Organization	T	3	0	0	3	3	30	20	50	3
5	3	PC	CT	23IOT1304	Data Structures	T	3	0	0	3	3	30	20	50	3
6	3	PC	CT	23IOT1305	**Lab.:** Data Structures	P	0	0	2	2	1		60	40	
7	3	PC	CT	23IOT1306	**Lab:** Computer Workshop	P	0	0	2	2	1		60	40	
8	3	VEC--2	CT	23IOT1307	Basics of Python Programming	T	2	0	0	2	2	30	20	50	3
9	3	CEP	CT	23IOT1308	Community Engagement Project	P	0	0	2	4	2		60	40	
10	3	OE-1	OE		**Open Elective-I**	T	2	0	0	2	2	30	20	50	3
11	3	MDM	CT		**MD Minor Course-I**	T	2	0	0	2	2	30	20	50	3
					TOTAL		**17**	**0**	**8**	**27**	**22**				

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

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

III SEMESTER
23GE1301: Fundamentals of Management & Economics

Course Outcomes:

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

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

Unit I:	**7 Hrs.**
Principles of Management: Evolution of Management Thought: Scientific and Administrative Theory of Management, Definition and Concept of Management, Functions of Management: Planning, Organizing, Directing, Staffing and Controlling, Motivational Theories, Concept of Leadership.	
Unit II:	**8 Hrs.**
Marketing and Financial Management: Marketing and Financial Management –Marketing Theories and Concept-Marketing Mix, Market Segmentation, Targeting and Positioning and Functions Financial Management and Accountancy- Accountancy Rules and Capital, Preparation of Books of Account- Journal posting of Transaction into ledger and preparation of trial Balance, Introduction of Trading Account, Profit and loss account and balance sheet.	
Unit III:	**7 Hrs.**
Introduction to Microeconomics: Nature and Scope of Microeconomics, Demand Analysis: Meaning and determinants of demand, law of demand, Elasticity of Demand - types and degrees, Utility analysis, Law of diminishing marginal utility, supply- law of supply, Law of Variable proportions and Return to Scale, Classification of market structure.	
Unit IV:	**8 Hrs.**
Introduction to Macroeconomics: Nature and Scope of Macroeconomics, Concept of GDP, GNP, NDP, NNP, Measurement of GDP; Economic Growth and development, Money – definition, types and function of money, Inflation – meaning, types, causes and measure to control, concept of deflation, functions of central and commercial bank , Sources of public revenue - direct and indirect taxes.	
	Total Lecture **30 Hours**

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

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_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
23IOT1301 : Microcontroller & Interfacing

III SEMESTER
23IOT1302 : Lab. Microcontroller & Interfacing

III SEMESTER
23IOT1303 : Computer Architecture Organization

III SEMESTER
23IOT1304 : Data Structures

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Implement applications of stacks and queues. 2. Develop applications using linked list. 3. Demonstrate various operations of tree data structure. 4. Apply the knowledge of graph data structure for solving real life problems.

Unit I:	**8 Hrs.**
Introduction to Data structures, classification, dynamic memory allocation, array-based implementation of stacks, queues, applications of stacks: expression conversion, applications of queue, implementation stack using queue and queue using stack, Hashing	
Unit II:	**8 Hrs.**
Linked list, self-referential data structure, types: singly, doubly, circular, application for polynomial evaluation, implementation of stacks and queue using linked list.	
Unit III:	**8 Hrs.**
Binary trees, binary search trees, terminologies, AVL, Red-Black	
Unit IV:	**8 Hrs.**
Splay trees, B and B+ trees, Multidimensional trees, Tries	
Unit V	**7 Hrs.**
Directed and Undirected Graphs, Terminologies, Graph traversals, connected and bi-connected components, Topological sort, Applications of BFS and DFS	
Unit VI:	**6 Hrs.**
Minimum Spanning Trees, Shortest Path Algorithms and Applications, All pair shortest paths, Introduction to Network flow Problems	
Total Lecture	**45 Hours**

Textbooks:	
1.	Data Structures using C ,Latest , Reema Thareja ,Oxford publications.
2.	Data Structures, Algorithms and Applications in C++, 2nd, S. Sahani, University Press Orient Longman (India) Pvt. Ltd.
3.	Data Structures and Algorithms in C++ ,Student, Michael T. Goodrich, R. Tamassiaand, Mount Willy, JonhWilly and sons.

Reference Books:	
1.	Data Structures a Pseudocode approach with C ,Latest , Richard Gilberg, B. Forouzan ,Thompsons Course Technology
2.	Data Structures and Program Design in C, Latest ,Tondo Kruse, Leung and Tondo, Pearson Publications

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
2.	

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/106102064
2.	https://www.youtube.com/watch?v=I_314LpT6X8
3.	https://nptel.ac.in/courses/106106133

III SEMESTER
23IOT1305: Lab. Data Structures

Course Outcomes
Upon successful completion of the course the students will be able to 1. Implement applications of stacks and queues. 2. Develop applications using linked list. 3. Demonstrate various operations of tree data structure. 4. Apply the knowledge of graph data structure for solving real life problems

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

SN	Experiments based on
1	Program based on Stacks and its application
2	Program based on Queue and its application
3	Implementation of one data structures using another
4	Program based on linked list
5	Program on Skip list
6	Program based on Binary tree
7	Program based on Binary Search tree
8	Program based on application of Graph in networking
9	Program based on finding shortest path using Graph
10	Mini project covering all data structures

III SEMESTER
23IOT1306 : Lab. Computer Workshop

Course Outcomes
Upon successful completion of the course the students will be able to 1. Understand the fundamentals of computer hardware and working of Linux operating system 2. Use Linux commands to manage files and file systems 3. Execute Scripts 4. Debug Programs on various IDEs

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

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

III SEMESTER
23IOT1307 : Basics of Python Programming

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Select any framework for python programming as per their understanding. 2. Write any python program using various data structures and control statements. 3. Demonstrate skill for effective usage of file handling and concepts of classes and objects. 4. Develop advanced applications using functionalities provided under various packages of Python.

Unit I:	**7 Hrs.**
Python frameworks : Basic syntax, variables and expressions, basic operators, decision making	
Unit II:	**7 Hrs.**
Control flow statements: continue, break, Loops: while, for and Functions	
Unit III:	**8 Hrs.**
Data structures: list, dictionary, arrays, tuples, sets, strings Unit IV: [06Hrs] File handling, Classes and Objects, Introduction to Various Libraries: NumPy: Fundamental package for scientific computing NLTK- Natural language toolkit	
Unit IV:	**8 Hrs.**
File handling, Classes and objects, Python patterns- Implementing Graphs NetworkX- A package for the creation, manipulation, and study of the structure, dynamics, and functions of complex networks	
Total Lecture	**30 Hours**

Textbooks:	
1.	Introduction to Programming Using Python, 1st, Y. Daniel Liang Pearson
2.	Python: The Complete Reference ,1st, Martin C Brown McGraw Hill

Reference Books:	
1.	Database System Concepts, Henry Korth and Others, McGraw Hill
2.	Database Systems, Connolly, Pearson Publications
3	Database Systems, S. K. Singh, Pearson Education
4	Principles of Database Systems Ullman, Golgotia Publications 1998

III SEMESTER

23IOT1308 : Community Engagement Project

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 Computer Technology)

B.Tech in CSE (IoT)

SoE No. 23IoT-101

III SEMESTER

Code MDM1CT103 : Sub. Name: IoT Architecture and Protocol

Course Outcomes :
Upon successful completion of the course the students will be able to 1. To Describe the Architectural Overview of IoT 2. Differentiate between the levels of the IoT architectures. 3. Illustrate various IoT Protocols (Datalink, Network, Transport, Session, Service)

Unit I: Introduction to IoT, IoT Challenges, IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints, Data representation and visualization, Interaction and remote control.	**8/Hrs.**
Unit II: IOT Data Link Layer & Network Layer Protocols: PHY/MAC Layer(3GPP MTC, IEEE 802.11, IEEE 802.15), Wireless HART, ZWave, Bluetooth Low Energy, Zigbee Smart Energy, DASH7 - Network Layer-IPv4, IPv6, 6LoWPAN, 6TiSCH,ND, DHCP, ICMP, RPL, CORPL, CARP	**8 Hrs.**
Unit III: Transport & Session Layer Protocols: Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)-(TLS, DTLS) – Session Layer HTTP, CoAP, XMPP, AMQP, MQTT	**7 Hrs.**
Unit IV: Service Layer Protocols & Security: Service Layer one M2M, ETSI M2M, OMA, BBF – Security in IoT Protocols – MAC 802.15.4 , 6LoWPAN, RPL, Application Layer	**7 Hrs.**

	Total Lecture	**30 Hours**

Textbooks:	
1.	Raj kamal, "Internet of Things architecture and design principles ", 1ed, Mc Graw Hill.
2.	Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.

Reference Books:

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

1.	Peter Waher, "Learning Internet of Things", PACKT publishing, BIRMINGHAM – MUMBAI Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
2.	Peter Waher, "Learning Internet of Things", PACKT publishing, BIRMINGHAM – MUMBAI Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	

MOOCs Links and additional reading, learning, video material	
1.	http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html

III SEMESTER
Multidisciplinary Minor Courses

Track 1
MDMT1IOT101 : Internet of Things (IoT)

Courses	Sem	MDMT1IOT101 : Internet of Things (IoT)
MDM-I	3	(MDM1IOT101) IoT Architecture and Protocol
MDM-II	4	(MDM2IOT102) IoT Design Principles
MDM-III	5	(MDM3IOT103) Fog and Edge Computing
MDM-IV	6	(MDM4IOT104) Security and Privacy in IoT
MDM-V	7	(MDM5IOT105) IoT in Healthcare
MDM-VI	8	(MDM6IOT106) Cognitive IoT

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/

III SEMESTER

Mandatory Learning Course (MLC)

MLC2123 : YCAP3

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

(Accredited 'A++' Grade by NAAC with a score of 3.6)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

4th Semester

(Department of Electronics Engineering)

B. Tech in CSE (IoT)

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Computer Technology)

B. Tech in Computer Science and Engineering (IOT)

SoE No. 23IoT-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	23GE1404	Probability Theory and Sampling Theory	T	3	0	0	3	3	30	20	50	3
2	4	HS	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	CT	23IOT1401	Introduction to Internet of Things	T	3	0	0	3	3	30	20	50	3
		PC	CT	23IOT1402	Lab : Introduction to Internet of Things	P	0	0	2	2	1		60	40	
6	4	PC	CT	23IOT1403	Object Oriented Programming	T	3	0	0	3	3	30	20	50	3
7	4	PC	CT	23IOT1404	**Lab :** Object Oriented Programming	P	0	0	2	2	1		60	40	
8	4	VSEC-3	CT	23IOT1405	**Lab :** Vocational & Skill Enhancement Data Analysis using R	P	0	0	2	4	2		60	40	
9	4	OE-2	OE		**Open Elective-II**	T	2	0	0	2	2	30	20	50	3
10	4	MDM	CT		**MD Minor Course-II**	T	2	0	0	2	2	30	20	50	3
					TOTAL		**19**	**0**	**6**	**27**	**23**				

List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	**YCAP4 :** YCCE Communication Aptitude Preparation	**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

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

IV SEMESTER
23GE1404 : Probability Theory and Sampling Theory

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Identify an appropriate probability distribution for a given discrete or continuous random variable and compute probabilities.
2. Use probability distributions to solve a given problem
3. Apply concepts of sampling theory to find probabilities and estimate parameters of various problems.
4. Test the hypothesis and estimate confidence intervals at different levels.

Unit I:	**8 Hrs.**
Random Variables and Probability Distributions: Conditional probability, Baye's theorem. Discrete and Continuous random variables, Probability function and Distribution function, Joint distributions. Independent Random variables, Conditional Distribution.	
Unit II:	**7 Hrs.**
Mathematical Expectation: Mathematical Expectation, Variance and Standard Deviation, Moments, Moment generating function, Skewness and Kurtosis.	
Unit III:	**7 Hrs.**
Special Probability Distributions: Binomial, Geometric, Poisson, Exponential, Normal, Central Limit theorem.	
Unit IV:	**8 Hrs.**
Sampling Theory: Unbiased and efficient estimates, Point estimates and interval estimates. Confidence interval for means, Confidence interval for proportions, Confidence interval for differences and sums of mean and proportions.	
Unit V:	**7 Hrs.**
Estimation: Unbiased and efficient estimates. Point estimates and interval estimates. Confidence interval for means, Confidence interval for proportions, Confidence interval for differences and sums of mean and proportions.	
Unit VI:	**8 Hrs.**
Hypothesis Testing: Definition of hypothesis, Testing of hypothesis for large samples using normal distributions. Testing of hypothesis for small distributions (student's t-test, F-test). Goodness of fit test (Chi-square distribution).	
	Total Lecture **45 Hours**

Textbooks:	
1	M. R. Spiegel, The theory and problems of probability and Statistics, 3rd edition, Schaum series. (McGraw Hill)
2	Michael J. Evans and Jeffrey S. Rosenthal, Probability and Statistics, 2nd edition, W. H. Freeman publisher, 2009

Reference Books:	
1	S. C.Gupta and V.K.Kapoor , Fundamentals of Mathematical statistics, 10th Edition, Sultan chand and son, 2001.
2	G Balaji, Probability and Statistics, 15th edition, G Balaji publisher, 2017

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/111106051
2	https://archive.nptel.ac.in/courses/111/104/111104137/
3	https://archive.nptel.ac.in/courses/111/106/111106135/

IV SEMESTER
23GE1401 : Entrepreneurship Development

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

Unit I:	**7 Hrs.**
Entrepreneur & Entrepreneurship: Meaning of Entrepreneur, Evolution of the concept – Theories and Models, Types of Entrepreneur, Stages in entrepreneurial process- Idea Generation, Screening, Selection and Managing Resources.	
Unit II:	**8 Hrs.**
Legal Compliances for Incorporating Start up: Fundamentals of choosing the Business Organization form for startup, Incorporation of Partnership, LL.P & Co – operative, Incorporation of One Person Company, Pvt. Ltd., Pub. Ltd. and not for profit company, Financing the legal Venture and Legal Compliances.	
Unit III:	**7 Hrs.**
Entrepreneurship and IP Strategy: Intellectual Property : Definition and Concept of Trade Mark, Patent, Copyright, Industrial Design, IP Strategy and Entrepreneurship.	
Unit IV:	**8 Hrs.**
Support to Entrepreneurs: 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	**30 Hours**

Student activities:	
1.	Interview at least four entrepreneurs or businessman and identify Traits of successful entrepreneurs.
2.	Analyse case studies of any two successful entrepreneurs.
3.	Download product development and innovative films from internet.
4.	Identify your hobbies and interests and convert them into business idea

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
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://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.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

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

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

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"**

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	

IV SEMESTER
23IOT1302 : Theory of Computation

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Construct automata, regular expression for any pattern 2. Write context free grammar for various languages. 3. Design push down automata and Turing Machine for a language. 4. Derive whether a problem is decidable or not.

Unit I:	**(8 Hrs.)**
Alphabet, Symbols, Sets, Strings, Language, Operations, Relations, Design of Finite State Machines, Acceptance of strings and languages, Non-Deterministic Finite Automation, Deterministic Finite Automation, Equivalence between NFA and DFA, NFA with ε-transition, Minimization of FA. **Contemporary Issues related to Topic**	
Unit II:	**(7 Hrs.)**
Regular Regular sets, Regular expressions, Manipulation of regular expressions, Equivalence between RE and FA. Pumping Lemma, closure properties of regular sets (Proofs not required), Regular grammars, Right linear and left linear regular grammars, inter-conversion between LLG & RLG, Equivalence between regular grammar and F.A., Inter-conversion between RE and RG. **Contemporary Issues related to Topic**	
Unit III:	(7 Hrs.)
Context free grammar, Derivation trees (Syntax tree and Parse tree), Ambiguous Grammar, Context Free Language (CFL), Normal Form of grammar: Chomsky Normal form, Greibach normal form. **Contemporary Issues related to Topic**	
Unit IV:	(6 Hrs.)
Push down automata, definition, and model, acceptance of CFL by empty Stack and by final state, equivalence CFL and PDA, Inter-conversion, Closure of properties of CFL, DPDA & NDPDA. **Contemporary Issues related to Topic**	
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, Church‟s hypothesis, Chomsky hierarchy of language, Linear bounded automata and context sensitive language, Universal Turing Machin **Contemporary Issues related to Topic**	

Unit VI:	(6 Hrs.)
Un-decidability Problems related to Recursive enumerable language and Turing Machine, post correspondence problem. Recursive function Theory –Basis functions and operations on them. Bounded minimization preemptive μ recursive function unbounded minimization and recursive function **Contemporary Issues related to Topic**	
Total Lecture	**40 Hours**

Textbooks:	
1.	Introduction to Automata Theory, Languages, and computation ,3rd Edition ,Hopcroft J.E., Rajeev Motwani, Jeffrey D. Ullman Pearson Education.
2.	Introduction to languages and the Theory of Computation,3rd Edition ,John C.Martin ,Mc Graw Hill.

Reference Books:	
1.	Introduction to the Theory of Computation,2nd Edition,Michael Sipser, GALE CENGAGE Learning
2.	Theory of Computation, 1st Edition , Dr. O. G. Kakde ,Laxmi Publication

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://onlinelibrary.wiley.com/doi/epdf/10.1002/0471224642

MOOCs Links and additional reading, learning, video material	
1.	https://www.digimat.in/nptel/courses/video/106104028/L01.html
2.	https://www.digimat.in/nptel/courses/video/106104148/L38.html

IV SEMESTER
23IOT1402 : Object Oriented Programming

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Understand the concept of object-oriented programming and modeling. 2. Apply the knowledge of object-oriented programming to solve the given problem. 3. Analyze the problem to provide the object-oriented solution using advanced programming concepts. 4. Design the event driven web based solution for the problem.

Unit I:	**(5 Hrs.)**
Introduction to object oriented programming paradigm, procedure oriented programming vs OOP, features of OOP, benefits of OOP, defining class, instantiating a class. UML diagrams to represent class, objects and various relationships. Code of ethics for programmer.	
Unit II:	**(7 Hrs.)**
Functions in OOP, function overloading, Passing & returning Objects, pointers to members, constructors and its types, Access specifiers and packages. Inheritance, types of inheritance, run time polymorphism, abstract classes, Interface, collection interface	
Unit III:	**(7 Hrs.)**
Exceptions – exception hierarchy – throwing and catching exceptions – built-in exceptions, creating own exceptions, Stack Trace Elements. Input / Output Basics – Streams – Byte streams and Character streams – Reading and Writing Console – Reading and Writing Files	
Unit IV:	**(7 Hrs.)**
Multithreading, Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, Inter-thread communication, daemon threads, thread groups. Generic Programming – Generic classes – generic methods – Bounded Types – Restrictions and Limitations	
Unit V:	**(7 Hrs.)**
MVC architecture, Java web components and its architecture Graphics programming – Frame – Components – working with 2D shapes – Using color, fonts, and images	
Unit VI:	**(7 Hrs.)**
Basics of event handling – event handlers – adapter classes – actions – mouse events – AWT event hierarchy – Introduction to Swing – layout management – Swing Components – Text Fields, Text Areas – Buttons- Check Boxes – Radio Buttons – Lists- choices- Scrollbars – Windows –Menus – Dialog Boxes.	
Total Lecture	**40 Hours**

Textbooks:	
1.	Thinking in Java , 4th Edition , Bruce Eckel, Prentice Hall

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

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Technology/

MOOCs Links and additional reading, learning, video material	
1.	https://www.digimat.in/nptel/courses/video/106105191/L01.html
2.	https://www.youtube.com/watch?v=-HafzawNlUo

IV SEMESTER
23IOT1403 : Lab. Object Oriented Programming

Course Outcomes
Upon successful completion of the course the students will be able to
1. Understand the concept of object-oriented programming and modeling. 2. Apply the knowledge of object-oriented programming to solve the given problem. 3. Analyze the problem to provide the object-oriented solution using advanced programming concepts. 1. Design the event driven web based solution for the problem.

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

SN	**Program based on**
1	Implement the concept of Class and its data members and member functions in Java/C++
2	Implement the concept of function and operator overloading in Java/C++
3	Implement the concept of friend function
4	Implement the concept of class constructor and its type in Java/C++
5	Implement the concept of Abstraction in Java/C++
6	Implement the concept of all types of inheritance in Java/C++
7	Implement he collection listener to solve the problem in Java
8	Implement the concept of run time polymorphism in Java/C++
9	Implement the concept of Files using command line arguments in Java/C++
10	Implement the concept of function templates and class template in C++
11	Implement the concept of exception in Java/C++
12	Implement the concept of applet to prepare a web application in Java
13	Implement the event driven approach to prepare the web application in Java

IV SEMESTER
23IOT1404 : Lab : Vocational & Skill Enhancement
Data Analysis using R

Course Outcomes
Upon successful completion of the course the students will be able to 1. Independently analyze and interpret data using R. 2. Apply statistical methods and machine learning algorithms to solve real-world problems. 3. Create professional data visualizations and reports for effective communication. 4. Work on data analysis projects from data cleaning to insights generation.

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

SN	**Experiments based on**
1	Import data from CSV, Excel, databases, etc.
2	Export data to various formats.
3	Data Cleaning and preparing using R
4	Calculate descriptive statistics (mean, median, standard deviation, etc.).
5	Apply machine learning algorithms for classification and clustering tasks.
6	Create visualizations like histograms, boxplots, scatter plots.
7	Create interactive visualizations with plotly.
8	Preprocess text data (tokenization, stemming, stop word removal).
9	Integrate R with big data frameworks like Spark for large-scale data analysis.
10	Present analysis findings professionally to stakeholders.

IV SEMESTER
IV SEMESTER
Code MDM2CT203. : Sub. Name : IoT Design Principles

Course Outcomes :

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

1. Choose an appropriate communication model for given design criteria
2. Analyze IOT environments using various communication technologies
3. Understand essentials of IoT Security
4. Discuss the various domains where IOT can be applied successfully.

Unit I:	**8 Hrs.**
Overview of Internet of Things: Defining IoT, Importance of IoT , IoT Basic Characteristics, Enabling Technologies of IoT, IoT communication Models, IoT Communication API‟s Cloud Services: IAAS, PAAS, SAAS, IoT Specific Cloud Services RFID: Introduction to RFID and its Applications in IoT.	
Unit II:	**8 Hrs.**
Design Principles for IoT: Internet- based communication,IPv4, IPv6,6LoWPAN protocol, IP Addressing in the IoT, Message communication protocols (CoAP,MQTT,XMPP,AMQP), IEEE802.15.4, ZigBee, Bluetooth, NFC, Wireless HART, ZWave,	
Unit III:	**6 Hrs.**
Wireless Sensor networks: Basic Building blocks of IoT system: Sensors, Processors, gateways, Applications. Components of sensor nodes, Node Behavior in WSNs, Applications, WSN Coverage, OGDC algorithm, Stationary and Mobile Wireless Sensor Networks.	
Unit IV:	**8 Hrs.**
Privacy and Security : Introduction to web security, Vulnerabilities of IoT, Privacy, Security requirements, Threat analysis, IoT security tomography and layered attacker model, Identity Management and Establishment, Access control, Message integrity, Non-repudiation and availability . Case Study: Wireless Patient Monitor system, Home automation concept and case study, Surveillance applications concept and, Other IoT applications	

	Total Lecture	**30 Hours**

Textbooks:	
1.	Internet of Things Principles and Paradigms, Edited By Rajkumar Buyya, Amir Vahid Dastjerdi, Morgan Kaufmann, ELSEVIER
2.	Raj Kamal, "Internet of Things-Architecture and design principles", McGraw Hill Education.
3	The Internet of Things: Connecting Objects to the Web edited by Hakima Chaouchi

Reference Books:	
1.	Fundamentals of Wireless Sensors Networks Theory and Practice, Waltenegus Dargie and Christian Poellabauer, WILEY Series
2.	Rethinking the Internet of Things: A Scalable Approach to Connecting Everything 1 st Edition, Francis DaCosta, Apress Publications
3	Introduction to Internet of Things, Prof. Sudip Misra,NPTEL Lectures Notes, Department of Computer Science & Engineering, Indian Institute of Technology Kharagpur,

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	

MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.nptel.ac.in/noc22_cs40/preview

IV SEMESTER
Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1IOT101 : Internet of Things (IoT)
MDM-I	3	(MDM1IOT101) IoT Architecture and Protocol
MDM-II	4	(MDM2IOT102) IoT Design Principles
MDM-III	5	(MDM3IOT103) Fog and Edge Computing

MDM-IV	6	(MDM4IOT104) Security and Privacy in IoT
MDM-V	7	(MDM5IOT105) IoT in Healthcare
MDM-VI	8	(MDM6IOT106) Cognitive IoT

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

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

5th Semester

(Department of Electronics Engineering)

B. Tech in CSE (IoT)

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Computer Technology)

B. Tech in Computer Science and Engineering (IOT)

SoE No. 23IoT-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	CSE(IOT)	23IOT1501	Database Management System	T	3	0	0	3	3	30	20	50	3
2	5	PC	CSE(IOT)	23IOT1502	**Lab :** Database Management System	P	0	0	2	2	1		60	40	
3	5	PC	CSE(IOT)	23IOT1503	Operating Systems	T	3	0	0	3	3	30	20	50	3
4	5	PC	CSE(IOT)	23IOT1504	**Lab :** Operating Systems	P	0	0	2	2	1		60	40	
5	5	PC	CSE(IOT)	23IOT1505	Design Analysis and Algorithms	T	3	0	0	3	3	30	20	50	3
6	5	PC	CSE(IOT)	23IOT1506	**Lab :** Design Analysis and Algorithms	P	0	0	2	2	1		60	40	
7	5	PC	CSE(IOT)	23IOT1507	Therotical Foundations Computer Science	T	2	0	0	2	2	30	20	50	3
8	5	PE	CSE(IOT)		**Professional Elective-I**	T	3	0	0	2	2	30	20	50	3
9	5	PE	CSE(IOT)		**Lab :** Professional Elective-I	P	0	0	2	2	1		60	40	
10	5	OE-3	OE		**Open Elective-III**	T	3	0	0	3	3	30	20	50	3
11	5	MDM	CSE(IOT)		**MD Minor Course-III**	T	3	0	0	3	3	30	20	50	3
12	5	STR	CSE(IOT)	23IOT1508	Internship, Seminar and Report	P	0	0	2	2	1		60	40	
					TOTAL		**20**	**0**	**10**	**29**	**24**				
List of Mandatory Learning Course (MLC)															
1	5	HS	T&P	MLC2125	**YCAP5 :**YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Professional Electives -I

1	5	PE-I	CSE(IOT)	23IOT1521	**PE-I :** Computer Vision
	5	PE-I	CSE(IOT)	23IOT1522	**PE-I : Lab :** Computer Vision
2	5	PE-I	CSE(IOT)	23IOT1523	**PE-I :** Geo-Intelligence for Smart IoT Devices
	5	PE-I	CSE(IOT)	23IOT1524	**PE-I : Lab :** Geo-Intelligence for Smart IoT Devices
3	5	PE-I	CSE(IOT)	23IOT1525	**PE-I :** Mathematical Foundations for Data Analysis
	5	PE-I	CSE(IOT)	23IOT1526	**PE-I : Lab :** Mathematical Foundations for Data Analysis

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	

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 Electronics Engineering)

B. Tech in CSE (IoT)

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Computer Technology)

B. Tech in Computer Science and Engineering (IOT)

SoE No. 23IoT-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	CSE(IOT)	23IOT1601	Computer Networks	T	2	0	0	3	3	30	20	50	3
2	6	PC	CSE(IOT)	23IOT1602	**Lab :** Computer Networks	P	0	0	2	2	1		60	40	
3	6	PC	CSE(IOT)	23IOT1603	Artificial Intelligence and Machine Learning	T	3	0	0	3	3	30	20	50	3
4	6	PC	CSE(IOT)	23IOT1604	**Lab :** Artificial Intelligence and Machine Learning	P	0	0	2	2	1		60	40	
5	6	PC	CSE(IOT)	23IOT1605	**Lab :** Competitive Coding	P	0	0	2	2	1		60	40	
6	6	PC	CSE(IOT)	23IOT1606	Design Thinking and Research Methodology	T	2	0	0	2	2	30	20	50	3
7	6	PE	CSE(IOT)		**Professional Elective-II**	T	3	0	0	3	3	30	20	50	3
8	6	PE	CSE(IOT)		**Lab :** Professional Elective-II	P	0	0	2	2	1		60	40	
9	6	PE	CSE(IOT)		**Professional Elective-III**	T	3	0	0	3	3	30	20	50	3
10	6	MDM	CSE(IOT)		**MD Minor Course-IV**	T	3	0	0	3	3	30	20	50	3
11	6	VSEC-4	CSE(IOT)	23IOT1607	**Lab : Java FSD**	P	0	0	2	2	1		60	40	
12	6	STR	CSE(IOT)	23IOT1608	Project Phase-I	P	0	0	4	4	2		60	40	
					TOTAL		**16**	**0**	**14**	**31**	**24**				
List of Mandatory Learning Course (MLC)															
1	6	HS		MLC126	**YCAP6 :**	**A**	3	0	0	3	**0**				

Professional Electives -II

1	6	PE-II	CSE(IOT)	23IOT1621	**PE-II :** Bussiness Intelligence
2	6	PE-II	CSE(IOT)	23IOT1622	**PE-II : Lab :** Bussiness Intelligence
3	6	PE-II	CSE(IOT)	23IOT1623	**PE-II :** Mobile and Web Application for IoT
4	6	PE-II	CSE(IOT)	23IOT1624	**PE-II : Lab :** Mobile and Web Application for IoT
5	6	PE-II	CSE(IOT)	23IOT1625	**PE-II :** UI/UX Design
6	6	PE-II	CSE(IOT)	23IOT1626	**PE-II : Lab :** UI/UX Design

Professional Electives -III

1	6	PE-III	CSE(IOT)	23IOT1641	**PE-III :** Industrial IoT
2	6	PE-III	CSE(IOT)	23IOT1642	**PE-III :** IoT Sensors and devices
3	6	PE-III	CSE(IOT)	23IOT1643	**PE-III :** Optimization Techniques

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

VI SEMESTER
23IOT1601: Computer Networks

Course Outcomes :
Upon successful completion of the course the students will be able to
1. To understand design issues of layers and network reference model
2. To Solve the given problems related to networking domain.
3. To analyze different networking protocol at various layers.
4. To evaluate the performance of network using different tools.

Unit I:	**8 Hrs.**
Introduction: The uses of computer networks, LAN's, MAN's, WAN's., protocol hierarchies, design issues for layers, interfaces and services, connection oriented and connectionless services, service primitives relationship of services to protocols. The OSI reference model. TCP/IP reference model, Comparison of OSI & TCP/IP reference models, Critique of OSI model & protocols, critique of TCP/IP reference mode	
Unit II:	**7 Hrs.**
Transmission Impairments, Transmission Media: Guided, unguided, Architecture of the Internet, , The Public Switched Telephone Network Switching: circuit, packet and message switching, Modems	
Unit III:	**8 Hrs.**
The Data Link Layer: Data link layer design issues- Framing, Error Control, Flow Control, Link Management, Error detection and Correction-Error-Correcting Codes, error-detecting codes, Elementary data link protocols-An Unrestricted simplex Protocol, A simplex stop and wait protocol, A simplex protocol for a noisy channel, Sliding window protocols- A one bit sliding window protocol, Go Back N protocol, Selective Repeat Protocol.	
Unit IV:	**8 Hrs.**
The Medium Access Sublayer: Static and Dynamic Channel allocation in LAN's and MAN's, Access Protocols ALOHA, Persistent and Non Persistent CSMA, CSMA/CD, Collision free protocols, Binary countdown, Limited connection protocol: The adaptive tree walk protocol.	
Unit V:	**7 Hrs.**
The Network Layer: Network Layer design issues-services provided to the transport layer, Logical Addressing: Classbase and classless, Subnetting and Supernetting, Routing and Routing Algorithm, Distance Vector, Link State, Hierarchical. Congestion Control algorithms- Preallocation of buffers, Packet discarding, Choke packets, Load shedding, Jitter control. Leaky bucket algorithm, token bucket algorithm, IP header format (IPv4, IPv6)	
Unit VI:	**7 Hrs.**
The Transport Layer: Transport layer design issues-services provided to the session layer, Quality of service, transport service primitives, Elements of transport protocols-Addressing, Establishing and Releasing a connection, Flow control and Buffering, Multiplexing, Crash Recovery. Transmission Control Protocol (TCP). The Application Layer: HTTP DNS, SMTP, FTP, TFTP.	
	Total Lecture **45 Hours**

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

Textbooks:	
1.	Computer Networks, A.S. Tanenbaum , Pearson Publication
2.	Computer Networking , Behrouz A. Forouzan , McGraw-Hill Publication.

Reference Books:	
1.	Data communications and networking, Behrouz A. Forouzan , McGraw-Hill
2.	

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	

MOOCs Links and additional reading, learning, video material
https://archive.nptel.ac.in/courses/106/105/106105183/

VI SEMESTER
23IOT1602: Lab Computer Networks

Course Outcomes
Upon successful completion of the course the students will be able to 1. To understand design issues of layers and network reference model 2. To Solve the given problems related to networking domain. 3. To analyze different networking protocol at various layers. 4. To evaluate the performance of network using different tools.

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

SN	Experiments based on
1	Use Network Utility Command like ping, ipconfig, netstat, tracert to observe the network details.
2	To implement Hamming Code using C and C++.
3	To implement Dijkstra's Routing algorithm using backtracking approach.
4	Use traffic monitoring tool Wireshark to observe network traffic with packet details.
5	To implement Go_back_n sliding window protocol
6	Configure router. Configure network using Cisco Packet Tracer software and show packet transmission from source to destination.
7	Use Openssl command to perform Asymmetric key encryption(RSA) and also implement RSA algorithm.
8	Client server communication using socket programming
9	Simulating IoT environment using Cisco Packet Tracer.

VI SEMESTER
23IOT1603: Artificial Intelligence and Machine Learning

Course Outcomes :

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

1. Explain the core principles of Artificial Intelligence and machine learning to understand its capabilities and relevance across problem domains.
2. Formulate AI problems using search strategies, logical reasoning, and probabilistic approaches to develop intelligent decision-making systems.
3. Apply supervised, unsupervised, and ensemble learning models to solve real-life problems to support informed decision-making.
4. Apply explainable and federated learning techniques to develop privacy-preserving models, addressing real-world challenges.
5. Analyze different machine learning approaches to choose suitable models based on performance metrics, fairness, and privacy needs.

Unit	Topics	
Unit I	**Philosophy of AI and Search Problems:**	**8 Hrs**
Introduction to Artificial Intelligence, AI vs ML vs Deep Learning, Types of AI: Narrow AI, General AI, Super AI, Strong AI vs Weak AI, Applications of AI, Intelligent agents: Types and architectures, modelling a problem as search problem: State space representation and problem formulation, Informed and Uninformed search, Heuristic search, Adversarial search, Constraint satisfaction problems		
Unit II	**Knowledge Representation & Reasoning:**	**7 Hrs**
Propositional and Predicate Logic, Inference rules and resolution, Semantic networks and frames, Ontologies and description logic, Forward and backward chaining, reasoning under uncertainty Introduction to probabilistic reasoning (Bayes Theorem)		
Unit III	**Supervised Learning:**	**8 Hrs**
Introduction to Supervised learning, ML pipeline: Preprocessing, Training, Testing, Classification: KNN, Decision Trees, Model evaluation: Confusion Matrix, Precision, Recall, F1 Score, Accuracy, Error, Loss functions, Cross-validation and hyperparameter tuning, Overfitting, underfitting, bias-variance trade-off		
Unit IV	**Unsupervised Learning**:	**7 Hrs**
Clustering: K-Means, Hierarchical, Dimensionality Reduction: PCA, t-SNE, Evaluation of clustering models, Applications in recommendation systems.		
Unit V	**Ensemble Learning:**	**8 Hrs**
Introduction to ensemble methods – Bagging, Boosting, Stacking, Bagging – Random Forests, Out-of-Bag (OOB) estimation, boosting – AdaBoost, intuition and working, Gradient Boosting – GBM vs AdaBoost, XGBoost intro, Stacking & Voting – Hard vs soft voting, meta-learning.		

Unit V	Federated Learning of Explainable AI:	7 Hrs
Explainable AI; Need for interpretability in ML models, SHAP, LIME: Model explanation tools, Fairness, accountability, transparency, Use cases, Distributed machine learning without centralized data, Federated Learning; Privacy-preserving ML, Applications in mobile devices (e.g., Google GBoard), Challenges in federated optimization.		
	Total	**45 Hrs**

Sr. No	**Textbook**
1	Marc Peter Deisenroth, A. Aldo Faisal, Cheng Soon Ong, Mathematics for Machine Learning, Cambridge University Press (23 April 2020)
2	S Sridhar and M Vijayalakshmi, "Machine Learning", Oxford University Press, 2021.
3	Tom M. Mitchell- Machine Learning - McGraw Hill Education, International Edition
4	Stuart Russell & Peter Norvig, Artificial Intelligence: A Modern Approach, Prentice-Hall, Third Edition (2009)
5	Trevor Hastie, Robert Tibshirani, and Jerome Friedman -The Elements of Statistical Learning
6	Zhi-Hua Zhou -Ensemble Methods: Foundations and Algorithms

Sr. No	**Reference Book**
1	Christopher M. Bishop Pattern Recognition and Machine Learning - Springer, 2nd edition
2	López-Blanco, R., Alonso, R.S., González-Arrieta, A., Chamoso, P., Prieto, J. (2023). Federated Learning of Explainable Artificial Intelligence (FED-XAI): A Review. In: Ossowski, S., Sitek, P., Analide, C., Marreiros, G., Chamoso, P., Rodríguez, S. (eds) Distributed Computing and Artificial Intelligence, 20th International Conference. DCAI 2023. Lecture Notes in Networks and Systems, vol 740. Springer, Cham. https://doi.org/10.1007/978-3-031-38333-5_32
3	Fed-XAI: Federated Learning of Explainable Artificial Intelligence Models⋆

VI SEMESTER
23IOT1604 : Lab Artificial Intelligence and Machine Learning

VI SEMESTER

23IOT1606 : Design Thinking in CSE(IOT) and Research Methodology

Course Outcomes :

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

1. Comprehend the foundational concepts of research methodology
2. Identify and formulate research problems and conduct effective literature reviews and adhere to ethical research practices
3. Collect and analyze data using appropriate methods.
4. Interpret research findings and write scientific reports..

Unit:1	Fundamentals of Design Thinking	8 Hours

Introduction to Design Thinking; Definition, Evolution, Relevance to IoT, Five Stages of Design Thinking; Empathize, Define, Ideate, Prototype, Test–IoT context; Empathy in IoT Design Understanding stakeholders: users, environments, sensors; Problem Framing in IoT Framing real-world IoT problems; environmental sensing, healthcare, automation; Case Study & Activity

Unit:2	Prototyping and Evaluating Human-Centric IoT Solutions	7 Hours

Ideation Techniques: Brainstorming, SCAMPER, Mind Maps for IoT innovation; Rapid Prototyping for IoT: Using Arduino/Raspberry Pi, paper prototyping interfaces; Feedback Loops in IoT Design: Testing with stakeholders, iteration; Ethical and Responsible IoT: Data privacy, network reliability, security; Capstone Mini Project: Group work: Apply 5-stage process to IoT (e.g., smart home, health, agri-tech)

Unit:3	Research Fundamentals, Research Problem and Design, Literature Review	8 Hours

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

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

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

Contemporary Issues related to Topic

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

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 Data Analysis and Interpretation: Processing and analyzing data, Statistical tools: Measures of central tendency, Dispersion, Correlation, Regression, Hypothesis testing: Null and alternative hypothesis, Type I and II errors, Use of software tools (e.g., Excel/SPSS/MATLAB for analysis), Interpretation of results Technical Writing, Research Ethics: Publication ethics and responsibilities of researchers, Structure and components of research report, Types of technical reports and papers, writing thesis and dissertations, Referencing and citation styles (APA, IEEE, etc.), Ethical considerations in engineering research., Plagiarism and research ethics **Contemporary Issues related to Topic**

Total Lecture Hours	**30 Hours**

Textbooks	
1	Don Norman - *The Design of Everyday Things*
2	Jake Knapp- Sprint: *How to Solve Big Problems and Test New Ideas in Just Five Days*
3	C.R. Kothari – *Research Methodology: Methods and Techniques*, New Age International
4	Ranjit Kumar – *Research Methodology: A Step-by-Step Guide for Beginners*, Sage Publications.
Reference Books	
1	R. Panneerselvam – *Research Methodology*, PHI Learning.
2	Dawson, C. – *Practical Research Methods*, UBS Publishers.
3	Trochim, W.M.K. – *Research Methods: The Concise Knowledge Base*.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
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MOOCs Links and additional reading, learning, video material	
1	**Stanford d.school resources** (free) https://dschool.stanford.edu/resources
2	**IDEO Design Thinking Toolkit (free): https://designkit.org/**

VI SEMESTER

23IOT1621 : PE-III: Business Intelligence

Course Outcomes :

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

1. Understand the basic concepts of Business Intelligence, digital data types, multidimensional modelling and its applications in different technology domain.
2. Apply the ETL process to absorb the data in MDDM and statistical technique to understand data.
3. Analyze the data to identify digital data types, multidimensional schema and hidden pattern from data.
4. Design the MDDM and reports using the business concepts.

Unit I:	**7 Hrs.**
Introduction to Business Intelligence: Introduction to digital data and its types – structured, semi-structured and unstructured, BI Definitions & Concepts, BI Framework, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities, Business Applications of BI, BI best practices.	
Unit II:	**8 Hrs.**
Introduction to OLTP and OLAP (MOLAP, ROLAP, HOLAP) Introduction to Multi-Dimensional Data Modeling: Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi-dimensional modeling, cubes, Identifying Dimension tables and fact table, attribute, hierarchies, star and snowflake schema, Data Warehousing concepts and its role in BI	
Unit III:	**7 Hrs.**
Basics of Data Integration (Extraction Transformation Loading): Concepts of data integration, needs and advantages of using data integration, introduction to common data integration approaches, Meta data – types and sources, Introduction to data quality, data profiling concepts and applications	
Unit IV:	**8 Hrs.**
Decision Making and Analytics: An Overview of Business Intelligence, Analytics, and Decision Support Descriptive Analytics: Introduction to Business Reporting, Visual Analytics, and Business Performance Management, Predictive Analytics: Introduction to Techniques for Predictive Modeling Prescriptive Analytics: Automated Decision Systems and Expert Systems, case study.	
Unit V:	**7 Hrs.**
Introduction to business metrics and KPIs, creating cubes using Microsoft Excel, Basics of Enterprise Reporting: A typical enterprise, Malcolm Baldrige - quality performance framework, balanced scorecard, enterprise dashboard, balanced scorecard vs. enterprise dashboard.	

Unit VI:	8 Hrs.
Case study: Overview and use of products from open software. BI road Ahead: BI and mobility, BI and cloud computing, BI for ERP systems, Social CRM and BI.	
Total Lecture	**45 Hours**

Textbooks:	
1.	R. N. Prasad, Seema Acharya, Fundamentals of Business Analytics, Wiley India
2.	Sam Anahory, Dennis Murray, Data Warehousing in the real world A practical guide for building Decision Support System, PEARSON

Reference Books:	
1.	Business Intelligence by David Loshin, Business Intelligence by David Loshin, Business Intelligence by David Loshin.
2.	Business intelligence for the enterprise by Mike Biere, Business intelligence for the enterprise by Mike Biere, Business intelligence for the enterprise by Mike Biere.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
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MOOCs Links and additional reading, learning, video material	
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VI SEMESTER
23IOT1622 : PE-III Lab: Business Intelligence

Course Outcomes
Upon successful completion of the course the students will be able to 1. Apply the ETL process to absorb the data in MDDM and statistical technique to understand data. 2. Design the MDDM and reports using the business concepts.

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

SN	Experiments based on
1	By using excel, create a chart report, by considering module names on the X-axis, Various Modules on Y-axis. (Bar chart, pivot chart, pie chart, line chart, combo chart) Perform the Slice, Roll-up, Drill Down operations.
2	Perform Extract Transform Load (ETL) extracts data from data-sources, transforms it, cleans it in preparation for reports and analysis and loads it into a data warehouse.
3	Integration of SQL and Tableau.
4	To develop a dashboard that helps understand the factors impacting profit and loss, focusing on **sales trends over the past five years** and **regional variations**, you can structure the dashboard to include the following key elements:(Use Marketing and sales data, build insights from which decisions can be acted upon)
5	Develop Tableau Dashboard to analyze Netflix with OLAP system.
6	Identification of Dimension and Fact table and build star/snowflake model in Power BI by addressing the correct relationship 1:1,1:* , * : 1 and * :* etc.
7	Develop Power BI Dashboard : To provide real-time data on customer behavior and actions.

VI SEMESTER

23IOT1623 : Mobile and Web Application for IoT

Course Outcomes :
Upon successful completion of the course the students will be able to 1. To understand the different flavors of mobile operating system and their specific features. 2. To design an app using different controls. 3. To design an app which can manage data and can communicate with native application. 4. To design and publish an app which can handle multiple devices with different configurations

Unit I: Introduction To Kotlin	**7 Hrs.**
Overview of Kotlin language and comparison with Java, Setting up the Kotlin development environment,Basic syntax: variables, data types, operators, and control flow (if, when, loops),Functions and basic I/O operations,Nullable types and null safety in Kotlin, Using Kotlin Playground and Android Studio for basic programming.	
Unit II: Introduction to Android	**8 Hrs.**
Android architecture and its components, understanding activities, fragments, and views, introduction to Android Studio and project structure, application lifecycle and manifest file, permissions and SDK versioning, introduction to Material Design guidelines.	
Unit III: Building Basic Layout	**8 Hrs.**
XML layout files and design structure, views and View Groups: Linear Layout, Relative Layout, Constraint Layout, widgets: Text View, Edit Text, Button, Image View, Scroll View and List View basics, designing responsive layouts for multiple screen sizes and densities, previewing and testing UI layouts on emulators and physical devices.	
Unit IV: Fundamentals of Kotlin, object-oriented programming, and lambdas.	**8 Hrs.**
Object-Oriented Programming concepts: classes, objects, inheritance, polymorphism, constructors, properties, and methods, data classes and enums, collections and generics, introduction to lambdas and higher-order functions, using Kotlin's standard library for functional programming.	
Unit V: Add a button to an APP	**7 Hrs.**
Handling user input through buttons and text fields, managing application state and stateful widgets, click listeners	
Unit VI: Interacting with UI & State	7 **Hrs.**
UI event handling, toasts, dialogs, and snackbars, navigation between activities and passing data, introduction to View Model.	
Total	**45 Hrs**

Textbooks:	
1.	*Android Programming with Kotlin for Beginners* by John Horton, Packt Publishing, **ISBN-10:** 178961540
2.	

Reference Books:	
1.	
2.	

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Google Syllabus Links and additional reading, learning, video material	
1.	Your first Android app
2	Building app UI

VI SEMESTER
23IOT1624 : Lab: Mobile & Web application for IOT

Course Outcomes
Upon successful completion of the course the students will be able to **1. Understand and apply** basic Kotlin programming constructs including variables, control structures, functions, null safety, and object-oriented concepts for Android app development. **2. Design and develop** responsive user interfaces using XML layout files, ViewGroups, and widgets in Android Studio, adhering to Material Design principles. **3. Implement event handling and application logic** using Kotlin to capture user input, manage app state, navigate between screens, and interact with Android system components like Toasts and Dialogs. **4. Integrate learned concepts** to develop a mini Android application that demonstrates use of ViewModel, multi-screen navigation, and proper UI/UX design for real-world problem-solving.

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

SN	Experiments based on
1	Objective: Set up Kotlin development using Kotlin Playground and Android Studio. Tasks: - Write simple Kotlin programs using variables, data types, operators. - Practice control flow using if, when, for, and while.
2	Objective: Understand Kotlin functions and null safety features. Tasks: - Write functions with default and named arguments. - Demonstrate use of nullable types and null safety operators (?. , ?: , !!).

3	Objective: Implement OOP concepts using Kotlin. Tasks: - Create classes and objects. - Demonstrate inheritance, constructors, and method overriding. - Use data classes and enum types.
4	Objective: Work with Kotlin collections and higher-order functions. Tasks: - Use lists, maps, and sets. - Apply filter, map, forEach with lambdas. - Write custom higher-order functions.
5	Objective: Understand the Android Studio environment and project structure. Tasks: - Create a basic Android project. - Identify the role of each folder and file (e.g., manifest, Gradle files). - Understand SDK versioning and permissions.
6	Objective: Design UI using XML layout files. Tasks: - Use LinearLayout, RelativeLayout, and ConstraintLayout. - Add TextView, Button, and EditText widgets.
7	Objective: Enhance UI with common widgets. Tasks: - Use ImageView, ScrollView, and ListView. - Design a responsive layout for multiple screen sizes. - Preview and test layout on emulator and physical devices.

8	Objective: Capture user input and handle UI events. Tasks: - Implement button click listeners. - Retrieve text from input fields and show with Toast or Snackbar.
9	Objective: Implement activity navigation and data passing. Tasks: - Create two activities. - Use Intent to switch activities and pass data via putExtra.
10	Objective: Manage UI state with ViewModel. Tasks: - Set up ViewModel in a basic app. - Maintain state across configuration changes. - Use LiveData to update UI.
11	**Mini Project – Android App using Kotlin** Objective: Integrate knowledge from all units to build a functional Android application. Tasks: - Design and develop a simple multi-screen Android application using Kotlin. - Include user input handling, navigation between activities, and UI state management using ViewModel. - Follow Material Design guidelines for UI. - Ensure responsive layouts and test on emulator or physical device. - Example ideas: To-Do App, Notes App, Calculator, Quiz App, Simple Login App with Validation.

VI SEMESTER
23IOT1625 : UI/UX Design

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Understand design thinking concept 2. Apply user requirements and the design tools to design the UI 3. Analyze the various visual designs to select appropriate one

Unit I:	**7 Hrs.**
Design Thinking Fundamentals: Introduction to Design thinking – Concept, Purpose, 5 stages of design thinking – Empathize, Define, Ideate, Prototype, Test, Introduction to User Interface / User Experience (UI/UX) – Definition of Design with respect to digital media, User Interface, User experience, Difference between UI and UX. History of UX. Need of UI and UX	
Unit II:	**7 Hrs.**
User Requirements and its Analysis: Introduction to research and analysis tool (freeware) such as FigJam, User requirements – Definition, Types of user research - Qualitative research, Quantitative research. Tools to collect user requirements – personal observation, interviews, questionnaire, User/ Expert reviews, User requirement analysis - Understanding target audience and client requirements, Competitive analysis, Affinity mapping, Defining User Persona	
Unit III:	**8 Hrs.**
Information Architecture and Wireframing: Site maps and user flows, Content organization and navigation design, Low-fidelity wireframes: sketching interfaces, Layout design principles, Usability heuristics and accessibility basics	
Unit IV:	**8 Hrs.**
User Interface Design: Storyboarding, User journey mapping, Gestalt principles of design - Aesthetics in UI design - Using Light, Color and Contrast Effectively in UI Design, Introduction to any freeware design tool such as Figma, Visual Communication Design - effective visual communication for graphical user interface	
Unit V:	**7 Hrs.**
User Experience Design Tool: Introduction to User Experience design, UX design open source tool such as - Figma features – Navigations, interactions, Buttons Creating library, Gamification, micro-animation, Creating visual identity of the project – design system, design theme	

Unit VI:	8 Hrs.
Prototyping and Testing: Introduction to Wireframing - Purpose of wireframing, Types – low fidelity, medium fidelity, high fidelity, Basics of sketching, Creating low fidelity wireframes, medium fidelity and high fidelity in Figma, Basic considerations in wireframing – device, size, behavior, interaction 5.4 Elements used in wireframing – visual design, high fidelity elements, Prototyping and Testing	
Total Lecture	45 Hours

Textbooks:	
1.	The Elements of User Experience: User-Centered Design for the Web and Beyond, Jesse James Garrett, New Riders Publishing
2.	Design Thinking: The Handbook, Falk Uebernickel, Li Jiang, Walter Brenner, Britta Pukall, Therese Naef, World Scientific Publishing Co Pte Ltd
3.	Designing and Prototyping Interfaces with Figma, Fabio Staiano, Packt Publishing Ltd, Grosvenor House

Reference Books:	
1.	https://aim.gov.in/pdf/Design_Thinking.pdf
2.	https://youtu.be/-wzNTPXVIyM?si=zET5z3GpIPl-cAry
3.	https://youtu.be/XT152i5asdQ?si=jPdLFFExnaZO8NRs
4.	https://usabilitypost.com/2008/08/14/using-light-color-and-c

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

VI SEMESTER
23IOT1626: Lab: UI/UX Design

Course Outcomes
Upon successful completion of the course the students will be able to 1. Create interactions using design tool 2. Create innovative design prototype for given applications

SN	Experiments based on
1	Use Design tool for user requirement collection and analysis
2	Recreate a given user interface using any open source design tool
3	Create grid system for the given screen using any design tool
4	Design given user interface using various components such as auto-layouts in the design tool
5	Recreate given website for UI design, color, images, interactions, menu
6	Create any two gamification effects for given user interface in given scenario
7	Design a quiz for given user interface
8	Create navigations for the given website/ App
9	Create gamification for task completion in website such as LMS/ retail website/ banking website
10	Convert created prototype in HTML page

VI SEMESTER
23IOT1641 PE-III : Industrial IoT

Course Outcomes :

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

1. Understand the foundational concepts and architecture of the Industrial Internet of Things (IIoT).
2. Analyze communication protocols and sensor integration for real-time IIoT data collection.
3. Evaluate edge, fog, and cloud computing paradigms for IIoT system deployment.
4. Apply knowledge of security, standards, and case studies for IIoT system design.

Unit I: Introduction to Industrial IoT	**7 Hrs.**
Definition and scope of Industrial IoT, Comparison of IoT and IIoT,Key components and architecture of IIoT systems,Industrial automation and control systems,Industrial sensors and actuators overview,Role of embedded systems and PLCs,Industry 4.0 and smart manufacturing,Cyber-physical systems in IIoT,IIoT applications across industries,Challenges and opportunities in Industrial IoT adoption	
Unit II: IIoT Networking and Communication Protocols	**8 Hrs.**
Overview of industrial network types (LAN, WAN, PAN), Wired vs. wireless industrial communication, IIoT communication technologies: Bluetooth, ZigBee, LoRa, NB-IoT, Industrial Ethernet and Modbus protocol, MQTT, CoAP, OPC-UA protocols for IIoT, SCADA and HART in industrial communication, Time-sensitive networking (TSN) for IIoT, Interoperability issues in industrial communication, Network topology and data transmission models, Case studies of IIoT network deployments	
Unit III: Sensor Integration and Data Acquisition	**7 Hrs.**
Classification of industrial sensors (temperature, pressure, vibration, etc.), Sensor selection and calibration for IIoT applications, Signal conditioning and analog-to-digital conversion, Sensor interfaces: SPI, I2C, UART, Edge node architecture for data acquisition, Introduction to DAQ systems and PLC integration, Real-time data processing and filtering techniques, Sensor fusion and preprocessing, Data logging and transmission in IIoT environments, Fault detection and diagnostics using sensor data	
Unit IV: Edge, Fog, and Cloud Computing in IIoT	**8 Hrs.**
Architecture and need for distributed computing in IIoT, Edge computing: definition, components, and use cases, Fog computing vs. edge computing, Cloud platforms for IIoT: AWS IoT, Azure IoT Hub, Google Cloud IoT, Data flow management and message brokers, Real-time analytics at the edge, Integration of fog gateways and data centers, Latency and bandwidth considerations, Role of AI/ML at edge and cloud in IIoT, Case studies demonstrating computing layer implementation	
Unit V: Security, Privacy, and Standards in IIoT	**7Hrs.**

Threats and vulnerabilities in IIoT systems, Security in sensor networks and data transmission, Encryption techniques for IIoT (TLS, AES, RSA), Device authentication and access control, Secure communication protocols in industrial networks, Role of firewalls and intrusion detection systems (IDS), Data privacy and regulatory compliance

Unit VI: Applications and Case Studies of Industrial IoT	**8 Hrs.**
Predictive maintenance and condition monitoring, Remote asset management, Industrial robotics and automation, Energy management systems, Smart grid and utility monitoring, IIoT in logistics and supply chain, Environmental monitoring in industrial zones, Digital twin and simulation-based control, IIoT-based quality control and inspection, Case studies from manufacturing, oil & gas, and agriculture sectors	
Total Lecture	**45 Hours**

Textbooks:	
1.	Alasdair Gilchrist, Industry 4.0: The Industrial Internet of Things, Apress, 2016.
2.	Sabina Jeschke et al., Industrial Internet of Things, Springer, 2017.

Reference Books:	
1.	Jan Holler et al., From Machine-to-Machine to the Internet of Things, Academic Press, 2014.
2.	Sudip Misra et al., Introduction to Industrial Internet of Things and Industry 4.0, CRC Press, 2021.

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/106/105/106105195
2.	https://www.coursera.org/learn/industrial-iot

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 Computer Technology)

B.Tech in CSE IoT

SoE No. 23IoT-101

VI SEMESTER

23IOT1642 : PE-III -Subject Name: IoT Sensors and Devices

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Explain the architecture, components, and applications of IoT systems. 2. Classify and describe the working of various sensors used in IoT applications. 3. Explain types and operations of actuators and their role in IoT-based automation. 4. Interface sensors and actuators with microcontrollers using appropriate signal conversions. 5. Demonstrate knowledge of communication protocols used in sensor data transmission. 6. Analyze design considerations for sensor-based IoT systems in real-world applications.

Unit I:	**(8 Hrs.)**
Introduction to IoT and Smart Devices: Definition, characteristics, and architecture of IoT, Evolution from M2M to IoT, Applications: Smart homes, cities, healthcare, agriculture, and industry, Overview of IoT enabling technologies, Role of sensors and actuators in IoT.	
Unit II:	**(7 Hrs.)**
Sensors for IoT : Classification of sensors: physical, chemical, biological, etc. ,Working principles of commonly used sensors: Temperature (e.g., DHT11/22) ,Light (e.g., LDR) ,Proximity (e.g., IR, ultrasonic) ,Gas sensors (e.g., MQ series) , Accelerometer and gyroscope (e.g., MPU6050) , Sensor characteristics: sensitivity, range, accuracy, calibration.	
Unit III:	**(8 Hrs.)**
Actuators and Output Devices: Classification and working of actuators: Electrical (DC/servo/stepper motors), Mechanical, thermal, hydraulic, pneumatic, Actuator selection criteria for IoT, Output devices: displays (LCD/OLED), buzzers, relays, Real-world examples: smart lighting, door locks, HVAC control.	
Unit IV:	**(7 Hrs.)**
Microcontrollers and Integration : Introduction to microcontrollers: Arduino, ESP32/ESP8266, Raspberry Pi , GPIO programming basics , Interfacing sensors and actuators , Analog vs. digital signals , Basics of ADC/DAC , Power management considerations in IoT devices.	
Unit V:	**(7 Hrs.)**
Communication and Networking : Overview of IoT communication protocols: Wired: I2C, SPI, UART , Wireless: Wi-Fi, Bluetooth, Zigbee, LoRa, NB-IoT, Sensor networks and data flow, Gateway role and cloud integration basics, Examples: MQTT, HTTP for sensor data transmission.	
Unit VI:	**(8 Hrs.)**
Design, Deployment, and Applications: Sensor node design and packaging, Environmental factors and device calibration, Case studies: smart agriculture, industrial monitoring, Security, privacy, and ethical concerns in IoT devices, Trends: Edge computing, AI-enabled sensors.	
Total Lecture	**45 Hours**

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

Textbooks:	
1.	Internet of Things: A Hands-On Approach, Arshdeep Bahga, Vijay Madisetti , Universities Press , ISBN: 978-8173719547
2.	Internet of Things (IoT): Architecture and Design Principles , Raj Kamal, McGraw-Hill Education, ISBN: 978-9352605224

Reference Books:	
1.	"Getting Started with the Internet of Things", Cuno Pfister, O'Reilly Media, ISBN: 978-1449393571
2.	Practical Internet of Things with Arduino and Raspberry Pi, Rajesh Singh, Anita Gehlot, Bhupendra Singh, CRC Press, ISBN: 978-0367332431
3	"Exploring Raspberry Pi: Interfacing to the Real World with Embedded Linux", Derek Molloy, Wiley, ISBN: 978-1119188681

VI SEMESTER
23IOT1643 : PE-III: Optimization Techniques

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Understand basic theoretical principles for formulation of optimization models and its solution.
2. Apply the unified and exact mathematical foundations and general principles of soft computing techniques to solve real-world computational problems
3. Analyze linear and non-linear systems by identifying suitable intelligent modeling techniques, optimization strategies, and control mechanisms to evaluate system behavior and performance.

Unit I:	**7 Hrs.**
Unconstrained Optimization: Optimizing Single-Variable Functions, conditions for Local Minimum and Maximum, Optimizing Multi-Variable Functions.	
Unit II:	**8 Hrs.**
Constrained Optimization: Optimizing Multivariable Functions with Equality Constraint: Direct Search Method, Lagrange Multipliers Method, Constrained Multivariable Optimization with inequality constrained: KuhnTucker Necessary conditions, Kuhn –Tucker Sufficient Conditions	
Unit III:	**7 Hrs.**
Optimization: Quasi-Newton Methods and line search, least squares optimization, Gauss-Newton, Levenberg-Marquartd, Extensions of LP to Mixed Integer Linear Programming (MILP)	
Unit IV:	**7 Hrs.**
Non-Liner Programming: The Newton Algorithm, Non-Linear Least Squares, Sequential Quadratics Programming (SQP), Constrained Optimization, SQP Implementation, Multi-Objective Optimization, Branch and Bound Approaches, Genetic Algorithms and Genetic Programming	
Unit V:	**8 Hrs.**
Optimization in Operation Research: Dynamic Programming, Transportation – Linear Optimization Simplex and Hitchcock Algorithms, Algorithms, Minimax and Maximum Algorithm, Discrete Simulation	
Unit VI:	**8 Hrs.**
Integer Programming: Cutting Plane Methods, Separable Programming, Stochastic Programming, Goal Programming, Integer Linear Programming, Pure and Mixed Strategy in theory of Games, Transshipment Problems, Heuristic Methods	
Total Lecture	**45 Hours**

Textbooks:	
1.	Operations Research: Applications and Algorithms, 3rd , Winston W L, Cengage Learning
2.	Optimization: Theory and Applications, L. Cesari, Springer
3.	Model Building in Mathematics Programming, H. Paul Williams, Wiley

Reference Books:	
1.	Integer and Combinatorial Optimization, G.L. Nemhauser and L.A. Wolsey, Wiley
2.	Discrete Optimization, R.G. Parker and R.L. Rardin.

V SEMESTER

Mandatory Learning Course (MLC)

MLC2126 : YCAP6