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 Electronics Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Electronics Engineering)

B. Tech in Electronics Engineering

SoE No. 23EE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1104	Applied Chemistry	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1105	**Lab:** Applied Chemistry	P	0	0	2	2	1		60	40	
4	1	HS/AEC1	GE	23GE1112	Professional Communication	T	2	0	0	2	2	30	20	50	2
5	1	HS/IKS	GE	23GE1115	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
6	1	BES	CV	23CV1101	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
7	1	BES	CV	23CV1102	**Lab:** Engineering Mechanics	P	0	0	2	2	1		60	40	
8	1	BES	IT	23IT1103	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
9	1	BES	IT	23IT1104	**Lab:** Programming for Problem Solving	P	0	0	2	2	1		60	40	
10	1	VSEC	GE	23GE1117	Get Set Go	…	…	…	…	…	2		60	40	
11	1	CC1	GE		**Liberal Learning Course (LLC1)**	…	…	…	…	…	2		60	40	
					TOTAL FIRST SEM		**15**	**0**	**6**	**21**	**22**				
SECOND SEMESTER (GROUP-A)															
1	2	BS	GE	23GE1202	Differential Equations, Matrices and Statistics	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1208	Engineering Physics	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1209	**Lab:** Engineering Physics	P	0	0	2	2	1		60	40	
4	2	BES	ME	23ME1201	Engineering Graphics	T	1	0	0	1	1	30	20	50	3
5	2	BES	ME	23ME1202	**Lab :** Engineering Graphics	P	0	0	4	4	2		60	40	
6	2	BES	EL	23EL1201	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	2	BES	EL	23EL1205	Lab : Electrical and Electronics Workshop	P	0	0	2	2	1		60	40	
8	2	PC	EE	23EE1203	Digital Logic Design	T	3	0	0	3	3	30	20	50	3
9	2	PC	EE	23EE1204	**Lab :** Digital Logic Design	P	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English	…	…	…	…	…	2		60	40	
11	2	CC2	GE		**Liberal Learning Course (LLC2)**	…	…	…	…	…	2		60	40	
					TOTAL SECOND SEM		**13**	**0**	**10**	**23**	**22**				

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

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

(Department of Electronics Engineering)

B. Tech in Electronics Engineering

SoE No. 23EE-101

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

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

MANDATORY LEARNING COURSES													
1	2	HS		GE2131	Universal Human Values (UHV)	A	2	0	0	2	0		

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

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

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

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

Applicable for AY 2023-24 Onwards

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							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	HSSM-1	GE	23GE1301	Fundamentals of Management & Economics	T	2	0	0	2	2	30	20	50	3
2	3	PC	EE	23EE1301	Electronic Devices and Circuits	T	3	0	0	3	3	30	20	50	3
3	3	PC	EE	23EE1302	**Lab :** Electronic Devices and Circuits	P	0	0	2	2	1		60	40	
4	3	PC	EE	23EE1303	Network Analysis	T	3	0	0	3	3	30	20	50	3
5	3	PC	EE	23EE1304	**Lab :** Network Analysis	P	0	0	2	2	1		60	40	
6	3	PC	EE	23EE1305	Signal and Systems	**T**	3	0	0	3	3	30	20	50	3
7	3	VEC-2	EE	23EE1306	Basics of Python Programming	T	2	0	0	2	2	30	20	50	3
8	3	CEP	EE	23EE1307	Community Engagement Project	P	0	0	2	4	2		60	40	
9	3	OE-1	OE		**Open Elective-I**	T	2	0	0	2	2	30	20	50	3
10	3	MDM	EE		**MD Minor Course-I**	T	2	0	0	2	2	30	20	50	3
						TOTAL	**17**	**0**	**6**	**25**	**21**				

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

		July, 2023	1.00	Applicable for AY 2023-24 Onwards
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SoE No. 23EE-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	HSSM-2	GE	23GE1401	Entrepreneurship Development	T	2	0	0	2	2	30	20	50	3
3	4	**AEC-2**	GE	23GE1405 23GE1406	Marathi Language / Hindi Language	T	2	0	0	2	2	30	20	50	3
4	4	VEC-1	CV	23CV1411	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
5	4	PC	EE	23EE1401	Electromagnetic Fields	**T**	3	0	0	3	3	30	20	50	3
6	4	PC	EE	23EE1402	**Lab :** Electronics Workshop	P	0	0	2		1		60	40	
7	4	PC	EE	23EE1403	Analog Circuits	**T**	3	0	0	3	3	30	20	50	3
8	4	PC	EE	23EE1404	**Lab :** Analog Circuits	**P**	0	0	2	2	1		60	40	
9	4	VSEC-2	EE	23EE1405	**Lab :** PCB design or CAD	P	0	0	2	4	2		60	40	
10	4	OE-2	OE		**Open Elective-II**	T	2	0	0	2	2	30	20	50	3
11	4	MDM	EE		**MD Minor Course-II**	T	2	0	0	2	2	30	20	50	3
					TOTAL		**19**	**0**	**6**	**25**	**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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SoE No. 23EE-101

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							L	T	P	Hrs		MSEs*	TA**	ESE	
FIFTH SEMESTER															
1	5	PC	EE	23EE1501	Analog and Digital Communication	T	3	0	0	3	3	30	20	50	3
2	5	PC	EE	23EE1502	**Lab** : Analog and Digital Communication	P	0	0	2	2	1		60	40	
3	5	PC	EE	23EE1503	Digital System Modelling	T	3	0	0	3	3	30	20	50	3
4	5	PC	EE	23EE1504	**Lab :** Digital System Modelling	P	0	0	2	2	1		60	40	
5	5	PC	EE	23EE1505	Microcontroller and Interfacing	T	3	0	0	3	3	30	20	50	3
6	5	PC	EE	23EE1506	**Lab :** Microcontroller and Interfacing	P	0	0	2	2	1		60	40	
7	6	PC	EE	23EE1507	Algorithm and Data Structure	T	2	0	0	2	2	30	20	50	3
8	6	PC	EE	23EE1508	**Lab :** Algorithm and Data Structure	P	0	0	2	2	1		60	40	
9	5	PE	EE		**Professional Elective-I**	T	3	0	0	3	3	30	20	50	3
10	5	**OE-3**	OE		**Open Elective-III**	T	3	0	0	3	3	30	20	50	3
11	5	MDM	EE		**MD Minor Course-III**	T	3	0	0	3	3	30	20	50	3
12	5	STR	EE	23EE1509	Internship and Indsutrial Visit	P	0	0	2	2	1		60	40	
					TOTAL		**20**	**0**	**10**	**30**	**25**				
List of Mandatory Learning Course (MLC)															
1	5	HS	T&P	MLC2125	**YCAP5 :** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Professional Elective - I

1	5	PE-I	EE	23EE1521	**PE-I :** Computer Architectures and Organisation
2	5	PE-I	EE	23EE1522	**PE-I :** Swithching Theory
3	5	PE-I	EE	23EE1523	**PE-I :** Embedded Operating System
4	5	PE-I	EE	23EE1524	**PE-I :** Transmission line and wave Guide
5	5	PE-I	EE	23EE1525	**PE-I :** Sensors, Actuators and Signal conditioning
6	5	PE-I	EE	23EE1526	**PE-I :** Power Electronics

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	EE	23EE1601	Object Oriented Programming	**T**	3	0	0	3	3	30	20	50	3
2	6	PC	EE	23EE1602	**Lab :** Object Oriented Programming	**P**	0	0	2	2	1		60	40	
3	6	PC	EE	23EE1603	Control System Engineering	**T**	3	0	0	3	3	30	20	50	3
4	6	PC	EE	23EE1604	Design Thinking and Research Methodology	T	2	0	0	2	2	30	20	50	3
5	6	PE	EE		**Professional Elective-II**	**T**	3	0	0	3	3	30	20	50	3
6	6	PE	EE		**Lab : Professional Elective-II**	**P**	0	0	2	2	1		60	40	
7	6	PE	EE		**Professional Elective-III**	**T**	3	0	0	3	3	30	20	50	3
8	6	PE	EE		**Lab : Professional Elective-III**	**P**	0	0	2	2	1		60	40	
9	6	MDM	EE		**MD Minor Course-IV**	T	3	0	0	3	3	30	20	50	3
10	5	**VSEC-4**	EE	23EE1605	**Lab :** Electronics Design Automation	P	0	0	2	4	2		60	40	
11	6	STR	EE	23EE1606	Project Phase-I	P	0	0	4	4	2		60	40	
					TOTAL		**17**	**0**	**12**	**31**	**24**				

List of Mandatory Learning Course (MLC)															
1	6	HS		MLC126	**YCAP6 :** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Professional Electives - II					
1	6	PE-II	EE	23EE1621	**PE-II :** Data Analytics
2	6	PE-II	EE	23EE1622	**PE-II : Lab :** Data Analytics
3	6	PE-II	EE	23EE1623	**PE-II :** Digital VLSI Design
4	6	PE-II	EE	23EE1624	**PE-II : Lab :** Digital VLSI Design
5	6	PE-II	EE	23EE1625	**PE-II :** Embedded System
6	6	PE-II	EE	23EE1626	**PE-II : Lab :** Embedded System
7	6	PE-II	EE	23EE1627	**PE-II :** Industrial Automation
8	6	PE-II	EE	23EE1628	**PE-II : Lab :** Industrial Automation
9	6	PE-II	EE	23EE1629	**PE-II :** RF & Microwave
10	6	PE-II	EE	23EE1630	**PE-II : Lab :** RF & Microwave
11	6	PE-II	EE	23EE1631	**PE-II :** Quantum Computing
12	6	PE-II	EE	23EE1632	**PE-II : Lab :** Quantum Computing

Professional Electives - III					
1	6	PE-III	EE	23EE1641	**PE-III :** Machine Learning
2	6	PE-III	EE	23EE1642	**PE-III : Lab :** Machine Learning
3	6	PE-III	EE	23EE1643	**PE-III :** CMOS Subsystem Design
4	6	PE-III	EE	23EE1644	**PE-III : Lab :** CMOS Subsystem Design
5	6	PE-III	EE	23EE1645	**PE-III :** Computer Communication Network
6	6	PE-III	EE	23EE1646	**PE-III : Lab :**Computer Communication Network
7	6	PE-III	EE	23EE1647	**PE-III :** Wireless Communication
8	6	PE-III	EE	23EE1648	**PE-III : Lab :** Wireless Communication
9	6	PE-III	EE	23EE1649	**PE-III :** Soft Computing & Optimization Techniques
10	6	PE-III	EE	23EE1650	**PE-III : Lab :** Soft Computing & Optimization Techniques
11	6	PE-III	EE	23EE1651	**PE-III :** Cryptography and Network Security
12	6	PE-III	EE	23EE1652	**PE-III : Lab :** Cryptography and Network Security

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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

1st Semester

(Department of Electrical Engineering)

B. Tech in Electronics Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Electronics Engineering)

B. Tech in Electronics Engineering

SoE No. 23EE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1104	Applied Chemistry	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1105	**Lab:** Applied Chemistry	P	0	0	2	2	1		60	40	
4	1	HS/AEC1	GE	23GE1112	Professional Communication	T	2	0	0	2	2	30	20	50	2
5	1	HS/IKS	GE	23GE1115	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
6	1	BES	CV	23CV1101	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
7	1	BES	CV	23CV1102	**Lab:** Engineering Mechanics	P	0	0	2	2	1		60	40	
8	1	BES	IT	23IT1103	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
9	1	BES	IT	23IT1104	**Lab:** Programming for Problem Solving	P	0	0	2	2	1		60	40	
10	1	VSEC	GE	23GE1117	Get Set Go	…	…	…	…	…	2		60	40	
11	1	CC1	GE		**Liberal Learning Course (LLC1)**	…	…	…	…	…	2		60	40	
					TOTAL FIRST SEM		**15**	**0**	**6**	**21**	**22**				
SECOND SEMESTER (GROUP-A)															
1	2	BS	GE	23GE1202	Differential Equations, Matrices and Statistics	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1208	Engineering Physics	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1209	**Lab:** Engineering Physics	P	0	0	2	2	1		60	40	
4	2	BES	ME	23ME1201	Engineering Graphics	T	1	0	0	1	1	30	20	50	3
5	2	BES	ME	23ME1202	**Lab :** Engineering Graphics	P	0	0	4	4	2		60	40	
6	2	BES	EL	23EL1201	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	2	BES	EL	23EL1205	Lab : Electrical and Electronics Workshop	P	0	0	2	2	1		60	40	
8	2	PC	EE	23EE1203	Digital Logic Design	T	3	0	0	3	3	30	20	50	3
9	2	PC	EE	23EE1204	**Lab :** Digital Logic Design	P	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English	…	…	…	…	…	2		60	40	
11	2	CC2	GE		**Liberal Learning Course (LLC2)**	…	…	…	…	…	2		60	40	
					TOTAL SECOND SEM		**13**	**0**	**10**	**23**	**22**				

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

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 Electronics Engineering

SoE No. 23EE-101

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

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

MANDATORY LEARNING COURSES													
1	2	HS		GE2131	Universal Human Values (UHV)	A	2	0	0	2	0		

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

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

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

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

Applicable for AY 2023-24 Onwards

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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 Mathematics & Humanities)

B.Tech First Year

SoE No. 23FY-101

I SEMESTER

23GE1101: Calculus and Vector

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

Unit I: Differential Calculus	**(6 Hrs.)**
Successive differentiation, n^{th} derivative of rational function, Trigonometrical transformations, n^{th} derivative of the product of two functions (Leibnitz's theorem), Taylor's theorem, Use of Maclaurin's theorem for one variable, standard expansions, Examples on Taylor's Theorem. **(Contemporary Issues related to Topic)**	
Unit II: Partial Differentiation	**(7 Hrs.)**
Functions of several variables, First and higher order derivatives, Homogeneous functions, Euler's theorem on homogeneous function, Chain rule and total differential coefficient of composite functions. Jacobians. **(Contemporary Issues related to Topic)**	
Unit III: Integral Calculus	**(6 Hrs.)**
Improper integrals: Gamma and Beta functions, applications of integral calculus in computing area, length, volumes, and surface of solids of revolutions. **(Contemporary Issues related to Topic)**	
Unit IV: Multiple integrals	**(6 Hrs.)**
Double integral, change of order of integral, change of variables, triple integrals and its applications. **(Contemporary Issues related to Topic)**	
Unit V: Vector Calculus	**(7 Hrs.)**
Vector fields, Vector differentiation, Gradient, Divergence and Curl, Directional derivatives with physical interpretation, Solenoidal and irrotational motions. **(Contemporary Issues related to Topic)**	
Unit VI: Vector Integration & Applications	**(7 Hrs.)**
Vector integration: Line, surface and volume integrals, Statement of Stoke's theorem, Gauss divergence theorem and Green's theorem (without proof), Simple applications of these theorems. **(Contemporary Issues related to Topic)**	
Total Lecture	**39 Hours**

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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

23GE1104/23GE1204: Applied 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 engineering materials for industrial applications. (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: Fuels **(8 Hrs.)**

Introduction, Calorific value, HCV & LCV. Determination of calorific value of fuels by Bomb & Boy's calorimeter. Dulong's formula Numerical.
Significance of Proximate and Ultimate analysis.
Knocking in Internal combustion petrol and diesel engines, Octane and Cetane number, Knocking and its relationship with structure of fuels. Catalytic cracking & advantages. Contemporary issues related to the topic

Unit V: Engineering Materials **(7 Hrs.)**

Cement: Introduction, Manufacturing of Portland cement. Role of microscopic constituents. Properties-setting and hardening, heat of hydration and soundness. Types of cement-Rapid hardening cement, Low heat cement, High alumina cement. Ready-mix concrete.

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Lubricants: Introduction, Classification, Mechanism of Lubrication.
Properties & Significance of liquid lubricants–Viscosity and viscosity index, Flash and fire point, Cloud and pour point, Aniline point, acid value, saponification number. Numerical on V.I. Contemporary issues related to the topic.

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

Nanomaterials: Definition, Carbon Nanotubes and types. Applications of Nanomaterials in Electronics, Environment and Medicine.
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.
Spectroscopic techniques: Introduction and applications. Contemporary issues related to the topic

Total Lecture	**45 Hours**

Textbooks:

1.	S S. Dara , A Text book 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 .

Reference Books:

1.	Eskel Nordell , Water treatment for industrial and other use ,Rein hold Publishing Corporation, New York.
2.	Lloyd A.Munro, Chemistry in Engineering, Prentice-hall, Inc Nj, 2nd Edition.
3.	Robert B Leighou Mc Graw, Chemistry of Engineering Materials, Hill Book Company, Inc New York.
4.	B.K.Sharma Krishna, Engineering Chemistry, Prakashan media private LTD. 1st Edition, 2014.
5.	R.V.Gadag, A.Nityananda Shetty, Engineering Chemistry ,I K International Publishing House New Delhi , First Edition.
6	Fred. Billmeyer Jr., A textbook of polymer science, Wiley India ,Third 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://youtu.be/-R7s17hD104
7.	https://youtu.be/Bmj85Ihfv7w

I/II SEMESTER

23GE1105/23GE1205: Applied 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

I SEMESTER

23GE1112 : 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	**(6 Hrs.)**
Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Classification of Barriers (Intrapersonal, Interpersonal, Organizational).	
Unit II: English Phonetics	**(7 Hrs.)**
Speech Mechanism, Organs of speech, Consonant and Vowels sounds symbols, word stress rules	
Unit III: Presentation & Interview Skills	**(6 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	**(7 Hrs.)**
Report -Types, Characteristics, prewriting aspects of report and preparing writing of reports Memo- Objectives, Types, Structure and Layout Email-Etiquettes, acronyms.	
Total Lecture	**26 Hours**

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

I SEMESTER

23GE1115 : Indian Knowledge System

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

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

Textbooks	
1	Reader's Digest: Vanished Civilizations, THE READER'S DIGEST ASSOCIATION LIMITED, LONDON,NEWYORK.
2	Qaiser Zoha Alam ; Language and Literature Divers Indian Experience
3	Bal Ram Singh (Author), Nath Girish (Author) ; Science and Technology in Ancient Indian Texts
4	NCERT Books

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

	PPT's/Research papers
1	https://www.researchgate.net/publication/360889208_STONE_AGE_TOOL_TECHNOLOGY_and_CULTURAL_DEVELOPMENT
2	https://scholar.google.com/citations?view_op=view_citation&hl=en&user=iT1KSV8AAAAJ&sortby=pubdate&citation_for_view=iT1KSV8AAAAJ:UeHWp8X0CEIC

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

I SEMESTER

23CV1101 : Engineering Mechanics

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

Unit I: Resultant of planar force System	**(7 Hrs.)**
Fundamental concepts, system of forces, laws of mechanics, principle of transmissibility of force, Moment of force, Principle of moment, Couple, Resultant of a planar force system, Equivalent force couple system. **(Contemporary Issues related to Topic)**	
Unit II: Equilibrium of planar force System	**(6 Hrs.)**
Free body diagrams, Conditions of equilibrium, types of supports, types of beams, types of loads on beam, Equilibrium of a planar force system **(Contemporary Issues related to Topic)**	
Unit III: Friction and Trusses	**(7 Hrs.)**
Friction: Coulomb's laws of dry friction, plane friction, belt friction. Trusses: Types of trusses, assumptions in analysis of truss, Analysis of truss by method of joint. **(Contemporary Issues related to Topic)**	
Unit IV: Properties of Surfaces	**(6 Hrs.)**
Centroid: Introduction, First Moment of Area, Centroid of composite areas. Moment of Inertia: Introduction, Second Moment of Area, Polar moment of Inertia, Radius of Gyration, Transfer formula for moment of Inertia, Product of Inertia, Moment of Inertia, and product of inertia for composite areas, Principal Moments of Inertia. **(Contemporary Issues related to Topic)**	
Unit V: Virtual Work Method and Kinetics of Particle	**(7 Hrs.)**
Virtual Work Method: Introduction, Principle of virtual work, Application to beam and frame. Kinetics of Particle: Introduction, Newton's law of motion for a Particle, D' Alembert's principle, Translation of particle and connected system. **(Contemporary Issues related to Topic)**	
Unit VI: Work Energy and Impulse Momentum Method	**(6 Hrs.)**
Work Energy Method: Introduction, Work energy equation for translation, Work energy applied to particle motion and connected system. Impulse Momentum Method: Introduction, Linear Impulse momentum, Conservation of linear momentum, coefficient of restitution, elastic impact, Impulse momentum in plane motion. **(Contemporary Issues related to Topic)**	
Total Lecture	**39 Hours**

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

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

I SEMESTER

23CV1102 : Lab. Engineering Mechanics

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

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

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

I SEMESTER

23IT1103 : Programming for Problem Solving

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

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

			July,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

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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

I SEMESTER

23IT1104 : Lab. Programming for Problem Solving

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

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

			July,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

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

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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 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**

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

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

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(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 Electronics Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Electronics Engineering)

B. Tech in Electronics Engineering

SoE No. 23EE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1104	Applied Chemistry	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1105	**Lab:** Applied Chemistry	P	0	0	2	2	1		60	40	
4	1	HS/AEC1	GE	23GE1112	Professional Communication	T	2	0	0	2	2	30	20	50	2
5	1	HS/IKS	GE	23GE1115	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
6	1	BES	CV	23CV1101	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
7	1	BES	CV	23CV1102	**Lab:** Engineering Mechanics	P	0	0	2	2	1		60	40	
8	1	BES	IT	23IT1103	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
9	1	BES	IT	23IT1104	**Lab:** Programming for Problem Solving	P	0	0	2	2	1		60	40	
10	1	VSEC	GE	23GE1117	Get Set Go	…	…	…	…	…	2		60	40	
11	1	CC1	GE		**Liberal Learning Course (LLC1)**	…	…	…	…	…	2		60	40	
					TOTAL FIRST SEM		**15**	**0**	**6**	**21**	**22**				
SECOND SEMESTER (GROUP-A)															
1	2	BS	GE	23GE1202	Differential Equations, Matrices and Statistics	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1208	Engineering Physics	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1209	**Lab:** Engineering Physics	P	0	0	2	2	1		60	40	
4	2	BES	ME	23ME1201	Engineering Graphics	T	1	0	0	1	1	30	20	50	3
5	2	BES	ME	23ME1202	**Lab :** Engineering Graphics	P	0	0	4	4	2		60	40	
6	2	BES	EL	23EL1201	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	2	BES	EL	23EL1205	Lab : Electrical and Electronics Workshop	P	0	0	2	2	1		60	40	
8	2	PC	EE	23EE1203	Digital Logic Design	T	3	0	0	3	3	30	20	50	3
9	2	PC	EE	23EE1204	**Lab :** Digital Logic Design	P	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English	…	…	…	…	…	2		60	40	
11	2	CC2	GE		**Liberal Learning Course (LLC2)**	…	…	…	…	…	2		60	40	
					TOTAL SECOND SEM		**13**	**0**	**10**	**23**	**22**				

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

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 Electronics Engineering

SoE No. 23EE-101

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

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

MANDATORY LEARNING COURSES													
1	2	HS		GE2131	Universal Human Values (UHV)	A	2	0	0	2	0		

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

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

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

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

Applicable for AY 2023-24 Onwards

II SEMESTER

23GE1202 : 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	**(7 Hrs.)**
Higher order linear differential equations with constant coefficients, Complementary functions and Particular Integral for different cases, Method of variation of parameters, Examples on application to various fields. **(Contemporary Issues related to Topic)**	
Unit III: Differential Equations III	**(6 Hrs.)**
Cauchy's homogeneous linear differential equations, Legendre's linear differential equation, Applications of differential equations to various fields (only up to second order). **(Contemporary Issues related to Topic)**	
Unit IV: Partial Differential Equations	**(6 Hrs.)**
Partial Differential Equations of first order, first degree i.e. Lagrange's form, linear homogeneous equations of higher order with constant coefficient. Application of variable separable method to solve first and second order partial differential equations. **(Contemporary Issues related to Topic)**	
Unit IV: Matrices	**(7 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	**(6 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	**39 Hours**

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

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

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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/

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 Physics)

B.Tech First Year

SoE No. 23FY-101

II SEMESTER

23GE1208 : Engineering 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. Assess the characteristics of semiconductor materials in terms of crystal structures, charge carriers and Energy bands.
3. Examine the intensity variation of light due to interference, diffraction, laser and its applications.
4. Analyze the motion of charged particles in electric and magnetic field and its applications to electron optic devices.
5. Illustrate the nature and characterization of magnetic materials and superconductors for engineering applications.

Unit I: Quantum Physics	**(7 Hrs.)**
Wave-particle duality, de-Broglie's hypothesis, Wave packet, Heisenberg's uncertainty principle: significance and applications, Wave function and its probability interpretation, Schrodinger Equation, Particle in infinite potential well. **(Contemporary Issues related to Topic)**	
Unit II: Semiconductor Physics	**(7 Hrs.)**
Formation of energy bands in solids; Classification of solids, Energy band diagram of Si and Ge, Intrinsic and extrinsic semiconductors, Conductivity, Law of mass action, Fermi function, Fermi level in intrinsic and extrinsic semiconductors, Dependence of Fermi level on impurity concentration and temperature, Hall effect. **(Contemporary Issues related to Topic)**	
Unit III: Geometrical Optics	**(7 Hrs.)**
Interference: Interference in thin films, Wedge shaped film, Newton's rings, Applications of interference Diffraction: Fraunhofer diffraction from a single slit. **(Contemporary Issues related to Topic)**	
Unit IV: Laser	**(6 Hrs.)**
Coherence and its types, Interaction of radiation with matter, Population Inversion, Pumping: methods and schemes, Optical resonant cavity, Ruby laser, Semiconductor diode laser, Properties and engineering applications of laser. **(Contemporary Issues related to Topic)**	
Unit V: Electron Ballistics	**(7 Hrs.)**
Motion of a charged particle in uniform electric and magnetic field, Cross field configuration; Electron refraction, Electron lens. Cathode ray oscilloscope and its application. **(Contemporary Issues related to Topic)**	
Unit VI: Magnetic Materials & Superconductors	**(6 Hrs.)**
Introduction to magnetic materials, Interpretation of Hysteresis curves, Superconductors: Type-I and Type-II, Meissner effect, Applications. **(Contemporary Issues related to Topic)**	
Total Lecture	**40 Hours**

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

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.
9	B. K. Pandey, S. Chaturvedi, Engineering Physics, 1st Edition, Cengage Learning.
10	John Allision, Electronic Engineering Materials and Devices, TMH edition, 10th reprint, Tata 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/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
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Dekker%20-%20Solid%20State%20Physics.pdf

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

II SEMESTER
23GE1209 : Lab. Engineering 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. Assess the characteristics of semiconductor materials in terms of crystal structures, charge carriers and Energy bands. 3. Examine the intensity variation of light due to interference, diffraction, laser and its applications. 4. Analyze the motion in electric field and magnetic field and its applications to electron optic devices. 5. Illustrate the nature and characterization of magnetic materials and superconductors for engineering Applications.

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	Determination of Band gap in a semiconductor by four probe method.
6	Determination of Band gap in a semiconductor using reverse biased p-n junction diode.
7	Determination of radius of curvature of Plano convex lens using Newton's rings.
8	Determination of thickness of thin paper using air wedge.
9	Determination of wavelength of sodium light using diffraction grating.
10	Determination of wavelength of laser using diffraction grating.
11	Determination of divergence of laser beam.
12	Determination of amplitude and frequency of sinusoidal signal using CRO.
13	To measure the phase shift introduced by a phase shift network using Dual beam CRO.
14	Determination of the velocity of Ultrasonic waves in a non -electrolytic liquid by ultrasonic interferometer.

II SEMESTER

23ME1201 : Engineering Graphics

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Construct orthographic drawing and isometric drawing of a given object
2. Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects
3. Develop the lateral surfaces of various solids, their section and intersection**.**
4. Practice the use of software tools used for Two dimensional drawings.

Unit I: Theory of Orthographic Projections:	**(3 Hrs.)**
Introduction, Quadrant system, Theory of orthographic projection, Projection method and principal planes, First and Third angle projections,	
Unit II: Theory of Isometric Projections:	**(2 Hrs.)**
Theory of isometric projection, Method for drawing isometric views, Different problems on isometric projections.	
Unit III: Lines:	**(2 Hrs.)**
Projection of points, Projection of lines, True lengths and inclinations, apparent lengths and inclinations, various positions of lines in different quadrants, Traces of lines, projection of line on auxiliary plane.	
Unit IV: Planes and Solids:	**(4 Hrs.)**
Projection planes: (Polygonal Lamina, Circular Lamina), Projection of Perpendicular planes and oblique planes. Auxiliary views (Auxiliary planes) Projection of Solids :(Inclined to One Plane Only) - Polyhedra (Regular and Irregular Polyhedra), Solids of Revolution	
Unit V: Section of Solids and Development of Surfaces:	**(2 Hrs.)**
Types of Section planes, Sectional top view, True shape. Development of different solids using Radial line and parallel line methods.	
Unit VI: Intersection of Surfaces of solids:	**(2 Hrs.)**
Intersection between similar solids, Intersection between dissimilar solids, Lines and Curves of Intersection.	
Total Lecture	**15 Hours**

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

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

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

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

II SEMESTER

23ME1202 : Lab. Engineering Graphics

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Construct orthographic drawing and isometric drawing of a given object
2. Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects
3. Develop the lateral surfaces of various solids, their section and intersection**.**
4. Practice the use of software tools used for Two dimensional drawings.

Practical's to be performed from the list as below

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

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 Electrical Engineering)

B.Tech in Electrical Engineering

SoE No. 23EL-101

II SEMESTER

23EL1201 : Basic Electrical and Electronics Engineering

Course Outcomes:

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

Unit I: Circuit Elements and Energy Sources	**(7 Hrs.)**
Circuit Elements, Series and Parallel Combination of Resistances, Inductance and Capacitances, Energy Sources, Source Transformation, Sources with Periodic Waveforms, A.C. in Inductance and Capacitance, Star-Delta Connection. **(Contemporary Issues related to Topic)**	
Unit II: Analysis of Network	**(7 Hrs.)**
Kirchhof's Laws, Current Division, Voltage Division, Nodal and Mesh Analysis of Electric Circuits, Thevenin's Theorem **(Contemporary Issues related to Topic)**	
Unit III: Generator and Motors	**(7 Hrs.)**
Introduction to Generator, Construction, working principle, Types of Generators, Introduction to DC Motor,Working Principle of DC Motor, Types of Motors. **(Contemporary Issues related to Topic)**	
Unit IV: Diode and Transistor	**(6 Hrs.)**
Introduction to Semiconductor, P-N junction diodes, Biasing & Characteristics of diodes. Diode Circuits - Half wave rectifier, full wave rectifier, bridge rectifier. Introduction to BJT- NPN and PNP, Modes of operation,. **(Contemporary Issues related to Topic)**	
Unit V: Operational Amplifier and Its Application	**(7 Hrs.)**
Introduction to Op-Amp, Inverting and Non-Inverting Amplifier, Linear Applications of OP-AMP like adder, Subtractor, integrator, differentiator and non-linear application using Comparator. **(Contemporary Issues related to Topic)**	
Unit VI: Electronics Measurement	**(6 Hrs.)**
Introduction to Measurement System, Generalized block diagram of Measurement System, Static & dynamic characteristics of measurement system, Types of errors & their sources, Statistical analysis. **(ContemporaryIssues related to Topic)**	
Total Lecture	**40 Hours**

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

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

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

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

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

II SEMESTER

23EL1205 : Lab : Electrical and Electronics Workshop

Course Outcomes:
Upon successful completion of the course the students will be able
1. To choose the electrical and electronics components/equipment for various application 2. To select various sensors and measuring instruments for different applications. 3. To build the various electrical wiring for different application

Sr. No.	Experiments based on
1	Introduction of Tools, Electrical Materials and Electrical Drawing Symbols
2	Introduction to basic Electrical Components (R, L, C) with its number and color coding.
3	Introduction to Different types of Measuring Instruments and its demonstration.
4	To implement 12 V DC power supply using 7812 IC
5	Fabrication of four switch socket Electrical Distribution Board
6	To fabricate Staircase Wiring and Godown Wiring
7	Fabrication of solar powered electric fan
8	To monitor the output voltage of solar panel using voltage Sensor
9	Introduction to Different sensor devices and its demonstration.
10	To Study different protection devices and Importance of Earthing.

II SEMESTER
23EE1203 : 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**

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

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

II SEMESTER
23EE1204 : 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

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

B. Tech SoE and Syllabus 2023

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

(Department of Mathematics & Humanities)

SoE No. 23FY-101

B.Tech First Year

II SEMESTER

23GE1218 : Functional English

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

Unit:1	Introduction to Functional English	6 Hours
What is FE? And Areas of application. Basic Interactive sentences - Greetings & Replies, Asking for information, Telling people what you do, Asking somebody's opinion, Giving your opinion, Saying someone is correct, Saying that someone is wrong, Apologizing, Praising someone's work, Saying goodbye. Introduction & Basics of Common Expressions – Offer, Request, Gratitude, Apology. Modal Verbs - Words used often: Can- could, Will – would, Shall – should, Ought to-Must, May-might. Practice exercises, Practice Conversations, Script Activity		
Unit:2	**Internet & Social Media Communication**	**6 Hours**
Introduction & Basics to Social Networking, Texting & Instant messaging, Blogs & Discussion Board- discussion with examples, Ethics of social media & communication Topic: Introduction to Creative Ads Why Ads, What's in it for me? Characteristics of ads. Assignment Quiz on the above Topics, Exercises for Evaluation		
Unit:3	**TENSES**	**6 Hours**
Introduction & Basics, Simple Tense (Past, Present, Future), Continuous Tense (Past, Present, Future) – discussion with examples. Introduction & Basics, Perfect Tense (Past, Present, Future), Perfect Continuous Tense (Past, Present, Future) – discussion with examples Introduction to Movie Magic, Learn English with films, Film Vocabulary, Describing a film, Types of Films Assessment – Letter and Email Writing, Tenses – Quiz		
Unit:4	**Written Communication**	**5 Hours**
Introduction & Basics of Writing, five methods of communication, Mind your grammar, Commonly confusing words Letters – Format, Parts of a business letter, When does communication fail?, Things to remember, Positive language not negative language, Active voice not passive voice Effective emailing -How to make an effective e-mail, Few common e-mail habits that cause problems, Parts of an e-mail, Some other important aspects.		

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

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 Electrical Engineering)

B. Tech in Electronics Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Electronics Engineering)

B. Tech in Electronics Engineering

SoE No. 23EE-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-1	GE	23GE1301	Fundamentals of Management & Economics	T	2	0	0	2	2	30	20	50	3
2	3	PC	EE	23EE1301	Electronic Devices and Circuits	T	3	0	0	3	3	30	20	50	3
3	3	PC	EE	23EE1302	**Lab :** Electronic Devices and Circuits	P	0	0	2	2	1		60	40	
4	3	PC	EE	23EE1303	Network Analysis	T	3	0	0	3	3	30	20	50	3
5	3	PC	EE	23EE1304	**Lab :** Network Analysis	P	0	0	2	2	1		60	40	
6	3	PC	EE	23EE1305	Signal and Systems	**T**	3	0	0	3	3	30	20	50	3
7	3	VEC-2	EE	23EE1306	Basics of Python Programming	T	2	0	0	2	2	30	20	50	3
8	3	CEP	EE	23EE1307	Community Engagement Project	P	0	0	2	4	2		60	40	
9	3	OE-1	OE		**Open Elective-I**	T	2	0	0	2	2	30	20	50	3
10	3	MDM	EE		**MD Minor Course-I**	T	2	0	0	2	2	30	20	50	3
						TOTAL	**17**	**0**	**6**	**25**	**21**				

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

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

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

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

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

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

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 Electronics Engineering)

B.Tech in Electronics Engineering

SoE No. 23EE-101

III SEMESTER

23EE1301: Electronic Devices and Circuits

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Analyze different types of semiconductor devices, their operation and characteristics. 2. Design and analyze the DC bias circuitry of BJT and FET. 3. Analyze and model BJT for small signal and low frequency. 4. Apply concept of feedback to improve the stability of circuits. 5. Design circuits using the transistors and oscillators

Unit:1	**Transistors**	**8 Hours**
BJT - structure, operation, characteristics and Biasing BJT structure, Symbol, Basic operation. Input and Output Characteristics in CE, CB and CC configuration, BJT biasing, Stability factor.		
Unit:2	**Low frequency BJT**	**7 Hours**
Single Stage Amplifiers BJT small signal model – Analysis of CE, CB, CC amplifiers, Miller's theorem		
Unit:3	**JFET & MOSFET**	**7 Hours**
JFET:-Symbol, Structure, operation, characteristics, Drain and Transfer Characteristics, JFET Biasing. **MOSFET: -**Structure, Symbol, Basic operation, Drain and Transfer Characteristics, MOSFET Biasing.		
Unit:4	**Low frequency FET & MOSFET**	**8 Hours**
Small signal model– Analysis of CS, CG and CD amplifiers.		
Unit:5	**Power Amplifiers**	**7 Hours**
Classes of power amplifiers – Class A, Class B amplifiers, Analysis of Class A, Class B, Distortions in amplifiers.		
Unit :6	**Feedback Amplifiers and Oscillators**	**8 Hours**
Feedback Amplifiers: - Feedback Concept, Classification of amplifiers based on feedback topology, (Voltage, Current, Transconductance and Transresistance amplifiers), Effect of negative feedback on various performance parameters of an amplifier. **Oscillators:** Condition for oscillations, phase shift – Wien bridge, Hartley, Colpitts and Crystal oscillator.		
	Total Lecture Hours	**45 Hours**

Textbooks	
1	Millman & Halkies, "Electronic Device and Circuits", Second Edition, Tata McGraw Hill.
2	Boylestead & Nashelsky, "Electronic devices and Circuits Theory" Eighth edition, PHI

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Reference Books	
1	Millman Halkies, "Integrated Electronics", Tata McGraw Hill.
2	David A. Bell, "Electronic Device and Circuits", Fourth Edition, PHI.
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	http://nptel.iitm.ac.in/video.php?subjectId=117103063
2	NPTEL Video: mod07lec29: BJT
3	NPTEL Video: mod07lec30

III SEMESTER
23EE1302: Lab. Electronic Devices and Circuits

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Analyze different types of semiconductor devices, their operation and characteristics. 2. Design and analyze the DC bias circuitry of BJT and FET. 3. Analyze and model BJT for small signal and low frequency. 4. Apply concept of feedback to improve the stability of circuits. 5. Design circuits using the transistors and oscillators

Sr. No.	Experiments based on
1	To plot I/P & O/P Characteristics of Common Base Transistor Configuration. Find I/P& O/P Resistance and Current Gain.
2	To plot I/P & O/P Characteristics of Common Emitter Transistor Configuration. Find I/P& O/P Resistance and Current Gain.
3	To perform the Fixed Bias circuit of the transistor.
4	To perform the Self Bias circuit of transistor.
5	To perform the Drain and Transfer characteristics of Field Effect Transistor (FET).
6	To Plot the Frequency Response of a single stage RC coupled CE amplifier.
7	N-Channel MOSFET amplifier in common source configuration with and without feedback.
8	To determine the efficiency of Class A power amplifier.
9	To determine the efficiency of Class B push pull power amplifier and to study cross over distortion.
10	To determine the phase shift in RC phase shift oscillator.

III SEMESTER
23EE1303 : Network Analysis

Course Outcomes:
Upon successful completion of the course the students will be able to 1. **Define, understand** and **explain** concepts related to electrical networks. 2. **Apply** the knowledge of network theorems to the electrical networks to acquire the desired parameter. 3. **Understand** and **analyze** electrical circuits in transform domain. 4. **Apply** the concept of two – port networks to **evaluate** different two-port parameters. 5. **Analyze** network concepts using EDA Tool.

Unit:1	**Nodal Analysis of Electric Circuits**	***8 Hours***
Basics of electric circuits, circuit elements and their voltage – current relationship, classification of circuit elements, sources - their types and characteristics, concept of equivalent sources, source transformation and duality, concept of supernode , nodal analysis of circuits containing resistors, inductors, capacitors, transformers, and both independent and dependent sources to determine current, voltage and power.		
Unit:2	**Mesh Analysis of Electric Circuits**	***7 Hours***
Mesh Analysis, Concept of super mesh, mutual inductance, coefficient of coupling, dot convention, dot marking in coupled coils, mesh analysis of circuits containing resistors, inductors, capacitors, transformers, and both independent and dependent sources to determine current, voltage and power.		
Unit:3	**Network Theorem**	***9 Hours***
Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem		
Unit:4	**Initial and Final Conditions, Impedance Functions and Circuit Analysis with Laplace Transform**	***7 Hours***
Concept of initial and final conditions, behaviour of resistor, inductor and capacitor at t = 0- and at t = 0+, procedure for evaluating initial and final conditions, analytical treatment. Review of Laplace Transform, transform impedance and admittance, s – domain impedance and admittance models for resistor, inductor and capacitor, series and parallel combinations of elements. Transformed network on loop and mesh basis, mesh and node equations for transformed networks, time response of electrical network with and without initial conditions by Laplace transform.		

Unit:5	**Transforms of other Signal Waveforms, Network Functions, Poles and Zeros of network functions**	***7 Hours***
Unit step, ramp and impulse functions with and without time delay, their Laplace transform, waveform synthesis and its application to electrical networks. Terminal pairs or ports, network functions for one port and two port networks, definition and physical interpretation of poles and zeros, pole-zero plot for network functions, restrictions on pole and zero locations for driving point and transfer functions, time domain behaviour from the pole – zero plot, network synthesis using pole – zero plot.		
Unit :6	**Two Port Parameters**	***7 Hours***
Standard reference directions for the voltages and currents of a two – port network, defining equations for open circuit impedance, transmission, inverse transmission, hybrid and inverse hybrid parameters, relationships between parameter sets, conditions for reciprocity and electrical symmetry in terms of two – port parameters, interconnections of two - port networks.		
	Total Lecture Hours	**45 Hours**

Text books	
1	M.E.VanValkenburg, Network Analysis, 3rd Edition, PHI Learning Private Limited.
Reference Books	
1	Sudhakar,A.,Shyammohan,S.P., Circuits and Network, Tata McGraw-Hill New Delhi
2	A William Hayt ,Engineering Circuit Analysis,8th Edition, McGraw-Hill Education.
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/108105159
2	https://archive.nptel.ac.in/courses/108/105/108105159/

III SEMESTER
23EE1304 : Lab. Network Analysis

Course Outcomes:
Upon successful completion of the course the students will be able to 1. **Define, understand** and **explain** concepts related to electrical networks. 2. **Apply** the knowledge of network theorems to the electrical networks to acquire the desired parameter. 3. **Understand** and **analyze** electrical circuits in transform domain. 4. **Apply** the concept of two – port networks to **evaluate** different two-port parameters. 5. **Analyze** network concepts using EDA Tool.

Sr. No.	Experiments based on
1	Introduction to PSPICE and Perform nodal analysis on simple electrical circuits.
2	Perform nodal analysis on electrical circuits with dependent energy sources.
3	Perform mesh analysis on simple electrical circuits.
4	Perform mesh analysis on electrical circuits with dependent energy sources.
5	Verification of Superposition Theorem.
6	Verification of Thevenin's Theorem.
7	Verification of Norton's Theorem.
8	Verification of Maximum Power Transfer Theorem.
9	Perform nodal analysis on RLC circuits.
10	Perform mesh analysis on RLC circuits.

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(Department of Electronics Engineering)

B.Tech in Electronics Engineering

SoE No. 23EE-101

III SEMESTER

23EE1305 : Signal and Systems

Course Outcomes:
Upon successful completion of the course the students will be able to 1. **Understand** and apply mathematical knowledge for Continuous & Discrete time signals 2. Apply mathematical knowledge for problem analysis in Continuous & discrete time systems 3. **Apply** and **analyze** various properties of transform techniques to solve the continuous and discrete Time Systems 4. **Analyze** various methods to categorize the LTI Systems and identify solutions and apply for mathematical representation of systems

Unit:1		**7 Hours**
Continuous and Discrete time signals Signal representation, Transformation of the independent variable, classification of signals, Signal Energy and Power, Periodic, Even & Odd, Real and Exponential Signals		
Unit:2		**8 Hours**
Continuous and Discrete time System Continuous-Time Systems, system properties: linearity: additivity and homogeneity, shift-invariance, causality, stability, convolution		
Unit:3		**7 Hours**
Fourier Series Representation of Periodic Signals Fourier Series Representation of Continuous-Time Periodic Signals, convergence of the Fourier Series.		
Unit:4		**8 Hours**
Fourier Transform Convergence of Fourier Transform and its Properties, Representation of A periodic Signals, The Fourier Transform for Periodic Signals. Analysis and Characterization of LTI Systems using the Fourier Transform.		
Unit:5		**7 Hours**
The Laplace Transform . The Region of Convergence for Laplace Transforms. The Inverse Laplace Transform. Properties of the Laplace Transform. Analysis and Characterization of LTI Systems Using the Laplace Transform. The Unilateral Laplace Transform		
Unit :6		**8 Hours**
Z transform The Z Transform. The Region of Convergence for Z Transforms. The Inverse Z Transform. Properties of the Z Transform. Analysis and Characterization of LTI Systems Using the Z Transform		
	Total Lecture Hours	**45 Hours**

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

Text books	
1	Alan V. Oppenheim, Alan S.Willsky, with S. Hamid,., Signals and Systems, Prentice Hall of India.
Reference Books	
1	B.P.Lathi, Linear Systems and Signals
2	D.Roy Choudhury, Networks and Systems, New Age International Publishers
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html
2	
MOOCs Links and additional reading, learning, video material	
1	NPTEL Material from web (ISC Bangalore/IITS)
2	NPTEL Material from web (ISC Bangalore/IITS)
3	https://onlinecourses.nptel.ac.in/noc22_ee93/preview
4	https://onlinecourses.nptel.ac.in/noc22_ee90/preview

III SEMESTER
23EE1306 : Basics of Python Programming

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Interpret the fundamental Python syntax and semantics 2. Use of Python control flow statements. 3. Express proficiency in the handling of strings and functions. 4. Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.

Unit:1		**5 Hours**
Introduction to Python Programming Language, Identifiers, Keywords, Statements and Expressions, Variables, Operators, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, The type() Function and Is Operator.		
Unit:2		**5 Hours**
Control Flow Statements, The if Decision Control Flow Statement, The if…else Decision Control Flow Statement, The if…elif…else Decision Control Statement, Nested if Statement, The while Loop, The for Loop, The continue and break Statements,		
Unit:3		**5 Hours**
Strings, Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings, Lists, Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, The del Statement.		
Unit:4		**5 Hours**
Dictionaries, Creating Dictionary, Accessing and Modifying key:value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, The del Statement,		
Unit:5		**5 Hours**
Tuples and Sets, Creating Tuples, Basic Tuple Operations, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Tuple Methods, Using zip() Function, Sets, Set Methods, Traversing of Sets, Frozenset		
Unit :6		**5 Hours**
Visualizing Information: what is data visualization, use of Pyplot Matplotlib Library, Creating Line charts and scatter plot, Creating bar charts and Pie Charts, Customizing the plots, Creating Histogram with PyPlot and other library, Creating Frequency Polygons, Creating Box plot, Plotting data from Data frame.		
	Total Lecture Hours	**30 Hours**

Text books	
1	"Introduction to Python Programming", 1st Edition, Gowrishankar S, Veena A CRC Press/Taylor & Francis.
Reference Books	
1	"Python Data Science Handbook: Essential Tools for Working with Data", 1st Edition, Jake VanderPlas, O'Reilly Media
2	"Core Python Applications Programming", 3rd Edition, Wesley J Chun, Pearson Education
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.python.org/
2	https://www.w3schools.com/python/
3	https://www.geeksforgeeks.org/python-programming-language/

III SEMESTER
23EE1307 : Community Engagement Project

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Develop a deeper understanding of the importance of healthy living and its impact on overall well-being. 2. Develop a sense of community and belonging among participants through collaborative activities and shared experiences. 3. Make positive lifestyle changes and will be equipped with resources

Sr. No.	Experiments based on (Sensor based mini project and report writing)
1	Soiling testing project (MSPA-1)
2	Temperature and Humidity testing project (MSPA-2)
3	Air pollution related project (MSPA-3)
4	Solar power related project (MSPA-4)

III SEMESTER
Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1EE101 : Sustainable Electronics
MDM-I	3	(MDM1EE101) Sustainable Electronics Fundamentals
MDM-II	4	(MDM2EE102) Consumer Electronics
MDM-III	5	(MDM3EE103) Digital Electronics
MDM-IV	6	(MDM4EE104) Microcontroller with Arduino applications
MDM-V	7	(MDM5EE105) Sensors and Actuators
MDM-VI	8	(MDM6EE106) E-waste Management and Recycling Technologies

Track 2

Courses	Sem	MDMT2EE201 :Applied Signal Processing
MDM-I	3	(MDM1EE201) Fundamentals of Digital Electronics
MDM-II	4	(MDM2EE202) Fundamental of Image Processing and Applications
MDM-III	5	(MDM3EE203) Computer Vision
MDM-IV	6	(MDM4EE204) Forensic Image Processing
MDM-V	7	(MDM5EE205) Biomedical Image Processing
MDM-VI	8	(MDM6EE206) Remote Sensing and satellite Image Processing

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 (Audit Course)
MLC2123 : YCAP3

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

Nagar Yuwak Shikshan Sanstha's

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

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

4th Semester

(Department of Electrical Engineering)

B. Tech in Electronics Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Electronics Engineering)

B. Tech in Electronics Engineering

SoE No. 23EE-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	HSSM-2	GE	23GE1401	Entrepreneurship Development	T	2	0	0	2	2	30	20	50	3
3	4	**AEC-2**	GE	23GE1405 23GE1406	Marathi Language / Hindi Language	T	2	0	0	2	2	30	20	50	3
4	4	VEC-1	CV	23CV1411	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
5	4	PC	EE	23EE1401	Electromagnetic Fields	**T**	3	0	0	3	3	30	20	50	3
6	4	PC	EE	23EE1402	**Lab :** Electronics Workshop	P	0	0	2		1		60	40	
7	4	PC	EE	23EE1403	Analog Circuits	**T**	3	0	0	3	3	30	20	50	3
8	4	PC	EE	23EE1404	**Lab :** Analog Circuits	**P**	0	0	2	2	1		60	40	
9	4	VSEC-2	EE	23EE1405	**Lab :** PCB design or CAD	P	0	0	2	4	2		60	40	
10	4	OE-2	OE		**Open Elective-II**	T	2	0	0	2	2	30	20	50	3
11	4	MDM	EE		**MD Minor Course-II**	T	2	0	0	2	2	30	20	50	3
					TOTAL		**19**	**0**	**6**	**25**	**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
23EE1401: Electromagnetic Fields

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Define and recognize different co-ordinate systems, apply different techniques of vector calculus to understand concepts of electromagnetic field theory. Describe the fabrication process on MOS transistors. 2. Determine the electromagnetic force exerted on charged particles, current elements, working principle of various electric and magnetic fields. 3. Explain fundamental laws governing electromagnetic fields and evaluate the physical quantities of electromagnetic fields in different media using the fundamental laws. 4. Deduce and justify the concepts of electromagnetic waves, means of transporting energy or information, in the form of radio waves.

Unit:1		**8 Hours**
Orthogonal coordinate systems- Cartesian, Cylindrical, Spherical and Transformations, differential lengths, surfaces and volumes.		
Unit:2		**7 Hours**
Coulomb's law, Electric field Intensity for different charge distribution: Point, Line, Surface & Volume, Electric flux, Gauss's law and Application, Divergence, Maxwell's First equation (Electrostatics), The Divergence Theorem.		
Unit:3		**8 Hours**
Energy & Potential: Energy Expended in Moving a Point charge in an Electric Field, Definition of Potential Difference and Potential, Potential field of a point charge, Potential field of a System of charges: Conservative Property, Potential Gradient, The Dipole, Poisson's and Laplace's equation, Uniqueness Of Electrostatic solution.		
Unit:4		**7 Hours**
Biot-Savart's law and its applications, Ampere's Circuital law and its applications, Curl, Stoke's Theorem, Magnetic flux and magnetic flux density, Faraday's law, displacement current, Maxwell's equations for static and time varying fields with physical significance		
Unit:5		**8 Hours**
Uniform plane wave, wave propagation in free space & dielectric, Poynting's Theorem and Wave Power, Propagation in Good Conductors: Skin Effect.		
Unit :6		**8 Hours**
Reflection of uniform plane waves at Normal incidence, standing wave ratio, plane wave propagation in general directions, plane wave reflection at oblique incidence angles, Brewsters angle.		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Engineering Electromagnetic, William H. Hayt, 7 th Edition, Tata McGraw – Hill, 2006 reprint.
2	Electromagnetics ,J D Kraus, 3 rd edition 1984, McGraw – Hill
Reference Books	
1	Electromagnetism: Theory and application, Ashutosh Pramanik, 2 nd edition august 2009, Prentice Hall.
2	Elements of Electromagnetics, M. N. O. Sadiku, 4 th edition 2007, Oxford Press
3	Field and Wave Electromagnetics, David K. Cheng, Second Edition, Addison Wesley
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://archive.nptel.ac.in/courses/108/106/108106073/

IV SEMESTER
23EE1402: Lab. Electronics Workshop

Course Outcomes:
Upon successful completion of the course the students will be able to 1. **Understand** and identify Different Electronics Components. 2. **Apply** the basic knowledge of Electronics Components to select the mini project. 3. **Demonstrate** their practical Knowledge to do Artwork, printing, Etching & drilling of PCB for mini project. 4. **Prepare** the mini project report and three minute video.

Sr. No.	**Experiments based on**
1	Identification of Various electronic components used in electronics workshop.
2	Identification of various equipment used in electronics workshop.
3	Testing of various electronics components.
4	Soldering and De-Soldering Practice.
5	PCB Design using EDA Tools (Orcad Layout Plus /Allegro/ Multisim Ultiboard /EasyEDA / Express PCB)
6	Etching and fabrication
7	Mini Project (Arduino / Node MCU / Raspberry Pi)
8	Report Writing

IV SEMESTER
23EE1403: Analog Circuits

Course Outcomes:

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

CO-1 : Student will acquire knowledge of the fundamentals, the different Parameters and internal structure of the operational amplifier.
CO-2 : Student will analyze and design the linear applications of the operational amplifier.
CO-3 : Students will analyze and design active Butterworth filters using operational amplifier
CO-4 : Student will analyze and design the non-linear applications of the operational amplifier.
CO-5 : Student will be able to use simulation tools and hardware to conduct experiments using operational amplifier circuits

Unit:1	Differential Amplifier, configurations, DC & AC Analysis of DIBO and DIUBO, Differential amplifier using swamping resistor, constant current bias, current mirror, cascaded differential amplifier. DC Level Shifter.	**8 Hours**
Unit:2	OPERATIONAL AMPLIFIER FUNDAMENTALS: Block Diagram of Op-AMP, Ideal Op-Amp, OPAMP parameters, Basic Op-Amp Configurations: Open loop, Feedback in OPAMP circuit: Inverting, Non-inverting, voltage follower. Compensation of error parameters :Input Bias and Offset Current, Input Bias and Offset voltages, frequency compensation.	**7 Hours**
Unit:3	LINEAR APPLICATIONS : Summing, difference amplifier, integrator, differentiator, Current-to-Voltage Converter, Voltage-to-Current Converter, Instrumentation Amplifiers, Instrumentation Applications, Transducer Bridge amplifiers.Precision Rectifiers, Log/Antilog amplifiers	**8 Hours**
Unit:4	ACTIVE FILTERS: Transfer function, first order filter, Standard second order response, higher order filter, KRC Filters, Multiple feedback filters, second and higher order Butterworth filter design.	**7 Hours**
Unit:5	NONLINEAR CIRCUITS: Voltage Comparators, Comparator Applications, Peak Detectors, Schmitt Triggers: Inverting & Non-inverting, Sample-and-Hold Circuits, clipper, clamper, WAVEFORM GENERATORS: multivibrators, triangular wave generator, Sinusoidal Oscillators.	**8 Hours**
Unit :6	Monolithic timer IC555, D-A AND A-D CONVERTERS: Performance Specifications of D-A Converters (DACs) and A-D Converters (ADCs), D-A Conversion Techniques, A-D Conversion Techniques.	**7 Hours**
	Total Lecture Hours	**45 Hours**

Text books	
1	Op-amps and Linear Integrated Circuits, RamakantA.Gayakwad,Prentice Hall 3rd Edition
2	Linear Integrated Circuits, S. Salivahanan, V. S. Bhaaskaran, Tata McGraw Hill Publication 3rd Edition
3	Linear Integrated Circuits, D. Roy Chaudhuri, Shail Jain, New Age International 3rd Edition
Reference Books	
1	Design with Operational Amplifiers and Analog Integrated Circuits, Sergio Franco, McGraw-Hill 3rd Edition
2	
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html
2	
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc24_ee73/preview
2	https://archive.nptel.ac.in/courses/108/108/108108111/

IV SEMESTER
23EE1404 : Lab. Analog Circuits

Course Outcomes:
Upon successful completion of the course the students will be able to
CO-1 : Student will acquire knowledge of the fundamentals, the different Parameters and internal structure of the operational amplifier.
CO-2 : Student will analyze and design the linear applications of the operational amplifier.
CO-3 : Students will analyze and design active Butterworth filters using operational amplifier
CO-4 : Student will analyze and design the non-linear applications of the operational amplifier.
CO-5 : Student will be able to use simulation tools and hardware to conduct experiments using operational amplifier circuits

Sr. No.	Experiments based on
1	To determine DC operating point and verify Gain relationship of Dual input Balanced Output Differential amplifier. To plot input output waveforms.
2	To determine DC operating point and verify Gain relationship of Dual input Un-balanced Output Differential amplifier. To plot input output waveforms.
3	To verify Gain relationship of Inverting and Non-inverting amplifier. To plot frequency response of Non-Inverting amplifier and verify gain bandwidth relation.
4	To determine CMRR and Slew rate of OP-AMP and compare with theoretical values.
5	To verify gain relationship of Summer, Scalar and Subtractor circuits.
6	To determine cut-off frequencies f_a and f_b of Integrator using frequency response and verify input output waveforms.
7	To determine cut-off frequencies f_a and f_b of Differentiator using frequency response and verify input output waveforms.
8	To determine cut-off frequency of second order Butterworth Low pass filter using frequency response and verify order of filter from stop band of frequency response.
9	To determine cut-off frequency of second order Butterworth High pass filter using frequency response and verify order of filter from stop band of frequency response.
10	To verify VUT and VLT of Schmitt trigger using OP-AMP IC 741 and plot the hysteresis curve.

IV SEMESTER
23EE1405 : Lab. PCB design or CAD

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Understand of fundamental concepts related to PCB design 2. Gain proficiency in using industry-standard EDA tools for PCB design 3. apply design rules and best practices in PCB layout, component placement 4. Analyse and optimize signal integrity in PCB designs, soldering practices 5. Prototype development, and practical testing to ensure that the designed circuits

Sr. No.	Experiments based on
1	Introduction to PCB Design Process
2	Introduction to EDA tools
3	PCB materials
4	PCB layout methods
5	Etching Process
6	Soldering Process
7	Fabrication and Testing
8	Mini Project

IV SEMESTER
Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1EE101 : Sustainable Electronics
MDM-I	3	(MDM1EE101) Sustainable Electronics Fundamentals
MDM-II	4	(MDM2EE102) Consumer Electronics
MDM-III	5	(MDM3EE103) Digital Electronics
MDM-IV	6	(MDM4EE104) Microcontroller with Arduino applications
MDM-V	7	(MDM5EE105) Sensors and Actuators
MDM-VI	8	(MDM6EE106) E-waste Management and Recycling Technologies

Track 2

Courses	Sem	MDMT2EE201 :Applied Signal Processing
MDM-I	3	(MDM1EE201) Fundamentals of Digital Electronics
MDM-II	4	(MDM2EE202) Fundamental of Image Processing and Applications
MDM-III	5	(MDM3EE203) Computer Vision
MDM-IV	6	(MDM4EE204) Forensic Image Processing
MDM-V	7	(MDM5EE205) Biomedical Image Processing
MDM-VI	8	(MDM6EE206) Remote Sensing and satellite Image Processing

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 (Audit Course)

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 Electrical Engineering)

B. Tech in Electronics Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Electronics Engineering)

B. Tech in Electronics Engineering

SoE No. 23EE-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	EE	23EE1501	Analog and Digital Communication	T	3	0	0	3	3	30	20	50	3
2	5	PC	EE	23EE1502	**Lab** : Analog and Digital Communication	P	0	0	2	2	1		60	40	
3	5	PC	EE	23EE1503	Digital System Modelling	T	3	0	0	3	3	30	20	50	3
4	5	PC	EE	23EE1504	**Lab :** Digital System Modelling	P	0	0	2	2	1		60	40	
5	5	PC	EE	23EE1505	Microcontroller and Interfacing	T	3	0	0	3	3	30	20	50	3
6	5	PC	EE	23EE1506	**Lab :** Microcontroller and Interfacing	P	0	0	2	2	1		60	40	
7	6	PC	EE	23EE1507	Algorithm and Data Structure	T	2	0	0	2	2	30	20	50	3
8	6	PC	EE	23EE1508	**Lab :** Algorithm and Data Structure	P	0	0	2	2	1		60	40	
9	5	PE	EE		**Professional Elective-I**	T	3	0	0	3	3	30	20	50	3
10	5	**OE-3**	OE		**Open Elective-III**	T	3	0	0	3	3	30	20	50	3
11	5	MDM	EE		**MD Minor Course-III**	T	3	0	0	3	3	30	20	50	3
12	5	STR	EE	23EE1509	Internship and Indsutrial Visit	P	0	0	2	2	1		60	40	
					TOTAL		**20**	**0**	**10**	**30**	**25**				
List of Mandatory Learning Course (MLC)															
1	5	HS	T&P	MLC2125	**YCAP5 :** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Professional Elective - I

1	5	PE-I	EE	23EE1521	**PE-I :** Computer Architectures and Organisation
2	5	PE-I	EE	23EE1522	**PE-I :** Swithching Theory
3	5	PE-I	EE	23EE1523	**PE-I :** Embedded Operating System
4	5	PE-I	EE	23EE1524	**PE-I :** Transmission line and wave Guide
5	5	PE-I	EE	23EE1525	**PE-I :** Sensors, Actuators and Signal conditioning
6	5	PE-I	EE	23EE1526	**PE-I :** Power Electronics

Open Elective - III

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

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Chairperson	Dean (Acad. Matters)	Date of Release	Version	

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 Electronics Engineering)

B.Tech in Electronics Engineering

SoE No. 23EE-101

V SEMESTER

23EE1501: Analog and Digital Communication

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. **Understand** basic concepts of analog and digital communication system 2. **Analyze** various AM-FM receivers, along with the effect of noise on analog communication systems. 3. **Describe** various digital modulation techniques and various parameters associated with it. 4. **Apply** the knowledge of information theory and the error control codes 5. **Perform experiments** based on analog and digital communication.		
Unit:1	Basic block diagram of Analog communication system, Modulation techniques: Need for modulation, Basic concepts of Amplitude Modulation: mathematical Analysis, modulation index, frequency spectrum, power requirement of AM, FM, PM	**7 Hours**
Unit:2	Receivers: Basic receiver, Tuned Radio Frequency (TRF), Super heterodyne receiver, AM detectors, FM Detectors, External Noise, internal Noise, Addition of Noise due to several sources, Addition of Noise due to several amplifiers in cascade, Noise figure, signal to noise ratio, calculation of noise figure, Noise figure from equivalent resistance	**8 Hours**
Unit:3	Pulse Modulation: Generation and demodulation of pulse amplitude modulation (PAM); pulse width modulation (PWM); pulse position modulation (PPM), Pulse code modulation (PCM),Time division Multiplexing, Frequency division multiplexing, DPCM, Delta modulation, Adaptive delta modulation	**7 Hours**
Unit:4	Introduction to information theory, entropy, Huffman, Prefix code, and L-Z encoding algorithm, , line coding	**8 Hours**
Unit:5	Digital Modulation techniques: Amplitude Shift Keying (ASK) – Frequency Shift Keying (FSK) –Phase Shift Keying (PSK) – BPSK – QPSK, Quadrature Amplitude Modulation (QAM),	**7Hours**
Unit :6	Channel coding : Linear block code ,Basic concept of convolution code, distance properties, Viterbi algorithm , Fano algorithm, , cyclic codes	**8Hours**
Total Lecture Hours		**45 Hours**

Textbooks	
1	"Electronic Communication System", Fourth Edition by George Kennedy
2	Haykin S., "Communications Systems", John Wiley and Sons, 2004,4th edition

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Reference Books	
1	"Radio Engineering", G.K.Mithal, Khanna Publications
2	Proakis J. G. and Salehi M., "Communication Systems Engineering", Pearson Education, 2002.
3	B.P.Lathi ,Modern anolog and Digital Communications system third edition oxford university 2007
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/117105143
2	https://nptel.ac.in/courses/117105144?authuser=1
3	https://nptel.ac.in/courses/117105077?authuser=1
5	https://nptel.ac.in/courses/108101113?authuser=1

V SEMESTER
23EE1502: Lab. Analog and Digital Communication

Course Outcomes:
Upon successful completion of the course the students will be able to
1. **Understand** basic concepts of analog and digital communication system 2. **Analyze** various AM, FM receivers, along with the effect of noise on analog communication systems. 3. **Describe** various digital modulation techniques and various parameters associated with it. 4. **Apply** the knowledge of information theory and the error control codes 5. **Perform experiments** based on analog and digital communication.

Sr. No.	Experiments Lists
1	To perform Amplitude Modulation & Demodulation.
2	To perform Frequency Modulation & Demodulation.
3	To perform Pulse Amplitude Modulation & Demodulation.
4	To perform Pulse Width Modulation & Demodulation.
5	To perform of Pulse Position Modulation & Demodulation.
6	To perform Pulse Code Modulation.
7	To perform Delta Modulation for different step size.
8	To perform Huffman Coding.
9	To perform QPSK modulation
10	To perform linear block code.
11	To perform Cyclic code
12	To perform convolutional code

V SEMESTER
23EE1503: Digital System Modelling

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. **Understand** hardware description language and able to design and simulate digital systems using different abstraction levels. 2. **Apply and design** combinational and sequential logic circuits. 3. **Apply and design** the basics of synchronous sequential logic and finite state machines. 4. **Analyze** building blocks in digital system and explain the programmable devices and able to design digital systems using modern design tools. 5. **Evaluate** practical experiments to solve problems using an appropriate designing method.		
Unit:1	Introduction of HDL	**8 Hours**
HDL Based Design flow, Requirements of HDL, Design Methodologies, Different Modelling styles, Introduction to Verilog, Elements of Verilog, Verilog Module definition, Elements of Module, Basic Concepts in Verilog, Reserved Keywords, Syntax & Semantics, Comments, Identifiers, Number Representation, System Representation, Verilog Ports, Verilog Data Types, Wire & Variables, Physical & Abstract, Constants, Parameter, Verilog Data Operators.		
Unit:2	Data Flow Modelling	**7 Hours**
Data Flow Modelling, Delay, Continuous Assignment, Delayed Continuous assignment Design entry in Verilog & Test bench, Combinational blocks design, Compilation and synthesis, Timing analysis resolving signal values		
Unit:3	Structural Modelling	**8 Hours**
Structural Modelling Feature, Module Instantiation, Gate level Primitives, Gate Delays, Switch Level Primitives, User Defined Primitives.		
Unit:4	Behavioural Modelling,	**7 Hours**
Behavioural Modelling, Initial, Always, Procedural Assignment, Blocking and Non- Blocking assignments, Sequential & Parallel Blocks, Race around Condition, Timing Control, Procedural Statements, Conditional Statements if case loop repeat forever etc, Zero Delay Control, Event Based Timing Control, Compiler Directives, Assign Design, Force Release, Latch Models, FF Models, State Machine Coding, Moore and Mealy Machines.		
Unit:5	Combinational & sequential system	**8 Hours**
Combinational & sequential system Design examples like Shift Registers, Counters, LFSR, Stacks and Queues, Multi bit Adders & Multiplier, Huffman Coding, Processor and Memory Model, CPU, System Tasks and Functions, Design Verification.		
Unit :6	Introduction to FPGA	**7 Hours**
Digital Design Fundamentals, Combinational & Sequential design issues, Introduction to finite state machines, Moore & Mealy Machine, Introduction to programmable devices, PLA, PAL, PROM, Structure of CPLDs, Introduction to FPGA, Architecture, CLB, IOB, Programmable Interconnect Points, Different type of programmable switches used in PLDs.		
	Total Lecture Hours	**45 Hours**

Text books	
1	Samir Palnitkar, Verilog HDL: A Guide to Digital Design and Synthesis, 2nd Edition,2003, Prentice Hall
Reference Books	
1	Zainalabedin Navabi, Verilog Digital System Design, Second Edition, Tata McGraw Hill,2009.
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://onlinecourses.nptel.ac.in/noc20_cs63/

V SEMESTER
23EE1504: Lab: Digital System Modelling

Course Outcomes:
Upon successful completion of the course the students will be able to 1. **Understand** hardware description language and able to design and simulate digital systems using different abstraction levels. 2. **Apply and design** combinational and sequential logic circuits. 3. **Apply and design** the basics of synchronous sequential logic and finite state machines. 4. **Analyze** building blocks in digital system and explain the programmable devices and able to design digital systems using modern design tools. 5. **Evaluate** practical experiments to solve problems using an appropriate designing method.

Sr. No.	Experiments based on
1	Write data flow Verilog Codes of basic gates
2	Write data flow Verilog Codes for Multiplexer & Demultiplexer
3	Write data flow Verilog Codes for Decoder & Encoder
4	Write gate level Verilog Codes for Adder & Subtractor
5	Write gate level Verilog Codes for flip flops
6	Write structural Verilog Codes for Full adder using half adder
7	Write structural Verilog Codes for 3:8 Decoder using 2:4 decoder
8	Write behavioural Verilog code of digital circuits using if-else statement.
9	Write behavioural Verilog code of digital circuits using case statement.
10	Write Verilog code for Mealy and Moore sequence detector
11	Write a verilog code for 4 bit SISO using D-Flip Flop.
12	Write a verilog code for 4 bit Ripple Carry Adder
13	Mini Project

V SEMESTER
23EE1505: Microcontroller and Interfacing

Course Outcomes:		
After completion of the course, student will demonstrate the ability to: 1. **Understand** the internal design of 8051 microcontroller along with the features and their programming. 2. **Analyze** the data transfer information through serial & parallel ports. 3. **Apply** the fundamentals of assembly level programming of microcontroller. 4. **Design** different interfacing applications using microcontrollers and peripherals.		
Unit:1	**Overview of Architecture of 8051**	**8 Hours**
Processor Core and Functional Block Diagram, Description of memory organization, Overview of ALL SFR's and their basic functionality.		
Unit:2	**Low Level programming Concepts**	**8 Hours**
Addressing Modes, Instruction Set and Assembly Language programming (ALP), Developing, Building, and Debugging ALP's.		
Unit:3	**On-Chip Peripherals Study, Programming, and Application**	**8 Hours**
Ports: Input/output, Timers & Counters, UART, Interrupts.		
Unit:4	**External Interfaces Study, Programming and Applications**	**7Hours**
LEDS, Switches (Momentary type, Toggle type), Seven Segment Display: (Normal mode, BCD mode, Internal Multiplexing & External Multiplexing), LCD (8bit, 4bit, Busy flag, custom character generation),Keypad Matrix		
Unit:5	**Protocols Study, Programming and Applications**	**7 Hours**
I2C (EEPROM and RTC),SPI (EEPROM) Infrared Communications (RC5 protocol).		
Unit :6	**Interfacing**	**7 Hours**
A/D & D/A Converter, Stepper Motor, DC Motor, RF Communication, RFID, CAN, Ethernet MAC, ZIGBEE.		
	Total Lecture Hours	**45 Hours**

Text books	
1	The 8051 Microcontroller and Embedded System, by M. A. Mazidi, Prentice Hall.
2	The 8051 Microcontroller, by Kenneth J. Ayala, West Publishing Company.
Reference Books	
1	"The 8051 Microcontroller Based Embedded Systems", Manish K Patel, McGraw Hill, 2014, ISBN: 978-93- 329-0125-4.
2	"Microcontrollers: Architecture, Programming, Interfacing and System Design", Raj Kamal, Pearson Education, 2005.
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.keil.com/dd/docs/datashts/atmel/at89c51_ds.pdf
2	https://www.electronicwings.com/
3	https://www.tutorialspoint.com/microprocessor/microcontrollers_8051_architecture.htm
4	https://nptel.ac.in/courses/108/105/108105102/

V SEMESTER
23EE1506: Lab. Microcontroller and Interfacing

Course Outcomes
Upon successful completion of the course, the student will be able to:
1. Students will be able to **understand** the concept of Controller, architecture of 8051
2. Students will demonstrate the ability to identify, formulate and **design** program for an assigned task.
3. Students will be able to **design** interface & program peripheral devices.
4. **Demonstrate** various interfacing concepts and circuits necessary for various applications

Sr. No.	Experiments based on
1	WAP to Perform basic Arithmetic operation: a) Addition of 2 - 8 bit numbers b) Subtraction of 2 - 8 bit numbers c) Multiplication of 2 - 8 numbers d) Division of 2 - 8 bit numbers
2	WAP to Perform Sorting of data: a) Ascending order b) Descending order
3	WAP to Perform: a) Data Transfer. b) Block Move c) Exchange, d) Finding Largest Element In An Array
4	WAP to perform CODE CONVERSION: a) BCD – ASCII b) ASCII – DECIMAL c) DECIMAL – ASCII. d) HEX - DECIMAL e) DECIMAL – HEX

5	Write an 8051 program to Glow LED after every 100 ms connected to port pin P0.4 of 8051. Generate delay using timer.
6	Write an 8051 program to display '0' to '9' and 'A' to 'F' on seven segment display with the time interval of 100msec.
7	Write an 8051 program to display the messages LIFE and HELP alternately on a 4-digit seven-segment display Interface.
8	Write an 8051 program to drive a Stepper motor Interface to rotate the motor by N steps in clockwise direction and N steps in anti-clockwise direction. Introduce suitable delay between successive steps.
9	Write an 8051 program to scan a 4 x 4 keypad for key closure and display the code of the key pressed on LCD.
10	Generate different waveforms Sine, Square, Triangular, Ramp etc. using DAC interface to 8051; change the frequency and amplitude.
11	Mini Project

V SEMESTER
23EE1507: Algorithm and Data Structure

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. **Understand** the trade-offs of algorithms and programming aspects 2. **Apply** various operation on data Structure 3. **Implement** various types of algorithms and **analyze** performance of system 4. **Develop** programs using data structures and latest compilers		
Unit:1	**Introduction to Algorithms**	**8 Hours**
Introduction to Algorithms, Basics of Algorithm, Sub Algorithms, Analysis of Algorithms, Time and Space Complexity, Top down and bottom-Up Approach. Arrays, Operations, Types, Representation of 1D, 2D arrays in memory		
Unit:2	**Searching and Sorting**	**7 Hours**
Sorting, Quick Sort, Merge Sort, Insertion, Selection and Bubble Sort, Heap Sort, Searching, Linear, Binary Search, Hashing and collision Handling mechanism.		
Unit:3	**Stack and Queue**	**7 Hours**
Stack, Fundamentals, Operations, Push, Pop, Applications of Stacks, Evaluation of Expressions, Recursion, Queues, Operations, Add, Delete, Types of Queues, Circular Queue, Dequeue.		
Unit:4	**Linked list Graphs and trees**	**8 Hours**
Fundamentals of singly, Doubly, Circular Linked List, Basic Terminology of Tree, Binary Tree Traversals, Binary Search Tree, Graph Representation, Graph Traversals, Breath First Search, Depth First Search, Minimum Cost Spanning Trees		
Total Lecture Hours		**30 Hours**

Textbooks	
1	Fundamentals of Data Structures, Ellis Horowitz and Sartaj Sahani, Galgotia, Publication,
Reference Books	
1	Data Structures and Program, Design in C, Kruse, Leung and Tondo, PHI
2	An Introduction to Data Structures with Applications, Tremblay & Sorenson, TMH
3	Data Structures, Schaum Series, Seymour Lipschutz, G.A. V. Pai, TMH
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/106102064
2	https://archive.nptel.ac.in/courses/106/106/106106127/
3	https://onlinecourses.nptel.ac.in/noc20_cs85/preview

V SEMESTER
23EE1508 : Lab. Algorithm and Data Structure

Course Outcomes:
Upon successful completion of the course the students will be able to
1. **Understand** the trade-offs of algorithms and programming aspects
2. **Apply** various operation on data Structure
3. **Analyze** various types of Data Structure
4. **Implement** various types of algorithms and **analyze** performance of system
5. **Develop** programs using data structures and latest compilers

Sr. No.	Experiments based on
1	Write a program on control Structure & Statements
2	Write a program on If –else structure
3	Write a program on Case Statement
4	Write a program on Functions
5	Write a program on Macros
6	Write a program on Pointers
7	Write a program on Structures
8	Write a program on Linked List
9	Write a program on Doubly linked list
10	Write a program on graphs
11	Write a program on Trees
12	Write a program on Search Algorithms
13	Write a program on Stacks

V SEMESTER

23EE1521: PE-I: Computer Architecture and Organization

Course Outcomes		
Upon successful completion of the course the students will be able to 1. Understand the basic concepts of peripherals of computer system 2. Apply the design issues in the development of computer system architecture 3. Analyze the concepts of Parallel processing and pipelining for computer architecture design 4. Evaluate parameters required for processor design		
Unit:1	**Register and processor Level Design**	**7 Hours**
Register Level components, Programmable logic devices, Register level design, The Processor level components, Processor level design		
Unit:2	**CPU Organization**	**7 Hours**
CPU organization, Data representation, Fixed point numbers, Floating point numbers, IEEE 754 floating point formats, Instruction sets – Instruction formats, instruction types, addressing modes		
Unit:3	**Datapath Design**	**7 Hours**
Fixed point arithmetic, addition and subtractions, Multiplication, Division, Arithmetic operations on Floating point numbers		
Unit:4	**Control design**	**7 Hours**
Basic Concepts, Hard-wired Control-Design methods, classical method, one hot method, parallelism in microinstruction, Micro programmed control, Horizontal versus vertical, Multiplier Control Unit		
Unit:5	**Memory organization**	**7 Hours**
Device characteristics, RAM, Serial access memories, virtual memory, concept of cache & associative memories.		
Unit :6	**System Organization**	**7 Hours**
Local and long-distance communication input-output systems, Interrupt, DMA, introduction to parallel processing.		
	Total Lecture Hours	**42 Hours**

Text books	
1	Jhon.P. Hayes, Computer Architecture, and organization McGraw-Hill Companies
Reference Books	
1	Carl Hammacher, Computer organization, McGraw-Hill Science
2	Andrew S. Tanenbaum, Structured computer and Organization, PHI
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	
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V SEMESTER
23EE1522: PE-I: Switching Theory

Course Outcomes		
Upon successful completion of the course the students will be able to 1. **Design** and **Analyze** multilevel logic Network and Threshold logic for nanotechnologies. 2. **Analyze** testing of combinational circuits, Fault Models. 3. **Design** and **analyze** the synchronous and asynchronous sequential circuits. 4. **Identify** and test the sequential machines with experiments.		
Unit:1	**Multi-level logic synthesis, Technology-independent synthesis**	**7 hrs**
Factoring, Decomposition, Extraction, Substitution, and Technology mapping: steps in technology mapping		
Unit:2	**Threshold logic for nanotechnologies**	**7 hrs**
Threshold elements, synthesis of threshold networks: Unate function, Identification & Realization of threshold function.		
Unit:3	**Testing of combinational circuits**	**7 hrs**
Fault models, Structural testing, IDDQ testing, Delay fault testing, Synthesis for testability, Testing for nanotechnologies.		
Unit:4	**Synchronous sequential circuits and Iterative Networks**	**7 hrs**
Memory elements and their excitation functions, synthesis of synchronous sequential circuits, Moore and Mealy machines, finite state machine flow charts, tables		
Unit:5	**Asynchronous sequential circuits**	**7 hrs**
Modes of operation, Hazards, Synthesis of SIC & MIC fundamental-mode circuits.		
Unit :6	**State-identification experiments and testing of sequential circuits**	**7 hrs**
Experiments, Homing experiments, Distinguishing experiments, Machine identification, Checking experiments, Built-in self-test (BIST).		
	Total Lecture Hours	**42 Hours**

Text books	
1	Switching & Finite Automata Theory: ZviKohavi, Niraja K. Jha, Third Edition 2010 Cambridge University Press
2	Fundamentals of Digital Logic With VHDL Design: Stephen Brown Second Edition, 2007 TMH
Reference Books	
1	Modern Switching Theory and Digital Design, Lee S.C, PHI Edition
2	Digital Logic and Computer Design, M.Morris Mano, PHI Edition

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://onlinecourses.nptel.ac.in/noc19_cs74/unit?unit=64&lesson=65
2	https://onlinecourses.nptel.ac.in/noc19_cs74/unit?unit=64&lesson=66
3	https://onlinecourses.nptel.ac.in/noc19_cs74/unit?unit=64&lesson=67
4	https://onlinecourses.nptel.ac.in/noc19_cs74/unit?unit=64&lesson=68
5	https://onlinecourses.nptel.ac.in/noc19_cs74/unit?unit=64&lesson=69
6	https://onlinecourses.nptel.ac.in/noc19_cs74/unit?unit=64&lesson=70

V SEMESTER
23EE1523: PE-I: Embedded Operating System

Course Outcomes		
Upon successful completion of the course the students will be able to **CO1 :Understand** the concepts of operating systems and processes **CO2 :Learn** processes, threads and memory management and storage structures **CO3 : Evaluate** the algorithms and solutions for operating system management **CO4 :Analyse** the security issues in operating systems		
Unit 1	**Introduction to OS**	**7 Hrs**
Computer System organization, Architecture, Structure, Operations, Process Management, Memory Management, OS Services, User Operating System Interface, System Calls, System Programs		
Unit:2	**Process Management**	**7 Hrs**
Process Concept, Scheduling, Operations, Scheduling Criteria, Scheduling Algorithms, Tread Scheduling		
Unit:3	**Deadlock**	**7 Hrs**
Synchronization, Critical Section Problem, Semaphores, Deadlocks, System Models, Characterization, Handling, Deadlocks, Deadlock Prevention, Deadlock Avoidance		
Unit 4	**Memory Management**	**7 Hrs**
Memory Management Strategies,, Swapping, Continuous Memory Allocation,, Paging, Segmentation , Virtual Memory Management, Demand Paging, Page Replacement, Trashing		
Unit:5	**File System**	**7 Hrs**
File System Concept, Access Methods, Directory and Disk Structure, Mounting, Sharing, Mass Storage Structure, Disk Attachment, Scheduling, RAID Structure		
Unit :6	**Security and Protection**	**7 Hrs**
Protection and Security , Domain of Protection, Access Matrix, Access Control, Language based Protection, Security Problem, System and Network Threats, Cryptography as Security Tool		
	Total Lecture Hours	**42 Hours**

Text books	
1	Abram Silberschatz, " Operating System Concepts ", John Wiley & Sons
2	Andrewn Tanenbaum, " Modern Operating Systems ", PHI, India
Reference Books	
1	Harvey Deitel, " Operating Systems ", Pearson Education
2	William Stallings, " Operating Systems ", PHI, India
3	Pramod Chandra, " An Introduction to Operating Systems, Concepts and Practice ", PHI, India
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	http://nptel.iitm.ac.in
2	https://www.youtube.com/watch?v=hELr9-7aAG8
3	https://www.youtube.com/watch?v=MVfHrlpOjP4

V SEMESTER
23EE1524: PE-I : Transmission line and wave Guide

Course Outcomes

Upon successful completion of the course the students will be able to
1.**Apply** knowledge of fundamental parameters of transmission line and is distortion in transmission line.
2.**Apply** knowledge of transmission line to Create impedance matching networks
3.**Evaluate** the propagation characteristics of electromagnetic waves in various wave guide structures.
4.**Apply** smith chart for transmission line parameter and impedance matching networks

Unit 1	**Transmission Line Theory**	**7 hrs**
Definition of Characteristic impedance, The transmission line as a cascade of T-Sections Definition of Propagation Constant, General Solution of the transmission line, The two standard forms for voltage and current of a line terminated by an impedance, physical significance of the equation and the infinite line, The two standard forms for the input impedance of a transmission line terminated by an impedance, meaning of reflection coefficient, wavelength and velocity of propagation.		
Unit 2	**Waveform Distortion**	**7 hrs**
Distortion less transmission line, The telephone cable, Inductance loading of telephone cables, Input impedance of lossless lines – reflection on a line not terminated by Zo, Transfer impedance reflection factor and reflection loss, T and ∏ Section equivalent to lines.		
Unit 3	**Impedance Matching at Radio Frequencies**	**7 hrs**
Standing waves and standing wave ratio on a line , The circle diagram for the dissipation less line , The Smith Chart , Application of the Smith Chart , Conversion from impedance to reflection coefficient and vice-versa. Impedance to Admittance conversion and vice versa, Input impedance of a lossless line terminated by impedance, single stub matching and double stub matching.		
Unit 4	**Guided Waves**	**7 hrs**
Waves between parallel planes of perfect conductors, TE and TM waves in parallel plane waveguide, characteristics of TE and TM Waves, Velocities of propagation, Attenuation of TE and TM waves in parallel plane guides, Dominant mode in parallel plane guide.		
Unit 5	**Rectangular Waveguides**	**7 hrs**
Transverse Magnetic Waves in Rectangular Wave guides, TE and TM Waves in Rectangular Waveguides, characteristic of TE and TM Waves, Dominant mode in rectangular waveguide, Wave impedances, characteristic impedance, Excitation of modes.		
Unit 6	**Circular Wave Guides and Resonators**	**7 hrs**
Bessel functions, Solution of field equations in cylindrical coordinates, TM and TE waves in circular guides wave impedances and characteristic impedance, Dominant mode in circular waveguide		
	Total Lecture Hours	**42**

	Hours

Text books	
1	Antenna And Wave Propagation by KD Prasad
Reference Books	
1	Electro Magnetic Waves and Radiating System by E.C. Jordan and K.G.Balmain ,PHI
2	Transmission lines and wave guides by L.Ganesan,S.S.Sreeja Mole ,PHI
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://youtu.be/ozeYaikI11g?si=PGelNx6APfE6uT7D
2	https://youtu.be/yezmCNGTVYU?si=UxdDHlaRLaLWkNBR

V SEMESTER

23EE1525: PE-I: Sensors, Actuators and Signal conditioning

Course Outcomes		
Upon successful completion of the course the students will be able to - **1.Understand** the fundamental concepts and working principles of various sensors and actuators. **2.Explain and analyze** signal conditioning techniques used for different types of sensors. **3. Understand** and model the operation of **linear actuators** used in industrial and embedded systems. **4. Explain and analyze** Digital and Intelligent Sensors		
Unit 1	**Introduction to Sensor-Based Measurement Systems**	**8 Hrs**
Sensor General Concepts and Terminology, Measurement systems, sensors and actuators, Signal conditioning and display, Sensor Classification, Primary Sensors- Temperature sensors: Bimetals, Pressure sensors, Flow velocity and flow-rate sensors, Level sensors, Force and torque sensors, Acceleration and inclination sensors, Velocity sensors, Materials for Sensors Soft Magnetic Materials - Hard Magnetic Materials.		
Unit 2	**Signal Conditioning for Sensors**	**8 Hrs**
Signal Conditioning for Resistive Sensors-Measurement of Resistance, Voltage Dividers, Potentiometers, Application to thermistors, Dynamic measurements, Amplifiers for voltage dividers, Signal Conditioning for Reactance Variation Sensors- Problems and Alternatives, ac Bridges, Signal Conditioning for Self-Generating Sensors Chopper and Low-Drift Amplifiers, Chopper amplifiers.		
Unit 3	**Position, Proximity, Flow Level Sensor**	**8 Hrs**
Measurement of position using Hall effect sensors. Proximity sensors: Inductive & Capacitive, Use of proximity sensor as accelerometer and vibration sensor. Flow Sensors: Ultra sonic & Laser. Level Sensors: Ultra sonic & Capacitive, Thermoelectric Sensors, Piezoelectric Sensors.		
Unit 4	**Linear Actuators**	**7 Hrs**
Mathematical Model for Linear Actuators - Fast-Acting Actuators - Disk Solenoids - Plunger Solenoids - Ball Solenoids - Conical Solenoids - Applications of Solenoid Actuators - Long Stroke Solenoid Fuel Pump - Gasoline Injectors - Natural Gas Injectors - Diesel Fuel Injectors - Compressor Solenoid Valves - Transmission Solenoid		
Unit 5	**Disk Rotary Actuators**	**7 Hrs**
Disk Rotary Actuator Analysis - Disk Rotary Actuator Design - Disk Rotary Actuator Excitation Electromagnetic Circuit - Disk Rotary Actuator, Cylindrical Rotary Actuators - Cylindrical Rotary Actuator PM - Cylindrical Rotary Actuator Excitation Electromagnetic Circuit		
Unit 6	**Digital and Intelligent Sensor**	**7 Hrs**
Resonant Sensors, Sensors based on quartz resonators, SAW sensors, Vibrating wire strain gages, Vibrating cylinder sensors, Digital flowmeters, Communication Systems for Sensors, Intelligent Sensors		
	Total Lecture Hours	**45 Hrs**

Text books	
1	Sensor & signal conditioning, second edition, Ramon Pallas-Areny/John G. Webster, A Wiley-Interscience Publication John Wiley & Sons, Inc.
Reference Books	
1	Principles of Industrial Instrumentation, 2nd Edition, D. Patranabis, Tata McGraw Hill Publishing Company Ltd, 1996
2	Mechanical and Industrial Measurements, R.K. Jain, Khanna Publishers, New Delhi,1999,
3	A Course on Mechanical Measurements, Instrumentation and Control, A.K. Sawhney and P. Sawhney, DhanpathRai and Co, 2004
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/108108147
2	https://nptel.ac.in/courses/108105064

V SEMESTER
23EE1523: PE-I: Power Electronics

Course Outcomes:

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

1. **Identify** power semiconductor devices and explain their applications in power converters.
2. **Explain** the operating principles of single-phase controlled rectifiers and cycloconverter.
3. **Understand** key parameters related to commutation and protection of power devices, as well as analyze converter circuits.
4. **Analyse** the performance characteristics of choppers, and inverters.

Unit:1	**Power Semiconductor Devices-A**	**8 Hours**
SCR and its characteristics, Gate characteristics, SCR turn off Methods, ratings. Series and parallel connections of SCRs, TRIAC.		
Unit:2	**AC –DC and AC-AC Converter**	**8 Hours**
Commutation methods of SCR, Single phase half wave and full wave Controlled Rectifier with resistive and inductive load, effect of freewheeling diode, cycloconverter (Single phase step up and step down)		
Unit:3	**Three Phase Line Commutated Converters**	**7 Hours**
Three phase three pulse converters, three phase bridge converter, speed control of dc motors (with single phase rectifier).		
Unit:4	**Power Semiconductor Devices-B**	**8 Hours**
Characteristic and working of MOSFET, Gate turn off thyristor and insulated gate bipolar transistor. protection of SCR: gate circuit protection, over voltage and over current protection, snubber circuit design		
Unit:5	**DC-DC Converter**	**8 Hours**
Principles of step-down chopper, step up chopper classification, Control strategies, time ratio control and current limit control, Multi phase chopper.		
Unit :6	**DC-AC Converter (Inverter)**	**7 Hours**
Series resonant inverters, Modified series inverter, parallel inverter, single phase bridge inverter, three phase bridge Inverter: 120 degree and 180 degree mode, design of inverter. Applications		
	Total Lecture Hours	**45 Hours**

Text books	
1	Power Electronics, P. S. Bhimbra, Khanna Publishers.2003
2	Power Electronics, D.Y.Shingare, Electrotech Publication Engineering Series
Reference Books	
1	Power Electronics, 1981, C.W.Lander, McGraw Hill
2	Thyristors Applications and their, 2nd Edition 2002, Dr.M.Ramamoorty, East West Press
3	Power Electronics, 1989, Ned Mohan, T.M.Undeland, and W.P.Robbins, John Wiley and Sons
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Power%20Electronics/Muhammad%20H.%20Rashid-Power%20electronics%20_%20devices,%20circuits,%20and%20applications-Pearson%20(2014).pdf
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=1Auay7ja2oY&list=PLA07ACBDE053A8229&pp=iAQB NPTEL Course on Power Electronics by Prof. B. G. Fernandes.
2	https://archive.nptel.ac.in/courses/108/102/108102145/

V SEMESTER
23OE3521 : Introduction to Fintech

Course Outcomes:		
Upon successful completion of the course the students will be able to: **1.Understand the Evolution and Ecosystem of FinTech:** Demonstrate knowledge of the historical development of FinTech and the various players in the ecosystem including startups, financial institutions, regulators, and consumers. **2.Analyze Key FinTech Technologies and Trends:** Explain and evaluate the core technologies driving FinTech innovation such as blockchain, artificial intelligence, machine learning, big data, and APIs. **3.Apply FinTech Concepts in Real-world Scenarios:** Apply FinTech tools and techniques to solve problems in banking, investment, insurance, and personal finance using case studies and practical examples. **4. Design Innovative FinTech Solutions:** Develop or propose innovative financial products or services leveraging emerging technologies, with a focus on improving accessibility, efficiency, and transparency in financial services.		
Unit:1	**Introduction to Fintech**	**8 Hrs**
Definition and evolution of fintech, Traditional finance vs. fintech innovations, Key players in the fintech ecosystem (startups, incumbents, regulators), Fintech's role in financial inclusion		
Unit:2	**Core Technologies Powering Fintech**	**7 Hrs**
Blockchain, Bitcoin, Stock Market and cryptocurrencies, Artificial intelligence and machine learning in finance, Big data analytics and its applications, Cyber-security and fraud prevention in fintech		
Unit 3	**Digital Payments and Open Banking**	**8 Hrs**
Evolution of digital payments (mobile wallets, contactless payments), Open banking and API-driven financial services, The role of fintech in remittances and cross-border transactions Case studies: PayPal, Stripe, Revolut		
Unit 4	**Financial Markets**	**7 Hrs**
Introduction to Financial Markets, Types of Financial Markets, Key Functions of Financial Markets,		

Capital Formation & Investment Platform

Unit:5	Algorithmic Trading & Quantitative Finance	8 Hrs

Trading Mechanisms, Technical & Fundamental Analysis, Basics of algorithmic trading, Intro to quant models and backtesting, Using Python/R in trading algorithms, API-based trading and data fetching, FinTech Applications in Stock Markets

Unit :6	Regulatory Environment, Framework and Future Trends	7 Hrs

Fintech regulations and compliance, Ethical considerations and data privacy in fintech, Role of SEBI and other regulators, Insider trading and market manipulation laws, Compliance and audit practices.

Emerging trends: DeFi (Decentralized Finance), Central Bank Digital Currencies (CBDCs), The future of fintech: Opportunities and challenges

	Total Lecture Hours	45 Hours

Textbooks:

1. Susanne Chishti, Janos Barberis (2016). The FINTECH Book: The Financial Technology
2. Susanne Chishti, Janos Barberis (2016), THE FINTECH BOOK: The financial technology handbook for investors, entrepreneurs and visionaries, Wiley.
3. Sanjay Phadke (2020) Fintech future, The Digital DNA of Finance, SAGE Publishing.

Reference Books:

1. Agustin Rubini (2018). Fintech in a Flash: Financial Technology Made Easy, Zaccheus Entertainment, 3rd edition (2018), ISBN-10: 1547417161, ISBN-13: 978-1547417162.
2. Choudhary, P., & Thenmozhi, M. (2024). Fintech and financial sector: ADO analysis and future research agenda. International Review of Financial Analysis, 103201.
3. Harsono, I., & Suprapti, I. A. P. (2024). The Role of Fintech in Transforming Traditional Financial Services. Accounting Studies and Tax Journal (COUNT), 1(1), 81-91.
4. EY Tech Trends Chapter VIII: top FinTech trends in 2023

MOOCs Links and additional reading, learning, video material

1. https://corporatefinanceinstitute.com/course/intro-to-fintech/
2. https://www.udemy.com/course/fintech-frontiers-introduction-to-fintech/
3. https://www.futurelearn.com/courses/introduction-to-fintech-and-financial-innovation
4. https://www.mygreatlearning.com/academy/learn-for-free/courses/introduction-to-fintech

V SEMESTER
23OE3522 : Financial Analytics

Course Outcomes		
Upon successful completion of the course the students will be able to: 1.Apply financial analytics techniques to real-world business problems. 2.Analyze financial data using statistical and computational tools to Construct and interpret financial models for forecasting and decision-making. 3.Evaluate risks and optimize financial portfolios.		
Unit 1	**Introduction to Financial Analytics**	**7 Hrs.**
Introduction to Financial Systems and Statements: Overview of Financial Analytics and its role in decision-making, Introduction to financial markets and instruments, Time value of money, interest rates, annuities , Financial statements: Balance Sheet, Income Statement, and Cash Flow Statement, Financial ratios and performance metrics		
Unit 2	**Financial Data and Preprocessing Techniques**	**8 Hrs.**
Basic corporate financial predictive modelling- Project analysis- cash flow analysis- cost of capital Financial Break even modelling, Capital Budget model-Payback, NPV, IRR.		
Unit 3	**Exploratory Financial Data Analysis**	**8 Hrs.**
Time-series components: trend, seasonality, cyclicality, Descriptive analytics of stock and commodity data, Moving averages and smoothing techniques, Correlation and covariance of financial assets, Visualization: candlestick charts, return plots, correlation heatmaps		
Unit 4	**Predictive Modeling in Finance:**	**8Hrs.**
Introduction to regression analysis (linear, multiple), Time-series forecasting: AR, MA, ARIMA models, Introduction to machine learning in finance: decision trees, random forests, Case study: Stock price prediction using ARIMA/ML models		
Unit 5	**Basics of Investment and Risk Analysis**	**8 Hrs.**
Return and risk: Definitions and examples, Types of financial risk: market, credit, operational, Calculating returns and standard deviation using stock data, Diversification and correlation		
Unit 6	**Risk Management and Portfolio Analytics**	**7 Hrs**
Intro to Portfolio Analytics, What is a portfolio? Portfolio basics: building a basket of assets, calculating portfolio return and risk, Diversification benefits using correlation matrix, Introduction to efficient frontier (conceptual only)		
	Total Lecture	**45 Hours**

Textbooks:	
1.	Financial analytics with R by Mark J. Bennett, Dirk L. Hugen, Cambridge university press.
2.	Haskell Financial Data Modeling and Predictive Analytics Paperback – Import, 25 Oct 2013 by Pavel Ryzhov.
3.	Statistics and Data Analysis for Financial Engineering: With R Examples David Ruppert, Springer 2nd Edition ISBN: 978-1493926138
Reference Books:	
1	Quantitative Financial Analytics: The Path To Investment Profits Paperback – Import, 11 Sep 2017
2	Introduction to Financial Analysis by Kenneth S. Bigel, Touro College, OPEN TOURO, NEW YORK.
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.coursera.org/learn/financial-analysis
2	https://www.edx.org/learn/financial-analysis/babson-college-financial-analysis-for-decision-making
3	https://www.youtube.com/watch?v=hnlByld08Io

V SEMESTER
23OE3524 : Lifestyle Diseases

Course Outcomes

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

1. **Understand Public Health and Lifestyle Diseases:**
Recognize and explain the fundamental principles of public health and the impact of lifestyle on health. Discuss various lifestyle-related diseases and how they can be prevented through effective lifestyle management.

2. **Analyze Causes and Risk Factors of Lifestyle Diseases:**
Identify and enumerate the causes, risk factors, and pathophysiology of common lifestyle diseases such as atherosclerosis, hypertension, stroke, diabetes, obesity, nephritis, and liver diseases. Study cases before and post COVID-19.

3. Apply Diagnostic and Preventive Strategies:
Demonstrate the ability to outline diagnostic methods, interpret basic test results, and describe preventive, therapeutic, and management strategies for lifestyle-related diseases.

4. Integrate Nutrition and Holistic Health Approaches:
Relate the principles of nutrition, Yoga, and Meditation to health and disease prevention. Identify common nutritional disorders and discuss dietary guidelines for managing specific health conditions.

Unit 1	**Introduction to Public Health and Lifestyle Diseases**	**8 Hrs.**

Concepts of lifestyle and its impact on health, Introduction to lifestyle diseases: definition, prevalence, and significance, Role of behavioral and environmental factors in lifestyle diseases, Impact of pandemics on public health: Focus on COVID-19, Behavioral changes during and after COVID-19: hygiene, mobility, mental health, Role of public health systems and global responses to COVID-19

Unit 2	**Causes and Risk Factors of Lifestyle Diseases – Part I**	**8 Hrs.**

Pathophysiology and risk factors of: Atherosclerosis, Hypertension, Stroke

Role of genetics, diet, physical activity, stress, and addiction, Early signs, symptoms, and progression of these diseases

Increased cardiovascular risk due to COVID-19 infection and lockdown-related inactivity, Exacerbation of hypertension and cerebrovascular conditions during the pandemic, Role of stress, anxiety, and social isolation during lockdowns as risk factors

Unit 3	**Causes and Risk Factors of Lifestyle Diseases – Part II**	**7 Hrs.**
Pathophysiology and risk factors of: Diabetes mellitus (Type 1 and Type 2), Obesity and metabolic syndrome, Nephritis and liver diseases (e.g., fatty liver, hepatitis), Complications and co-morbidities associated with these diseases, Link between COVID-19 and metabolic disorders like diabetes and obesity, post-COVID complications affecting kidneys and liver, Impact of steroid use and viral infection on metabolic health		
Unit 4	**Diagnosis, Prevention, and Management**	**8Hrs.**
Common diagnostic tools: blood tests, imaging, and clinical assessments, Basics of interpreting diagnostic results, Prevention strategies: primary, secondary, and tertiary levels, Conventional and lifestyle-based treatment approaches, Public health policies and screening programs, COVID-19 diagnostic methods and interpreting test results (RT-PCR, antibody tests), Managing post-COVID conditions: fatigue, inflammation, long COVID symptoms, Preventive strategies: vaccines, immunity, and their public health implications		
Unit 5	**Holistic Approaches to Health – Yoga and Meditation**	**7 Hrs.**
Principles and practices of Yoga and their physiological benefits, Role of Meditation in stress management and mental health, Scientific evidence supporting Yoga and Meditation in disease prevention and recovery, Integrating Yoga and Meditation into daily routines for holistic health, Role of Yoga and Meditation in COVID-19 recovery and mental well-being, Evidence-based studies on Yoga for lung function, stress reduction during/post-COVID		
Unit 6	**Nutrition and Dietary Management in Lifestyle Diseases**	**7 Hrs**
Basics of nutrition: macronutrients and micronutrients, Common nutritional disorders and deficiencies, Role of diet in prevention and management of lifestyle diseases, Dietary guidelines and therapeutic diets for diabetes, hypertension, obesity, liver and kidney diseases, Role of traditional diets and functional foods, Nutrition for immunity: Key nutrients during and after COVID-19, Dietary support in COVID-19 recovery: high-protein, anti-inflammatory diets, Addressing post-COVID appetite loss, taste/smell dysfunction, and digestive issues, Nutritional rehabilitation in post COVID cases.		
	Total Lecture	**45 Hours**

Textbooks:	
1.	"Textbook of Lifestyle Medicine" by James M. Rippe, Publisher: CRC Press
2.	"Nutrition and Lifestyle for Health and Wellness" by Garry Egger, Katrina Arthur, and Tamara Bucher, Publisher: Oxford University Press

Reference Books:	
1	"Lifestyle Medicine" by Garry Egger, Andrew Binns, and Stephan Rossner, Publisher: Academic Press
2	"Essentials of Human Nutrition" by Jim Mann and A. Stewart Truswell, Publisher: Oxford University Press
3	"Yoga and Cardiovascular Management" by Swami Satyananda Saraswati, Publisher: Bihar School of Yoga
4	"Clinical Dietetics and Nutrition" by F.P. Antia and Philip Abraham, Publisher: Oxford University Press (India)
5	5. "Post-COVID Recovery: Diet, Lifestyle, and Mental Health" by Rujuta Diwekar (for popular/scientific audience) Publisher: Self-published
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	1. Lifestyle Medicine: Improving the Future of Health Care ● Platform: edX (Offered by Doane University) Link: https://www.edx.org/course/lifestyle-medicine
2	Nutrition, Exercise and Sports ● Platform: Coursera (Offered by Wageningen University) Link: https://www.coursera.org/learn/nutrition-exercise
3	Yoga and Well-being ● Platform: SWAYAM (offered by various Indian universities) Link: https://swayam.gov.in → Search "Yoga" or "Health & Wellness"
4	CDC Resources: ● Chronic Disease Prevention Tools https://www.cdc.gov/chronicdisease/index.htm Post-COVID Conditions (Long COVID) https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects/
5	TED Talks ● Dean Ornish: The world's killer diet https://www.ted.com/talks/dean_ornish_on_healing *On reversing heart disease with lifestyle changes* Rujuta Diwekar: The Indian Diet Wisdom (YouTube Link): https://www.youtube.com/watch?v=d8CkP3Ioxcc

V SEMESTER
23OE3525 : Holistic Nutrition

Course Outcomes		
Upon successful completion of the course the students will be able to: 1.Discuss the role of essential nutrients in physical, mental and emotional wellness 2.Discuss the role of deficiencies in essential nutrients in the disease process 3.Explain how the standard American diet relates to the disease process 4.Identify five contemporary eating "styles" and lists the pros and cons of each		
Unit 1	**NUTRITION AND HEALTH**	**8 Hrs.**
Introduction to the principles of nutrition; Basics of nutrition including; micronutrients (vitamins and minerals), the energy-yielding nutrients (Carbohydrates, Lipids and Proteins), metabolism, digestion, absorption and energy balance.		
Unit 2	**AYURVEDA – MIND/BODY HEALING**	**7 Hrs.**
Philosophy of Holistic Nutrition with spiritual and psychological approaches towards attaining optimal health; Principles and practical applications of Ayurveda, the oldest healing system in the world. Three forces – Vata, Pitta and Kapha, that combine in each being into a distinct constitution. Practical dietary and lifestyle recommendations for different constitutions will also be explored in real case studies.		
Unit 3	**COMPARATIVE DIETS**	**8 Hrs.**
Evaluating principles of food dynamics, nutrient proportions, holistic individuality, the law of opposites, food combining, and more. Therapeutic benefits and limitations of several alternative diet approaches, including: modern diets , food combining , high protein diets, Vegetarian approaches , cleansing and detoxification diets		
Unit 4	**PREVENTIVE HEALTH CARE**	**7 Hrs.**
Proper nutrition protection against, reverse and/or retard many ailments including: osteoporosis, diabetes, atherosclerosis and high blood pressure, arthritis, cancer, anemia, kidney disease and colon cancer. Current research developments on phytochemicals, antioxidants and nutraceuticals will be explored.		
Unit 5	**NUTRITION AND ENVIRONMENT**	**7 Hrs.**
Maintain and promote health, Right to self-determination and self-knowledge, Nutrition principles which promote health and prevent disease, Safety of our food supply, naturally occurring and environmental toxins in foods, microbes and food poisoning.		
Unit 6	**CASE STUDY**	**8 Hrs**
Practical dietary and lifestyle recommendations for different constitutions will also be explored in real case studies. Case study for Body and Mind Healing		
	Total Lecture	**45 Hours**

Textbooks:	
1.	Desai, B. B., Handbook of Nutrition and Diet. Marcel Dekker, New York. 2000
2.	Macrae, R., Rolonson Roles and Sadlu, M.J. 1994. Encyclopedia of Food Science & Technology & Nutrition. Vol. XI. Academic Press
Reference Books:	
1	Modern Nutrition in Health & Disease by Young & Shils.
2	Nutritive Value of Indian Foods.- by C. Gopalan, B. V. Rama Sastri, S. C. Balasubramanian
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://ayurhealing.net/blog/ayurveda-and-mind-body-health/
2	https://www.healthline.com/nutrition/ayurvedic-diet
3	https://headachejournal.onlinelibrary.wiley.com/doi/10.1111/head.12363
4	https://www.ayurveda-products.eu/content/ayurvedic-lifestyle-and-recipes/ayurvedic-nutrition

V SEMESTER
MDM3EE103 : Digital Electronics

Course Outcomes		
Upon successful completion of the course the students will be able to **1. Remember** and **Understand** Basic Logic Gates and Number system **2. Analyse** the Boolean Algebra and apply the Simplification Techniques **3. Apply** the Concept of combinational logic circuits **4. Apply** the Concept of sequential logic circuits		
Unit 1	**Number system and codes**	**7 Hrs.**
Introduction to Number systems, binary Number system, Octal Number System Hexadecimal Number system, Conversion of number System, Signed Numbers, Ones and Twos Complement representation. Binary Codes , BCD, Gray,Excess-3.		
Unit 2	**Logic gates and Boolean Algebra**	**7 Hrs.**
Basic Digital circuits AND, OR and NOT operation,NAND and NOR operation, Exclusive OR operation, Boolean algebraic theorems, DeMorgan's theorem, SOP, POS Canonical forms of Boolean expression.		
Unit 3	**Logic functions Minimization**	**7 Hrs.**
Simplification of Boolean functions Using K-Map, Two and Three variable K map, Four variable K map, Product of sum and Sum of product simplification and realisation using gates, Don't care conditions. Design of Arithmetic circuits Half adder, Full adders, Half Subtractions and Full Subtractions.		
Unit 4	**Combinational logic Circuit**	**7 Hrs.**
Multiplexer, De-multiplexer, Encoder, Decoder. Functions & its implementation of Boolean expressions using logic gates, Digital Comparator		
Unit 5	**Sequential Logic circuits**	**7 Hrs.**
Introduction to sequential circuit, one bit memory cell, Clocked S-R, J-K flip flop, Master-slave J-K flip flop, T and D flip flop, Excitation table of flip flop		
Unit 6	**Registers and Counter**	**7 Hrs**
Introduction to registers and Mode of operation, shift register and its application, Synchronous and Asynchronous counter, Modulus of Counter		
	Total Lecture	**42 Hours**

Textbooks:	
1.	Modern Digital Electronics by R P Jain, tata McGraw-Hill Publishing Company Limited
Reference Books:	
1	Fundamental of Digital Circuit By Anand Kumar
2	Digital Design by Morris Mano, Pearson education, 2018,PEARSON
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/117103064
2	https://nptel.ac.in/courses/117106086

V SEMESTER
MDM3EE203 : Computer Vision

Course Outcomes		
Upon successful completion of the course the students will be able to 1.Gain the knowledge of Image Formation, Image Enhancement and Segmentation. 2.Analyse various feature extraction techniques. 3.Describe core vision tasks through Motion estimation and Object 4.Explore the areas where automation can be possible through Image processing and Computer Vision.		
Unit 1	**Introduction**	7 Hrs.
Digital Image fundamentals, Image Sensing and acquisition, Sampling and Quantization, Image formation models, Overview of Computer Vision, Applications of Image processing and Computer Vision		
Unit 2	**Image Enhancement**	8 Hrs.
Image enhancement in spatial domain, Basic grey level Transformations, Histogram Processing Techniques, Spatial Filtering, Image smoothing and Image Sharpening, Image enhancement process in frequency domain, Low pass filtering, High pass filtering		
Unit 3	**Image Segmentation**	8 Hrs.
point, line and edge detection, Thresholding, Regions Based segmentation, Edge linking and boundary detection		
Unit 4	**Feature Extraction**	7 Hrs.
Importance of Features, Feature extraction techniques, Histogram of Oriented Gradient (HOG), Scale Invariant Feature Transform (SIFT), Background subtraction techniques, Image Matching, Principal Component Analysis (PCA)		
Unit 5	**Object Recognition and Motion Estimation**	8 Hrs.
Object Recognition techniques: Viola-Jones, Yolo, Deep learning algorithms for Object Recognition. Optical Flow, Gaussian Mixture Model (GMM), Structure of Motion, Motion Estimation.		
Unit 6	**Applications of Image Processing and Computer vision**	7 Hrs.
Face Recognition, Facial Expression Recognition, Optical Character Recognition, Automated Video Surveillance		
	Total Lecture	**45 Hours**

Textbooks:	
1.	Digital Image Processing- Refael C. Gonzalez and Richard E. Woods, Wesley
2	Computer Vision - A modern approach, by D. Forsyth and J. Ponce, Prentice Hall Robot Vision, by B. K. P. Horn, McGraw-Hill.
Reference Books:	
1	Introductory Techniques for 3D Computer Vision, by E. Trucco and A. Verri, Publisher: Prentice Hall.
2	Computer Vision, D. H. Ballard, C. M. Brown, Prentice-Hall, Englewood Cliffs, 1982
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	NPTEL Courses https://onlinecourses.nptel.ac.in/noc19_cs58/preview https://onlinecourses.nptel.ac.in/noc19_ee55/preview
2	Coursera Courses on Image Processing, Computer Vision

V SEMESTER

Mandatory Learning Course (Audit Course)

MLC2125 : YCAP5

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

6th Semester

(Department of Electrical Engineering)

B. Tech in Electronics Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Electronics Engineering)

B. Tech in Electronics Engineering

SoE No. 23EE-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	EE	23EE1601	Object Oriented Programming	**T**	3	0	0	3	3	30	20	50	3
2	6	PC	EE	23EE1602	**Lab :** Object Oriented Programming	**P**	0	0	2	2	1		60	40	
3	6	PC	EE	23EE1603	Control System Engineering	**T**	3	0	0	3	3	30	20	50	3
4	6	PC	EE	23EE1604	Design Thinking and Research Methodology	T	2	0	0	2	2	30	20	50	3
5	6	PE	EE		**Professional Elective-II**	**T**	3	0	0	3	3	30	20	50	3
6	6	PE	EE		**Lab : Professional Elective-II**	**P**	0	0	2	2	1		60	40	
7	6	PE	EE		**Professional Elective-III**	**T**	3	0	0	3	3	30	20	50	3
8	6	PE	EE		**Lab : Professional Elective-III**	**P**	0	0	2	2	1		60	40	
9	6	MDM	EE		**MD Minor Course-IV**	T	3	0	0	3	3	30	20	50	3
10	5	**VSEC-4**	EE	23EE1605	**Lab :** Electronics Design Automation	P	0	0	2	4	2		60	40	
11	6	STR	EE	23EE1606	Project Phase-I	P	0	0	4	4	2		60	40	
					TOTAL		**17**	**0**	**12**	**31**	**24**				

List of Mandatory Learning Course (MLC)															
1	6	HS		MLC126	**YCAP6 :** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Professional Electives - II					
1	6	PE-II	EE	23EE1621	**PE-II :** Data Analytics
2	6	PE-II	EE	23EE1622	**PE-II : Lab :** Data Analytics
3	6	PE-II	EE	23EE1623	**PE-II :** Digital VLSI Design
4	6	PE-II	EE	23EE1624	**PE-II : Lab :** Digital VLSI Design
5	6	PE-II	EE	23EE1625	**PE-II :** Embedded System
6	6	PE-II	EE	23EE1626	**PE-II : Lab :** Embedded System
7	6	PE-II	EE	23EE1627	**PE-II :** Industrial Automation
8	6	PE-II	EE	23EE1628	**PE-II : Lab :** Industrial Automation
9	6	PE-II	EE	23EE1629	**PE-II :** RF & Microwave
10	6	PE-II	EE	23EE1630	**PE-II : Lab :** RF & Microwave
11	6	PE-II	EE	23EE1631	**PE-II :** Quantum Computing
12	6	PE-II	EE	23EE1632	**PE-II : Lab :** Quantum Computing

Professional Electives - III					
1	6	PE-III	EE	23EE1641	**PE-III :** Machine Learning
2	6	PE-III	EE	23EE1642	**PE-III : Lab :** Machine Learning
3	6	PE-III	EE	23EE1643	**PE-III :** CMOS Subsystem Design
4	6	PE-III	EE	23EE1644	**PE-III : Lab :** CMOS Subsystem Design
5	6	PE-III	EE	23EE1645	**PE-III :** Computer Communication Network
6	6	PE-III	EE	23EE1646	**PE-III : Lab :**Computer Communication Network
7	6	PE-III	EE	23EE1647	**PE-III :** Wireless Communication
8	6	PE-III	EE	23EE1648	**PE-III : Lab :** Wireless Communication
9	6	PE-III	EE	23EE1649	**PE-III :** Soft Computing & Optimization Techniques
10	6	PE-III	EE	23EE1650	**PE-III : Lab :** Soft Computing & Optimization Techniques
11	6	PE-III	EE	23EE1651	**PE-III :** Cryptography and Network Security
12	6	PE-III	EE	23EE1652	**PE-III : Lab :** Cryptography and Network Security

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

VI SEMESTER
23EE1601 : 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
2. Develop programs using arrays, functions, classes, and objects.
3. Analyse the concept of Inheritance, Polymorphism, overloading
4. Apply Standard Template Library components in applications

Unit:1	**Introduction**	**8 Hours**

History of C++ and its relation to C , Structure of a C++ program, Principles of Object-Oriented Programming (OOP), OOP Paradigm, Basic Concepts of OOP, Benefits of OOP, Input/Output using cin, cout

Unit:2	**Token Expressions & Control Structures**	**8 Hours**

Tokens, Keywords, Identifiers and Constants, Data Types, Type Compatibility, Variables, Operators in C++,Implicit Conversions, Operator Precedence, Control Structures.

Unit:3	**Functions in C++, Classes & Objects**	**7 Hours**

The Main Function, Function Prototyping, Call by Reference, Return by Reference, Inline Functions, Function Overloading, Friend and Virtual Functions. Specifying a class, Member Functions, Static Member Functions, Arrays of Objects, Friend Function.

Unit:4	**Constructors & Destructors, Operator Overloading, Inheritance**	**8 Hours**

Constructors, Parameterized Constructors, Copy Constructors, Dynamic Constructors, Destructors, Operator Overloading, Inheritance , types of inheritance, Polymorphism and virtual functions.

Unit:5	**File handling**	**8 Hours**

Files, classes for file stream operations, Opening, Closing and Processing files, End of file detection, File pointers, Updating a file, Error Handling during file operations, Command line arguments, Exception Handling.

Unit :6	**Standard Template Library**	**7 Hours**

Templates: Function and Class Templates, Introduction to STL: Vectors, Lists, Maps, Sets , Iterators and Algorithms

Total Lecture Hours	**45 Hours**

Text books	
1	Object Oriented programming with C++, E. Balagurusamy
Reference Books	
1	Fundamentals of Data Structures in C++, Robert Lafore
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/106105153
2	https://archive.nptel.ac.in/courses/106/105/106105153/
3	https://nptel.ac.in/courses/106105151
4	https://onlinecourses.nptel.ac.in/noc19_cs48/preview

VI SEMESTER
23EE1602 : 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 2. Analyse the concept of Inheritance , Polymorphism, overloading 3. Choose the appropriate data structure and algorithm design method for specific application 4. Develop and use linear and non-linear data structures 5. Create software solutions for complex problems

Sr. No.	Experiments based on
1	Implement the concept of Class and its data members and member functions in C++
2	Implement the concept of function and operator overloading in C++
3	Implement the concept of friend function
4	Implement the concept of class constructor and its type in C++
5	Implement the concept of Abstraction in C++
6	Implement the concept of all types of inheritance in C++
7	Implement the concept of run time polymorphism in C++
8	Implement the concept of Files using command line arguments in C++
9	Implement the concept of function templates and class template in C++
10	Implement the concept of exception in C++

VI SEMESTER
23EE1603 : Control System Engineering

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Understand and apply concepts related to linear control system 2. Apply the concepts of control system to obtain the system Transfer function 3. Analyze time domain analysis of given control system 4. Apply frequency domain analysis method to various linear control systems		
Unit:1	**Introduction to Control Systems:**	**7 Hrs**
History of control system, Basic Components of Control System. Open loop control and close loop control with examples. Classification of control systems, Transfer function, block Diagram and signal flow graph:-Transfer function and gain. Order of a system. Block diagram algebra & reduction techniques Signal flow graph, its constructions and Mason's gain formula.		
Unit:2	**Mathematical modeling of physical system:**	**7 Hrs**
Mathematical modelling of physical system such as –electrical, mechanical, electro-mechanical, thermal, hydraulic, pneumatic etc., Analogous systems,Characteristics of Feedback Control Systems: Effect of negative feedback compared to open loop system such as –sensitivity to parameter variation. sensitivity to parameter variation such gain and forward path, Speed of time response, bandwidth, and disturbance rejection., Linearizing effect, Effect of positive feedback.		
Unit:3	**Time Domain Analysis of Control Systems:**	**6 Hrs**
Concept of transient response, Steady state response, time response, standard test signals, Time response of first order systems, Transfer function of second order system, Time response of second order system, Time response specifications of second order system, steady state error (ess) analysis, static error constants and system type, dominant poles. Relation between roots of characteristic equation, damping ratio and transient response.		
Unit:4	**Unit:4 Stability of Linear Control Systems:**	**6 Hrs**
Concept of stability, stable, unstable and marginally stable system, Absolutely stable and conditionally stable system, Necessary conditions for stability, method to determine stability, Routh-Hurwitz stability criterion with special cases, relative stability analysis, Routh-Hurwitz stability criterion with special cases, relative stability analysis. State Variable Analysis.		

Unit:5	Root Locus Technique:	7 Hrs
Definition, magnitude and angle criteria, properties of root locus, construction rules, for root locus plot of negative feedback systems, determining the gain from root locus plot, effect of addition of poles and zeros of G(s) H(s).		
Unit:6	**Frequency domain analysis of control systems:**	**7 Hrs**
Concept of frequency response and sinusoidal transfer function, resonant frequency, resonant peak, cut off frequency, bandwidth, and correlation between time and frequency response, polar plot, Bode plot, all pass and minimum, log magnitude verses phase plot. Stability in Frequency domain: Nyquist stability criteria, concept of gain margin and phase margin and its computation using polar plot and log magnitude verses phase plot. Lag, lead and lag-lead compensation		
	Total Lecture Hours	**40 Hours**

Text books	
1	I.J. Nagrath. M. Gopal, Control system Engineering Sixth Edition, Prentice Hall
Reference Books	
1	Katsuhiko Ogata, Modern Control system, Fifth Edition, Prentice Hall.
2	Joseph J. DiStefano, Feedback and Control Systems, 2nd Edition. McGraw-Hill Education
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://onlinecourses.nptel.ac.in/noc22_ee31/preview

VI SEMESTER

23EE1604 : Design Thinking in Electronics Engineering & Research Methodology

Course Outcomes:

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

1: *Explain* the principles of design thinking and the phases of the research process in engineering contexts.

2: *Apply* appropriate research methods and data collection techniques to identify and define engineering problems.

3: *Analyze* collected data using suitable statistical tools and *evaluate* research findings to draw valid conclusions.

4: *Design* and *construct* technical reports and research papers adhering to ethical standards and scholarly conventions.

Unit:1	**Introduction to Research and the Design Thinking Process in Electronics Engineering:**	**7 Hours**

Basics of Engineering Research - Definition and scope of research in Electronics Engineering, Role of innovation in Electronics. Introduction to Design Thinking - Five phases: Empathize, Define, Ideate, Prototype, Test. Problem Identification in Electronics- Observation techniques, Understanding user needs: interviews and surveys in technical contexts, Problem statement formulation (e.g. Signal and Image processing and analysis, Healthcare and Biomedical Engineering, etc.). Empathy and Need Finding in Electronics Engineering- Empathizing with end-users: healthcare, communication, automation, etc., Case studies of empathetic design in electronics products.

Unit:2	**Research Design, Data Interpretation, and Ethics in Electronics:**	**8 Hours**

Research Process in Engineering- Research design: experimental, analytical, simulation-based, Formulating hypotheses in electronics. Data Collection and Analysis - Tools: sensors, simulation software, MATLAB, Python, Quantitative and qualitative data in electronics research, Data interpretation and drawing conclusions.

IPR, Scholarly Publishing And Entrepreneurships: IPR- intellectual property rights and patent law, commercialization, copy right, royalty, trade related aspects of intellectual property rights (TRIPS); scholarly publishing- IMRAD concept and design of research paper, citation and acknowledgement, Opportunities & statutory requirements – information of Government Regulations – Gomasta, Company formation – types, Startups, entrepreneurial decision process, business opportunities, preparing business plan & feasibility, financing.

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.

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.		
	Total Lecture Hours	**30 Hours**

Text books	
1	H. S. Fogler and S. E. LeBlanc, Strategies for Creative Problem Solving, 2nd edition, Pearson, Upper Saddle River, NJ, 2008.
2	Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
3	Levine, Effective Problem Solving, 2nd edition, Prentice Hall, Upper Saddle River, NJ,1994
Reference Books	
1	Activities for Teaching creativity and Problem Solving - By Arthur B Vangundy - Pfeiffer
2	Whimbey and J. Lochhead, Problem Solving & Comprehension, 6th edition, Lawrence Erlbaum, Mahwah, NJ, 1999.
3	Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International.
4	Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes.
5	Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing.
6	Wadehra, B.L. 2000. Law relating to patents, trademarks, copyright designs and geographical indications. Universal Law Publishing
7	Yousef Haik and Tamer M.Shahin, "Engineering Design Process", Cengage Learning, Second Edition, 2011.
8	Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett , "Solving Problems with Design Thinking - Ten Stories of What Works" (Columbia Business School Publishing) Hardcover 2013
9	H. S. Fogler and S.E. LeBlanc, Strategies for Creative Problem Solving, Prentice Hall
10	E. Lumsdaine and M. Lumsdaine, Creative Problem Solving, McGraw Hill
11	J. Goldenberg and D. Mazursky, Creativity in product innovation. Cambridge University Press, 2002.
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	www.nptelvideos.in
2	www.coursera.com
3	www.udemy.com
4	swayam.gov.in

VI SEMESTER
23EE1621 : PE-II : Data Analytics

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Understand concept of different types of data and its analytical methods. 2. Understand data analytics life cycle for solving challenging business problems. 3. Analyze and Apply statistical procedures for analysis based on goals and nature of data. 4. Analyze and Apply best practices in data visualization to develop charts, maps tables and other visual representations of data

Unit:1	**Introduction and Overview**	**7 hrs**
Overview of Data Analytics: Types (Descriptive, Diagnostic, Predictive, Prescriptive), Data Analytics Lifecycle (CRISP-DM Framework) , Data Types and Sources (Structured, Unstructured, Semi-structured), Data Analytics vs. Data Analysis, Business Intelligence vs. Data Analytics, The Business Use of Data Analytics, Types of data analytics		
Unit:2	**Statistical Foundations for Data Analysis**	**8 hrs**
Descriptive Statistics (Mean, Median, Variance, Skewness, Kurtosis), Probability Distributions (Normal, Binomial, Poisson, Exponential), Inferential Statistics (Hypothesis Testing, p-value, Confidence Intervals), Correlation and Covariance ANOVA and Chi-square Tests		
Unit:3	**Exploratory Data Analysis (EDA)**	**7 hrs**
Data Quality and Noise , Handling Missing Values, Outliers, and Duplicates, Feature Engineering and Feature Scaling, Data Normalization, Standardization, Univariate, Bivariate, and Multivariate Analysis		
Unit:4	**Regression Analysis**	**9 hrs**
Introduction to Regression , Difference between Correlation and Regression,Types of Regression (Linear, Logistic, Polynomial), Simple & Multiple Linear Regression, Model Evaluation & Diagnostics , Metrics: R^2, Adjusted R^2, RMSE, MAE , Residual Analysis (Patterns, Heteroscedasticity), Identifying Multicollinearity , Handling Overfitting, Binary vs. Multinomial Logistic Regression , Odds Ratio, Logit Function, Model Evaluation (Confusion Matrix, ROC-AUC)		
Unit:5	**Story telling with Data and data visualization**	**7 hrs**
Why Planning?, Creating Interesting Stories with Data – Reader-driven Narratives, Author-driven Narratives; Perceptions and Presentation Methods, Best Practices in Visualization, Interactive Visualization, Event Listeners and Layouts, Case Studies for Visualization, Trends and Uncertainty		
Unit :6	**Evolution of Big Data**	**7 hrs**
Definition of Big Data, Challenges with Big Data, Traditional Versus Big Data approach, characteristics of Big Data, Big Data Platform, HDFS , current trends and top Challenges in Big Data.Ethics and Privacy in Data Analytics		
	Total Lecture Hours	**45 Hours**

Text books	
1	Data Analytics using Python, Bharti Motwani, Wiley publicatiion
2	Think Stats: Probability and Statistics for Programmers, Allen B. Downey, O'Reilly Media
3	Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data , Publisher: EMC Education Services / Wiley
Reference Books	
1	Python: Data Analytics and Visualization, Packt Publishing, 2017.
	Practical Statistics for Data Scientists (2nd Edition) Authors: Peter Bruce, Andrew Bruce, Peter Gedeck Publisher: O'Reilly Media
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/106107220/L01.html
2	https://www.youtube.com/watch?v=tA42nHmmEKw
3	https://www.digimat.in/nptel/courses/video/110106072/L01.html
4	https://www.digimat.in/nptel/courses/video/106106179/L01.html

VI SEMESTER
23EE1622 : PE-II : Lab. Data Analytics

Course Outcomes:
Upon successful completion of the course the students will be able to : 1. Apply EDA techniques using tools such as Python (Pandas, Matplotlib, Seaborn) to clean, transform, and visualize datasets. 2. Analyze patterns, correlations, and trends within datasets to extract meaningful insights. 3. Demonstrate proficiency in handling real-world datasets and performing statistical analysis to support data-driven decision-making. 4. Demonstrate analytical findings effectively through visualizations and summary reports.

Sr. No.	Experiments based on
1	Introduction to Python libraries for data analytics (numpy , pandas)
2	Demonstrating the following data preprocessing tasks using python libraries: a)Loading the dataset b) Identifying the dependent and independent variables.c) Dealing with missing data
3	Demonstrate the following data preprocessing tasks using python library a) Dealing with categorical data b) Scaling the features.
4	Demonstrate the following Similarity and Dissimilarity Measures using python a) Pearson's Correlation b) Cosine Similarity c) Jaccard Similarity d) Euclidean Distance e) Manhattan Distance
5	Perform a t-test and ANOVA using Python.
6	Perform linear regression on a given data set
7	Create visual plots using Matplotlib
8	Create statistical plots with seaborn.
9	Introduction to Power BI
10	Create a dashboard using Power BI
11	Mini project

VI SEMESTER
23EE1623 : PE-II : Digital VLSI Design

Course Outcomes		
Upon successful completion of the course the students will be able to 1. Understand and interpret the basic concepts of MOS transistors. 2. Apply the concept of CMOS as a switch to design digital logic circuits. 3. Analyze inverter design, characteristics, and Performance parameters of CMOS Circuits. 4. Design and implement combinational and sequential circuits using different CMOS styles 5. Evaluate the performance of digital CMOS circuits using simulation tools.		
Unit:1	**Introduction of CMOS**	**8 Hours**
Introduction of MOSFETs: CMOS Fabrication Process steps, NMOS Enhancement Transistor, MOS Transistor Operations, PMOS Enhancement Transistor, Regions of Operations, Threshold Voltage, MOS Device Equations.		
Unit:2	**Logic Design With CMOS**	**7 Hours**
Logic Design With MOSFETs: Ideal Switches and Boolean Operations, MOSFETs as Switches, Basic Logic Gates in CMOS, Compound Gates in CMOS, Transmission Gate Circuits (TG), Pass Transistor.		
Unit:3	**CMOS inverter**	**7 Hours**
Stick diagrams, MOS inverter Characteristics: Resistive load inverter, Inverters with n type MOSFET load, CMOS inverter, Principle of operation, DC characteristics, Tristate Inverter, Noise Margin, Introduction to Bi-CMOS Inverter.		
Unit:4	**Combinational circuit design**	**8 Hours**
Static CMOS, Ratioed Logic circuits, Analysis of CMOS Logic Gates: MOS Device Capacitance, Switching Characteristics, Rise Time, Fall Time, Propagation Delay, Power Dissipation in CMOS, Fan-in, Fan-out, Complex Logic Structures, Complementary Static CMOS, Pseudo NMOS Logic, Dynamic CMOS Logic, CMOS Domino Logic, CMOS Pass Transistor Logic.		
Unit:5	**Sequential Circuit Design**	**7 Hours**
Sequential Circuit Design, Latches and Flip Flops: D-latch, S-R latch and flip flop, J-K latch and flip flop.		
Unit :6	**Data path VLSI System Component**	**8 Hours**
Data path VLSI System Components: Half and full adder, half and full subtractor, Comparators, barrel shifters, Multiplexers, Demultiplexer, Binary Decoders, Equality Detectors, Priority Encoders.		
	Total Lecture Hours	**45 Hours**

Text books	
1	Neil H. E. WesteHarris, Principle of CMOS VLSI Design, 4th Edition, Addison Wesley VLSI Series.
Reference Books	
1	John P. Uyemura, Introduction to VLSI Circuits and Systems, Students Edition, Wiley Publication.
2	Sung-Mo Kang, Yusuf leblebici, CMOS VLSI Design, Third edition, 2008, Tata McGraw Hill.
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/108107129
2	https://nptel.ac.in/courses/106103116
3	https://nptel.ac.in/courses/117106092

VI SEMESTER
23EE1624 : PE-II : Lab: Digital VLSI Design

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Understand and interpret the basic concepts of MOS transistors. 2. Apply the concept of CMOS as a switch to design digital logic circuits. 3. Analyze inverter design, characteristics and Performance parameters of CMOS Circuits. 4. Design and implement combinational and sequential circuits using different CMOS styles 5. Evaluate the performance of digital CMOS circuits using simulation tools.

Sr. No.	Experiments based on
1	To implement CMOS Inverter
2	To implement NAND and AND gate using CMOS
3	To implement NOR and OR gate using CMOS
4	To implement 3 input NAND and NOR gate using CMOS
5	To implement different Functions using CMOS
6	To implement Function MUX and DMUX using CMOS
7	To implement NAND and NOR gate S-R flip-flop using CMOS logic.
8	To implement NAND and NOR gate J-K flip-flop using CMOS logic.
9	To implement Full adder using CMOS
10	To implement Full Subtractor using CMOS
11	To implement Binary encoder using CMOS
12	Mini Project

VI SEMESTER
23EE1625 : PE-II : Embedded System

Course Outcomes:		
After completion of the course, student will demonstrate the ability to: CO1: Describe the ARM microprocessor architectures, its features and instructions. CO2: Write program for specific task. CO3: Analyze and Interface the peripherals to ARM based microcontroller. CO4: Develop embedded system application using ARM based microcontroller. CO5: Write program and Debug using IDE tool like KEIL MDK410.		
Unit:1	**INTRODUCTION TO ARM**	**7 Hours**
Introduction to ARM, Advantages of architectural features of ARM Processor, Processor modes, Register organization, Exceptions and its handling, 3/5- stage pipeline ARM organization		
Unit:2	**ARM OVERVIEW**	**7 Hours**
ARM and THUMB instruction sets, ARM programmer's modes, Instruction set in detail and programming, data processing instruction, data transfer instruction, Control flow instructions, simple assembly language programs.		
Unit:3	**ARM PROGRAMMING**	**7 Hours**
ARM assembly language programs and C language programs. Code conversion programs.		
Unit:4	LPC 2148 ARCHITECTURE	**7 Hours**
LPC 2148 architecture block diagrams, pins and signals. GPIO, I / O Interfaces like LED and Switch and their Programs.		
Unit:5	LPC 2148 INTERFACING	**7 Hours**
Display interfacing with LPC 2148. 7segment display interfacing. LCD interfacing and programs.		
Unit :6	**ARM APPLICATION**	**7 Hours**
LPC 2148 TIMER and PWM Applications. Embedded ARM applications		
Total Lecture Hours		**42 Hours**

Text books	
1	ARM System on chip Architecture, 2nd edition,2000,steve Furber, Pearson Education Asia
2	Embedded Linux, Hardware, Software and interfacing, 2002. Craig Hallabaugh, Addison-Wesley Professional
3	ARM System Developer's Guide: Designing and Optimizing, 2005 Sloss Andrew N, Symes Dominic, Wright Chris Morgan Kaufman Publication

Reference Books	
1	Technical references on www.arm.com.
2	Web base resources for RTOS and µCOS.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/106105159
2	https://nptel.ac.in/courses/106105193

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 Electronics Engineering)

B.Tech in Electronics Engineering

SoE No. 23EE-101

VI SEMESTER

23EE1626 : PE-II : Lab : Embedded System

Course Outcomes:
Upon successful completion of the course the students will be able to 1. **Write** program for specific task 2. **Analyze** and Interface the peripherals to ARM based microcontroller 3. **Develop** embedded system application using ARM based microcontroller 4. **Write program** and **Debug** using IDE tool like KEIL MDK410 for ARM

Expt. No.	Name of Experiment / Problem Statement
1	a) Write program to perform addition of two16 bit nos. and store result in R5 b)Write program to perform subtraction of two 16 bit nos. and store result in R5
2	Write program to add two nos. x and y present in memory at address 4000000H and 40000004H and store in memory 40000008H
3	Write program to add Five 8 bit nos. present in memory from address 40000004H and store result in memory 4000 0030H
4	Write program to multiply data of two array zi = xi * yi xi and yi are 32 bit nos • array1 (xi) stored from address 40000000H • array 2 (yi) stored from address 40000020H • no. of elements in array i = 5 Store result array3 (zi) from address 40000040H
5	Compare two strings of 3 ASCII characters, One string starts at 0x40000000 and other at 0x40000010. If both the string match store 11H in memory location 0x40000030 otherwise store 22H in memory location 0x40000030.
6	Draw Interfacing of 1 LED with LPC2148 and write program to blink LED connected to port pin P1.16. Use LPC 2148 ARM Kit to demonstrate.
7	Draw Interfacing of 8 LED with LPC2148 and Write program to blink 8 LEDs alternately connected to port pins P1.23 to P1.16. Use LPC 2148 ARM Kit to demonstrate.
8	Draw Interfacing of 1 LED and 1 switch with LPC2148 and Write program to turn ON LED, if Switch is pressed else LED OFF. LED is connected to port pin P1.16 and switch is connected to input pin P0.10 and SW is grounded by using output pin P0.14. Use LPC 2148 ARM Kit to demonstrate.
9	Draw Interfacing of common cathode 7 segment display with LPC2148 and write program to display 0 to 9 at an interval of 2 sec. 7 segment display is connected to port pins P1.23 to P1.16. Use LPC 2148 ARM Kit to demonstrate.
10	Draw Interfacing of common anode 7 segment display with LPC2148 and write program to display 0 to 5 at an interval of 3 sec. 7 segment display is connected to port pins P1.23 to P1.16. Use LPC 2148 ARM Kit to demonstrate.

VI SEMESTER
23EE1627 : PE-II: Industrial Automation

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Apply the principles of industrial automation to select and implement suitable automation technologies for manufacturing processes. 2. Analyze different types of sensors and actuators used in automated systems for process monitoring and control. 3. Apply programming skills to develop control logic for industrial applications using Programmable Logic Controllers (PLCs). 4. Analyze the operation of Supervisory Control and Data Acquisition (SCADA), and Distributed Control Systems (DCS) in real-time industrial control systems.		
Unit:1	**Overview of Industrial Automation:**	**7**
Automation Requirements, Industrial Automation Systems & Architecture, Introduction to PLC & SCADA , Industrial Communication Protocols		
Unit:2	**Control Systems and Actuation in Industrial Automation:**	**8**
PID controller, mechanical switches, solid-state switches, electrical actuators: Solenoids, relays and contactors, ac motor, energy conservation schemes through vfd, dc motors, servo motor, pneumatic and hydraulic actuators.		
Unit:3	**PLC Operation: Fundamentals and Significance:**	**8**
Definition & Importance, Evolution of PLCs, PLC Architecture & Block Diagram, Types of PLCs, CPU Unit Architecture, Memory Classification.		
Unit:4	**PLC Programming:**	**8**
Core Ladder Logic Functions, Electrical Wiring Diagrams, PLC Scan Cycle, PLC Programming Languages, Module Addressing, Basic Relay Operations, Input, Output, and Timer/Counter Instructions, Arithmetic & Comparison Functions.		
Unit:5	**SCADA: Fundamentals and Significance: SCADA: Fundamentals and Significance:**	**7**
Introduction, block diagram, elements of SCADA, features of SCADA, MTU, RTU functions, applications of SCADA, communications in SCADA		
Unit :6	Overview of Distributed Control Systems (DCS):	7
Introduction to DCS, Key Features, architecture, input and output modules, specifications of DCS, Advantages and Applications. Material handling, automated storage system, and Identification Technologies		
Total Lecture Hours		**45 Hours**

Textbooks	
1	**Programmable Logic controllers and Industrial Automation** Madhuchhanda Mitra, Samarjit Sen Gupta, Penram International Publishing India Pvt. Ltd
2	**Programmable Logic controllers** by Petruzella, Frank D., publishing McGraw-Hill Education

Reference Books	
1	Programmable Logic Controllers, Principles and Applications John W. Webb, Ronold A Prentice Hall of India Pvt. Ltd,5th Edition
2	Industrial Instrumentation and Control S.K. Singh The McGraw Hill Companies
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://onlinecourses.nptel.ac.in/noc21_me67/preview
2	https://www.youtube.com/watch?app=desktop&v=tw-79FiRYKA

VI SEMESTER
23EE1628 : PE-II: Lab. Industrial Automation

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Develop, test, and debug PLC Programs using ladder logic for industrial automation applications.
2. Analyze the operation of PLC-based automation systems for effective control and monitoring.
3. Develop small projects using timers, Counters, and Arithmetic Functions to design automation logic.
4. PLC Programs to ensure functionality and efficiency in automation processes.

Sr. No.	Experiments based on
1	Introduction to PLC trainer & its installation with PC
2	Write and implement a ladder logic program for a Combinational Logic Circuit
3	Write and implement a ladder logic program to Perform Various Boolean Functionsusing digital inputs
4	Write and implement a ladder logic program for a 4:1 and 8:1 Multiplexer.
5	Write and implement a ladder logic program forBinary to Gray Code Conversion using digital
6	Write and implement a ladder logic program PLC Program to Implement SR Flip-Flop
7	Write and implement a ladder logic program for Burglar Alarm Security System
8	Write and implementation of simple ladder logic program using timer 1) On delay timer 2) Off delay timer
9	Write and implement a ladder logic program for traffic light controller system
10	Mini Project

VI SEMESTER
23EE1629 : PE-II : RF & Microwave

Course Outcomes:

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

1. **Analyze** the limitations of conventional vacuum tubes at high frequencies and differentiate the structural and operational characteristics of linear beam O-type and M-type tube
2. **Analyze** the working and applications of microwave passive components and **Evaluate** the behavior of multi-port networks using Z, Y, and scattering parameter
3. **Apply** appropriate microwave measurement techniques to determine parameters like power, VSWR, impedance, frequency,
4. **Examine** the construction, working, and characteristics of microwave solid-state devices and **compare** their performance for high-frequency applications.

Unit:1	**Microwave linear beam tubes (O type)**	**7 hrs**

High frequency limitations of conventional microwave devices, Two cavity Klystron Amplifier – Mechanism and mode of Operation, Power output and Efficiency, Applegate diagram, applications, Reflex Klystron Oscillator – Mechanism and mode of Operation Power output, efficiency, mode curve, Electronic Admittance, Modulation of Reflex Klystron; Applications, Helix TWT, BWO. Slow wave structures

Unit:2	**Microwave cross-field tubes (M Type)**	**8 hrs**

Magnetron Oscillator – Hull cut-off voltage, Mechanism of Operation, Mode separation, Phase focusing effect, Power output and Efficiency, Cylindrical magnetron, parallel plate magnetron, split anode magnetron, Types of strapping, Tuning of magnetron. Applications,

Unit:3	**Microwave passive Devices (Reciprocal and non-reciprocal)**	8 hrs

Wave guide Tees - E plane Tee, H plane Tee, Magic Tee and their applications, Directional couplers, Wave guide Corners, Bends and Twists ,Attenuators, Isolators, Gyrators, Circulators, Phase shifter, Rectangular cavity resonator, Transmission line resonators.

Unit:4	Microwave Network Analysis	**8 hrs**

Introduction, Symmetrical Z and Y matrices for reciprocal network, Scattering matrix representation of multi port networks, comparison between [S], [Z] and [Y] matrices, Inter relationship between impedance matrix, admittance matrix and Scattering matrix, properties of scattering matrix, Scattering matrix of transmission lines, ABCD parameters with S parameters, Scattering matrix derivation for all components, Numerical Problems.

Unit:5	**Microwave measurement**	**7 hrs**
Introduction, Tunable detector, Slotted line Carriage, VSWR meter, Power measurements sensor, Bolo meter sensor, power sensor, Low and High power measurement, Insertion loss and Attenuation measurement, VSWR measurement – Low and High VSWR, Impedance measurement. Frequency measurement, Measurement of cavity Q, Dielectric measurement, Antenna Measurement – radiation pattern, Phase and gain. Types of Microwave filters: Image parameter method, Insertion loss method.		
Unit :6	Microwave solid state devices and circuits	**7 hrs**
Microwave diodes – Gun diode – Mode of operation, Crystal diode, PIN diode –, IMPATT diodes, Application as Oscillator and Amplifiers, Varactor diode, parametric amplifier, Microwave transistors, MASER. Strip lines: Micro strip lines, parallel strip lines. Coplanar, shielded		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Annapurna Das, Sisir Das, Microwave Engineering (2nd edition), Tata Mcgraw hill
2	Samuel Liao, Microwave Devices and Circuits 1990, Pearson
Reference Books	
1	Ludwig, Theory And Application 2nd edition,2011 Pearson Education India
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://archive.nptel.ac.in/courses/117/106/117106091/
2	https://nptel.ac.in/courses/108108377
3	https://archive.nptel.ac.in/courses/117/105/117105122/
4	https://archive.nptel.ac.in/courses/108/101/108101112/

VI SEMESTER
23EE1630 : PE-II : Lab. RF & Microwave

Course Outcomes:
Upon successful completion of the course the students will be able to **1. Determine** and evaluate characteristics of a Reflex Klystron experimental measurements. 2.**Evaluate** the performance of waveguide components such as E-plane, H-plane, and Magic Tees by measuring their input-output characteristics. 3. **Apply** different microwave measurement techniques for measurement of VSWR 4. **Determine** and evaluate characteristics Microwave solid state devices

Sr. No.	Experiments based on
1	Introduction to Microwave Components
2	To find the frequency of reflex klystron & Determine electronic and mechanical tuning range.
3	To verify power verses repeller voltage characteristics of reflex klystron.
4	To verify the performance of wave-guide tees i) E-plane tee ii) H-plane tee.
5	To verify the performance of E-H plane tee (magic tee).
6	To determine coupling and isolation of a three port circulator
7	To verify the performance of directional coupler i) multi hole ii) cross directional coupler.
8	To find attenuation of fixed attenuator and To verify the calibration of variable attenuators.
9	To measure the small V.S.W.R. and large V.S.W.R.
10	To verify the relationship among free space wavelength, cut off wavelength, guide wavelength.
11	To verify characteristics of Gunn diode

VI SEMESTER
23EE1631 : PE-II: Quantum Computing

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Understand the basic concepts of Quantum Mechanics 2. Understand and analyze logic gates with Quantum mechanism 3. Understand and analyze Quantum Computing Algorithms 4. Understand and analyze Quantum Computing Applications		
Unit:1	**Introduction to Quantum Mechanics:**	**8 Hours**
Basic principles of quantum mechanics, Wave-particle duality, Superposition and measurement, Quantum gates and operators		
Unit:2	**Qubits and Quantum Gates:**	**8 Hours**
Quantum bit (qubit) representation, Quantum gates (e.g., Pauli gates, Hadamard gate, CNOT gate), Quantum circuits and circuit diagrams, Single-qubit and multi-qubit operations		
Unit:3	**Quantum Algorithms:**	**7 Hours**
Quantum parallelism and superposition, Quantum Fourier transform, Quantum search algorithms (e.g., Grover's algorithm), Shor's algorithm for prime factorization		
Unit:4	**Quantum Error Correction and Noise:**	**7 Hours**
Sources of noise and errors in quantum systems, Quantum error correction codes, Error mitigation techniques		
Unit:5	**Quantum Applications:**	**8 Hours**
Quantum simulation, Quantum cryptography, Quantum machine learning Quantum optimization		
Unit :6	**Quantum Hardware:**	**7 Hours**
Physical implementation of qubits (e.g., superconducting qubits, trapped ions, topological qubits), Quantum circuit design and optimization, Challenges and advancements in quantum hardware development.		
	Total Lecture Hours	**45 Hours**

Text books	
1	"Quantum Computation and Quantum Information" by Michael Nielsen and Isaac Chuang
2	"Quantum Computing for Computer Scientists" by Noson S. Yanofsky and Mirco A. Mannucci
3	"Quantum Computing: A Gentle Introduction" by Eleanor Rieffel and Wolfgang Polak
Reference Books	
1	"Quantum Computing since Democritus" by Scott Aaronson

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	"Quantum Computing for Everyone" by Chris Bernhardt and "Quantum Mechanics for Scientists and Engineers" by Stanford University.
2	"Quantum Computing Fundamentals" by IBM, "Quantum Mechanics and Quantum Computation" by MIT, and "Quantum Cryptography" by Delft University of Technology.
3	"Introduction to Quantum Computing" IBM Quantum.
4	"Quantum Computing for Business" and "Discovering Quantum Mechanics and Quantum Computing" by the University of Glasgow.

VI SEMESTER
23EE1632 : PE-II: Lab. Quantum Computing

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Understand the basic concepts of Quantum Mechanics 2. Understand and analyze logic gates with Quantum mechanism 3. Understand and analyze Quantum Computing Algorithms 4. Understand and analyze Quantum Computing Applications

Sr. No.	Experiments based on
1	To implement NOT gate with quantum bits.
2	To implement quantum basic gates using quantum bits.
3	To implement NAND gate using quantum bits.
4	To implement NOR gate using quantum bits.
5	Design Half Adder using quantum bits.
6	Design Full Adder using quantum bits.
7	Design 2:1 Multiplexer using quantum bits.
8	Design 4:1 Multiplexer using quantum bits.
9	Design 2:4 Decoder using quantum bits.
10	Design Encoder using quantum bits.

VI SEMESTER
23EE1641 : PE III: Machine Learning

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. **Apply** mathematical concepts and programming techniques to construct machine learning and deep learning use cases and algorithms. 2. **Design and develop** supervised and unsupervised learning algorithms. 3. **Analyze** diverse machine learning use cases to evaluate the performance of models using metrics like RMSE, AUC, or confusion matrix, and assess their computational complexity and effectiveness in different application scenarios		
Unit:1	**Regression:**	**7 Hours**
Supervised and Unsupervised Learning, Regression, Model and Cost Function, Gradient Descent, Multivariate Linear Regression, Feature Scaling, Gradient Descent for multivariable		
Unit:2	**Classification:**	**7 Hours**
Classification, Hypothesis Representation, Decision Boundary, Cost function and Gradient Descent, Multi-classification, Regularization, Model Evaluation		
Unit:3	**Supervised Learning:**	**7 Hours**
KNN, SVM, Decision tree, Naive Bayes Classifiers, Random Forest		
Unit:4	**Unsupervised learning:**	**7 Hours**
K-means clustering, Hierarchical Clustering, DBSCAN Clustering, PCA, Anomaly Detection, Recommender System		
Unit:5	**Artificial Neural Network:**	**7 Hours**
Introduction to neural network, Activation Functions, Perceptron rule, Back propagation		
Unit :6	**Deep Learning:**	**7 Hours**
Introduction to deep learning, building blocks of CNN, Computational Complexity, Lenet, Alexnet, New topics to be announced time to time		
	Total Lecture Hours	**42 Hours**

Text books	
1	Shai Shalev-Shwartz and Shai Ben-David. Understanding Machine Learning. Cambridge University Press.2017 https://www.cse.huji.ac.il/~shais/UnderstandingMachineLearning/copy.html
2	Trevor Hastie, Robert Tibshirani and Jerome Friedman, The Elements of Statistical Learning. Second Edition, 2009. https://web.stanford.edu/~hastie/ElemStatLearn/
3	Christopher Bishop,Pattern Recognition and Machine Learning, Springer,2006, https://www.microsoft.com/en-us/research/people/cmbishop/downloads/

Reference Books	
1	Avrim Blum, John Hopcroft and Ravindran Kannan, Foundations of Data Science. 2017
2	Goodfellow, I., Bengio, Y., Courville, A., Deep Learning, Part II, MIT Press, 2016
3	Kevin P. Murphy , Machine Learning: A Probabilistic Perspective, MIT Press,2012
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://cognitiveclass.ai/courses/machine-learn-scing-with-python
2	https://cognitiveclass.ai/courses/python-for-dataience
3	https://www.youtube.com/playlist?list=PLfwnwx2j1EkrcP2FiDCW2ajJZ08pWDAur
4	NPTEL: Practical Machine Learning with Tensor flow

VI SEMESTER
23EE1642 : PE III: Lab. Machine Learning

Course Outcomes:
Upon successful completion of the course the students will be able to 1. **Design and develop** application models using supervised and unsupervised learning algorithms **2. Analyze** different use cases to evaluate the performance of the models **3. Compare** different machine learning techniques **4. Demonstrate the comprehension** of the trade-offs involved in design choices.

Sr. No.	Experiments based on
1	Data Pre-processing , cleaning and EDA
2	Linear Regression
3	Non Linear Regression
4	K-Nearest Neighbours
5	Decision Tree
6	Support Vector Machine
7	K-Means Clustering
8	Hierarchical Clustering
9	Content based Recommendation System
10	Collaborative filtering Recommendation System
11	Mini Project

VI SEMESTER
23EE1643 : PE III:CMOS Subsystem Design

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Understand VLSI circuit timing using Logical Effort analysis. 2. Design elementary data path subsystems like adder and subtractors. 3. Design elementary data path subsystems like Multiplier and comparators 4. Analyse and compute the power consumption of a VLSI circuit.		
Unit:1	**Wires and Interconnect:**	**8 Hours**
Resistance, Capacitance, RC delay analysis, Crosstalk delay and noise effects, Repeaters, Logical Effort, Crosstalk control, reliability.		
Unit:2	**Synchronizers:**	**8 Hours**
Synchronizers; Arbiters; Clock Synthesis; PLLs; Clock generation; Clock distribution; Synchronous Vs Asynchronous design, introduction to pipelined system/ALU.		
Unit:3	**Datapath Subsystems :**	**7 Hours**
Adders: Full Adder using a variety of Logics styles, bit-serial Adder, Ripple Carry Adder, Carry-skip Adder, Carry Look-ahead Adder, Brent-Kung Adder, Kogge-Stone Adder, Carry-Save Adder (multi-operand addition), etc. with power and speed trade-off		
Unit:4	**Datapath Subsystems :**	**8 Hours**
Multipliers: Unsigned Array Multiplier, Booth Encoded Multiplier, Baugh-Wooley Multiplier, Wallace tree multiplier, etc. , comparators, shifter-registers, random number generators based on Linear Feedback Shift-Registers (LFSR).		
Unit:5	**Memory Array Subsystems :**	**8 Hours**
Register-file, Content-addressable memory, LIFO and FIFO SRAM design, Reliability; Power dissipation in Memories		
Unit :6	**Special-purpose Subsystems:**	**7 Hours**
Packaging; power distribution; I/O pads, Emerging topics in VLSI.		
	Total Lecture Hours	**45 Hours**

Text books	
1	Neil H. E. WesteHarris, Principle of CMOS VLSI Design, 4th Edition, Addison Wesley VLSI Series.
Reference Books	
1	John P. Uyemura, Introduction to VLSI Circuits and Systems, Students Edition, Wiley Publication.
2	Sung-Mo Kang, Yusuf leblebici, CMOS VLSI Design, Third edition, 2008, TataMcGraw Hill.
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/108107129
2	https://nptel.ac.in/courses/106103116
3	https://nptel.ac.in/courses/117106092

VI SEMESTER
23EE1644 : PE III: Lab. CMOS Subsystem Design

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Understand VLSI circuit timing using Logical Effort analysis.
2. Design elementary data path subsystems like adder and subtractors.
3. Design elementary data path subsystems like Multiplier and comparators
4. Analyse and compute the power consumption of a VLSI circuit.

Sr. No.	Experiments based on
1	Design and verify the inverter circuit using transient analysis.
2	Design NAND and NOR gate perform all the analysis.
3	Design Adder and Subtractor circuit using NAND and NOR gates
4	Design 4-bit carry propagate adder
5	Design 4-Bit carry lookahead Adder
6	Design Kogge-Stone adder
7	Design Array multiplier
8	Design Wallace tree and Dadda Multiplier
9	Design Baugh-Wooley multiplier
10	Mini Project

VI SEMESTER
23EE1645 : PE III: Computer Communication Network

Course Outcomes:		
Upon successful completion of the course the students will be able to 1.Understand fundamental underlying principles of computer networking 2. Describe and analyze a number of data link, network, and transport layer protocols. 3. Analyze and design routing algorithms. 4. Understand network security and the working of various application layer protocols 5. Design and simulate basic network concepts using modern tool		
Unit:1	Introduction: Data Communication	07
Introduction: Data Communication ,Communication Network ,The internet, Protocols and Standards, Addressing ,layered architecture, OSI reference model, TCP/IP protocol Suit		
Unit:2	Physical layer	07
Physical layer and medium access layer: Guided transmission media, Unguided transmission media, multiple access protocols: ALOHA, CSMA, CSMA/CD, CSMA/CA. Controlled Access: Reservation, Polling, Token Passing.,FDMA,TDMA,CDMA, IEEE standard 802 for LAN and MAN, high speed LANS, repeaters, hubs, bridges, fast Ethernet, Wireless LAN		
Unit:3	Data link layer	07
Data link layer: Design issues, Framing, error detection and correction methods, , Flow Control ,elementary data link protocols:Simple protocol, Stop and wait protocol, Go-Back-N Protocol, Selective repeat protocol		
Unit:4	Network layer and transport layer	07
Network layer and transport layer: network layer design issues, routing, congestion, internetworking, transport layer design issues, TCP and UDP, routers and gateways		
Unit:5	Application layer	07
Application layer: Domain name system, electronic mail system, Remote Logging and File Transfer, WWW and HTTP, Multimedia.		
Unit :6	Security:	
Security: Cryptography, e-mail security, web security, communication security, Digital Signature Entity Authentication, FIREWALLS, SSL Services		
	Total Lecture Hours	**42 Hours**

Text books	
1	Data Communications and Networking by Behrouz a Forouzan,5th Edition
2	Computer Networks by Tanenbaum,5th Edition
Reference Books	
1	Data and Computer Communication by W. Stallings ,8th Edition
2	
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.tutorialspoint.com/digital_communication/digital_communication_quick_guide.htm
2	https://nptel.ac.in/courses/106/105/106105080/
3	https://nptel.ac.in/courses/106/106/106106091/

VI SEMESTER
23EE1646 : PE III: Lab. Computer Communication Network

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Understand fundamental underlying principles of computer networking
2. Describe and analyze a number of data link, network, and transport layer protocols.
3. Analyze and design routing algorithms.
4. Understand network security and the working of various application layer protocols
5. Design and simulate basic network concepts using modern tool

Sr. No.	Experiments based on
1	To construct and verify Simple LAN using Cisco Packet Tracer.
2	To Connect Two Local Area Networks using a Router using Cisco Packet Tracer
3	To design Star and Bus Topology using Cisco Packet Tracer.
4	To design Mesh and Ring Topology using Cisco Packet Tracer.
5	To design Static routing using 3 routers using Cisco Packet Tracer.
6	To design Wireless LAN using Cisco Packet Tracer.
7	To Connect DNS server using Packet tracer
8	To study Fabrication of UTP cables.

VI SEMESTER
23EE1647 : PE-III: Wireless Communication

Course Outcomes:		
Upon successful completion of the course the students will be able to **1. Understand** basic concepts of wireless communication system **2. Apply** the knowledge of Cellular concepts on wireless medium. **3. Analyze** wireless communication using mathematical analysis. **4. Describe** the importance of various wireless networking standards along with applications and standard formats used for transmission **5.** Use of modern tools to **simulate** & **Evaluate** various wireless communication parameters for the given problem statement		
Unit:1	**The Cellular Concept**	**8 hours**
Evolution of Mobile Radio Communications, Comparison of common wireless communication systems, Examples of wireless communication system, Generations of cellular Networks, Cellular telephone system, frequency reuse, channel assignment and handoff strategies, interference and system capacity, Trunking & grade of service, improving capacity in cellular system		
Unit:2	**Mobile Radio Propagation-large scale path loss**	**7 hours**
Introduction to Radio Wave Propagation, free space propagation model, Reflection, Diffraction, Scattering, Signal Penetration into Buildings, Ray Tracing & Site Specific Modelling		
Unit:3	**Small Scale fading & Multipath**	**8 hours**
Multipath Propagation, Small Scale Multipath Measurements, Parameters of Mobile Multipath Channels, Types Of Small Scale Fading, Rayleigh &Rician Distribution		
Unit:4	**Equalization & Diversity**	**8 hours**
Fundamentals of equalization, space polarization, frequency and time diversity techniques, space diversity, polarization diversity, frequency and time diversity. RAKE Receiver		
Unit:5	**Wireless Systems and Standards**	**7 hours**
GSM- global system for mobile: services and features, GSM system architecture, GSM radio subsystem, GSM channel types, GSM frame structure, signal processing in GSM, introduction to CDMA digital cellular standard (IS-95).		
Unit :6	**Wireless Networking**	**8 hours**
Introduction to wireless networks, Differences Between Wireless & Fixed Telephone Networks, Development of wireless networks, Traffic routing in wireless networks, Wireless data services, Common channel signalling, Signalling System No. 7.An Example of SS7-Global Cellular Network Interoperability.		
	Total Lecture Hours	**45 Hours**

Text books	
1	T S. Rappaport, Wireless Communication Principles and practice, Prentice Hall PTR, upper saddle river, New Jersey,2nd edition 2002
2	William C. Y. Lee, Mobile Communications Design fundamentals, John Willey,2nd edition 1997
Reference Books	
1	KamiloFehe, Wireless digital communication : modulation & spread spectrum applications, Prentice Hall PTR; Har/Dis edition
2	W .C .Y. Lee, Wireless and Cellular Communication, McGraw Hill
3	J.D. Parson, The Mobile Radio Propagation channel, Jon Wiley
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://onlinecourses.nptel.ac.in/noc21_ee66/

VI SEMESTER
23EE1648 : PE-III: Lab. Wireless Communication

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Understand basic concepts of wireless communication system 2. Apply the knowledge of Cellular concepts on wireless medium. 3. Analyze wireless communication using mathematical analysis. 4. Describe the importance of various wireless networking standards along with applications and standard formats used for transmission 5.Use of modern tools to simulate & Evaluate various wireless communication parameters for the given problem statement

Sr. No.	Experiments based on
1	Compute the number of channels available per cell
2	Find frequency reuse factor and signal to interference ratio for the given path loss exponent
3	Perform Data and voice analysis in lost call system
4	To study fresnel Zone diffraction loss
5	Plot Knife Edge diffraction gain versus fresnel diffraction parameter based on exact method
6	Compute factors affecting small scale fading
7	Study of Rayleigh Probability Distribution Function as a function of time.
8	Design communication link using linear equalizer with the help of simulink model
9	To find the parameters of GSM
10	Mini project

VI SEMESTER

23EE1649 : PE-III: Soft Computing & Optimization Techniques

Course Outcomes:

On completion of this course, Students will be able to

1. Apply the concepts of "soft" computing and distinguish them from "hard" computing in solving real-world problems involving uncertainty and imprecision.
2. Develop fuzzy sets and implement fuzzy operations, relations, and decision-making processes for applications in control systems.
3. Analyze the basic models, architectures, and learning methods of ANNs, including supervised and unsupervised learning paradigms.
4. Analyse and Implement genetic algorithms and their operators to solve single-objective optimization and Multi-objective Optimization problems using GAs.

Unit:1	**Concept of computing systems:**	**7 hrs**
"Soft" computing versus "Hard" computing, characteristics of Soft computing, Some applications of Soft computing techniques Fuzzy sets, logic operations, and relations, extension principle		
Unit:2	**Fuzzy controllers:**	**8 hrs**
Fuzzy decision-making; fuzzy inference systems; design steps in fuzzy logic controller; application of fuzzy logic controller		
Unit:3	**Artificial Neural Network:**	**8 hrs**
Fundamental concept, Evolution of Neural Networks, Basic Models, McCulloh-Pitts Neuron, Linear Separability, Hebb Network. Supervised Learning , Network: Perceptron Networks, Adaptive Linear Neuron, Multiple Adaptive Linear Neurons, Backpropagation Network		
Unit:4	**Unsupervised Learning Networks:**	**8 hrs**
Fixed weight competitive nets, Kohonen self-organizing feature maps, learning vectors quantization, counter propagation networks, adaptive resonance theory networks. Convolutional neural networks, deep learning neural networks, extreme learning machine model.		
Unit:5	**Genetic Algorithms:**	**7 hrs**
Concept of "Genetics" and "Evolution" and its application to probabilistic search techniques. Basic GA framework and different GA architectures GA operators: Encoding, Crossover, Selection, Mutation, etc. Evolutionary Algorithm, Simulated Annealing, Ant colony optimization. Solving single-objective optimization problems using GAs.		
Unit :6	**Multi-objective Optimization Problem Solving:**	**7 hrs**
Concept of multi-objective optimization problems (MOOPs) and issues of solving them. Multi-Objective Evolutionary Algorithm (MOEA). Non-Pareto approaches to solve MOOPs Pareto-based approaches to solve MOOPs Some applications with MOEAs.		
	Total Lecture Hours	**45 Hours**

Text books	
1	George J.Klir and Bo Yuan, Fuzzy sets and Fuzzy Logic, Second Edition, PHI, 2006
2	S.N.Sivanandam, and S.N.Deepa, Principles of Soft computing, Second Edition, Wiley India Pvt. Ltd, 2013
3	D.E. Goldberg, Genetic algorithms in search, optimization, and machine learning, Addison-Wesley
Reference Books	
1	N.P.Padhy and S.P.Simon, Soft computing with MATLAB programming, Oxford publishers, 2015.
2	J.M.Zurada, Introduction to artificial neural systems, Jaico Publishing House, 2006
3	D.E. Goldberg, Genetic algorithms in search, optimization, and machine learning, Addison-Wesley
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://onlinecourses.nptel.ac.in/noc22_me44/preview?utm_source=chatgpt.com
2	https://youtu.be/6xTmkJM0Yi8
3	https://youtu.be/WebTnQacBYs

VI SEMESTER

23EE1650 : PE-III: Lab. Soft Computing & Optimization Techniques

Course Outcomes
On completion of this course, Students will be able to 1. **Evaluate** different types of membership functions in fuzzy logic systems and interpret their applicability in real-world decision-making scenarios. 2. **Design** and **develop** fuzzy logic-based controllers and evaluate their performance using suitable criteria. 3. **Analyze** and **Implement** the basic models, architectures, and learning methods of ANNs, including supervised and unsupervised learning paradigms. 4. **Analyze** and **Implement** genetic algorithms and their operators to solve single-objective optimization and Multi-objective Optimization problems using GAs.

Sr. No.	Experiments based on
1	(a) To perform basic matrix operations such as addition, subtraction, multiplication, and inversion using Python. (b) Study Fuzzy Logic Fundamentals and generate graphs showing different types of membership functions. Implement Union, Intersection and Complement operations on two different fuzzy sets.
2	Perform various arithmetic operations on two fuzzy sets defined as fuzzy numbers.
3	Defuzzify the given fuzzified output using all methods of defuzzification.
4	Design a Fuzzy controller for Air conditioning system/Washing Machine.
5	Identification of a system using Perceptron/Radial Base Function Network (RBFN).
6	Identification of a system by using Backpropagation algorithm.
7	Minimizing the objective function by using Genetic Algorithm (GA)
8	Minimizing the objective function by using Particle Swarm Optimization (PSO)
9	Minimizing the objective function by using Cuckoo Search Algorithm (CSA)
10	Minimizing the objective function by using Ant Colony Optimization (ACO)

VI SEMESTER
23EE1651 : PE-III : Cryptography and Network Security

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Describe the fundamental principles of cryptography and network security. 2. Apply classical encryption techniques and explain their cryptographic significance. 3. Explain the working of symmetric and asymmetric key cryptographic algorithms. 4. Analyze the role of cryptographic hash functions and digital signatures in authentication and integrity.		
Unit:1	**Cryptography Mathematics**	**7** Hrs
Integer Arithmatic, Modular Arithmatic, Euclidiean Algorithm, Modulo operator, Congruence, Primitiveroots, Inverses, Extended Eculidian Algorithm.		
Unit:2	Introduction to Security	**7** Hrs
Security Goals ,Cryptographic Attacks, Services and Mechanisms, Techniques		
Unit:3	Traditional Symmetric Key Ciphers	**8** Hrs
Kerchoff's Principal, Substitution Ciphers (mono alphabetic ciphers, poly alphabetic ciphers)-Transposition Ciphers-Stream and Block Ciphers. Modern Symmetric Key Ciphers:- Substitution Box-Permutation Box.		
Unit:4	Symmetric Key Block Cipher	**8** Hrs
Fiestel and Non-Fiestel Ciphers, Data Encryption Standard (Encryption , Decryption , Key Generation Algorithm), Advanced Encryption Standard (AES) (Encryption , Decryption , Key Generation Algorithm).		
Unit:5	Public Key Cryptosystems	**8** Hrs
Knapsack Cryptosystem ,RSA Cryptosystem , Rabin Cryptosystem (Encryption, Decryption ,Key Generation)		
Unit :6	Network Layer Security	**7** Hrs
IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload-Intruders, Internet Key Exchange Algorithm (Diffie-Hellman Key Exchange)		
	Total Lecture Hours	**45 Hours**

Text books	
1	Cryptography and Network Security, Second Edition, Behrouz A. Forouzan, Mcgraw-Hill
Reference Books	
1	Cryptography and Network Security Principles and Practices , 4'th , William Stallings, (Pearson Edu Asia)

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	Nptel Video : https://www.youtube.com/watch?v=Q-HugPvA7GQ&list=PL71FE85723FD414D7
2	https://www.youtube.com/watch?v=LWU11bLvXKI&list=PLJ5C_6qdAvBFAuGoLC2wFGruY_E2gYtev&index=36

VI SEMESTER
23EE1652 : PE-III : Lab. Cryptography and Network Security

Course Outcomes:
Upon successful completion of the course the students will be able to 1.Recall and explain fundamental concepts of cryptography, including terminology (plaintext, ciphertext, key, cipher). 2.Implement basic encryption and decryption algorithms such as Caesar Cipher, Vigenère Cipher, etc. 3.Demonstrate symmetric encryption schemes (DES, AES) and analyze their strength. 4.Implement and simulate asymmetric encryption algorithms 5.Develop secure hash functions and demonstrate message integrity using algorithms

Sr. No.	Experiments based on
1	Perform encryption and decryption using Caesar Cipher.
2	Implement Monoalphabetic Substitution Cipher
3	Encrypt and decrypt text using the Vigenère Cipher technique
4	Construct a 5x5 matrix and use digraphs to perform encryption/decryption.
5	Matrix-based encryption and decryption using modulo arithmetic.
6	Implement DES Algorithm
7	Implement RSA Algorithm
8	Implement Diffie-Hellman Key Exchange
9	Generate the hash of a message using a simplified version of MD5
10	Implement SHA-1 Hashing Algorithm

VI SEMESTER
MDM4EE104: Microcontroller with Arduino Applications

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. **Describe** the architecture of 8051, its features and instructions 2. **Write** program for specific task 3. **Analyze** and Interface the peripherals to 8051 microcontroller 4. **Develop** application using 8051/ Arduino microcontroller 5. **Simulate** using IDE tool like Keil uVision5		
Unit:1	**Overview of 8051**	**7 Hrs**
Overview of 8051 Microcontroller family, Architecture, Memory organization, Internal RAM, Flag Register, Register Banks, SFRs , Functional pin description and various resources of MCS 51, Hardware Overview		
Unit:2	**Assembly Language Programming**	**7 Hrs**
Addressing modes, Instruction set and Assembly language programming Programs using look up table. Loop, Jump and Call instructions, Delay Programs		
Unit:3	**Programming of 8051**	**7 Hrs**
8051 I/O programming, I/O Interfacing such as LED, switches and 7segment display, Introduction to Arduino		
Unit:4	**8051 interrupts and Timer**	**7 Hrs**
8051 interrupts and Timer, Programming in embedded C, Prgramming Arduino		
Unit:5	**Interfacing of 8051**	**7 Hrs**
Interfacing and programming for LCD, Basics of serial communication, Serial data transfer programs. Interface Program with Arduino		
Unit :6	**Applications of 8051**	**7 Hrs**
Applications: Interfacing of LED, LCD, stepper motor, Sensors with Arduino		
	Total Lecture Hours	**45 Hours**

Text books	
1	The 8051 Microcontroller and Embedded systems , Muhammad Ali Mazidi , J.G. Mazidi, 2nd edition PearsonEducation, Prentice Hall of India.
2	The 8051 Microcontroller Architecture, programming and Applications By Kenneth Ayala, Penram Indiapublication.
Reference Books	
1	8051 Microcontrollers programming and practice By Mike Predcko.
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	

VI SEMESTER
MDM4EE204 : Forensic Image Processing

Course Outcomes:		
Upon successful completion of the course the students will be able to 1 Analyse science of image description and representation. 2 Solve the problems based on Image enhancement and Edge Detection Techniques 3 Design the morphological concepts and different transformations. 4 Create the science of image forensics and Applications of Image Processing to Forensic.		
Unit:1	**Image Fundamentals**	8
Definition and types of image, co-ordinate convention, Human visual system and computer vision system, digitization and Shannon sampling theorem, zooming and shrinking of an image, relationship between pixels: neighbors, adjacency, connectivity and path, Distance measures between pixels		
Unit:2	**Image Enhancement**	7
Introduction and scope of image enhancement, Image enhancement in Enhancement: Spatial Domain: Gray level transformations – Histogram processing – Basics ofSpatial Filtering– Smoothing and Sharpening Spatial Filtering.		
Unit:3	**Edge detection operators:**	8
Sobel, Prewitt, Roberts, Canny and Laplacian operators		
Unit:4	**Image Description and Representation:**	7
Basic morphological concepts, binary dilation and erosion, opening and closing, hit-or-miss transformation, gray-scale dilation and erosion, opening and closing, top hat and geodesic transformation.		
Unit:5	**Image Forensics**	8
Introduction and scope of image forensics, Source Identification: overview of image source identification, digital camera and image sensors, identification based on sensor defects and physical defects.		
Unit :6	**Authentication of image evidence:**	7
Image tampering and its type, detection of image tampering based on scene, optics, sensor, and processing and image property.		
	Total Lecture Hours	45 Hours

Text books	
1	Rafel C. Gonzalez and Richard E. Woods, Digital Image Processing, Person Education. 3rd and 4th edition.
Reference Books	
1	Judith A. Redi & Wiem Taktak & Jean-Luc Dugelay, Digital image forensics: a booklet for beginners, Springer 2010
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MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc24_ee38/preview

VI SEMESTER

Mandatory Learning Course (Audit Course)

MLC2126 : YCAP6