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 & Telecommunication Engineering)

B. Tech in Electronics & Telecommunication 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 & Telecommunication Engineering)

B.Tech. in Electronics & Telecommunication Engineering

SoE No. 23ET-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	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**	**180**			
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	ETC	23ET1201	Digital Electronics and Logic Design	T	3	0	0	3	3	30	20	50	3
9	2	PC	ETC	23ET1202	**Lab :** Digital Electronics and 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 & Telecommunication Engineering)

B.Tech. in Electronics & Telecommunication Engineering

SoE No. 23ET-101

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

Liberal Learning Course

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	2	CC2	GE	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 activities 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	VEC-1	CV	23CV1311	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
3	3	PC	ET	23ET1301	Signals & Systems	T	3	0	0	3	3	30	20	50	3
4	3	PC	ET	23ET1302	**Lab :** Signals & Systems	P	0	0	2	2	1		60	40	
5	3	PC	ET	23ET1303	Electronic Devices and Circuits	T	3	0	0	3	3	30	20	50	3
6	3	PC	ET	23ET1304	**Lab :** Electronic Devices and Circuits	P	0	0	2	2	1		60	40	
7	3	PC	ET	23ET1305	Electromagnetic Fields	T	3	0	0	3	3	30	20	50	3
8	3	CEP	ET	23ET1306	Community Engagement Project	P	0	0	2	4	2		60	40	
9	3	OE1	OE		**Open Elective -I**	T	2	0	0	2	2	30	20	50	3
10	3	MDM	ET		**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	

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SoE No. 23ET-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	PC	ET	23ET1401	Analog Communication	T	3	0	0	3	3	30	20	50	3
5	4	PC	ET	23ET1402	**Lab** : Analog Communication	P	0	0	2	2	1		60	40	
6	4	PC	ET	23ET1403	Microcontroller and Interfacing	T	3	0	0	3	3	30	20	50	3
7	4	PC	ET	23ET1404	**Lab** : Microcontroller and Interfacing	P	0	0	2	2	1		60	40	
8	4	VSEC-3	ET	23ET1405	**Lab :** Electronic workshop and Equipment Maintenance	P	0	0	2	4	2		60	40	
9	4	VEC-2	ET	23ET1406	Python for Data Science	T	2	0	0	2	2	30	20	50	3
10	4	OE-2	OE		**Open Elective-II**	T	2	0	0	2	2	30	20	50	3
11	4	MDM	ET		**MD Minor Course-II**	T	2	0	0	2	2	30	20	50	3
					TOTAL		**19**	**0**	**6**	**27**	**23**				
List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	**YCAP4 :** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Open Elective - II

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	4	OE2	GE	23OE2401	OE-II : Combinatorics
2	4	OE2	GE	23OE2402	OE-II : Fuzzy Set Theory, Arithmetic And Logic
3	4	OE2	GE	23OE2403	OE-II : Green Chem. & Sustainability
4	4	OE2	GE	23OE2404	OE-II : Hydrogen Fuel
5	4	OE2	GE	23OE2405	OE-II : Electronic Materials And Applications
6	4	OE2	GE	23OE2406	OE-II : Laser Technology And Applications
7	4	OE2	MGT	23OE2407	OE-II : Finance And Cost Management
8	4	OE2	MGT	23OE2408	OE-II : Operation Research Techniques
9	4	OE2	MGT	23OE2409	OE-II : Project Evaluation & Management
10	4	OE2	MGT	23OE2410	OE-II : Total Quality Management
11	4	OE2	MGT	23OE2411	OE-II : Value Engineering
12	4	OE2	MGT	23OE2412	OE-II : Maintenance Management
13	4	OE2	MGT	23OE2413	OE-II : Industrial Safety
14	4	OE2	MGT	23OE2414	OE-II : Industry 4.0
15	4	OE2	MGT	23OE2415	OE-II : Operation Management
16	4	OE2	MGT	23OE2416	OE-II : Material Management
17	4	OE2	MGT	23OE2417	OE-II : Hospitality Management
18	4	OE2	MGT	23OE2418	OE-II : Human Resource Management & Organizational Behaviour
19	4	OE2	MGT	23OE2419	OE-II : Agri-Business Management
20	4	OE2	MGT	23OE2420	OE-II : Rural Marketing
21	4	OE2	MGT	23OE2421	OE-II : Marketing Management
22	4	OE2	MGT	23OE2422	OE-II : Health Care Management
23	4	OE2	MGT	23OE2423	OE-II : Designated approved online NPTEL/KKSU Course
24	4	OE2	MGT	23OE2424	OE-II : Indian Archeology
25	4	OE2	MGT	23OE2425	OE-II : Social & Positive Psychology
26	4	OE2	MGT	23OE2426	OE-II : Seismology & Earthquake

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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	ET	23ET1501	Fields & Radiating System	T	3	0	0	3	3	30	20	50	3
2	5	PC	ET	23ET1502	Digital Communication	T	3	0	0	3	3	30	20	50	3
3	5	PC	ET	23ET1503	**Lab :** Digital Communication	P	0	0	2	2	1		60	40	
4	5	PC	ET	23ET1504	Analog Integrated Circuits	T	3	0	0	3	3	30	20	50	3
5	5	PC	ET	23ET1505	**Lab :** Analog Integrated Circuits	P	0	0	2	2	1		60	40	
6	5	PC	ET	23ET1506	Network Theory	T	3	0	0	3	3	30	20	50	3
7	5	PC	ET	23ET1507	**Lab :** Network Theory	P	0	0	2	2	1		60	40	
8	5	PE	ET		**Professional Elective-I**	T	3	0	0	3	3	30	20	50	3
9	5	PE	ET		**Lab : Professional Elective-I**	P	0	0	2	2	1		60	40	
10	5	OE-3	OE		**Open Elective-III**	T	3	0	0	3	3	30	20	50	3
11	5	MDM	ET		**MD Minor Course-III**	T	3	0	0	3	3	30	20	50	3
12	5	STR	ET	23ET1508	Internship and Indsutrial Visit	P	0	0	2	2	1		60	40	
					TOTAL		**21**	**0**	**10**	**31**	**26**				
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	ET	23ET1521	**PE-I :** Digital System Design
2	5	PE-I	ET	23ET1522	**PE-I : Lab**: Digital System Design
3	5	PE-I	ET	23ET1523	**PE-I :** Optical Communication
4	5	PE-I	ET	23ET1524	**PE-I : Lab**: Optical Communication
5	5	PE-I	ET	23ET1525	**PE-I :** Electronics Measurement and Instrumentation
6	5	PE-I	ET	23ET1526	**PE-I : Lab :** Electronics Measurement and Instrumentation
7	5	PE-I	ET	23ET1527	**PE-I :** Internet of Things
8	5	PE-I	ET	23ET1528	**PE-I : Lab**: Internet of Things
9	5	PE-I	ET	23ET1529	**PE-I :** Data Base Management Systems
10	5	PE-I	ET	23ET1530	**PE-I : Lab:** Data Base Management Systems
11	5	PE-I	ET	23ET1531	**PE-I :** Artificial Intelligence
12	5	PE-I	ET	23ET1532	**PE-I : Lab**: Artificial Intelligence
13	5	PE-I	ET	23ET1533	**PE-I :** Information Theory and coding
14	5	PE-I	ET	23ET1534	**PE-I : Lab**:Information Theory and coding

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	ET	23ET1601	Digital Signal Processing	T	3	0	0	3	3	30	20	50	3
2	6	PC	ET	23ET1602	**Lab :** Digital Signal Processing	P	0	0	2	2	1		60	40	
3	6	PC	ET	23ET1603	Object Oriented Programming	T	3	0	0	3	3	30	20	50	3
4	6	PC	ET	23ET1604	**Lab :** Object Oriented Programming	P	0	0	2	2	1		60	40	
5	6	PC	ET	23ET1605	Control Systems	T	3	0	0	3	3	30	20	50	3
6	6	PC	ET	23ET1606	Design Thinking and Research Methodology	T	2	0	0	2	2	30	20	50	3
7	6	PE	ET		**Professional Elective-II**	T	3	0	0	3	3	30	20	50	3
8	6	PE	ET		**Lab : Professional Elective-II**	P	0	0	2	2	1		60	40	
9	6	MDM	ET		**MD Minor Course-IV**	T	3	0	0	3	3	30	20	50	3
10	6	**VSEC-4**	ET	23ET1607	**Lab :** Computer Maintenance	P	0	0	2	4	2		60	40	
11	6	STR	ET	23ET1608	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 :**	**A**	3	0	0	3	0				

Professional Elective - II					
1	6	PE-II	ET	23ET1621	**PE-II :** Machine Learning
2	6	PE-II	ET	23ET1622	**PE-II : Lab** : Machine Learning
3	6	PE-II	ET	23ET1623	**PE-II :** Digital Image Processing
4	6	PE-II	ET	23ET1624	**PE-II : Lab** : Digital Image Processing
5	6	PE-II	ET	23ET1625	**PE-II :** Computer Networks
6	6	PE-II	ET	23ET1626	**PE-II : Lab** : Computer Networks
7	6	PE-II	ET	23ET1627	**PE-II :** Data Structure and Algorithms
8	6	PE-II	ET	23ET1628	**PE-II : Lab :** Data Structure and Algorithms
9	6	PE-II	ET	23ET1629	**PE-II :** CMOS VLSI Design
10	6	PE-II	ET	23ET1630	**PE-II : Lab :** CMOS VLSI Design
11	6	PE-II	ET	23ET1631	**PE-II :** Multimedia & Animation
12	6	PE-II	ET	23ET1632	**PE-II : Lab :** Multimedia & Animation
13	6	PE-II	ET	23ET1633	**PE-II :** Radio Frequency Circuit Design
14	6	PE-II	ET	23ET1634	**PE-II : Lab :** Radio Frequency Circuit Design

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Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

Applicable for AY 2023-24 Onwards

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

1st Semester

(Department of Electronics & Telecommunication Engineering)

B. Tech in Electronics & Telecommunication 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 & Telecommunication Engineering)

B.Tech. in Electronics & Telecommunication Engineering

SoE No. 23ET-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	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**	**180**			
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	ETC	23ET1201	Digital Electronics and Logic Design	T	3	0	0	3	3	30	20	50	3
9	2	PC	ETC	23ET1202	**Lab :** Digital Electronics and 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 & Telecommunication Engineering)

B.Tech. in Electronics & Telecommunication Engineering

SoE No. 23ET-101

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

Liberal Learning Course

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	2	CC2	GE	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 activities 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

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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 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

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

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/106104128
2	https://nptel.ac.in/courses/106104128
3	https://www.youtube.com/watch?v=rQoqCP7LX60&list=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5hMt

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

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

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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
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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 & Telecommunication Engineering)

B. Tech in Electronics & Telecommunication 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 & Telecommunication Engineering)

B.Tech. in Electronics & Telecommunication Engineering

SoE No. 23ET-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	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**	**180**			
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	ETC	23ET1201	Digital Electronics and Logic Design	T	3	0	0	3	3	30	20	50	3
9	2	PC	ETC	23ET1202	**Lab :** Digital Electronics and 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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B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Electronics & Telecommunication Engineering)

B.Tech. in Electronics & Telecommunication Engineering

SoE No. 23ET-101

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

Liberal Learning Course

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	2	CC2	GE	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 activities 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**

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B. Tech SoE and Syllabus 2023

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

(Department of Electrical Engineering)

B.Tech in Electrical Engineering

SoE No. 23EL-101

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

23ET1201 : Digital Electronics and 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 understand the various codes.
2. Simplify the logical functions using minimization techniques
3. Design and analyze combinational Circuits
4. Design and analyze Synchronous and Asynchronous sequential Circuits.

Unit:1	**Digital System, Number system and codes**	**7 Hours**
Decimal, Binary, Octal & Hexadecimal Number systems and their inter conversion, BCD codes (8421-2421), BCD Arithmetic, Excess three code, Gray code. Representation of Signed Numbers, Binary addition, and subtraction. **Contemporary Issues related to Topic**		
Unit:2	**Logic Gates & Switching Algebra**	**7 Hours**
Basic logic circuits: Logic gates (AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR and their truth tables), Universal Gates, Switching Algebra, basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, Introduction to Logic Families. **Contemporary Issues related to Topic**		
Unit:3	**Minimization of Switching Function**	**8 Hours**
Minimization of SOP & POS expression, K-map method, NAND and NOR implementation, Quine-McCluskey Method (Tabular Method) for the determination of Prime Implicants, Essential and Non-essential prime Implicants. **Contemporary Issues related to Topic**		
Unit:4	**Combinational Logic Circuit**	**8 Hours**
Adder & Subtractor Circuit, BCD Adder, Look Ahead Carry Adder, Magnitude Comparator, Decoders, Encoders, Multiplexers, and Demultiplexers, Code converters. **Contemporary Issues related to Topic**		
Unit:5	**Sequential Circuit & Programmable logic circuits**	**7 Hours**
Sequential circuits, latches & flip-flops, excitation table of flip-flops. Flip-Flop to flip-flop conversion. Programmable logic circuits: Read only Memory, Programmable read-only memory (ROM/PROM), Programmable Logic Devices, PAL, Programmable Logic Arrays, and field programmable gate arrays (FPGA). **Contemporary Issues related to Topic**		

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/down synchronous counter, application of counter. **Contemporary Issues related to Topic**		
Total Lecture Hours		**44 Hours**

Textbooks	
1	R.P Jain, Modern Digital Electronics, Tata McGraw Hill,3rd Edition
2	Morris Mano, Digital Design, 3rd edition, 2005, Pearson.
3	Anand kumar- 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	Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 6thEdition, TMH, 2003.
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_ee75

II SEMESTER

23ET1202 : Lab. Digital Electronics and 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 understand the various codes.
2. Simplify the logical functions using minimization techniques
3. Design and analyze combinational Circuits
4. Design and analyze Synchronous and Asynchronous sequential Circuits.

Sr. No.	Experiments based on
1	Implement basic gates using universal gates.
2	Construction of half/full adder using XOR and NAND gates and verification of its operation.
3	Verify Binary to Gray and Gray to Binary conversion.
4	Implementation of 4x1 multiplexer and 1x4 demultiplexer using logic gates.
5	Verify the truth table of D-flip-flops and JK- flip-flops.
6	Design of 4-bit Shift Registers
7	Design and verify the 4-Bit Synchronous Counter.
8	Verify Truth Tables of basic Logic gates & Universal Gates using MULTISIM.
9	Design & verify Truth Table of Half adder & Full adder circuits Logic simulator.
10	Mini project

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.

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 Electronics & Telecommunication Engineering)

B. Tech in Electronics & Telecommunication 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 & Telecommunication Engineering)

B. Tech. in Electronics & Telecommunication Engineering

SoE No. 23ET-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	VEC-1	CV	23CV1311	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
3	3	PC	ET	23ET1301	Signals & Systems	T	3	0	0	3	3	30	20	50	3
4	3	PC	ET	23ET1302	**Lab :** Signals & Systems	P	0	0	2	2	1		60	40	
5	3	PC	ET	23ET1303	Electronic Devices and Circuits	T	3	0	0	3	3	30	20	50	3
6	3	PC	ET	23ET1304	**Lab :** Electronic Devices and Circuits	P	0	0	2	2	1		60	40	
7	3	PC	ET	23ET1305	Electromagnetic Fields	T	3	0	0	3	3	30	20	50	3
8	3	CEP	ET	23ET1306	Community Engagement Project	P	0	0	2	4	2		60	40	
9	3	OE1	OE		**Open Elective -I**	T	2	0	0	2	2	30	20	50	3
10	3	MDM	ET		**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**

			June,2024	1.00	Applicable for AY 2024-25 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

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]	
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MOOCs Links and additional reading, learning, video material	
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III SEMESTER
23ET1301- Signals & Systems

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Analyze continuous and discrete time signals and systems based on their properties and response of LTI system. 2. Analyze system properties based on impulse response and Fourier analysis. 3. Apply the Laplace transform for analysis of continuous-time system 4. Apply the Z- transform for analysis of discrete-time systems.

Unit:1	Signals and Systems	8 Hours
Continuous-Time and Discrete-Time Signals. Transformations of the Independent Variable. Continuous-Time and Discrete-Time Systems. Basic System Properties. **Contemporary Issues related to Topic**		
Unit:2	**Convolution**	**7 Hours**
Discrete-Time LTI Systems: The Convolution Sum. Continuous-Time LTI Systems: The Convolution Integral. Properties of Linear Time-Invariant Systems. **Contemporary Issues related to Topic**		
Unit:3	**Fourier Series Representation of Continuous Time Periodic Signals and Continuous Time Fourier Transform.**	**8 Hours**
The Response of LTI Systems to Complex Exponentials. Fourier Series Representation of Continuous-Time Periodic Signals. Convergence of the Fourier Series. The Continuous-Time Fourier Transform. Representation of Aperiodic Signals: The Continuous-Time Fourier Transform. The Fourier Transform for Periodic Signals. Properties of the Continuous-Time Fourier Transform. **Contemporary Issues related to Topic**		
Unit:4	**Fourier Series Representation of Discrete Time Periodic Signals and Discrete Discrete Time Fourier Transform.**	**7 Hours**
Fourier Series Representation of Discrete-Time Periodic Signals. The Discrete-Time Fourier Transform. Representation of Aperiodic Signals: The Discrete-Time Fourier Transform. The Fourier Transform for Periodic Signals. Properties of the Discrete-Time Fourier Transform. Representation of a Continuous-Time Signal by its Samples: The Sampling Theorem. Reconstruction of a Signal from Its Samples Using Interpolation. Aliasing. **Contemporary Issues related to Topic**		
Unit:5	**The Laplace Transform.**	**8 Hours**

The Laplace Transform. The Region of Convergence for Laplace Transforms. The Inverse Laplace Transform. Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot. Properties of the Laplace Transform. Analysis and Characterization of LTI Systems Using the Laplace Transform. System Function Algebra and Block Diagram Representations. **Contemporary Issues related to Topic**		
Unit :6	**The Z-Transform.**	**7 Hours**
The z-Transform. The Region of Convergence for the z-Transform. The Inverse z-Transform. Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot. Properties of the z-Transform. Analysis and Characterization of LTI Systems Using z-Transforms. System Function Algebra and Block Diagram Representations. **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Alan V. Oppenheim,Alan S. Willsky, with S. Hamid, Signals and Systems, 2nd edition, Prentice Hall. Publications
2	Hwei Hsu, Schaum's Outline of Signals and Systems, 4th edition 2002 McGraw-Hill
Reference Books	
1	B. P. Lathi, Principles of Signal Processing and Linear Systems, 1st edition, Oxford university
2	Simon Haykin and Van Veen, Wiley, Signals & Systems, 2nd Edition. 2005,TMH
3	Robert ,Signals & Systems Analysis Using Transformation Methods & MAT Lab, 1st edition 2003,McGraw-Hill Companies
4	C. L. Philips, J.M.Parr ,and Eve A.Riskin, Signals, Systems and Transforms, 3rd Edition,2004. Pearson education
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://eee.guc.edu.eg/Courses/Communications/COMM401%20Signal%20&%20System%20Theory/Alan%20V.%20Oppenheim,%20Alan%20S.%20Willsky,%20with%20S.%20Hamid-Signals%20and%20Systems-Prentice%20Hall%20(1996).pdf
2	http://people.disim.univaq.it/~costanzo.manes/EDU_stuff/Theory%20and%20Problems%20of%20Signals%20&%20Systems_Hsu_Schaum95.pdf
MOOCs Links and additional reading, learning, video material	
1	https://youtube.com/playlist?list=PLyqSpQzTE6M8KJ-XQ1m2vl3nd2ZUqKEN8

III Semester

23ET1302- Lab: Signals & Systems

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Analyze continuous and discrete time signals and systems based on their properties and response of LTI system. 2. Analyze system properties based on impulse response and Fourier analysis. 3. Sample and reconstruct the signals. 4. Apply the Laplace transform and Z- transform for analysis of continuous-time and discrete-time systems.

Sr. No.	Experiments based on
1	Understanding the Basic Signals
2	Properties of signals and their transformations
3	Systems and their classification.
4	Convolution of Continuous Time and Discrete Time Signals
5	Implementation of Fourier series
6	Implementation of Continuous time Fourier Transform
7	Implementation of Discrete time Fourier Transform
8	Sampling and reconstruction
9	Implementation of Laplace Transform
10	Implementation of z-Transform

III Semester
23ET1303 - Electronic Devices and Circuits

Course Outcomes:

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

1. Analyze the transistor circuits for different configurations.
2. Design transistor circuit with suitable biasing and stabilization techniques.
3. Analyze the response of transistors at low and high frequency
4. Analyze the effect of feedback on gain and frequency of amplifiers
5. Analyze power amplifier circuits.

Unit:1	Bipolar Junction Transistors	8 Hours

PN junction diode and its application ,Bipolar Junction Transistors : Physical structure and operation modes, Active region operation of transistor, DC analysis of transistor circuits, Ebor-Moll model ,Current voltage characteristics of CE, CB, CC configuration Transistor as an amplifier, Transistor as a switch.

Contemporary Issues related to Topic

Unit:2	Transistor Biasing Techniques	7 Hours

Transistor Biasing, The Operating Point, Bias Stability, Self-Bias, Fixed bias, collector to base bias, Emitter feedback bias, Stabilization against Variations in Ico, VBE, AND β, Collector-Current Stability, Thermal Runaway

Contemporary Issues related to Topic

Unit:3	MOSFET and Biasing Techniques	8 Hours

Field-effect Transistors -The Junction Field-effect Transistor, The Pinch-off Voltage Vp, The JFET Volt-Ampere Characteristics, MOSFET Device Structure and Physical Operation of MOSFET, Finite Output Resistance in Saturation, Characteristics of the MOSFET, Small Signal Equivalent Model, MOSFET Biasing by Fixing VGS, Biasing by Fixing VG and Connecting a Resistance in the Source, Biasing Using a Drain-to-Gate Feedback Resistor, Biasing Using a Constant-Current Source.

Contemporary Issues related to Topic

Unit:4	MOSFET Amplifiers and Small signal operation of MOSFET	7 Hours

MOSFET Amplifiers: Common Source, Common Drain and Common Gate Amplifiers. Small signal operation of MOSFET using π model and T model, Internal capacitances and high frequency model of MOSFET. Small signal operation of BJT.

Contemporary Issues related to Topic

Unit:5	Feedback Amplifiers and Oscillators	8 Hours
Feedback Amplifier : The General Feedback Structure, Various properties of Negative and positive Feedback, The Four Basic Feedback Topologies. The series-shunt Feedback amplifier, The series-series Feedback amplifier, The shunt-shunt Feedback amplifier, The shunt-series Feedback amplifier, RC phase shift **Contemporary Issues related to Topic**		
Unit :6	**Power Amplifier**	**7 Hours**
Power Amplifier: Class A, Class B, Class AB and Class C, Class D. Power Efficiency, Power Dissipation, Cross-Over Distortion in Class AB Circuits, Class A Transformer Coupled Power Amplifier, and Harmonic Distortion due to Large Signal operation. **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Sedra Smith, Microelectronics Circuits , 5th Edition 2010-01-07, Oxford Uni. Press
2	MillMan Halkias, Integrated Electronics , 7th edition 2009, Tata McGraw Hills
Reference Books	
1	Electronic Devices and Theory, BoyleStad, Nashelsky, 9th. Edition May 2010, PHI
2	Electronic Devices and Circuits, S Salivahanan, N Suresh Kumar, 3rd Edition, Tata McGraw Hills
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/3.MillmanHalkias-ElectronicDevicesCircuits.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Electronics%20and%20Telecommunication/2.Microelectronic%20Circuits%20by%20Sedra%20Smith,5th%20edition.pdf
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/playlist?list=PL350612601E2DBFDE
2	https://onlinecourses.nptel.ac.in/noc21_ee80/preview

III Semester
23ET1304 – Lab: Electronic Devices and Circuits

Course Outcomes:

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

1. Analyze the diode based circuits.
2. Analyze the transistor circuits for different configurations and biasing techniques.
3. Analyze the effect of feedback on gain and frequency response of amplifier.
4. Analyze power amplifier and Oscillator circuits

Sr. No.	Experiments based on
1	V- I characteristics of PN junction diode (Silicon), Zener diode, LED.
2	Find the i) Voltage regulation ii) Load Regulation of a Zener shunt regulator
3	Design Half wave & Full Wave Rectifier with filter
4	I/P & O/P Characteristics of Common Base Transistor
5	I/P & O/P Characteristics of Common Emitter Transistor Configuration
6	Obtain Frequency Response of single stage CE Amplifier
7	Drain and Transfer characteristics of Field Effect Transistor (FET)
8	Drain and Transfer characteristics of Metal Oxide Semiconductor Field Effect Transistor (MOSFET)
9	The frequency response of Common Source amplifier.
10	Design Fixed Bias circuit and Self Bias circuit and observe the effect of temperature variation on transistor parameters
11	Design Class B Amplifier with Cross Over Distortion.
12	Orcad based simulation of class AB power Amplifier.
13	Design RC Phase Shift Oscillator.

III Semester
23ET1305- Electromagnetic Fields

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Apply appropriate co-ordinate systems for solving electromagnetic field problems. 2. Apply the principles of electrostatics & magneto-statics for the solution of problems relating to electric and magnetic field. 3. Analyze static and time varying fields using Maxwell's equations. 4. Analyze wave propagation in different medium.

Unit:1	**Coordinate systems**	**8 Hours**
Orthogonal coordinate systems: Cartesian, cylindrical, spherical and transformations, Gradient of a Scalar Field. Divergence of a Vector Field , Curl of a Vector Field , Laplacian Operator, Irrotational and solenoidal field. **Contemporary Issues related to Topic**		

Unit:2	**Electric Field Intensity**	**7 Hours**
Coulomb's law , Electric field intensity for different charge distribution : point , line surface , volume , Concept of electric flux , Gauss's law and it's application to field computation in symmetric structures and non symmetric structures , Divergence theorem **Contemporary Issues related to Topic**		

Unit:3	**Concept of energy & work done**	**8 Hours**
Concept of energy & work done in moving a point charge : linear and circular path , Electric scalar potential :Absolute Potential and potential difference , Conservative property of Potential field , Potential field of a system of charges : circular ring and disk Dipole moment, electric field at a distant point due to electric dipole, Electrostatic energy density. Poisson's and Laplace's equation and its examples of solutions, Uniqueness of electrostatic solution **Contemporary Issues related to Topic**		

Unit:4	**Magnetic Field Intensity**	**8 Hours**
Biot –Savart law and applications to infinite and finite current filament, Ampere's Circuital law and applications to line charge, coaxial transmission cables, uniform current sheet charge, solenoid, toroid ,Stoke's Theorem Magnetic flux and magnetic flux density , Scalar and vector magnetic potential, Nature of magnetic materials , boundary conditions at interface of two magnetic fields , Potential energy. **Contemporary Issues related to Topic**		

Unit:5	Maxwell's equations	7 Hours
Time varying fields and Maxwell's equations: Faradays law, Displacement current, Maxwell's equation in point form, Maxwell's equations in integral form. **Contemporary Issues related to Topic**		
Unit :6	**Uniform plane wave**	**7 Hours**
Uniform plane wave, wave propagation in free space, wave propagation in Dielectrics, Poynting's Theorem and wave equations **Contemporary Issues related to Topic**		
	Total Lecture Hours	**45 Hours**

Textbooks	
1	William H. Hayt,Engineering Electromagnetics,Seventh Edition,Tata McGraw – Hill.
2	J D Kraus,Electromagnetics,4th edition1992,McGraw – Hill
3	David K. Cheng,Field and Wave Electromagnetics,Second Edition 21 Jan 2010,Addison Wesley.
Reference Books	
1	Ashutosh Pramanik,Electromagetism Theory and application,2nd Edition2009,Prentice Hall
2	M. N. O. Sadku,Elements of Electromagnetis,Oxford Press
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/Electronics%20and%20Telecommunication/elements-of-electromagnetics-by-matthew-n-o-sadiku.pdf
2	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/Engineering%20Electromagnetics%20-%20William%20%20Hayt.pdf
3	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/EM_Hayt_6th.pdf
MOOCs Links and additional reading, learning, video material	
1	https://youtube.com/playlist?list=PLuv3GM6-gsE3-hVNaw-YEb7EeY5XVPZdz
2	https://www.youtube.com/watch?v=pGdr9WLto4A https://www.youtube.com/watch?v=NNny9gMh_jo
3	https://www.youtube.com/watch?v=6FZusYyg0Po

III SEMESTER

23ET1306- Lab : Field Project

III SEMESTER
Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1ET101 : Instrumentation
MDM-I	3	(MDM1ET101) Electronic Measurement
MDM-II	4	(MDM2ET102) Sensors & Transducers
MDM-III	5	(MDM3ET103) Industrial Instrumentation
MDM-IV	6	(MDM4ET104) Biomedical Instrumentation I
MDM-V	7	(MDM5ET105) Biomedical Instrumentation II
MDM-VI	8	(MDM6ET106) Industrial Automation

Track 2

Courses	Sem	MDMT2ET201 : Wireless Communication
MDM-I	3	(MDM1ET201) Analog Communication I
MDM-II	4	(MDM2ET202) Analog Communication II
MDM-III	5	(MDM3ET203) Digital Communication
MDM-IV	6	(MDM4ET204) Fundamentals of Communication Networks
MDM-V	7	(MDM5ET205) Mobile Communication
MDM-VI	8	(MDM6ET206) 5G Communication

Track 3

Courses	Sem	MDMT3ET301 : Microcontroller systems design
MDM-I	3	(MDM1ET301) Basic Electronics
MDM-II	4	(MDM2ET302) Digital Circuits
MDM-III	5	(MDM3ET303) Microcontroller
MDM-IV	6	(MDM4ET304) Advanced Processor
MDM-V	7	(MDM5ET305) Fundamentals of IoT
MDM-VI	8	(MDM6ET306) Fundamentals of PLC

III Semester
Track1 : MDMT1ET101 : Instrumentation
MDM1ET101 –Electronic Measurement

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Explain the characteristics of measurement systems and errors. 2. Analyze the behavior of bridge circuits for the measurement of different electrical quantities 3. Explain the working of various measuring instruments.		
Unit:1	**Introduction to Measurement System**	**7 Hours**
Introduction, standards, Static & dynamic characteristics of measurement system, need of calibration, Types of errors & their sources, limiting errors & Statistical analysis. **Contemporary Issues related to Topic**		
Unit:2	**AC & DC Bridges**	**8 Hours**
DC bridges - Wheatstone bridge, Kelvin's double bridge. AC bridges – Inductance measurement- Maxwell's Induction bridge, Maxwell's Induction capacitance bridge, Hays Bridge, Capacitance measurement- Schering bridge, Frequency measurement- Wien bridge. **Contemporary Issues related to Topic**		
Unit:3	**Electronic Instruments**	**8 Hours**
DC meters, AC Voltmeter, Electronic Multimeter, Digital Multimeter, LCR-Q meter, Dual trace CRO, Digital Storage Oscilloscope. **Contemporary Issues related to Topic**		
Unit:4	**Signal Generators & Analyzers**	**7 Hours**
AF Generator, Pulse characteristics, Pulse Generators, Function Generator, Wave analyzer, Spectrum analyzer, Distortion analyzer . **Contemporary Issues related to Topic**		
Total Lecture Hours		**30 Hours**

Textbooks	
1	Electrical and Electronic Measurements AND Instrumentation, A. K. Sawhney, Dhanpat Rai &Co.
2	Modern Electronic Instrumentation and Measurement Techniques,Albert D. Helfrick ,William D. Cooper,2007 Edition PHI Publication.
Reference Books	
1	Electrical and Electronic Measurement PHI Publication, R. K. Rajput,1st Edition 2008.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/108105153

III Semester
Track2 : MDMT2ET201 : Wireless Communication
(MDM1ET201) Analog Communication I

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Explain concepts of analog Communication 2. Analyze different analog modulation techniques. 3. Analyze performance of communication receivers.

Unit:1	Amplitude Modulation	7 Hours
Block Diagram of Communication system, Need for modulation, Amplitude Modulation (AM), Mathematical Analysis, modulation index, frequency spectrum, power requirement of these Systems, AM Generation Method. **Contemporary Issues related to Topic**		

Unit:2	DSB-SC and SSB Modulation	8 Hours
DSB-SC modulation, time domain and frequency domain description, Generation of DSB-SC waves, SSB Modulation, generation of AM- SSB Modulated wave, Demodulation of SSB Waves, Vestigial side band modulation, Generation of VSB modulated wave, Applications of different AM waves. **Contemporary Issues related to Topic**		

Unit:3	Angle Modulation	8 Hours
Frequency Modulation (FM), mathematical Analysis, modulation index, frequency spectrum, narrowband & wideband FM, noise triangle in FM, Pre-emphasis & De-emphasis techniques, Phase modulation, power contents of the carrier & the sidebands in angle modulation, FM Generation Method. **Contemporary Issues related to Topic**		

Unit:4	Radio Receivers	7 Hours
Basic TRF Receiver, Super heterodyne receiver, performance parameters for receiver such as sensitivity, selectivity, fidelity, image frequency rejection etc., AM Detectors, FM discriminators, AGC technique. **Contemporary Issues related to Topic**		
	Total Lecture Hours	**30 Hours**

Textbooks	
1	Gorge Kennedy, "Electronic Communication System", Tata McGraw-Hill, 4thEdition-(Year: 1999).

2	Simon Haykin, " Principles of Communication Systems", John Wiley, 2nd Ed.
Reference Books	
1	K. Sam Shanmugam, "Digital and Analog communication systems", John Wiley & Sons, 1st edition 2005.
2	Frenzel "Communication Electronics", MGH. Third Edition 2001
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/KENNEDY%204th%20edition.pdf.
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/ANALOG%20COMMUNICATIONS%20-%20Dr.%20B.V.Raju%20Institute%20of%20(%20PDFDrive.com%20).pdf
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/Analog%20and%20Digital%20Communication%20Systems%20(%20PDFDrive.com%20).pdf
4.	https://harshasnmp.files.wordpress.com/2017/11/monochrome-and-colour-television-r-r-gulati.pdf
MOOCs Links and additional reading, learning, video material	
1	NPTEL Course on Analog Communication by Prof. Goutam Das, IIT Kharagpur, https://nptel.ac.in/courses/117105143

III Semester
Track3 : MDMT3ET301 :Microcontroller systems design
(MDM1ET301) Basic Electronics

Course Outcomes:

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

1. Explain concepts of diodes, rectifiers, BJT and Operational amplifier.
2. Analyze the characterstics of diodes, rectifiers, BJT.
3. Analyze the Operational amplifier based circuits.

Unit:1	Semiconductors and Diodes	8 Hours

Semiconductors, Intrinsic Semiconductors, Extrinsic Semiconductors. Diode Theory: Basic Ideas, The ideal Diode, Forward and Reverse Bias, Diode Equation, Volt-Ampere Characteristic. Special diodes: symbol of Zener diode, operation, V-I characteristics, symbol of photo diode, working principle, LED symbol and principle

Contemporary Issues related to Topic

Unit:2	Rectifiers	7 Hours

Half-wave Rectifier, Full-wave and Bridge Rectifier, derivation of Ripple factor, efficiency of Half-wave, full-wave and Bridge rectifiers. Merits and demerits of Half-wave, full-wave and Bridge rectifiers, Comparisons of rectifiers.

Contemporary Issues related to Topic

Unit:3	Bipolar Junction Transistors	8 Hours

Symbols of pnp and npn transistors and their working principles, Transistor currents, input and output characteristics of Common base configuration, Common Emitter configuration Transistor Switch, Amplifiers: working principles of Common base amplifier, Common Emitter amplifier, Common collector amplifier and their applications, FET

Contemporary Issues related to Topic

Unit:4	Operational Amplifier and Its Application	7 Hours

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

Total Lecture Hours	30 Hours

Textbooks

1	Albert Malvino and David J Bates, " Electronic Principles" , 7th Edition, Tata McGraw –Hill.
2	Boyelstad, " Electronic Devices and Circuits Theory", Pearson Education, 8th Edition
3	Ramakanth A. Gayakwad, " Op-Amps and Linear Integrated Circuits" - PHI, 4th Edition

Reference Books	
1	S.Salivahanan, Kumar, Vallavaraj , "Electronic Devices and Circuits" , TATA McGraw Hill, 2nd Edition,
2	D. Roy Chowdhury, " Linear Integrated Circuits", New Age International Pvt.Ltd., 2nd Edition
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/
MOOCs Links and additional reading, learning, video material	
1	http://nptel.ac.in/courses.php http://jntuk-coeerd.in/

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

III SEMESTER

Mandatory Learning Course (MLC)

MLC2123 : YCAP3

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

4th Semester

(Department of Electronics & Telecommunication Engineering)

B. Tech in Electronics & Telecommunication 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 & Telecommunication Engineering)

B. Tech. in Electronics & Telecommunication Engineering

SoE No. 23ET-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	PC	ET	23ET1401	Analog Communication	T	3	0	0	3	3	30	20	50	3
5	4	PC	ET	23ET1402	**Lab** : Analog Communication	P	0	0	2	2	1		60	40	
6	4	PC	ET	23ET1403	Microcontroller and Interfacing	T	3	0	0	3	3	30	20	50	3
7	4	PC	ET	23ET1404	**Lab** : Microcontroller and Interfacing	P	0	0	2	2	1		60	40	
8	4	VSEC-3	ET	23ET1405	**Lab :** Electronic workshop and Equipment Maintenance	P	0	0	2	4	2		60	40	
9	4	VEC-2	ET	23ET1406	Python for Data Science	T	2	0	0	2	2	30	20	50	3
10	4	OE-2	OE		**Open Elective-II**	T	2	0	0	2	2	30	20	50	3
11	4	MDM	ET		**MD Minor Course-II**	T	2	0	0	2	2	30	20	50	3
					TOTAL		**19**	**0**	**6**	**27**	**23**				
List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	**YCAP4 :** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Open Elective - II

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	4	OE2	GE	23OE2401	OE-II : Combinatorics
2	4	OE2	GE	23OE2402	OE-II : Fuzzy Set Theory, Arithmetic And Logic
3	4	OE2	GE	23OE2403	OE-II : Green Chem. & Sustainability
4	4	OE2	GE	23OE2404	OE-II : Hydrogen Fuel
5	4	OE2	GE	23OE2405	OE-II : Electronic Materials And Applications
6	4	OE2	GE	23OE2406	OE-II : Laser Technology And Applications
7	4	OE2	MGT	23OE2407	OE-II : Finance And Cost Management
8	4	OE2	MGT	23OE2408	OE-II : Operation Research Techniques
9	4	OE2	MGT	23OE2409	OE-II : Project Evaluation & Management
10	4	OE2	MGT	23OE2410	OE-II : Total Quality Management
11	4	OE2	MGT	23OE2411	OE-II : Value Engineering
12	4	OE2	MGT	23OE2412	OE-II : Maintenance Management
13	4	OE2	MGT	23OE2413	OE-II : Industrial Safety
14	4	OE2	MGT	23OE2414	OE-II : Industry 4.0
15	4	OE2	MGT	23OE2415	OE-II : Operation Management
16	4	OE2	MGT	23OE2416	OE-II : Material Management
17	4	OE2	MGT	23OE2417	OE-II : Hospitality Management
18	4	OE2	MGT	23OE2418	OE-II : Human Resource Management & Organizational Behaviour
19	4	OE2	MGT	23OE2419	OE-II : Agri-Business Management
20	4	OE2	MGT	23OE2420	OE-II : Rural Marketing
21	4	OE2	MGT	23OE2421	OE-II : Marketing Management
22	4	OE2	MGT	23OE2422	OE-II : Health Care Management
23	4	OE2	MGT	23OE2423	OE-II : Designated approved online NPTEL/KKSU Course
24	4	OE2	MGT	23OE2424	OE-II : Indian Archeology
25	4	OE2	MGT	23OE2425	OE-II : Social & Positive Psychology
26	4	OE2	MGT	23OE2426	OE-II : Seismology & Earthquake

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

IV SEMESTER

23GE1404 : Probability Theory and Sampling Theory

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

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

			June,2024	1.00	Applicable for AY 2024-25 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

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

Chairperson	Dean (Acad. Matters)	Dean OBE	June,2024 Date of Release	1.00 Version	Applicable for AY 2024-25 Onwards

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"**

IV Semester
23ET1401 : Analog Communication

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Describe fundamentals of communication systems and various analog modulation techniques.
2. Analyze different analog modulation and demodulation techniques.
3. Analyze various radio receivers and noise.
4. Analyze Pulse modulation techniques and wave propagation of signals.

Unit:1	Introduction to Communication Systems	4 Hours
Need and Importance of Communication, Elements of a Communication System, Types of communication systems, Electromagnetic Spectrum used in communication, Concept of Signals, Bandwidth and Power, Need for modulation. **Contemporary Issues related to Topic**		
Unit:2	**Amplitude Modulation**	**8 Hours**
Amplitude Modulation (AM), DSB-SC, SSB, VSB Transmissions, Mathematical Analysis, modulation index, Frequency spectrum, Power requirement of these Systems, AM Generation Method. **Contemporary Issues related to Topic**		
Unit:3	**Angle Modulation**	**8 Hours**
Frequency Modulation (FM), mathematical Analysis, modulation index, frequency spectrum, narrowband & wideband FM, noise triangle in FM, Pre-emphasis & De-emphasis techniques, Phase modulation, power contents of the carrier & the sidebands in angle modulation, FM Generation Method. **Contemporary Issues related to Topic**		
Unit:4	**Radio Receivers**	**9 Hours**
Basic TRF Receiver, Super heterodyne receiver, performance parameters for receiver such as sensitivity, selectivity, fidelity, image frequency rejection etc., AM Detectors, FM discriminators, AGC technique. **Contemporary Issues related to Topic**		
Unit:5	**Noise**	**8 Hours**
Sources of noise, External Noises, Internal Noises, Thermal noise, noise calculations, equivalent noise bandwidth, noise figure of an amplifier, effective noise temperature, calculation of noise figure for cascaded stages. **Contemporary Issues related to Topic**		

Unit :6	Pulse Modulation, Radiation & Propagation of signals	8 Hours
Generation and Demodulation of PAM, PWM, PPM. Basics of Radiation, Mechanisms of propagation, Ground wave, space wave and sky wave propagation, fading, diversity reception. **Contemporary Issues related to Topic**		
	Total Lecture Hours	**45 Hours**

Textbooks	
1	Gorge Kennedy,"Electronic Communication System", Tata McGraw-Hill, 4thEdition-(Year: 1999).
2	G. K. Mithal," Radio Engineering (Principles Of Communication Systems)", Edition, 15 ; Publisher, Khanna, 1988.
3	R. R. Gulati, "Modern Television Practice", New Age International publishers, 3rdEdition 2006.
Reference Books	
1	K. Sam Shanmugam,"Digital and Analog communication systems", John Wiley & Sons, 1st edition 1979.
2	Frenzel,"Communication Electronics", MGH. Third Edition 2001
3	Dhake. A. M," Television and Video Engineering" ,Tata McGraw Hill 2nd Edition MAY 2001.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/KENNEDY%204th%20edition.pdf.
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/ANALOG%20COMMUNICATIONS%20-%20Dr.%20B.V.Raju%20Institute%20of%20(%20PDFDrive.com%20).pdf
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/Analog%20and%20Digital%20Communication%20Systems%20(%20PDFDrive.com%20).pdf
4.	https://harshasnmp.files.wordpress.com/2017/11/monochrome-and-colour-television-r-r-gulati.pdf
MOOCs Links and additional reading, learning, video material	
1	NPTEL Course on Analog Communication by Prof. Goutam Das, IIT Kharagpur, https://nptel.ac.in/courses/117105143

IV Semester
23ET1402 : Lab: Analog Communication

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Analyze different analog modulation and demodulation techniques. 2. Analyze communication receiver and evaluate different parameters. 3. Analyze pulse modulation techniques.

Sr. No.	Experiments based on
1	Amplitude Modulation. Calculate Modulation Index, Bandwidth and plot its frequency spectrum.
2	Amplitude Demodulation.
3	DSB-SC AM using Diode ring modulator. Calculate Bandwidth and plot its frequency spectrum.
4	Frequency Modulation. Calculate Modulation Index, Bandwidth and plot its frequency spectrum.
5	Frequency Demodulation.
6	Signal analysis of AM Super heterodynes Radio Receiver.
7	Pulse Amplitude Modulation and Demodulation
8	Pulse Position Modulation and Demodulation
9	Pulse Width Modulation and Demodulation
10	Mini Project

IV Semester
23ET1403 : Microcontroller and Interfacing

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Explain fundamentals of 8051 microcontroller and peripherals. 2. Develop assembly language programs for 8051 microcontroller. 3. Develop embedded C language program for 8051 microcontroller. 4. Interface peripherals with 8051 microcontroller.

Unit:1	8051 ARCHITECTURE	7 Hours
Overview of 8051 Microcontroller family, Introduction to MCS 51 family, Architecture, Memory organization, Internal RAM, Flag Register, Register Banks, SFRs , Functional pin description and various resources of MCS 51. Hardware Overview. **Contemporary Issues related to Topic**		

Unit:2	ASSEMBLY LANGUAGE PROGRAMMING	8 Hours
Addressing modes, Instruction set and Assembly language programming Programs using look up table, Bit manipulation, 8051 I/O programming, Delay Programs. **Contemporary Issues related to Topic**		

Unit:3	EMBEDDED C PROGRAMMING	7 Hours
I/O Interfacing such as LED, switches, 7 segment display, 8051 programming in C: Data types and time delay, I/O programming, Logic operations, Data conversion programs, Lookup table access **Contemporary Issues related to Topic**		

Unit:4	TIMERS AND SERIAL COMMUNICATION	7 Hours
Timer programming in assembly and C: Various modes of operation, SFR related to timer operation. Serial Port programming in assembly and C: Basics of serial communication, 8051 connection to RS 232. Serial data transfer programs. **Contemporary Issues related to Topic**		

Unit:5	INTERRUPTS AND OFF-CHIP INTERFACING	8 Hours
8051 interrupts, Interrupts programming in assembly and C, programming timer interrupt, external interrupt, serial interrupt Interfacing and programming for LCD, Interfacing RTC. **Contemporary Issues related to Topic**		

Unit :6	INTERFACING OF OTHERS OFF- CHIP DEVICES	8 Hours
Interfacing of ADC, DAC, stepper motor, DC motors. **Contemporary Issues related to Topic**		
	Total Lecture Hours	**45 Hours**

Textbooks	
1	Muhammad Ali Mazidi, The 8051 Microcontroller and Embedded systems using assembly & C, Pearson Education Asia LPE
2	Myke Predko, Programming and Customizing the 8051 Microcontroller, McGraw-Hill
3	Kenneth Ayala, The 8051 Microcontroller , CENGAGE Learning
Reference Books	
1	Douglas V Hall, Intel or Atmel MCS 51 Family Microcontrollers Data Sheets, Tata McGraw Hill
2	A. K. Ray, K. M. Bhurchandi Microprocessor & Interfacing, 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/Electronics%20and%20Telecommunication/1.(eBook)%20Delmar%20Thomson%20-%20The%208051%20Microcontroller%20Architecture,%20Programming%20and%20Applications%201991.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/Book%208051microcontroller-ayala.pdf
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/the_8051_microcontroller_and_embedded_systems_using_assembly_and_c-2nd-ed_by_mazidi.pdf
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/108/105/108105102/
2	https://archive.nptel.ac.in/courses/106/108/106108100/
3	https://archive.nptel.ac.in/courses/117/104/117104072/

IV Semester
23ET1404: Lab. Microcontroller and Interfacing

Course Outcomes:

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

1. Develop assembly language programs for 8051 microcontroller.
2. Develop embedded C language program for 8051 microcontroller.
3. Interface peripherals with 8051 microcontroller.

Sr. No.	Experiments based on
1	Add data bytes in a internal RAM
2	Data block transfer
3	Find the maximum data byte in a block
4	Count even or odd numbers present in a data block
5	Conversion number to its equivalent another number
6	Toggle LED connected to port pin of micro-controller 8051
7	Display BCD no. on seven segment display or Display character on LCD.
8	Rotate stepper motor into clockwise /counter clockwise direction
9	Generate sawtooth waveform using DAC
10	Interfacing of RTC DS12887 with 8051 microcontroller & display current date & time serially
11	Read Analog signal from channel 2 of ADC and store it to internal RAM
12	Interfacing of servo motor with 8051

IV Semester
23ET1405 : Lab. Electronic workshop and Equipment Maintenance

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Identify and test passive and active electronic components and devices. 2. Design regulated DC Power supply and PCB Layout. 3. Fabricate Assemble, Test and Troubleshoot mini project. 4. Perform the maintenance of electronic equipment.

Sr. No.	Experiments based on
1	To study the safety precautions and use of an Analog and Digital Multimeter for the measurement of DC/AC Voltages and Currents.
2	Identification and Testing of Passive Electronic Components.
3	Identification and Testing of Active Electronic Components.
4	To Identify and Test wires, cables, connectors, Switches, Relays Interconnected components.
5	To study Operation and Testing of Microphones and Speakers.
6	To Design, Construct and Test Fixed DC regulated power supply of ± 5V and ± 12V/500mA on Zero PCB.
7	To Design PCB layout of a mini project.
8	To fabricate PCB of a mini project.
9	To Perform assembling of a mini project.
10	To Test and Troubleshoot a mini project.

Sr. No.	Maintenance of Electronic Equipment
1	Power Supply
2	Digital Multimeter
3	Mobile Charger
4	FM Radio
5	Audio Amplifier
6	Television (TV)
7	Telephone Instrument
8	Cell phone
9	Any other equipment

IV Semester
23ET1406 : Python for Data Science

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Describe the basic concepts of Python programming. 2. Develop Python programs using control structures, data structures and modules. 3. Develop Python programs for analysis of data frames.		
Unit:1		**7 Hours**
Introduction, Build-in Data types: Data type & Variables, Python Strings, Python Casting, Python Operator, Python built in data structures: Lists, Dictionaries, Tuples, Sets, and Arrays. **Contemporary Issues related to Topic**		
Unit:2		**8 Hours**
Python Control Statements: if, if – else, statements, Loop statements: For, while, continue and break, try and except statement, Python Function, Python Object and Classes, File Handling. **Contemporary Issues related to Topic**		
Unit:3		**7 Hours**
Python Modules: NumPy, Pandas, SciPy. Data visualization using Matplotlib. **Contemporary Issues related to Topic**		
Unit:4		**8 Hours**
Data Processing: Concatenating Data Frames, Stacking and unstacking Data Frames, Filling missing values, Dealing with duplicate values, Performance optimization, Python application **Contemporary Issues related to Topic**		
Total Lecture Hours		**30 Hours**

Textbooks	
1	Complete Reference, Martin C Brown, TATA McGraw Hill
Reference Books	
1	Core Python Programing, Wesley Chun, Prentice Hall publications
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc24_cs54/preview
2	https://onlinecourses.nptel.ac.in/noc24_cs57/preview
3	https://onlinecourses.nptel.ac.in/noc24_cs20/preview

IV SEMESTER

Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1ET101 : Instrumentation
MDM-I	3	(MDM1ET101) Electronic Measurement
MDM-II	4	(MDM2ET102) Sensors & Transducers
MDM-III	5	(MDM3ET103) Industrial Instrumentation
MDM-IV	6	(MDM4ET104) Biomedical Instrumentation I
MDM-V	7	(MDM5ET105) Biomedical Instrumentation II
MDM-VI	8	(MDM6ET106) Industrial Automation

Track 2

Courses	Sem	MDMT2ET201 : Wireless Communication
MDM-I	3	(MDM1ET201) Analog Communication I
MDM-II	4	(MDM2ET202) Analog Communication II
MDM-III	5	(MDM3ET203) Digital Communication
MDM-IV	6	(MDM4ET204) Fundamentals of Communication Networks
MDM-V	7	(MDM5ET205) Mobile Communication
MDM-VI	8	(MDM6ET206) 5G Communication

Track 3

Courses	Sem	MDMT3ET301 : Microcontroller systems design
MDM-I	3	(MDM1ET301) Basic Electronics
MDM-II	4	(MDM2ET302) Digital Circuits
MDM-III	5	(MDM3ET303) Microcontroller
MDM-IV	6	(MDM4ET304) Advanced Processor
MDM-V	7	(MDM5ET305) Fundamentals of IoT
MDM-VI	8	(MDM6ET306) Fundamentals of PLC

IV Semester
Track1 : MDMT1ET101 : Instrumentation
(MDM2ET102) Sensors & Transducers

Course Outcomes:

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

1. Explain the working principle, construction, operation, characteristics and features of various sensors and transducers.
2. Analyze the performance of temperature and pressure transducers.
3. Analyze the performance of level and pH transducers.

Unit:1	Introduction	7 Hours

Introduction to Transducers, Classification of transducers- Analog and Digital, Active and passive, Primary and Secondary transducers- Inverse transducer. Choice of transducer-Factors influencing choice of transducer. Need of transducers, Classification, selection criteria.

Contemporary Issues related to Topic

Unit:2	Pressure Measurements	8 Hours

Units of pressure - Types of Pressure transducers, manometers , Bourdon Tube, bellows, Diaphragms, Elastic elements with LVDT and strain gauges, Capacitive, Piezo-electric pressure sensor.
Testing and calibration of pressure gauges – Dead weight tester.

Contemporary Issues related to Topic

Unit:3	TEMPARATURE MEASUREMENT	8 Hours

Bimetallic thermometers, RTD, Thermistor, Thermocouples – Laws of thermocouple, Pyrometer and its Types. – Total radiation & selective radiation pyrometers – Optical pyrometer – Two color radiation pyrometers.

Contemporary Issues related to Topic

Unit:4	MISCELLANEOUS MEASUREMENT	7 Hours

Level transducers - Resistive, capacitive, ultrasonic level measurement
Rotary encoder, Proximity sensors- Inductive and capacitive, pH Measurement

Contemporary Issues related to Topic

Total Lecture Hours	30 Hours

Textbooks

1	Industrial Instrumentation and Control, 2003, S.K. Singh, Tata McGraw Hill, 2003
2	Electrical and Electronic Measurements AND Instrumentation, A. K. Sawhney, Dhanpat Rai &Co
3	Transducers and Instrumentation, D V S Murthy, prentice Hall of India Pvt.Ltd., New Delhi

Reference Books	
1	Principles of Industrial Instrumentation, D. Patranabis , T McGraw Hill Publishing Company Ltd, 1996.
2	Measurement & Analysis, B.C. Nakra & K. K. Chaudary, Tata McGraw Hill Publishing Ltd
3	Industrial Instrumentation, D.P. Eckman ,Wiley Eastern Ltd.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/117105144

IV Semester
Track2 : MDMT2ET201 : Wireless Communication
(MDM2ET202) Analog Communication II

Course Outcomes:

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

1. Describe the concept of noise, radiation & propagation of signals and random processes in the analog system.
2. Describe pulse modulation and multiplexing in analog system.
3. Analyze noise, radiation & propagation of signals and random processes.

Unit:1	Noise	8 Hours
Sources of noise, External Noises, Internal Noises, Thermal noise, noise calculations, equivalent noise bandwidth, noise figure of an amplifier, effective noise temperature **Contemporary Issues related to Topic**		
Unit:2	**Radiation & Propagation of signals**	**7 Hours**
Basics of Radiation, Mechanisms of propagation, Ground wave, space wave and sky wave propagation, fading, diversity reception. **Contemporary Issues related to Topic**		
Unit:3	**Pulse Modulation**	**8 Hours**
Types of pulse modulation PAM (single polarity, double polarity, PWM, Generation and Demodulation of PWM, PPM, Generation and Demodulation of PPM, Frequency Division Multiplexing , Time Division Multiplexing. **Contemporary Issues related to Topic**		
Unit :4	**Random Noise**	**7 Hours**
Probability random variable, review of probability theory, random variable, probability density and distribution function, random process, periodic processes, auto correlation and cross correlation application to signal analysis. **Contemporary Issues related to Topic**		
	Total Lecture Hours	**30 Hours**

Textbooks

1	Gorge Kennedy,"Electronic Communication System", Tata McGraw-Hill, 4thEdition-(Year: 1999).
2	G. K. Mithal," Radio Engineering (Principles Of Communication Systems)", Edition, 15 ; Publisher, Khanna, 1988.
3	R. R. Gulati, "Modern Television Practice", New Age International publishers, 3rdEdition 2006.

Reference Books	
1	K. Sam Shanmugam,"Digital and Analog communication systems", John Wiley & Sons, 1st edition 1979.
2	Frenzel,"Communication Electronics", MGH. Third Edition 2001
3	Dhake. A. M," Television and Video Engineering" ,Tata McGraw Hill 2nd Edition MAY 2001.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/KENNEDY%204th%20edition.pdf.
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/ANALOG%20COMMUNICATIONS%20-%20Dr.%20B.V.Raju%20Institute%20of%20(%20PDFDrive.com%20).pdf
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/Analog%20and%20Digital%20Communication%20Systems%20(%20PDFDrive.com%20).pdf
4.	https://harshasnmp.files.wordpress.com/2017/11/monochrome-and-colour-television-r-r-gulati.pdf
MOOCs Links and additional reading, learning, video material	
1	NPTEL Course on Analog Communication by Prof. Goutam Das, IIT Kharagpur, https://nptel.ac.in/courses/117105143

IV Semester
Track3 : MDMT3ET301 :Microcontroller systems design (MDM2ET302) Digital Circuits

Course Outcomes:

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

1. Analyze logic gates and number system.
2. Simplify the logical functions using various minimization techniques.
3. Analyze combinational and sequential logic Circuits.

Unit:1	Logic gates and binary operations	7 Hours

AND, OR, NOT, NAND, NOR, Exclusive–OR and Exclusive–NOR Implementations of Logic Functions using gates, NAND–NOR implementations, Number Systems.

Contemporary Issues related to Topic

Unit:2	Boolean postulates and laws	8 Hours

De-Morgan's Theorem - Principle of Duality, Boolean function, Canonical and standard forms, Minimization of Boolean functions, Minterm, Maxterm, Sum of Products (SOP), Product of Sums (POS), Karnaugh map Minimization, Don't care conditions.

Contemporary Issues related to Topic

Unit:3	Combinational logic circuits	8 Hours

Adder & Subtractor Circuit, BCD Adder, Look Ahead Carry Adder, Magnitude Comparator, Decoders, Encoders, Multiplexers, and Demultiplexers, Code converters.

Contemporary Issues related to Topic

Unit:4	Sequential logic circuits	7 Hours

Sequential circuits, latches & flip-flops, excitation table of flip-flops. Flip-Flop to flip-flop conversion.

Shift Register, Synchronous/Asynchronous counter.

Contemporary Issues related to Topic

Total Lecture Hours	30 Hours

Textbooks

1	R.P Jain, Modern Digital Electronics, Tata McGraw Hill,3rd Edition
2	Morris Mano, Digital Design, 3rd edition, 2005, Pearson.
3	Anand kumar- 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	Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 6thEdition, TMH, 2003.
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_ee75

IV SEMESTER

Open Elective -II : Basket

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	4	OE2	GE	23OE2401	OE-II : Combinatorics
2	4	OE2	GE	23OE2402	OE-II : Fuzzy Set Theory, Arithmetic And Logic
3	4	OE2	GE	23OE2403	OE-II : Green Chem. & Sustainability
4	4	OE2	GE	23OE2404	OE-II : Hydrogen Fuel
5	4	OE2	GE	23OE2405	OE-II : Electronic Materials And Applications
6	4	OE2	GE	23OE2406	OE-II : Laser Technology And Applications
7	4	OE2	MGT	23OE2407	OE-II : Finance And Cost Management
8	4	OE2	MGT	23OE2408	OE-II : Operation Research Techniques
9	4	OE2	MGT	23OE2409	OE-II : Project Evaluation & Management
10	4	OE2	MGT	23OE2410	OE-II : Total Quality Management
11	4	OE2	MGT	23OE2411	OE-II : Value Engineering
12	4	OE2	MGT	23OE2412	OE-II : Maintenance Management
13	4	OE2	MGT	23OE2413	OE-II : Industrial Safety
14	4	OE2	MGT	23OE2414	OE-II : Industry 4.0
15	4	OE2	MGT	23OE2415	OE-II : Operation Management
16	4	OE2	MGT	23OE2416	OE-II : Material Management
17	4	OE2	MGT	23OE2417	OE-II : Hospitality Management
18	4	OE2	MGT	23OE2418	OE-II : Human Resource Management & Organizational Behaviour
19	4	OE2	MGT	23OE2419	OE-II : Agri-Business Management
20	4	OE2	MGT	23OE2420	OE-II : Rural Marketing
21	4	OE2	MGT	23OE2421	OE-II : Marketing Management
22	4	OE2	MGT	23OE2422	OE-II : Health Care Management

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

IV SEMESTER

Mandatory Learning Course (MLC)

MLC2124 : YCAP4

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

5th Semester

(Department of Electronics & Telecommunication Engineering)

B. Tech in Electronics & Telecommunication 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 & Telecommunication Engineering)

B. Tech. in Electronics & Telecommunication Engineering

SoE No. 23ET-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	ET	23ET1501	Fields & Radiating System	T	3	0	0	3	3	30	20	50	3
2	5	PC	ET	23ET1502	Digital Communication	T	3	0	0	3	3	30	20	50	3
3	5	PC	ET	23ET1503	**Lab :** Digital Communication	P	0	0	2	2	1		60	40	
4	5	PC	ET	23ET1504	Analog Integrated Circuits	T	3	0	0	3	3	30	20	50	3
5	5	PC	ET	23ET1505	**Lab :** Analog Integrated Circuits	P	0	0	2	2	1		60	40	
6	5	PC	ET	23ET1506	Network Theory	T	3	0	0	3	3	30	20	50	3
7	5	PC	ET	23ET1507	**Lab :** Network Theory	P	0	0	2	2	1		60	40	
8	5	PE	ET		**Professional Elective-I**	T	3	0	0	3	3	30	20	50	3
9	5	PE	ET		**Lab : Professional Elective-I**	P	0	0	2	2	1		60	40	
10	5	OE-3	OE		**Open Elective-III**	T	3	0	0	3	3	30	20	50	3
11	5	MDM	ET		**MD Minor Course-III**	T	3	0	0	3	3	30	20	50	3
12	5	STR	ET	23ET1508	Internship and Indsutrial Visit	P	0	0	2	2	1		60	40	
					TOTAL		**21**	**0**	**10**	**31**	**26**				

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	ET	23ET1521	**PE-I :** Digital System Design
2	5	PE-I	ET	23ET1522	**PE-I : Lab**: Digital System Design
3	5	PE-I	ET	23ET1523	**PE-I :** Optical Communication
4	5	PE-I	ET	23ET1524	**PE-I : Lab**: Optical Communication
5	5	PE-I	ET	23ET1525	**PE-I :** Electronics Measurement and Instrumentation
6	5	PE-I	ET	23ET1526	**PE-I : Lab :** Electronics Measurement and Instrumentation
7	5	PE-I	ET	23ET1527	**PE-I :** Internet of Things
8	5	PE-I	ET	23ET1528	**PE-I : Lab**: Internet of Things
9	5	PE-I	ET	23ET1529	**PE-I :** Data Base Management Systems
10	5	PE-I	ET	23ET1530	**PE-I : Lab:** Data Base Management Systems
11	5	PE-I	ET	23ET1531	**PE-I :** Artificial Intelligence
12	5	PE-I	ET	23ET1532	**PE-I : Lab**: Artificial Intelligence
13	5	PE-I	ET	23ET1533	**PE-I :** Information Theory and coding
14	5	PE-I	ET	23ET1534	**PE-I : Lab**:Information Theory and coding

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

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

V Semester

23ET1501 – Fields & Radiating Systems

Course Outcomes:

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

1. Explain fundamentals of transmission lines, waveguides and antennas.
2. Analyze transmission lines parameters.
3. Analyze the various parameters of parallel plane and rectangular waveguides
4. Analyze antenna parameters

Unit:1	Transmission Lines	8 Hours

Introduction to transmission line theory, Transmission line parameters, Characterized impedance, Propagation constant, Phase constant, Attenuation constant, Waveforms distortion, Distortion less transmission lines, Loading of transmission lines, Reflection coefficient and VSWR, Equivalent circuits of transmission lines, Open and short circuited lines.

Contemporary Issues related to Topic

Unit:2	The Line at Radio And Power Frequencies	7 Hours

Parameters of open wire line and Coaxial line at high frequencies; Line constants for dissipation less line -voltages and currents on dissipation less line - standing waves and standing wave ratio - input impedance of open and short circuited lines.

Contemporary Issues related to Topic

Unit:3	Parallel Planes Waveguide	8 Hours

Guided Waves between parallel planes, Derivation of TE wave, Derivation of TM wave Characteristics of TE and TM wave, TEM waves and its characteristics.

Contemporary Issues related to Topic

Unit:4	Rectangular Waveguide	8 Hours

Introduction to rectangular waveguide, TM wave in rectangular waveguide, TE wave in rectangular waveguide, Characteristics of TE and TM wave in rectangular waveguide, Velocity, Guide wave length, Wave impedance, Field configurations.

Contemporary Issues related to Topic

Unit:5	Antenna Terminology	7 Hours

Retarded potentials, Field due to a current elements, Power radiated and radiation resistance, Reciprocity theorem applied to an antennas gain, Radiation intensity, Directivity and antenna gain.

Contemporary Issues related to Topic

Unit:6	Types of Antenna	7 Hours
Log –periodic antennas, horn antennas& Lens Antennas, **Contemporary Issues related to Topic**		
Total Hours		**45 Hours**

Textbooks	
1	K.D.Prasad, Antenna Theory And Waveguide by SatyaPrakashan ,New Delhi
2	Jordan and Balmain, Electromagnetic wave And Radiating System by Prentice hall of India
Reference Books	
1	C.A.Balanis, Antenna Theory & Design, John Wiley & sons
2	John D. Krauss, Antennas, McGraw-Hill International edition
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/cmos_kang.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20Engineering/30.CMOS%20Logic%20Circuit%20Design%20-%20(John%20P%20Uyemera).PDF
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=wKL6WsEOl00
2	https://www.youtube.com/watch?v=0OwmYAljz4A&list=PL0CD49F1FAD4E6FAA

V Semester

23ET1502 – Digital Communication

Course Outcomes:

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

1. Explain fundamentals of digital communication.
2. Analyze various source and channel coding techniques.
3. Analyze signal space concepts.
4. Analyze various digital modulation techniques.

Unit:1	Digital Communication basics	8 Hours

Fundamentals of Digital communication system, analog vs. digital communication, Block Diagram of Basic Digital Communication system, Sampling Process, PCM Generation and Reconstruction, Quantization Noise, Non-uniform Quantization, DPCM, Delta Modulation, adaptive delta modulation, Delta Sigma Modulation.

Contemporary Issues related to Topic

Unit:2	Digital Source Coding	7 Hours

Introduction to information theory, Shannon's channel capacity theorem, Channel Capacity of Binary Symmetric Channel, Huffman encoding, L-Z encoding algorithm.

Contemporary Issues related to Topic

Unit:3	Signal Space Concept	7 Hours

Gram-Schmitt procedure, Signal space representation of modulated signals, Error probability and optimum receivers for AWGN channels, Matched filters.

Contemporary Issues related to Topic

Unit:4	Digital Modulation Methods	8 Hours

Data formats, Coherent and non-coherent binary modulation techniques , Generation and detection of Amplitude Shift Keying, Phase Shift Keying, , Frequency shift Keying, differential phase shift keying, , Quadrature Phase Shift Keying, Quadrate Amplitude shift keying (QASK), QAM and MSK, power spectra, bandwidth efficiency, BER ,Constellation diagram.

Contemporary Issues related to Topic

Unit:5	Channel Coding Techniques	8 Hours

Review of channel coding, Linear block codes, cyclic codes, convolution, encoding and decoding, Viterbi algorithm .

Contemporary Issues related to Topic		
Unit :6	**Spread Spectrum**	**7 Hours**
Study of PN sequences, direct sequence methods, Frequency hop methods, digital spread spectrum, slow and fast frequency hop, synchronization methods for spread spectrum, application of spread spectrum **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Digital Communication, 4th edition ,2005, John G Prokis, McGraw Hill
2	Digital Communication, 3rd edition August 2007, Simon Haykin, JOHN WILEY & SONS
Reference Books	
1	Modern Communication systems (Principles and application), 1st edition Publication: 1994, Leon W. Couch II,PHI
2	Digital Communication, 1st edition, Shanmugham, CBS Publisher
3	Modern Digital & Analog Communication Systems, 4th edition Date: 2009, B.P.Lathi, Oxford Univ Pr Publication
4	Principles of Communication Systems, 2nd edition Pub Date: SEP-07, Taub Schilling, Publisher: Prentice Hall
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/Analog%20and%20Digital%20Communication%20Systems%20(%20PDFDrive.com%20).pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/Digital%20and%20Analog%20Communication%20Systems%20(%20PDFDrive.com%20).pdf
MOOCs Links and additional reading, learning, video material	
1	NPTEL Course on Modern Digital Communication by Prof. Suvra Sekhar Das, IIT Kharagpur, https://nptel.ac.in/courses/117105144
2	NPTEL Course on Digital Communication IIT Bombay by Prof. Bikash Kumar Dey, https://nptel.ac.in/courses/117101051

V Semester

23ET1503 – Lab Digital Communication

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Implement sampling and reconstruction of the signal 2. Analyze various source coding techniques. 3. Analyze various channel coding techniques. 4. Analyze various digital modulation techniques.

Sr. No.	Experiments based on
1	Sampling and reconstruction of signal
2	Pulse Code Modulation
3	Amplitude Shift Keying
4	Frequency Shift Keying
5	Phase Shift Keying
6	Various type of digital data formats (RZ, NRZ and Manchester).
7	Delta modulation
8	Adaptive delta modulation
9	Linear block code.
10	Convolutional code.
11	Simulation of modulation techniques using MATLAB

V Semester

23ET1504 – Analog Integrated Circuits

Course Outcomes:
Upon successful completion of the course the students will be able to **1.** Design OP-AMP configurations. **2.** Analyze OP-AMP circuit parameters and frequency response **3.** Design linear and non- linear OP-AMP applications. **4.** Explain special function ICs and design circuits using it.

Unit:1	**Operational Amplifier Fundamentals**	**8 Hours**
Ideal Op Amp, Basic Op Amp Configurations: Open loop, Feedback in OPAMP circuit: Inverting, Non- inverting, voltage follower **Contemporary Issues related to Topic**		
Unit:2	**Op Amp Limitations- Static And Dynamic**	**7 Hours**
Simplified Op Amp Circuit Diagram, OPAMP parameters, Input Bias and Offset Current, Input Bias and Offset voltages, input offset error Compensation, open loop and closed loop Frequency response, Transient response, gain bandwidth product (GBP) & its effect **Contemporary Issues related to Topic**		
Unit:3	**Linear Applications**	**8 Hours**
Summer, difference amplifier, integrator, differentiator, Current-to-Voltage Converter, Voltage-to- Current Converter, Instrumentation Amplifiers and Transducer Bridge amplifiers. **Contemporary Issues related to Topic**		
Unit:4	**Active Filters**	**7 Hours**
Transfer function, first order filter, standard frequency response, KRC Filters with variable gain and Unity Gain, Second order LPF & HPF, Butterworth filter design, BPF and BRF **Contemporary Issues related to Topic**		
Unit:5	**Nonlinear Circuits & Waveform Generators**	**8 Hours**
Precision Rectifiers, clipper, clamper, Voltage Comparators, Schmitt Triggers, Sample-and-Hold Circuits, Log/Antilog amplifiers, Sinusoidal Oscillators based on Wein bridge and RC Phase shift, Square wave generator, Triangular wave generator		

Contemporary Issues related to Topic		
Unit :6	**Special Function Ic's**	**7 Hours**
PLL (IC 565), Monolithic timers (IC 555), Performance Specifications, D-A Converters (DACs), A-D Converters (ADCs). **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Design with Operational Amplifiers and Analog Integrated Circuits 2002 - Sergio Franco, McGraw-Hill International
2	Linear Integrated Circuits 2015 - D. Roy Chaudhuri, New Age International
Reference Books	
1	Linear Integrated Circuits 2010- S. Salivahanan, V. S. Bhaaskaran, McGraw-Hill
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Electronics%20and%20Telecommunication/Analog%20Integrated%20Circuit%20Design,%202nd%20Edition%20(%20PDFDrive.com%20).pdf
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=9g9dowLjmCA&list=PLp6ek2hDcoNDAw1BehPFazZ5ogPV8UlQa

V Semester

23ET1505 –Lab Analog Integrated Circuits

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Design OP-AMP configurations. 2. Analyze OP-AMP circuit parameters and frequency response 3. Design linear and non- linear OP-AMP applications. 4. Analyze circuit using special function ICs.

SN	Experiments based on
1	Verify gain and frequency response of Inverting amplifier and Non-inverting amplifier using IC 741.
2	Verify Op-amp parameters CMRR and Slew Rate
3	Design and verify op-amp application as adder, averager and substractor
4	Design gain and frequency response of Integrator / Differentiator circuit Using IC 741.
5	Design Second Order low pass filter / high pass filter. Also verify its frequency response characteristics.
6	Design Astable Multivibrator circuits using IC 741
7	A. Verify Schmitt Trigger circuits using IC 741 B. Design of a Half Wave / Full Wave Precision Rectifier using IC 741
8	To construct and verify a RC Phase Shift oscillator / Wein Bridge oscillator.
9	Design Astable / Monostable Multivibrator circuits using IC 555
10	Verification of Digital to Analog converter using R- 2R ladder circuit.
11	Mini Project

V Semester

23ET1506 – Network Theory

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Analyze electrical circuits using nodal and mesh analysis 2. Evaluate electrical circuit parameters using network theorems 3. Estimate steady state and transient response of electrical circuits using initial and final conditions 4. Analyze waveforms using Laplace transform 5. Evaluate parameters of two – port networks.

Unit:1	**Nodal Analysis of Electric Circuits**	**8 Hours**
Basics of electric circuits, circuit elements and their voltage – current relationship, classification of circuit elements, Series Circuit, Parallel circuit, Source shifting, sources - their types and characteristics, concept of equivalent sources, source transformation, nodal analysis of circuits containing resistors, inductors, capacitors and both independent and dependent sources to determine current, voltage, power, and energy **Contemporary Issues related to Topic**		
Unit:2	**Mesh Analysis of Electric Circuits**	**7 Hours**
Mesh analysis of circuits containing resistors, inductors, capacitors and both independent and dependent sources to determine current, voltage, power, and energy. Network equation for RLC network, Mutual inductance , coefficient of coupling, dot convention, dot marking in coupled coils. **Contemporary Issues related to Topic**		
Unit:3	**Network Theorem**	**8 Hours**
Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem. **Contemporary Issues related to Topic**		
Unit:4	**Initial and Final Conditions, Impedance Functions and Circuit Analysis with Laplace Transform**	**7 Hours**
Review of Laplace Transform, concept of complex frequency; 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. Transient analysis		

Contemporary Issues related to Topic		
Unit:5	**Transforms of other Signal Waveforms, Network Functions**	**8 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 **Contemporary Issues related to Topic**		
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, short circuit admittance, transmission, inverse transmission, hybrid and inverse hybrid parameters, relationships between parameter sets. **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Network Analysis, M.E. Van Valkenburg, 3rdEdition, Prentice Hall
2	Engineering Circuit Analysis, William H. Hayt, Jack E. Kemmerly, Steven M. Durbin, 6th Edition, Tata McGraw– Hill Publishing Company Limited.
Reference Books	
1	Network Analysis with applications, William D. Stanley, 4th Edition, Pearson Education.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Electronics%20and%20Telecommunication/Network%20Analysis%20Book.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Electronics%20and%20Telecommunication/30.2019_Book_InternetOfThingsFromHy peToReal.pdf
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/108/105/108105159/
2	http://www.nitttrc.edu.in/nptel/courses/video/108105159/L12.html

V Semester

23ET1507 –Lab: Network Theory

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Apply the knowledge of MATLAB's interface and functions for electrical circuit simulations.
2. Analyze basic electrical circuits using PSPICE.
3. Simplify complex circuits and theorems through virtual lab environment.

SN	Experiment based on
1	To familiarize students with the MATLAB environment and its applications in circuit analysis.
2	To analyze the behaviour of **Resistive (R), Resistive-Inductive (RL), and Resistive-Capacitive (RC) circuits** under AC supply by observing voltage, current, phase difference, and frequency response in MATLAB environment.
3	To introduce students to PSPICE simulation software and its applications in electrical circuit analysis.
4	To perform nodal analysis on electrical circuits containing independent voltage and current sources using PSPICE simulation software.
5	To extend nodal analysis to circuits containing dependent voltage and current sources using PSPICE simulation software.
6	To verify the Maximum Power Transfer Theorem by determining the conditions under which a load receives maximum power from a source using PSPICE simulation software.
7	To verify Norton's theorem by converting a given linear bilateral DC circuit into its equivalent Norton circuit in virtual lab.
8	To validate Thevenin's theorem by reducing a complex linear DC network to its Thevenin equivalent in virtual lab.
9	To validate Tellegen's theorem by proving that the algebraic sum of power absorbed by all elements in an electrical network is zero using virtual lab.
10	To verify the Superposition Theorem by analyzing a linear circuit with multiple independent sources in virtual lab.
11	To generate and analyze standard signals such as Step, Ramp, and Impulse Responses and observe their effect on networks using MATLAB.
12	To plot poles and zeros of a transfer function and assess the stability of a given network using MATLAB.

V Semester

23ET1521 – PE-I : Digital System Design

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Compare CPLD and FPGA architectures 2. Design optimized combinational logic circuits 3. Design sequential circuits for digital system applications 4. Design digital subsystem for real world applications

Unit:1	**Digital Design Fundamentals**	**8 Hours**
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 **Contemporary Issues related to Topic**		
Unit:2	**HDL Design Methodologies**	**7 Hours**
HDL Based Design flow, Requirements of HDL, Design Methodologies, Different Modeling styles, Introduction to Verilog, Elements of Verilog, Verilog Module definition, Elements of Module **Contemporary Issues related to Topic**		
Unit:3	**Introduction to Verilog**	**8 Hours**
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, Design entry in Verilog & Test-bench, Compilation and synthesis, Timing analysis **Contemporary Issues related to Topic**		
Unit:4	**Data Flow Modelling**	**7 Hours**
Data Flow Modeling, Delay, Continuous Assignment, Delayed Continuous assignment, Structural Modeling Feature, Module Instantiation, Gate level Primitives, Gate Delays, Switch Level Primitives, User Defined		

Primitives **Contemporary Issues related to Topic**		
Unit:5	**Behavioral Modelling**	**8 Hours**
Behavioral 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 De-assign, Force Release, Latch Models, FF Models, State Machine Coding ,Moore and Mealy Machines **Contemporary Issues related to Topic**		
Unit :6	**Combinational & sequential system Design**	**7 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, New topic to be announced time to time **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**
Textbooks		
1	Verilog Digital System Design Zainalabedin Navabi Second Edition, Tata McGraw Hill, 2009	
2	Verilog HDL : A Guide to Digital, Design and Synthesis Samir Palnitkar 2nd Edition , Prentice Hall India, 2003	
Reference Books		
1	A Verilog HDL Primer"J. Bhaskar,2nd Edition, Star Galaxy Press,1997	
2	Digital Design : Principles and Practices 4th Edition, John F Wakerly, Pearson,2008	
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]		
1	https://ycce.knimbus.com/portal/v2/default/home	
MOOCs Links and additional reading, learning, video material		
1	https://archive.nptel.ac.in/courses/106/105/106105165/	
2	https://onlinecourses.nptel.ac.in/noc24_cs61/	

V Semester

23ET1522– Lab: PE-I Digital System Design

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Design optimized combinational logic circuits 2. Construct sequential circuits for digital system applications 3. Design digital subsystem for real world applications

SN	Experiments based on
1	Design individual AND, OR, NOT, NAND, NOR, XOR, and XNOR gates using gate-level modelling.
2	Design a half adder to compute sum and carry of two input bits. Also Design a half subtractor to compute difference and borrow of two input bits
3	a) Design a 4:1 Multiplexer with 4 inputs and 2 select lines. b) Design a 2:4 Decoder with enable control. c) Design a 1:4 Demultiplexer with single input and 2-bit selection..
4	Design a 1-bit and 2-bit comparator to compare two binary numbers the outputs should indicate greater than, equal to, or less than.
5	Design a full adder to compute sum and carry using three inputs
6	Design a D latch with enable input and data control.
7	Design a basic SR latch using behavioral constructs with Set and Reset inputs.
8	Design a 4-bit binary up counter with synchronous reset
9	Design a 4-bit shift register with load and shift functionality.
10	Combine subsystems to implement a basic 4-bit Arithmetic Logic Unit (ALU) supporting: • Addition and Subtraction ,Logic operations (AND, OR) • Comparison ,Shift operations • Output control using Multiplexers and Decoder
11	Mini Project

V Semester

22ET1523 – PE I : Optical Communication

Course Outcomes:

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

1. Elaborate the concepts of Optical fiber communication system
2. Analyze an Optical Communication System and various types of losses.
3. Analyze various types of sources and receivers in fiber optics.
4. Explain different fiber to fiber joints and methods of loss measurements in fiber optics.

Unit:1	INTRODUCTION TO OPTICAL FIBERS	8 Hours

Introduction of fiber Optic system. Principle of optical communication-Attributes and structures of various fibers such as step index, graded index mode and multi mode fibers. Propagation in fibers-Ray mode, Numerical aperture and multipath dispersion in step index and graded index fibers structure, Modes and Power flow in fibers.

Contemporary Issues related to Topic

Unit:2	SIGNAL DEGRADATION IN OPTICAL FIBERS	8 Hours

Attenuation, Scattering losses, Bending Losses, Core and Cladding losses, Signal Distortion in Optical Wave guides Group Delay , Material Dispersion, Wave guide Dispersion, Intermodal dispersion, Pulse Broadening , Mode Coupling

Contemporary Issues related to Topic

Unit:3	FIBER OPTICAL SOURCES	7 Hours

Direct and indirect Band gap materials – LED structures – Light source materials – Quantum efficiency and LED power, Modulation of a LED, External Quantum efficiency –Laser Diodes structures, Fabry Perot cavity

Contemporary Issues related to Topic

Unit:4	FIBER OPTICAL RECEIVERS	7 Hours

PIN and APD diodes – Photo detector noise, SNR, Detector Response time, Avalanche Multiplication Noise – Comparison of Photo detectors – Fundamental Receiver Operation – Amplifier.

Contemporary Issues related to Topic

Unit:5	POWER LAUNCHING AND COUPLING IN DIGITAL TRANSMISSION SYSTEM	8 Hours

Source to fiber power launching –Fiber to Fiber Joints-Fiber Splicing and connectors, Mechanical Misalignment, line coding –error correction, Optical Fiber Topologies, Wavelength division Multiplexing, Free Space Optical (FSO)Communication.

Contemporary Issues related to Topic

Unit :6	MEASUREMENT IN OPTICAL FIBERS	7 Hours
Attenuation measurement, Time domain dispersion and Frequency domain dispersion, NA measurement, Refractive index, Optical Time Domain Reflectrometry (OTDR), Eye pattern. **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Optical Fiber Communication 2008 - Gerd Keiser, McGraw-Hill International
2	Optical Communication, Principles and Practice - J.Senior, Prentice Hall of India
Reference Books	
1	Optical Communication System - S J. Gower, Prentice Hall of India
2	Fiber-Optic Communication System Third Edition - Govind Agrawal, John Willy & Sons
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc22_ee88 Fiber Optic Communication Technology - Course (nptel.ac.in)

V Semester

23ET1524 – PE I : Lab Optical Communication

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Analyze analog & digital fiber links. 2. Determine various types of losses in fiber optic communication. 3. Determine numerical aperture, eye pattern and amount of reflection in fiber optics. 4. Apply PWM, PAM and TDM for optical communication

Sr. No.	Experiments based on
1	To set fiber optic analog link using optical fiber.
2	To set fiber optic digital link using optical fiber.
3	To measure the attenuation of signal in optic fiber due to bending loss
4	To determine the attenuation due to propagation loss in optic fiber.
5	To estimate the numerical aperture of the given fiber.
6	To form fiber optic voice link using MIC and Speaker
7	To Study and perform PAM in optical fiber link
8	To Study and perform PWM in optical fiber link
9	To perform Time Division Multiplexing in optical fiber.
10	To study the eye pattern of optical fiber link.
11.	To measure reflection using OTDR in Optical fiber

Semester-V

23ET1525 – PEI: Electronics Measurement and Instrumentation

Course Outcomes:

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

1. Explain the fundamentals of measurement systems and instruments.
2. Analyze DC and AC bridge circuits.
3. Analyze characteristics of various sensors and transducers.
4. Elaborate data conditioning and acquisition systems.

Unit:1		**8 Hours**

Introduction to measurement , standards, static and dynamic characteristics of measurement system, need of Calibration, types of error & their sources and statistical analysis.

Contemporary Issues related to Topic

Unit:2		**7 Hours**

DC bridges- Wheatstone bridge, sensitivity of Wheatstone bridge, Kelvin's Double bridge.
AC bridge- Inductance measurement- Maxwell's Inductance bridge, Maxwell's Inductance capacitance's bridge, Hay's Bridge, Capacitance Measurement- Schering Bridge, Frequency Measurement- Wien Bridge.

Contemporary Issues related to Topic

Unit:3		**8 Hours**

DC meters, AC Voltmeter, TRUE/RMS voltmeter, Digital Multimeter, Digital Voltmeter, Q-meter, LCR meter, dual trace CRO, Dual beam CRO, Digital Storage Oscilloscope, RS422 instrumentation Bus.

Contemporary Issues related to Topic

Unit:4		**7 Hours**

AF Generator, Pulse characteristics, Pulse Generators, Function Generator, Sweep Frequency Generator, Wave analyzer, Spectrum analyzer, logic analyzer.

Contemporary Issues related to Topic

Unit:5		**8 Hours**

Definition, Classification of transducer, Selection of Transducer, Resistive transducer- Potentiometer, RTD, Thermistor, LM35 temperature sensor, Thermocouple, Strain Gauges, strain gauge Load Cells, Inductive transducer LVDT , capacitive transducers- Variable area, variable distance, Piezoelectric Transducer, photoelectric transducers , Electromagnetic flow meter.

Contemporary Issues related to Topic

Unit :6		7 Hours
Signal conditioning and its necessity, Functions of Signal conditioning, AC/DC Conditioning systems, Instrumentation Amplifier, Data conversion: ADC, DAC, Generalized data acquisition system: single channel, multi-channel and modular DAS. **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Modern Electronic Instrumentation and Measurement Techniques by Albert D. Helfrick William D. Cooper , **Pearson Education India,**2015 Edition
2	A Course in Electrical And Electronic Measurements And Instrumentation, by A. K. Sawhney Dhanpat Rai & Co., 2021 Edition
Reference Books	
1	Electrical and Electronics Measurements and Instrumentation, by Rajput R. K., S Chand & Co Ltd, 1 January 2008.
2	Elements Of Electronic Instrumentation And Measurement, by: Joseph J. Carr. 2nd Edition 2022, Prentice Hall
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	\\172.16.1.10\lib\ET\2021-22\E-Books
2	https://www-sciencedirect-com-ycce.knimbus.com/journal/measurement-sensors
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc19_ee44/preview

Semester-V

23ET1526 – Lab PEI: Electronics Measurement and Instrumentation

Course Outcomes:

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

1. Explain the operating principles and characteristics of various analog and digital measuring instruments with their conversion techniques.
2. Measure the electrical quantities such as resistance, inductance, capacitance using bridges
3. Perform accurate measurement of physical quantities such as temperature, displacement, and strain using appropriate transducers.

SN	Experiments based on
1	To study the operating principles of Analog and Digital meters
2	To determine an unknown resistance using the Wheatstone Bridge method.
3	To measure the unknown value of Inductance by using Maxwell's Inductance-Capacitance Bridge.
4	To evaluate an unknown capacitance using De-Sauty's Bridge.
5	To study the temperature - voltage characteristics of a thermocouple.
6	To measure the unknown temperature using RTD
7	To measure linear displacement using an LVDT and plot its input-output characteristics.
8	To measure Strain using Strain Gauge or load cell.
9	To study the characteristics of Photoelectric transducers
10	To perform analog-to-digital data conversion using an ADC and study its operation.

V Semester

23ET1527 – PE I : Internet of Things

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Explain the physical and Logical design of IoT. 2. Explore the IoT Networking and messaging protocols. 3. Explore python programming. 4. Apply basic skills of IoT to solve real life problems 5. Illustrate security for IoT.

Unit:1	**Introduction & Concepts:**	**8 Hours**
Introduction to Internet of Things, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels **Contemporary Issues related to Topic**		
Unit:2	**Networking of IoT Node**	**7 Hours**
IoT nodes, challenges in networking of IoT Nodes, IoT node access method, Low power low data rate network: IEEE 802.15.4 Physical layer, IEEE 802.15.4 MAC layer, LPWAN, LoRA Technology, SigFox technology, IPv6 over Low power WPAN, Header compression and Fragmentation, Routing protocol for LLNS. **Contemporary Issues related to Topic**		
Unit:3	**Messaging Protocol**	**8 Hours**
Introduction to CoAP, CoAP message format, CoAP communication in IoT infrastructure, Introduction to MQTT, MQTT message format & sessions. **Contemporary Issues related to Topic**		
Unit:4	**Developing Internet of Things & Logical Design**	**7 Hours**
Python Modules, Packages, File Handling, Date/ Time Operations, Classes, Python Packages, IoT Device-Raspberry Pi, Programming Raspberry pi with Python **Contemporary Issues related to Topic**		
Unit:5	**IoT Security**	**8 Hours**

Effect of security threats on user, authentication using OTP validation, Security Requirements for the Internet of Secure Things, Secure Solutions, Secure Framework of the IoT Related to Perceptual Layer, Challenges in IoT Security **Contemporary Issues related to Topic**		
Unit :6	**IoT application case study**	**7 Hours**
Smart City, Smart Grid, Smart Transportation, Smart Manufacturing, Smart Healthcare. **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

extbooks	
1	Arshdeep Bahga and Vijay Madisetti , "Internet of Things, a hands on approach" , Universities Press (India)Pvt. Ltd. 2017, ISBN: 978-81-7371-954-7.
Reference Books	
1	Internet of Things : Technologies, Applications, Challenges and Solution B.K.Tripathy & J.Anuradha by CRC press publication
2	From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence: By Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, 1 st Edition, Academic Press, 2014.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/UG%20COURSES/IIOT/IIOT%20(%20G%20Series).pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/30.2019_Book_InternetOfThingsFromHypeToReal.pdf
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/106/105/106105166/
2	https://onlinecourses.nptel.ac.in/noc21_ee85/preview

V Semester

23ET1528 – PE I : Lab Internet of Things

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Explore the physical and Logical design of IoT. 2. Explore the IoT Networking and messaging protocols. 3. Explore python programming.

SN	Experiments based on
1	Python arithmetic operators.
2	Python functions.
3	String manipulation using python.
4	List, dictionaries etc.
5	Interface LED with Raspberry pi.
6	Interface DHT11 temperature sensor with Raspberry pi.
7	Transfer data from DHT11 on the web using IoT.
8	Read the content of the web portal using IoT.
9	Implement MQTT protocol for IoT applications.
10	Implement COAP protocol for IoT applications.
11	Mini-project.

Semester V

23ET1530 PE-I : Data Base Management Systems

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Explain various concept of Data base management system. 2 . Design Entity Relationship Diagram for any scenario. 3. Solve queries based on relational algebra & SQL. 4. Identify functional dependencies & normalize the database and apply ACID properties. 5. Analyze transaction management, various concurrency control protocols and crash recovery methods.

Unit:1	**Introduction to Database Management System:**	**8 Hours**
General File System and Database system Concepts and Architecture, Data Models, Schemas and Instances, Abstraction & Different Levels of Data Abstraction, Data Independence: Logical & Physical Independence. **Contemporary Issues related to Topic**		
Unit:2	**Entity-Relationship Model:**	**7 Hours**
Entities and Entity Sets, Relationships and Relationship Sets, Attributes, Mapping Constraints, Keys, Entity Relationship Diagram, Reducing E-R Diagrams to Tables, Generalization, Aggregation, Design of an E-R Database Scheme **Contemporary Issues related to Topic**		
Unit:3	**SQL and Advanced SQL**	**8 Hours**
SQL: Data definition language (DDL), Data Manipulation Language (DML), Basic structure of SQL Queries, Set operations, Null Values, Nested subqueries, views, modification of database, transaction, Joins. **Advanced SQL:** SQL data types & schemas, Integrity Constraints, Domain Constraints, Assertions, triggers, Advanced SQL Features. **Contemporary Issues related to Topic**		
Unit:4	**Relational Data Model:**	**7 Hours**
Structure of Relational Databases, Relational Database Design: Pitfalls in Relational Database Design, Functional Dependencies, Normalization using Functional Dependencies, Alternative Approaches to Database design. **Relational Algebra**: Structure of relational databases, Fundamental Relational-Algebra Operations, Additional relational algebra operations, extended relational algebra operations, modification of the databases **Contemporary Issues related to Topic**		
Unit:5	**Data Storage and Querying & Transaction Management**	**8 Hours**
Data Storage and Querying: Storage and File Structure, Indexing and Hashing, Query Processing, query-evaluation.		

Transaction Management: ACID Properties, Implementation of ACID Properties, Database processes to support ACID Properties, Schedules, and Testing of Serializability.
Contemporary Issues related to Topic

Unit :6	**Concurrency Control & Crash Recovery**	**7 Hours**

Concurrency Control: Lock-based Protocols, Timestamp Based Protocols, Validation Techniques, Multiple Granularity, Multi version Timestamp Protocol, Transaction isolation levels, Read consistency.
Crash Recovery: Failure Classification, Log Based Recovery, Buffer Management, Checkpoints, Shadow Paging.
Contemporary Issues related to Topic

Total Lecture Hours	**45 Hours**

Textbooks	
1	Database System Concepts,Korth, Silberschatz, sudarshan ,McGraw-Hill publication
2	Fundamentals of Database Systems, Elmasri, Navathe & Gupta,Pearson Education.
Reference Books	
1	SQL & PL / SQL for Oracle 11g Black Book Kindle Edition,3rd Edition, Dr. P.S. Deshpande, Dreamtech Press
2	Database Systems, 3rd Edition,Connolly, Begg , Pearson Education
3	Database Systems, 6th Edition,S. K. Singh,Pearson Education
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/noc21_cs04/preview
2	https://onlinecourses.nptel.ac.in/noc22_cs80/preview

Semester V

23ET1530 Lab: PE-I : Data Base Management Systems

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Design Entity Relationship Diagram for any scenario. 2. Solve queries based on relational algebra & SQL.

SN	Experiments based on
1	Creating a schema -To implement different basic Data Definition Language (DDL) & Data Manipulation Language(DML) Commands in SQL.
2	To design an ER Diagram.
3	1. Answer each of the following questions. The questions are based on the following relational schema: Emp(*eid:* integer, *ename:* string, *age:* integer, *salary:* real) Works(*eid:* integer, *did:* integer, *pcttime:* integer) Dept(*did:* integer, *dname:* string, *budget:* real, *managerid:* integer) a. Give an example of a foreign key constraint that involves the Dept relation. What are the options for enforcing this constraint when a user attempts to delete a Dept tuple? b. Write the SQL statements required to create the preceding relations, including appropriate versions of all primary and foreign key integrity constraints. c. Define the Dept relation in SQL so that every department is guaranteed to have a manager. d. Write an SQL statement to add John Doe as an employee with *eid* = 101, *age* = 32 and *salary* = 15, 000. e. Write an SQL statement to give every employee a 10 percent raise. f. Write an SQL statement to delete the Toy department.
4	Given a schema , apply BETWEEN…AND, NOT BETWEEN, IN, NOT IN, IS NULL, IS NOT NULL clause on created database.
5	Given a schema , implement aggregate function & grouping commands.
6	Given a schema , implement basic set operations in SQL
7	Write the following queries in SQL for the following schema. Suppliers(sid: integer, sname: string, address: string) Parts(pid:

	integer, pname: string, color: string) Catalog(sid: integer, pid: integer, cost: real) 1. Find the pnames of parts for which there is some supplier. 2. Find the snames of suppliers who supply every part. 3. Find the snames of suppliers who supply every red part. 4. Find the pnames of parts supplied by Acme Widget Suppliers and by no one else. 5. Find the sids of suppliers who supply a red part and a green part. 6. Find the sids of suppliers who charge more for some part than the average cost of that part (averaged over all the suppliers who supply that part). 7. For each part, find the sname of the supplier who charges the most for that part. Find the sids of suppliers who supply only red parts.

V Semester

23ET1531 – PE I : Artificial Intelligence

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Describe different concepts of AI, and illustrate working of different types of intelligent agents and co-relate them in real life. 2. Differentiate between searching algorithms and apply appropriate algorithm to solve real life problems as well as in gaming domain. 3. Select appropriate knowledge representation technique to represent real life facts. 4. Analyze planning approaches and its operation for real life problem. 5. Demonstrate the working knowledge of reasoning in the presence of incomplete and/or uncertain information.

Unit:1		**7 Hours**
Introduction: AI , History, Overview, Intelligent Agents, Performance Measure, Rationality, Structure of Agents, Problem-solving agents, Problem Formulation, Uninformed Search Strategies **Contemporary Issues related to Topic**		
Unit:2		**8 Hours**
Informed (Heuristic) Search and Exploration, Greedy best first search, A* search, Memory bounded heuristic search, Heuristic functions, inventing admissible Heuristic functions, Local Search algorithms, Hill-climbing, Simulated Annealing **Contemporary Issues related to Topic**		
Unit:3		**7 Hours**
Constraint Satisfaction Problems, Backtracking Search, variable and value ordering, constraint propagation, intelligent backtracking, local search for CSPs, Adversarial Search, Games, The minimax algorithm, Alpha-Beta pruning, Imperfect Real-Time Decisions **Contemporary Issues related to Topic**		
Unit:4		**7 Hours**
Knowledge Based Agents, Logic, Propositional Logic: Inference, Equivalence, Validity and Satisfiability, Resolution, Forward and Backward Chaining, First Order Logic: Models for first order logic, Symbols and Interpretations,		

Atomic sentences, complex sentences, Quantifiers, Inference in FOL, Unification, Forward Chaining, Backward Chaining, Resolution **Contemporary Issues related to Topic**		
Unit:5		**8 Hours**
Planning, Language of planning problems, planning with state-space search, forward and backward state-space search, Heuristics for state-space search, partial order planning, planning graphs, planning with propositional logic **Contemporary Issues related to Topic**		
Unit :6		**7 Hours**
Uncertainty, Handing uncertain knowledge, rational decisions, basics of probability, axioms of probability, inference using full joint distributions, independence, Baye's Rule and conditional independence, Bayesian networks, Semantics of Bayesian networks, Exact inference in Bayesian Networks. **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	S. Russell and P. Norvig. Artificial Intelligence: A Modern Approach Pearson Education,3rd edition, 2010
2	E. Rich and K. Knight and Shivashankar B. Nair Artificial Intelligence McGraw Hill, ,3rd edition, 2009
Reference Books	
1	D. W. Patterson, Introduction to Artificial Intelligence and Expert System,PHI
2	George F. Lugar, Artificial Intelligence Pearson Education
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/UG%20COURSES/IIOT/IIOT%20(%20G%20Series).pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/30.2019_Book_InternetOfThingsFromHypeToReal.pdf
MOOCs Links and additional reading, learning, video material	
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V Semester

23ET1532 – PE I : Lab: Artificial Intelligence

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Implement various search algorithms to solve AI problems. 2. Evaluate the performance of heuristic-based algorithms in game-playing scenarios and optimize them using techniques .

SN	Experiments based on
1	Family tree program to include following rules 1. M is the mother of P if she is a parent of P and is female 2. F is the father of P if he is a parent of P and is male 3. X is a sibling of Y if they both have the same parent. Then add rules for grandparents, uncle-aunt, sister and brother.
2	Implement DFS (for 8 puzzle problem or Water Jug problem or any AI search problem).
3	Implement BFS (for Missionaries and Cannibal Problem)
4	Implement Heuristic (Steepest Ascent) Search for Tic-Tac-Toe game problem.
5	Implement Min-Max/Alpha Beta Pruning Algorithm for game solving.
6	Implement Best First search for Travelling Salesman Problem
7	Implement A* Algorithm.
8	Solve 8 Queen Problem.
9	Resolution algorithm.
10	Implement Naive Bayes Classifiers .

V Semester

23ET1533 – PE-I Information Theory and Coding

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Analyze, measure of information, Entropy, Rate of information. 2. Illustrate information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms. 3. Elaborate the continuous and discrete communication channels using input, output and joint probabilities 4. Determine a code word comprising of the check bits computed using Linear Block codes, cyclic codes & convolutional codes

Unit:1	**Information theory**	**8 Hours**
Concept of amount of information, information units Entropy: marginal, conditional, joint and relative entropies, relation among entropies Mutual information, information rate, **Contemporary Issues related to Topic**		
Unit:2	**Source Coding**	**7 Hours**
Encoding of the Source Output, Shannon's Encoding Algorithm, Shannon Fano Encoding Algorithm Source coding theorem, Prefix Codes, Kraft McMillan Inequality property KMI, Huffman codes . **Contemporary Issues related to Topic**		
Unit:3	**Information Channels**	**8 Hours**
Communication Channels, Discrete Communication channels Channel Matrix, Joint probability Matrix, Binary Symmetric Channel, System Entropies., Channel Capacity, Channel Capacity of Binary Symmetric Channel, and Binary Erasure Channel. **Contemporary Issues related to Topic**		
Unit:4	**Error Control Coding**	**8 Hours**
Introduction, Examples of Error control coding, methods of Controlling Errors, Types of Errors, types of Codes, Linear Block Codes: matrix description of Linear Block Codes, Error detection & Correction capabilities of Linear Block Codes, Single error correction Hamming code. Binary Cyclic Codes: Algebraic Structure of Cyclic Codes, Encoding using an (n-k) Bit Shift register, Syndrome Calculation, Error Detection and Correction, **Contemporary Issues related to Topic**		
Unit:5	**Convolution Codes**	**7 Hours**

Convolution Encoder, Time domain approach, Transform domain approach, Code Tree, Trellis and State Diagram, The Viterbi Algorithm **Contemporary Issues related to Topic**		
Unit :6	**Interleaving techniques**	**7 Hours**
Block and convolutional interleaving, Coding and interleaving applied to CD digital audio system - CIRC encoding and decoding, interpolation and muting. ARQ – Types of ARQ, Performance of ARQ, Probability of error and throughput **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Digital and Analog Communication Systems,, 5th edition Date:2006, K. Sam Shanmugam, Wiley India Pvt. Ltd
2	Digital Communication, 3rd edition August 2007, Simon Haykin, JOHN WILEY & SONS
Reference Books	
1	Information Theory, Coding and Cryptography Ranjan Bose, McGraw Hill Education , II edition, 25 April 2008,
2	Digital Conummications- Fundamentals and Applications, Bernard Sklar, Second Edition, Pearson Education, 2016
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://ycce.knimbus.com/portal/v2/default/home
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/117101053
2	https://onlinecourses.nptel.ac.in/noc22_ee49/

V Semester

23ET1534–PE-I : Lab: Information Theory and Coding

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Analyze entropies and mutual information of a given channel
2. Analyze variable length source coding and Channel coding
3. Implement ARQ technique using CAD tools.

SN	Experiments based on
1	Write a program for determination of various entropies and mutual information of a given channel Test various types of channel such as a) Noise free channel. b) Error free channel c) Binary symmetric channel d) Noisy channel **Compare channel capacity of above channels.**
2	Write a program for generation and evaluation of variable length source coding using(MATLAB) a) Shannon – Fano coding and decoding b) Huffman Coding and decoding c) Lempel Ziv Coding and decoding
3	Write a Program for coding & decoding of Linear block codes.
4	Write a Program for coding & decoding of Cyclic codes.
5	Write a program for coding and decoding of convolutional codes
6	Write a program for coding and decoding of BCH and RS codes.
7	Write a program to study performance of a coded and uncoded communication system (Calculate coding gain, error probability, Bit energy Vs error performance)
8	Write a simulation program to implement source coding and channel coding for transmitting a text File.
9	Implementation of any compression algorithm by using various toolboxes in MATLAB or any Other platform for either audio, image or video data.
10	Write a simulation program to implement ARQ techniques
11.	Mini Project

V Semester
MDM3ET103: Industrial Instrumentation

Course Outcomes:

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

1. Explain the working principles of analog and digital instruments, their design, and applications in measurement systems.
2. Analyze different types of recording instruments, flowmeters, and level measurement techniques used in industrial applications.
3. Evaluate signal conditioning circuits and final control elements for measurement and automation systems.

Unit:1	Analog Indicating Instruments	8 Hours

PMMC and Moving Iron instruments, Voltmeter, Ammeter, RMS and True RMS concept, Extension of range of ammeter, design of multirange ammeter, extension of range of voltmeter, design of multirange voltmeter, series and shunt type ohmmeter, Single phase wattmeter: construction and working.

Contemporary Issues related to Topic.

Unit:2	Digital Instruments	8 Hours

Introduction to digital instruments, Advantages of Digital instruments over Analog instruments, Block diagram, principle of operation, Accuracy of digital instruments, Need of ADC, ADC types like Flash, Counter, SAR and Dual-Slope, ADC Specifications, ADC Numerical, Need of DAC, DAC types like Weighted-Resistor and R-2R ladder, DAC Specifications, Its applications in digital instruments like Digital Multimeter, Digital Kilo Watt Hour meter, Digital Clamp meter.

Contemporary Issues related to Topic.

Unit:3	Recording Instruments and Virtual Instrumentation	7 Hours

Concept and classification of recorder, Basic Strip chart recorder Types of Strip chart recorder XY Recorder, Magnetic Tape recorder, Different marking mechanism in recorder, Application of recorders ,Introduction to virtual instrumentation

Contemporary Issues related to Topic.

Unit:4	FLOWMETERS	7 Hours

Variable head type flow meters: – Orifice plate – Venturi tube – Pitot tube. Area flow meter: – Rotameter, Principle and constructional details of electromagnetic flow meter – Ultrasonic flowmeters flow measurements for gases.

Contemporary Issues related to Topic.

Unit:5	LEVEL MEASUREMENT	7 Hours

Level measurement:- Float, Displacer type and Bubbler system – Electrical level gauge:- Resistance and Capacitance – Nuclear radiation and Ultrasonic types – Boiler drum level measurement:- Differential Pressure Method and Hydra step method – Solid level measurement..

Contemporary Issues related to Topic.

Unit :6	**Signal conditioning circuits and Final control**	**8 Hours**

Electronic amplifiers-Differential Amplifier,
Instrumentation Amplifiers, Precision rectifiers, Log amplifiers, Carrier Amplifiers, Lock-In Amplifiers, Isolation Amplifiers, Charge amplifiers, Phase-sensitive detectors. Final control operation- signal conversion- actuators- control elements, Actuators- Electrical – Pneumatic- Hydraulic, Control elements-mechanical- electrical- fluid valves

Contemporary Issues related to Topic.

Total Lecture Hours	**45 Hours**

Textbooks

1	S.K. Singh, Industrial Instrumentation and Control, Tata McGraw Hill, 2003.
2	D V S. Murty, "Transducers and Instrumentation", Second Edition, PHI Learning Pvt Ltd New Delhi, 2013
3	A. K. Sawhney ,Electrical and Electronic Measurements AND Instrumentation, Dhanpat Rai &Co
4	Stuart A. Boyer, "SCADA: Supervisory Control and Data Acquisition", Fourth edition, International Society of Automation, 2010

Reference Books

1	D. Patranabis T,Principles of Industrial Instrumentation ata , McGraw Hill Publishing Company Ltd, 1996.
2	Kevin Collins ,Programming for Industrial Automation
3	B.C. Nakra & K.K.Chaudary ,Instrumentation Measurement & Analysis, Tata McGraw Hill Publishing Ltd
4	E.O. Doebelin, Measurement Systems – Application and Design, Tata McGraw Hill publishing company,2003.
5	D.P. Eckman, Industrial Instrumentation, Wiley Eastern Ltd.
6	Robert B. Northrop, 'Introduction to instrumentation and measurements', CRC, Taylor and Francis 2005

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

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MOOCs Links and additional reading, learning, video material

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V Semester

MDM3ET203: Digital Communication

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Explain fundamentals of digital communication. 2. Analyze various source and channel coding techniques. 3. Analyze various digital modulation techniques. 4. Explain fundamentals of spread spectrum modulation.

Unit:1	Introduction to digital communication	8 Hours
Digital Communication system block diagram, advantages and disadvantages of digital communication, Sampling Theorem ,Types of sampling, Aliasing effect, Quantization process ,Quantization Noise **Contemporary Issues related to Topic**		
Unit:2	**Pulse code modulation**	**7 Hours**
Pulse code modulation (PCM), Differential pulse code modulation (DPCM): Transmitter and Receiver block Diagram and its working , Delta Modulation: Transmitter and Receiver block Diagram and its working slope overload and Granular noise, Advantages and disadvantages of DM Adaptive Delta modulation (ADM): Transmitter and receiver block diagram. advantages and disadvantages of ADM **Contemporary Issues related to Topic**		
Unit:3	**Source coding**	**8 Hours**
Concept of Entropy and Information rate , Source coding: Shannon Fano Coding ,Huffman coding, run-length encoding ,Lempel –Ziv Coding, **Contemporary Issues related to Topic**		
Unit:4	**Digital modulation techniques**	**8 Hours**
Line coding formats: Classification of line codes,Uni polar- RZ,NRZ,L,Polar RZ,NRZ and RZ,Bipo1ar- NRZ /AM1, RZ,Manchester -Split Phase and Differential Manchester, Polar quaternary and their waveforms , Digital modulation techniques and their advantages, concept of Coherent and Non coherent detection ,Shift keying Techniques : Amplitude Shift Keying (ASK) ,Frequency shift keying (FSK), Phase shift keying (PSK), Differential Phase shift keying (DPSK), Quadrature Phase shift keying (QPSK), Constellation diagram , transmitter and receiver block diagram and their working with waveforms **Contemporary Issues related to Topic**		

Unit:5	**Channel coding**	**7 Hours**
Channel coding : Error, causes of error and its effect ,error detection and correction using parity , Linear block codes, cyclic codes, convolution encoding and decoding. **Contemporary Issues related to Topic**		
Unit :6	**Spread Spectrum**	**7 Hours**
Study of PN sequences, direct sequence methods, Frequency hop methods, digital spread spectrum, slow and fast frequency hop, synchronization methods for spread spectrum, application of spread spectrum **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Digital Communication, 4th edition ,2005, John G Prokis, McGraw Hill
2	Digital Communication, 3rd edition August 2007, Simon Haykin, JOHN WILEY & SONS
Reference Books	
1	Modern Communication systems (Principles and application) Leon W. Couch II ,PHI
2	Modern Digital & Analog Communication Systems, B.P.Lathi , Oxford University
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20and%20Telecommunication/Analog%20and%20Digital%20Communication%20Systems%20(%20PDFDrive.com%20).pdf
MOOCs Links and additional reading, learning, video material	
1	NPTEL Course on Digital Communication IIT Bombay by Prof. Bikash Kumar Dey, https://nptel.ac.in/courses/117101051

V Semester

MDM3ET303: Microcontroller

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Elaborate 8051 microcontroller architecture. 2. Develop assembly language programs. 3. Develop embedded C language program 4. Explain interfacing of ON & OFF chip peripherals with 8051 microcontroller.

Unit:1	**8051 Architecture**	**8 Hours**
Overview of 8051 Microcontroller family, Introduction to MCS 51 family, Architecture, Memory organization, Internal RAM, Flag Register, Register Banks, SFRs , Functional pin description **Contemporary Issues related to Topic**		
Unit:2	**ASSEMBLY LANGUAGE PROGRAMMING**	**8 Hours**
Addressing modes, Instruction set and Assembly language programming Bit manipulation, 8051 I/O programming, Interfacing LED & Swiches with 8051, Delay Programs. **Contemporary Issues related to Topic**		
Unit:3	**EMBEDDED C PROGRAMMING**	**7 Hours**
8051 programming in C: Data types and time delay, I/O programming, Logic operations, Data conversion programs **Contemporary Issues related to Topic**		
Unit:4	**TIMERS AND SERIAL COMMUNICATION**	**8 Hours**
Timer programming in assembly and C: Various modes of operation, SFR related to timer operation. Serial Port programming in assembly and C: Basics of serial communication, 8051 connection to RS 232. Serial		

data transfer and receive programs. **Contemporary Issues related to Topic**		
Unit:5	**INTERRUPTS AND OFF-CHIP INTERFACING**	**7 Hours**
8051 interrupts: types, ISR, IVT, steps of execution, SFRs associated with interrupts, Interfacing and programming for LCD, Interfacing RTC **Contemporary Issues related to Topic**		
Unit :6	**INTERFACING OF OTHER OFF- CHIP DEVICES**	**7 Hours**
Interfacing of ADC, DAC, stepper motor ,DC motor **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks

1	Muhammad Ali Mazidi, The 8051 Microcontroller and Embedded systems using assembly & C, Pearson Education Asia LPE
2	Kenneth Ayala, The 8051 Microcontroller , CENGAGE Learning

Reference Books

1	Douglas V Hall, Intel or Atmel MCS 51 Family Microcontrollers Data Sheets, Tata McGraw Hill
2	A. K. Ray, K. M. Bhurchandi Microprocessor & Interfacing, 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/Electronics%20and%20Telecommunication/the_8051_microcontroller_and_embedded_systems_using_assembly_and_c-2nd-ed_by_mazidi.pdf

MOOCs Links and additional reading, learning, video material

1	https://archive.nptel.ac.in/courses/108/105/108105102/ 2
2	https://archive.nptel.ac.in/courses/106/108/106108100/ 3
3	3 https://archive.nptel.ac.in/courses/117/104/117104072/

V Semester

23OE3523: OE III Fundamentals of Investments

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Familiarize the students with different investment alternatives 2. Analyze Equity and Debt Instrument 3. Study Portfolio Analysis 4. Analyze investor protection.

Unit:1	Introduction to Investment:	**8 Hours**
Meaning of Investment – essential features of Investment-Investment Alternatives- Investment Environment (brief description on elements such as Financial Securities, Financial Markets, Financial Services, Financial Intermediaries, Regulators, and Investors). **Contemporary Issues related to Topic**		
Unit:2	Investment Management Process	**7 Hours**
Sources of Financial Information- Calculation of return on investment and expected return-Calculation of expected return under CAPM- Types of risk- Calculation of Standard deviation- calculation of beta under correlation and regression methods (Simple Problems) **Contemporary Issues related to Topic**		
Unit:3	Security Valuation:	**8 Hours**
Valuation of Fixed Income Securities: BondsEssential Features- Types of Bonds- Types of bond risks- estimating Bond Yields-Bond valuation (redeemable and irredeemable)- Valuation of Preference Shares (redeemable and irredeemable). Valuation of Equity- Dividend Yield Method- Dividend Yield plus growth method. **Contemporary Issues related to Topic**		
Unit:4	Approach to Security Analysis:	**7 Hours**
Security Analysis- Fundamental Analysis – EIC analysis – Tools for company analysis- Technical Analysis- stock charts(line, bar, candle stick and point and figure charts) **Contemporary Issues related to Topic**		

Unit:5	Portfolio Analysis:	**8 Hours**
Concept of portfolio – need and importanceportfolio diversification- a brief description of Markowitz model, Random Walk Theory, Efficient Market Hypothesis, Efficient Portfolio -Calculation of Portfolio Risk with two securities. (Covariance, Correlation, Standard deviation)- Portfolio Return. **Contemporary Issues related to Topi**		
Unit :6	Investor Protection:	**7 Hours**
Role of SEBI & Stock Exchanges in investor protection – Investor Education & Awareness Measures- Investor grievances and their redressal system –SCORES – Prohibition of Insider trading practices - UPSI-Rights and Duties of Investors - Investor activism. **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Sourain. Harry; Investment Management, Prentice Hall of India.
2	Donald E. Fisher and Ronald J. Jordan: Securities Analysis and Portfolio Management, Prentice Hall, New Delhi.
Reference Books	
1	Gupta L.C.: Stock Exchange Trading in India, Society for Capital Market Research and Development, Delhi.
2	Prasanna Chandra, Investment Analysis and Portfolio Management, McGraw Hill Education India
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
MOOCs Links and additional reading, learning, video material	
1	https://www.coursera.org/learn/investments-fundamentals
2	https://onlinecourses.swayam2.ac.in/cec25_cm09/preview

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

6th Semester

(Department of Electronics & Telecommunication Engineering)

B. Tech in Electronics & Telecommunication 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 & Telecommunication Engineering)

B. Tech. in Electronics & Telecommunication Engineering

SoE No. 23ET-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	ET	23ET1601	Digital Signal Processing	T	3	0	0	3	3	30	20	50	3
2	6	PC	ET	23ET1602	**Lab :** Digital Signal Processing	P	0	0	2	2	1		60	40	
3	6	PC	ET	23ET1603	Object Oriented Programming	T	3	0	0	3	3	30	20	50	3
4	6	PC	ET	23ET1604	**Lab :** Object Oriented Programming	P	0	0	2	2	1		60	40	
5	6	PC	ET	23ET1605	Control Systems	T	3	0	0	3	3	30	20	50	3
6	6	PC	ET	23ET1606	Design Thinking and Research Methodology	T	2	0	0	2	2	30	20	50	3
7	6	PE	ET		**Professional Elective-II**	T	3	0	0	3	3	30	20	50	3
8	6	PE	ET		**Lab : Professional Elective-II**	P	0	0	2	2	1		60	40	
9	6	MDM	ET		**MD Minor Course-IV**	T	3	0	0	3	3	30	20	50	3
10	6	**VSEC-4**	ET	23ET1607	**Lab :** Computer Maintenance	P	0	0	2	4	2		60	40	
11	6	STR	ET	23ET1608	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 :**	**A**	3	0	0	3	0				

Professional Elective - II					
1	6	PE-II	ET	23ET1621	**PE-II :** Machine Learning
2	6	PE-II	ET	23ET1622	**PE-II : Lab** : Machine Learning
3	6	PE-II	ET	23ET1623	**PE-II :** Digital Image Processing
4	6	PE-II	ET	23ET1624	**PE-II : Lab** : Digital Image Processing
5	6	PE-II	ET	23ET1625	**PE-II :** Computer Networks
6	6	PE-II	ET	23ET1626	**PE-II : Lab** : Computer Networks
7	6	PE-II	ET	23ET1627	**PE-II :** Data Structure and Algorithms
8	6	PE-II	ET	23ET1628	**PE-II : Lab :** Data Structure and Algorithms
9	6	PE-II	ET	23ET1629	**PE-II :** CMOS VLSI Design
10	6	PE-II	ET	23ET1630	**PE-II : Lab :** CMOS VLSI Design
11	6	PE-II	ET	23ET1631	**PE-II :** Multimedia & Animation
12	6	PE-II	ET	23ET1632	**PE-II : Lab :** Multimedia & Animation
13	6	PE-II	ET	23ET1633	**PE-II :** Radio Frequency Circuit Design
14	6	PE-II	ET	23ET1634	**PE-II : Lab :** Radio Frequency Circuit Design

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

Applicable for AY 2023-24 Onwards

VI Semester

23ET1601 – Digital Signal Processing

Course Outcomes:

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

1. Apply discrete Fourier transform and fast Fourier transform on signals.
2. Implement digital filters in a variety of structures.
3. Design digital IIR and FIR filter.
4. Analyze finite word length and multi-rate discrete time system with unequal sampling rates

Unit:1	**Discrete Fourier transform**	**9 Hours**

Frequency domain sampling: DFT, DFT as Linear transformation, Properties of DFT, Circular convolution, Use of DFT in Linear Filtering, DFT of long sequences

Contemporary Issues related to Topic

Unit:2	**FFT Algorithm**	**6 Hours**

FFT algorithms: Decimation in time, Decimation in Frequency, Radix-2 , Radix-4

Contemporary Issues related to Topic

Unit:3	**Digital filter structures**	**8 Hours**

Block diagram representation, Signal Flow Graph, Basic IIR structures, Basic FIR structures, IIR lattice structures, Linear Phase FIR, FIR lattice structure

Contemporary Issues related to Topic

Unit:4	**IIR filter design**	**8 Hours**

Bilinear transformation, Impulse invariant transformation, Low pass IIR digital filters, Butterworth and Chebyshev filter, Spectral transformations.

Contemporary Issues related to Topic

Unit:5	**FIR filter design**	**7 Hours**

FIR filter design using windowing techniques (Rectangular, Hann, Hamm, Blackmann, Bartlett and Kaiser), Frequency sampling technique, Finite Word length Effect

Contemporary Issues related to Topic

Unit :6	**Multirate Digital Signal Processing**	**7Hours**

Basic sample rate alternation devices, Multirate structure for sampling rate conversion, Multirate Design of Decimator and Interpolator, The Ployphase Decomposition **Contemporary Issues related to Topic**	
Total Lecture Hours	**45 Hours**

Textbooks	
1	"Digital Signal Processing - Principles, algorithms and applications" 4th edition, 2013 John G. Proakis McGraw-Hill
2	"Discrete time Signal Processing" 3rd edition 2010 Alan Oppenheim, Ronald Schafer and Buch Pearson
3	"Digital Signal Processing - A computer based approach," Publication. 4th edition, 2013 Sanjit K. Mitra, McGraw-Hill
Reference Books	
1	Digital Signal Processing 3rd Edition 2017 S Salivahanan A Vallavraj C Gnanapriya 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/Electronics%20and%20Telecommunication/Analog%20and%20Digital%20Communication%20Systems%20(%20PDFDrive.com%20).pdf
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/117/102/117102060/

VI Semester

23ET1602 –Lab: Digital Signal Processing

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Apply discrete Fourier transform on signals and verify properties. 2. Design digital IIR and FIR filter. 3. Analyze the effects of finite word length on discrete time system. 4. Analyze multi-rate discrete time system with unequal sampling rates

Sr. No.	Experiments based on
1	Discrete Fourier Transform and Inverse Discrete Fourier Transform of discrete time signals
2	The properties of DFT (Linearity, Time Reversal and Parsevals theorem)
3	Circular convolution of two discrete time signals
4	Circular time shift and Frequency shift Property
5	Butterworth IIR filters.
6	Chebyshev IIR filters.
7	FIR filters using windowing techniques
8	Analyzing Coefficient Quantization Effect
9	Decimator
10	Interpolator

VI Semester

23ET1603– Object Oriented Programming

Course Outcomes:

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

1. Explain the concept of Object oriented programming and data structure.
2. Develop C++ programs for implementation of various concepts of Object oriented programming
3. Develop C++ programs for implementing data structures using array and linked list.
4. Apply the knowledge of BFS, DFS and Dijkstra`s algorithm for traversal of Graph.
5. Develop C++ programs for implementing the concept of file handling, template and exception handling

Unit:1	Principles of Object Oriented Programming (OOP), Software Evaluation, OOP Paradigm, Basic Concepts of OOP, Benefits of OOP, Application of OOP. Introduction to C++, Tokens, Keywords, Identifiers, Variables, Operators, Manipulators. Expressions and Control Structures, Pointer, Arrays **Contemporary Issues related to Topic**	**8 Hours**
Unit:2	Functions, Function Prototyping Parameters Passing in Functions, Values Return by Functions, Inline Functions, Friend and Virtual Functions. Classes and Objects, Constructors and Destructors **Contemporary Issues related to Topic**	**7 Hours**
Unit:3	Operator overloading, Function Overloading, Inheritance, Types of Inheritance, Polymorphism, Friend and Virtual Functions. **Contemporary Issues related to Topic**	**8 Hours**
Unit:4	Definition of a data structure, Primitive and Composite data types, Asymptotic notations, Operations of Arrays, Order lists, Stacks, Applications of Stack, Infix to Postfix Conversion, Queues, Operations of Queues. **Contemporary Issues related to Topic**	**7 Hours**
Unit:5	Singly linked list, Doubly linked list, Skip list, Basics of Trees: Binary tree, Tree traversal; Graph, Definition, Types of Graphs, Traversal (BFS & DFS), Dijkstra`s algorithm **Contemporary Issues related to Topic**	**8 Hours**

Unit :6	Files – classes for file stream operations – Opening, Closing and Processing files – End of file detection – File pointes – Updating a file – Error Handling during file operations – Command line arguments – Templates – Exception Handling. **Contemporary Issues related to Topic**	**7 Hours**
	Total Lecture Hours	**45 Hours**

Textbooks	
1	Object Oriented programming with C++ ,3rd. Edition Year 2008, E. Balagurusamy McGraw-Hill Publication
Reference Books	
1	Object Oriented Programming in Microsoft C++,4th edition 2002, Robert Lafore ,
2	Fundamental of data structure in C++,5th edition, Horowitz and S.Shani, Galgotia Publication
3	Computer algorithms, 2nd Edition , Horowitz, S.Shani and S.Rajasekaran , Galgotia Publication
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_cs02/preview
2	https://archive.nptel.ac.in/courses/106/105/106105151/

VI Semester

23ET1604–Lab: Object Oriented Programming

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Develop C++ programs for implementation of various concepts of Object oriented programming 2. Develop C++ programs for implementing data structures using array and linked list. 3. Develop C++ programs for implementing the concept of file handling, template and exception handling

Sr. No.	Experiments based on
1	Different Control Structures in C++
2	Function & Function overloading
3	Class, Object and Constructor.
4	Inheritance and Virtual function
5	Operator overloading.
6	Friend function.
7	Stack and Queue using array
8	Stack and Queue using link list.
9	File handling and template.
10	Command line arguments and exception handling

VI Semester

23ET1605– Control Systems

Course Outcomes:

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

1. Apply block diagram reduction technique and signal flow graph for transfer function.
2. Analyze different characteristics of negative feedback system and
3. Analyze time response of first and second order system also the basic concepts of proportional, integral, and derivative (PID) control.
4. Determine the stability of linear control system
5. Analyze root locus plot and frequency response plots such as polar plot, Bode plot etc.

Unit:1	Introduction to Control Systems	8 Hours

Basic Components of Control System, Open loop control and close loop control with examples, classification of control systems. Transfer Function, Order of a system, block diagram algebra & reduction techniques, signal flow graph, its constructions and Mason's gain formula.

Contemporary Issues related to Topic

Unit:2	Mathematical Modelling and Characteristics of Control Systems	7 Hours

Mathematical modelling of physical system such as – electrical, mechanical, electro-mechanical systems.

Characteristics of Feedback Control Systems: Effect of negative feedback compared to open loop system such as – sensitivity to parameter variation, speed of time response, bandwidth, disturbance rejection and linearizing effect, Effect of positive feedback.

Contemporary Issues related to Topic

Unit:3	Time Domain Analysis of Control Systems	8 Hours

Concept of transient response, Steady state response and time response, standard test signals, system type, dominant poles, steady state error (ess) analysis, static error constants, 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, Relation between roots of characteristic equation, damping ratio and transient response. Introduction to P, PI, PID controllers.

Contemporary Issues related to Topic

Unit:4	Stability of Control Systems	7 Hours

Concept of stability, stable, unstable, marginally, Absolutely and conditionally stable system, Necessary conditions for stability, method to determine stability, Routh - Hurwitz stability criterion with special cases, relative stability

analysis.		
Contemporary Issues related to Topic		
Unit:5	**Root Locus Technique**	**7 Hours**
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)		
Contemporary Issues related to Topic		
Unit :6	**Frequency Domain Analysis of Control Systems**	**8 Hours**
Concept of frequency response and sinusoidal transfer function, Parameters of Frequency Domain Analysis, Correlation between time and frequency response, Polar Plot, Inverse Polar Plot, Nyquist Criterion and Bode Plot. Concept of gain margin and phase margin and its computation using log magnitude versus phase plot.		
Contemporary Issues related to Topic		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Control system engineering, I. J. Nagrath & M Gopal, 5th Edition,New Age International
2	Modern control engineering, Katsuhiko Ogata, 5th Edition,PHI Learning
3	Control system engineering, Norman S Nise, 7th Edition,Wiley & sons
Reference Books	
1	Sigma Series: Control Systems, Ashok Kumar, 1st Edition ,McGraw - Hill
2	Control systems: Principles and design, M. Gopal, 4th Edition,McGraw - Hill
3	Automatic control systems, B. C. Kuo, 7th Edition,PHI Learning Private ltd
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/107/106/107106081/
2.	https://nptel.ac.in/courses/108/106/108106098/

VI Semester

23ET1606– Design Thinking in Electronics & Telecommunication Engineering and Research Methodology

Course Outcomes:

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

1. Identify design principles from an engineering perspective
2. Devise visual design and documentation to communicate more effectively
3. Comprehend the foundational concepts of research methodology
4. Identify and formulate research problems and conduct effective literature reviews and adhere to ethical research practices
5. Collect and analyze data using appropriate methods.
6. Interpret research findings and write scientific reports.

Unit:1	Fundamentals of Design Thinking	8 Hours

Introduction to Design Thinking-Definition, origins, and applications in communication, embedded systems, VLSI, and signal processing.
Problem Identification in Electronics and Telecommunication - Real-world issues like latency, power constraints, noise, integration challenges, and IoT limitations.
Empathy Mapping-Identify stakeholders (e.g., users, engineers, service providers) and use 5Ws+1H to capture user needs and pain points.
User-Centered Challenge Framing-Convert observations into precise design problems with constraints and goals.

Unit:2	Application-Oriented Design Thinking in E&TC	7 Hours

Concept of Prototype Development
Theoretical understanding of prototype development stages in E&TC applications. Study of different prototyping methods including conceptual models, low-fidelity and high-fidelity prototypes.

Overview of Design and Simulation Tools-Introduction to simulation environments and their theoretical foundations. E.g. MATLAB/Simulink, Proteus and Multisim for analog/digital circuit simulation.

Case Study (Theoretical Perspective) Analytical study of a real-world E&TC problem. Application of the design thinking framework (Empathize → Define → Ideate → Prototype → Test) to systematically break down the problem.

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

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

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

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

Contemporary Issues related to Topic		
Unit:4	**Sampling and Data Collection, Data Analysis and Interpretation, Technical Writing, Research Ethics**	**7 Hours**

Sampling and Data Collection: Sampling techniques: Probability and Non-probability sampling, Characteristics of a good sample, Sample size determination, Data types: Primary and Secondary, Methods of primary data collection: Observation, Interview, Questionnaire, Schedule, Secondary data sources

Data Analysis and Interpretation: Processing and analyzing data, Statistical tools: Measures of central tendency, Dispersion, Correlation, Regression, Hypothesis testing: Null and alternative hypothesis, Type I and II errors, Use of software tools (e.g., Excel/SPSS/MATLAB for analysis), Interpretation of results

Technical Writing, Research Ethics: Publication ethics and responsibilities of researchers, Structure and components of research report, Types of technical reports and papers, Writing thesis and dissertations, Referencing and citation styles (APA, IEEE, etc.), Ethical considerations in engineering research., Plagiarism and research ethics

Contemporary Issues related to Topic

Total Lecture Hours	**30 Hours**

Textbooks	
1	C.R. Kothari – *Research Methodology: Methods and Techniques*, New Age International
2	Ranjit Kumar – *Research Methodology: A Step-by-Step Guide for Beginners*, Sage Publications.
Reference Books	
1	R. Panneerselvam – *Research Methodology*, PHI Learning.
2	Dawson, C. – *Practical Research Methods*, UBS Publishers.
3	Trochim, W.M.K. – *Research Methods: The Concise Knowledge Base*.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
MOOCs Links and additional reading, learning, video material	
1	

VI Semester

23ET1607– Lab: Computer Maintenance

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Identify computer peripherals 2. Installation of OS , application software and driver updation 3. Computer hardware problem identification and trouble shooting 4. Configure the wired and wireless network

SN	Experiments based on
1	Identification and Study of Internal Computer Components: Motherboard, CPU, RAM, Power Supply, and Peripherals
2	Practical Assembly and Disassembly of a Desktop Computer System with Component Reinstallation
3	Understanding the Configuration of BIOS/UEFI Settings: Boot Sequence, System Time, and Hardware Options
4	Hard Disk Partitioning and Formatting Using Disk Management Tools with NTFS and FAT32 File Systems
5	Implementation of Data Backup and Recovery Techniques Using System and Recovery Tools
6	Identification, Installation, and Updating of Hardware Drivers in a Computer System
7	Diagnosis and Troubleshooting of Common Operating System Issues: Boot Errors, Missing DLLs, and System Crashes
9	Exploration and Configuration of Control Panel Settings: User Accounts, System Security, and Power Management in Windows OS
10	Setting Up a Wired and Wireless Network
11	Study of Installation, Troubleshooting, and Maintenance of Printer and Scanner

VI Semester

23ET1621 – PE II : Machine Learning

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Analyze foundational concepts of regression and classification. 2. Evaluate machine learning models using various performance metrics. 3. Apply supervised and unsupervised learning algorithms for classification and pattern discovery. 4. Implement artificial neural networks and convolutional neural networks (CNNs), and interpret their architectures		
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 **Contemporary Issues related to Topic**		
Unit:2	**Classification**	**8 Hours**
Classification, Hypothesis Representation, Decision Boundary, Cost function and Gradient Descent, Multi-classification, Regularization, Model Evaluation **Contemporary Issues related to Topic**		
Unit:3	**Supervised Learning**	**8 Hours**
KNN, SVM, Decision tree, Naive Bayes Classifiers, Random Forest **Contemporary Issues related to Topic**		
Unit:4	**Unsupervised learning**	**7 Hours**
K-means clustering, Hierarchical Clustering, DBSCAN Clustering, , Recommender System, Anomaly Detection **Contemporary Issues related to Topic**		
Unit:5	**Artificial Neural Network**	**8 Hours**
Introduction to neural network, Activation Functions, Perceptron rule, Backpropagation network **Contemporary Issues related to Topic**		
Unit :6	**Deep Learning**	**7 Hours**
Introduction to deep learning, building blocks of CNN, Computational Complexity, Case studies based on CNN architectures : Alexnet, Lenet, VGG Net **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Machine Learning. Tom Mitchell. First Edition, McGraw- Hill, 1997.
Reference Books	
1	Introduction to Machine Learning Edition 2, by Ethem Alpaydin
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
MOOCs Links and additional reading, learning, video material	
1	**https://onlinecourses.nptel.ac.in/noc22_cs73/preview**
2	**https://onlinecourses.nptel.ac.in/noc22_cs97/preview**

VI Semester

23ET1622– PE II : Lab Machine Learning

Course Outcomes:

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

1. Apply regression techniques to build predictive models.
2. Implement classification algorithms for solving real-world problems.
3. Develop end-to-end machine learning solutions to real-world problems through project-based learning

Sr. No.	Experiments based on
1	Data Analysis
2	Prediction task using Linear Regression
3	Classification task using Logistic Regression
4	K Nearest Neighbour Classifier
5	Decision Tree
6	Support Vector Machine
7	Naïve Bays algorithm
8	K means Clustering
9	Recommender System
10	CNN

V Semester

23ET1623 – PE II: Digital Image Processing

Course Outcomes:

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

1. Describe the concepts of image enhancement, restoration, segmentation, representation and description.
2. Apply basic image processing algorithms and filtering techniques for image enhancement.
3. Apply the algorithms for image restoration and segmentation
4. Extract the features for image representation and description

Unit:1	**Digital Image fundamental**	**8 Hours**

Digital Image fundamental steps and components of an image processing system, elements of visual perception, Image formation and acquisition, Image sampling and quantization, some basic relationship between the pixels, mathematical tools used in digital image processing

Contemporary Issues related to Topic

Unit:2	**Intensity Transformation and Histogram Processing**	**7 Hours**

Image Negative, Log Transformation, Power Law transformation, Linear Piecewise transformation, Histogram Equalization, Histogram Specification, Histogram Statistics

Contemporary Issues related to Topic

Unit:3	**Filtering in spatial and frequency domain**	**8 Hours**

Fundamentals of Spatial Filtering, Smoothing spatial filtering, Sharpening Spatial Filtering, Unsharp masking and High boost filtering, Filtering in Frequency Domain: Introduction to Fourier transform and frequency domain, Smoothing frequency domain filters, sharpening frequency domain filters

Contemporary Issues related to Topic

Unit:4	**Image Restoration**	**7 Hours**

Image Restoration Image degradation/restoration process, noise model, restoration in presence of noise, periodic noise reduction, linear, position invariant degradation, estimating degradation function, Inverse filtering, Wiener filtering

Contemporary Issues related to Topic

Unit:5	**Image Segmentation**	**7 Hours**

Fundamentals, Detection of discontinuities: Point, Line and Edge, Thresholding, Region based segmentation: Region Growing, Split and Merge, Morphology Operation

Contemporary Issues related to Topic

Unit :6	**Feature Extraction**	**8 Hours**

Boundary Preprocessing: Chain Code, MPP, Signatures, Skeleton; Boundary Descriptors: Simple Descriptor, Shape Number, Fourier Descriptor, Statistical Moments; Region Feature descriptor: Basic descriptor, Topological Descriptor, Texture Descriptor **Contemporary Issues related to Topic**	
Total Lecture Hours	**45 Hours**

Textbooks	
1	Digital Image Processing by R.C. Gonzalez & R.E. Woods 4th Edition Pearson Education
Reference Books	
1	Digital Image processing using MATLAB by R.C. Gonzalez & R.E. Woods, Pearson Education
2	Digital Image processing by William K. Pratt 3rd Edition, 2004, John Wiley
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	**http://link.springer.com/openurl?genre=book&isbn=978-3-642-34900-3**
2	**http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6207-4**
3	**http://link.springer.com/openurl?genre=book&isbn=978-3-540-77071-8**
MOOCs Links and additional reading, learning, video material	
1	**https://nptel.ac.in/courses/117105079**
2	**https://onlinecourses.nptel.ac.in/noc19_ee55/preview**

V Semester

23ET1624 – PE II : Lab Digital Image Processing

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Apply basic image processing algorithms and filtering techniques for image enhancement. 2. Apply the algorithms for image restoration and segmentation 3. Extract the features for image representation and description

Sr. No.	Experiments based on
1	Basic Operations on Digital Images
2	Image enhancement using Gray level Transformation
3	Image Enhancement Using Piecewise linear transformation
4	Image Enhancement Using Histogram Processing
5	Spatial Domain Filtering Techniques for Image Enhancement
6	Frequency Domain Filtering Techniques for Image Enhancement
7	Image Restoration
8	Image Segmentation
9	Texture Description
10	Image Representation and Description

Semester: VI

23ET1625 –: PE-II Computer Networks

Course Outcomes:

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

1. Design an optimized communication network by integrating appropriate data transmission protocols
2. Analyse an efficient data communication system by integrating advanced concepts of LAN structures
3. Detect data transmission errors in communication networks.
4. Compare different data security protocols

Unit:1	Computer Network and Internet	8 Hours

History of Computer network and Internet, the network edge, ISPs and Internet backbone, Protocols and their service models, standards, standards of organizations

Contemporary Issues related to Topic

Unit:2	Link Layer and Local Area Networks	7 Hours

Data link layer design issues, Error detection and correction techniques, multiple access protocols, link layer addressing, Ethernet, Hubs and Switches, PPP

Contemporary Issues related to Topic

Unit:3	Network Layer	8 Hours

Network layer design issues, IP packets, IP addressing, IPV4, IPV6,virtual circuit and datagram networks, TCP and UDP, router and routing algorithms

Contemporary Issues related to Topic

Unit:4	Transport Layer	7 Hours

Transport layer design issues, transport service primitives, internet transport protocol TCP/IP architecture, TCP/IP protocol, TCP/IP utilities, wireless TCP

Contemporary Issues related to Topic

Unit:5	Security in Communication Networks	8 Hours

Network Security, authentication, Integrity, cryptography, public key and private key cryptography, firewalls, attacks and countermeasures

Contemporary Issues related to Topic		
Unit :6	**Application Layer**	**7 Hours**
Principles of Network Applications, HTTP, FTP, Email , Email, DNS, WWW, POP3, IMAP **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Data Communication and Networking Behrouz Forouzan Fifth Edition McGraw Hill
2	Computer Networking A top down Approach Featuring and Internet James F. Kurose Third Edition Pearson
Reference Books	
1	Computer Networks Andrew Tanenbaum Fourth Edition Prentice Hall PTR
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://ycce.knimbus.com/portal/v2/default/login
MOOCs Links and additional reading, learning, video material	
1	**NPTEL :: Computer Science and Engineering - NOC:Computer Networks and Internet Protocol**

Semester VI

23ET1626– Lab: PE-II Computer Networks

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Design an optimized communication network by integrating appropriate data transmission protocols 2. Detect Data transmission errors in communication networks. 3. Implement Network, Transport and data security protocols.

SN	Experiments based on
1	To perform stuffing and de-stuffing operation on a given array
2	How to bring two computers in a network
3	Perform network utility commands
4	To study and design LAN structures for autonomous system
5	To configure DNS server
6	To configure DHCP server
7	Implement flow control and error control protocol
8	Implement routing protocol
9	Implement data congestion in transport layer
10	To Perform data encryption and data decryption
11.	**Mini Project**

Semester VI

23ET1627– PE-II: Data Structure and Algorithms

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Explain various concepts of Data structures. 2. Develop the program for implementation of data structure . 3. Explain various concepts of algorithms and it's analysis 4. Implement various methods of searching , sorting and hashing

Unit:1	**8 Hours**
Binary trees, binary trees- basic algorithms and various traversals. Binary Search Trees (BSTs) and insertion, deletion in BSTs. Heaps **Contemporary Issues related to Topic**	
Unit:2	**7 Hours**
Height-balanced (AVL) trees, Splay tree, Red-black trees, Multi-way trees-B and B+ and applications **Contemporary Issues related to Topic**	
Unit:3	**8 Hours**
Graphs: representation & traversals. Spanning trees, shortest path algorithm, topological sort Sets: Representation and Operations. Sorting and searching **Contemporary Issues related to Topic**	
Unit:4	**7 Hours**
Pattern matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries. **Contemporary Issues related to Topic**	
Unit:5	**8 Hours**
Fundamentals of algorithm analysis, Space and time complexity of an algorithm , Application to the Analysis of Algorithms, Searching - Linear Search and binary search, Applications - Finding square root of 'n'-Longest, Common Prefix, Sorting – Insertion sort -Selection sort – Bubble sort – (Counting Sort) - Quick sort- Merge sort, Analysis, Applications - Finding the 'n'closest pair's **Contemporary Issues related to Topic**	
Unit :6	**7 Hours**
Hash functions, open hashing-separate chaining, closed hashing - linear probing, quadratic probing, double hashing, random probing, rehashing, extendible hashing, Applications – Dictionary- Telephone directory Heaps - Heap sort, Applications -Priority Queue using Heaps	

Contemporary Issues related to Topic		
Total Lecture Hours		**45 Hours**
Textbooks		
1	Introduction to Algorithms , Thomas H. Cormen, C.E. Leiserson, R L.Rivest and C. Stein, Third edition, MIT Press, 2009	
Reference Books		
1	Kurt Mehlhorn, and Peter Sanders – Algorithms and Data Sturctures The Basic Toolbox, Springer-Verlag Berlin Heidelberg, 2008	
2	Fundamentals of Data Structures in C, Ellis Horowitz, Satraj Sahni and Susan, Anderson-Freed, W. H. Freeman and Company.	
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]		
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Computer%20Science%20and%20Engineering/Book%20Fundamentals%20of%20Data%20Structure%20(1982)%20by%20Ellis%20Horowitz%20and%20Sartaj%20Sahni.pdf	
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Computer%20Science%20and%20Engineering/Data%20Structures%20Succinctly%20Part%201.pdf	
MOOCs Links and additional reading, learning, video material		
1	https://www.coursera.org/specializations/data-structures-algorithms	
2	https://nptel.ac.in/courses/106106127	

Semester VI

23ET1627– Lab PE-II: Data Structure and Algorithms

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Develop the program for implementation of data structure 2. Implement various methods of searching and sorting 3. Develop the program for implementation of hashing

SN	Experiments based on
1	Implementation of Binary search tree
2	Implementation of tree traversal
3	Implementation of AVL tree
4	Implementation of splay tree
5	Implementation of bubble sort
6	Implementation of selection sort
7	Implementation of merge sort
8	Implementation of heap sort
9	Implementation of binary search
10	Implementation of hashing

Semester VI

23ET1629-PEII: CMOS VLSI Design

Course Outcomes:

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

1. Elaborate the characteristics of MOSFET, MOSFET based circuits and process of CMOS circuits fabrication
2. Design the MOSFET inverters, combinational and sequential circuits.
3. Design optimized CMOS circuits and layouts.
4. Analyze switching characteristics and interconnection effects of MOS device, advance CMOS logic circuits.

Unit:1	Basic MOS Device Physics	8 Hours

MOS as a switch, MOS Structure & Symbols, MOS I/V Characteristics, MOS Enhancement Transistor, Second order effect of MOS: Body Effect, Junction Effect, Gate Leakage Effect, Channel Length Effect, Tunneling Effect, Velocity Modulation, Mobility Variation, Small Signal Modeling of MOSFETs.

Contemporary Issues related to Topic.

Unit:2	MOSFET Inverter Characteristics	7 Hours

Resistive Load Inverter, CMOS Inverter, Principle of operation & DC Characteristics, Tri-stated Inverter, Noise Margin Calculation, Logic Design with MOSFETs. Compound Gates in CMOS.

Contemporary Issues related to Topic.

Unit:3	Fabrication & Layout of CMOS IC	8Hours

Integrated circuit fabrication process: oxidation, diffusion, ion implantation, photolithography and twin-tub CMOS process. CMOS Technology: N-well, P-well, Twin Tub Process, Silicon on Insulator (SOI) Process, Layout Design Rules, Physical Design of Logic Gates, Euler's Path, Stick Diagram, Layout, Latch-up Effect.

Contemporary Issues related to Topic

Unit:4	Switching Characteristics & Interconnection Effect	7 Hours

MOS Device Capacitance Estimation, Switching Characteristics: Rise Time, Fall Time, Propagation Delay, Delay Estimation: Propagation Delay, Contamination Delay, Power Dissipation in CMOS: Static & Dynamic Power Calculation, Charge Sharing, Fan-in, Fan-out.

Contemporary Issues related to Topic

Unit:5	Combinational Circuit Design	8 Hours

Introduction combinational circuit design Adder, Subtractor, Encoder, Decoder, Multiplexer, Demultiplexer, Multiplier. Circuit Families, Static CMOS, Ratioed Circuits, Cascode Voltage Switch Logic, Dynamic Circuits, PassTransistor Circuits, Pseudo NMOS Logic, Dynamic CMOS Logic, CMOS Domino Logic, Zipper Logic, Clocked CMOS Logic, CVSL, Bi-CMOS Logic Family.

Contemporary Issues related to Topic		
Unit :6	**Sequential Circuit Design**	**7 Hours**
Introduction, Sequencing Static Circuits. Sequencing Methods, Max-Delay Constraints, Min-Delay Constraints, Time Borrowing, Clock Skew, Circuit Design of Latches: The SR Latch, CMOS D-Latch. Flip-Flops: Edge-Triggered Flip-Flop: S-R, J-K, D Flipflop. **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Neil H. E. Weste and K.Eshraghian, Principle of CMOS VLSI Design, 2ndedition, 1994,Addison Wesley VLSI Series
2	John P. Uyemura, Introduction to VLSI Circuits and Systems, 1st edition, Wiley Publication
Reference Books	
1	Sung-Mo Kang and Yusuf Leblebici , CMOS Digital Integrated circuits Analysis and Design, 3rdedition, 2008,Tata Mc-Graw Hill
2	Pucknell and K. Eshraghian, CMOS VLSI Design, 3rd edition, 2005, Prentice Hall
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Electronics%20and%20Telecommunication/cmos_kang.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Electronics%20Engineering/30.CMOS%20Logic%20Circuit%20Design%20%20(John%20P%20Uyemera).PDF
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_ee09

Semester: VI

23ET1630-PEII: Lab CMOS VLSI Design

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Elaborate the characteristics of MOSFET, MOSFET based circuits and process of CMOS circuits fabrication 2. Design the MOSFET inverters, combinational and sequential circuits. 3. Design optimized CMOS circuits and layouts. 4. Analyze switching characteristics and interconnection effects of MOS device, advance CMOS logic circuits.

SN	Experiments based on
1	DC and Transient analysis of NMOS and PMOS Transistor
2	DC and Transient analysis of CMOS Inverter
3	Design of combinational circuit using CMOS logic
4	Design of combinational circuit using pass transistor logic
5	Design of Sequential circuit using CMOS logic
6	Design of sequential circuit using pass transistor logic
7	Circuit design using CMOS Domino Logic
8	Circuit design using Zipper Logic
9	Circuit design using Clocked CMOS Logic
10	Mini Project

Semester VI

23ET1631-PEII: Multimedia & Animation

Course Outcomes:

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

1. Explain the concept of multimedia .
2. Apply the concept of image and video compression technics
3. Author 2D and 3D creative and interactive presentations for different target multimedia applications.
4. Use different standard animation techniques for 2D, 21/2 D, 3D application.
5. Explain the complexity of multimedia applications in the context of cloud, security, big data streaming, social networking, CBIR etc.,

Unit:1	Fundamental concepts in Text and Image	**8 Hours**

Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video

Contemporary Issues related to Topic

Unit:2	Multimedia data compression	**7 Hours**

Lossless compression algorithm: DCT, Wavelet- Based Coding, Embedded Zerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT), Basic Audio Compression

Contemporary Issues related to Topic

Unit:3	Basic Video Compression Techniques:	**8 Hours**

Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, MPEG2, MPEG4

Contemporary Issues related to Topic

Unit:4	**MULTIMEDIA AUTHORING**	**7 Hours**

Authoring metaphors, Tools Features and Types: Card and Page Based Tools, Icon and Object Based Tools, Time Based Tools, Cross Platform Authoring Tools, Editing Tools, Painting and Drawing Tools, 3D Modeling and Animation Tools, Image Editing Tools, audio Editing Tools, Digital Movie Tools, Creating interactive presentations, virtual learning, simulations.

Contemporary Issues related to Topic

Unit:5	**ANIMATION**	**8 Hours**

Principles of animation: staging, squash and stretch, timing, onion skinning, secondary action, 2D, 2 ½ D, and 3D animation, Animation techniques: Key frame, Morphing, Inverse Kinematics, Hand Drawn, Character rigging, vector animation, stop motion, motion graphics, Fluid Simulation, skeletal animation, skinning Virtual Reality, Augmented Reality.

Contemporary Issues related to Topic

Unit :6	**MULTIMEDIA APPLICATIONS**	**7 Hours**

Multimedia Big data computing, social networks, smart phones, surveillance, Analytics, Multimedia Cloud

Computing, Multimedia streaming cloud, media on demand, security and forensics, Online social networking, multimedia ontology, Content based retrieval from digital libraries. **Contemporary Issues related to Topic**	
Total Lecture Hours	**45 Hours**
Textbooks	
1	Ze-Nian Li, Mark S. Drew, Jiangchuan Liu, Fundamentals of Multimedia", Third Edition, Springer Texts in Computer Science, 2021.
2	John M Blain, The Complete Guide to Blender Graphics: Computer Modeling & Animation, CRC press, 3rd Edition, 2016.
Reference Books	
1	Gerald Friedland, Ramesh Jain, "Multimedia Computing", Cambridge University Press, 2018.
2	Prabhat K.Andleigh, Kiran Thakrar, "Multimedia System Design", Pearson Education, 1st Edition, 2015.
3	Mohsen Amini Salehi, Xiangbo Li, "Multimedia Cloud Computing Systems", Springer Nature, 1st
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
MOOCs Links and additional reading, learning, video material	
1	

Semester VI

23ET1632– Lab PE-II : Multimedia & Animation

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Apply the concept of image and video compression technics 2. Analyze 2D and 3D creative and interactive presentations for different target multimedia applications. 3. Apply different standard animation techniques for 2D, 21/2 D, 3D application.

SN	Experiments based on
1	Color model
2	DCT image compression scheme.
3	Dithering Concept
4	Chroma Subsampling.
5	Embedded Zero Tree algorithm
6	SPIHT (Set Partitioning in Hierarchical Trees) algorithm
7	Motion Vector
8	Background Subtraction in video
9	Multimedia Authoring
10	Multimedia Animation

VI Semester

23ET1633– PE II : Radio Frequency Circuit Design

Course Outcomes:

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

1. Analyze the behavior of series and parallel RLC circuit at High Frequency.
2. Elaborate the MOSFET based circuit design and different bandwidth estimation techniques.
3. Design high frequency amplifier for RF applications.
4. Explain biasing of RF circuit.
5. Design RF power amplifiers and phase detectors.

Unit:1	**Fundamentals of RF Circuits**	**8 Hours**

Introduction, History of wireless Communication, Non cellular wireless Applications, Propagation, Parallel RLC Tank Circuit, Series RLC Circuit , RLC Network as Impedance Transformer, Skin Effect, Resistor, Capacitor, Inductor.

Contemporary Issues related to Topic

Unit:2	**MOSFET and Transmission Lines**	**7 Hours**

MOSFET Physics, MOS Device Physics in Short Channel Regime , Other Effects, Link Between Lumped and Distributed Regime ,Driving Point impedance at iterated structures , Transmission line , Behaviour of finite length Transmission line.

Contemporary Issues related to Topic

Unit:3	**Bandwidth Estimation**	**8Hours**

Review of Smith Chart and S-Parameter, Application of smith chart, Rise time, Delay, Bandwidth Estimation Techniques - Open Circuit Time Constant, Short Circuit Time constant.

Contemporary Issues related to Topic

Unit:4	**HF RF Amplifier and Bandwidth Detection**	**7 Hours**

Introduction to High Frequency Amplifier Design, Zeros as Bandwidth Enhancer , The shunt series Amplifier, Tuned Amplifiers, Neutralization and Unilateralization Cascaded Amplifiers.

Contemporary Issues related to Topic

Unit:5	**Biasing of RF Circuit**	**8 Hours**

Introduction to Voltage references and Biasing, Review of Diode Behavior, Diodes and Bipolar transistors in CMOS Technology Supply independent bias circuits, Band gap Voltage References, Amplifier linearity.

Contemporary Issues related to Topic

Unit :6	**RF Power Amplifier and Phase Detectors**	**7 Hours**

Introductions to RF Power Amplifiers, Classification of Power Amplifiers, Modulation of Power Amplifiers, Introduction to Phase lock loops , Linear zed PLL Model, Phase Detector, Sequential Phase Detector, Loop Filters and Charge Pumps. **Contemporary Issues related to Topic**	
Total Lecture Hours	**45 Hours**

Textbooks	
1	The Design of CMOS Radio Frequency Integrated Circuits, 2nd Edition, Thomas H. Lee, Cambridge University Press.
2	RF Circuit Design Theory and Applications, 2nd Edition, R. Ludwig & P. Bretchko, Pearson Publication.
Reference Books	
1	Analysis and Design of Analog Integrated Circuits, 4th Edition, Paul R. Gray, Whiley India Publication.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20Engineering/43.design%20of%20analog%20cmos%20integrated%20circcuits.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electronics%20Engineering/81.microwave-devices-and-circuits-samuel-liao.pdf
MOOCs Links and additional reading, learning, video material	
1	NPTEL Course on CMOS RF Integrated Circuits by Dr. S. Chatterjee, IIT Delhi, https://www.youtube.com/playlist?list=PLbMVogVj5nJQdGDSx243YPnNeLMBrhNE8

VI Semester

23ET1634– PE II : Lab Radio Frequency Circuit Design

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Analyze the behavior of series and parallel RLC circuit at High Frequency. 2. Design high frequency amplifier for RF applications. 3. Design RF power amplifiers and phase detectors.

Sr. No.	Experiments based on
1	To import a Touchstone format data file and use it in simulations.
2	To design differential Amplifier.
3	To design the CMOS mixer.
4	To design the series RLC circuit.
5	To design parallel RLC circuit.
6	To design L-C Filter (Low Pass Filter by using lumped element).
7	To design of power BJT amplifier.
8	To design CLC circuit.
9	To design RF oscillator.
10	To design Power Amplifier for WiMAX Applications.

Semester VI

MDM4ET104 : Biomedical Instrumentation

Course Outcomes:

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

1. Elaborate Fundamentals of Biomedical Instrumentation and its Electrodes
2. Explain the measuring and recording instruments
3. Describe the functioning of imaging systems.
4. Describe the functioning of therapeutic equipment's

Unit:1	Fundamentals of Biomedical Instrumentation and its Electrodes.	8 Hours

Introduction to Physiological System of Human Body, Sources of Biomedical Signals, Man instrument system, Basic Medical Instrumentation System, Origin of Bioelectric Signals, Recording Electrodes, Electrodes for ECG. Electrodes for EEG, Electrodes for EMG.

Contemporary Issues related to Topic

Unit:2	Biomedical recorders and its Systems.	7 Hours

Basic Recording System, Biomedical Signal Analysis Techniques, Electrocardiograph Phonocardiograph (PCG), Electroencephalo-graph (EEG), Electromyograph (EMG) , Other Biomedical Recorders.

Contemporary Issues related to Topic

Unit:3	Measuring Instrumentation	8 Hours

Blood pressure measurement, Heart sound measurement oximetry, Pulse Oximeter, Electromagnetic Blood Flowmeter, Ultrasonic Blood Flow meters.

Contemporary Issues related to Topic

Unit:4	Analyzers	7 Hours

Pulmonary Function Measurements, Spirometry, Pneumo-tachometers, Measurement of Volume Respiratory Gas Analyzers, Blood pH Measurement.

Contemporary Issues related to Topic

Unit:5	Imaging Systems	8 Hours

Basis of Diagnostic Radiology, Visualization of X-rays Physical Parameters for X-ray Detectors, Ultrasonic Imaging Systems Medical Ultrasound, Basic Pulse-echo Apparatus ,A-Scan , Echocardiograph (M-mode), B-Scanner, Real-

time Ultrasonic Imaging Systems, MRI **Contemporary Issues related to Topic**		
Unit :6	**Therapeutic Equipment**	**7 Hours**
Cardiac Pacemakers: Need for Cardiac Pacemaker, External Pacemakers Implantable Pacemakers. Cardiac Defibrillators: Need for a Defibrillator, DC Defibrillator, and Implantable Defibrillators Ventilators. **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Joseph Carr, Brown, Introduction to Biomedical Equipment, Pearson, 2014
2	Khandpur R.S, Hand Book of Biomedical Instrumentation – Tata McGraw Hill publication , New Delhi, 2014.
Reference Books	
1	Leslie Cromwell, "Biomedical Instrumentation and measurement", PHI, New Delhi, 2015
2	John G. Webster, "Medical Instrumentation Application and Design", John Wiley and sons, New York, 2015.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4471-4474-8
2	\\172.16.1.10\lib\ET\2021-22\E-Books
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/108105101

Semester VI

MDM4ET204 –Fundamentals of Computer Networks

Course Outcomes:

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

1. Explain data transmission protocols and understand the applications of communication network
2. Apply the knowledge of LAN structure to design data communication system.
3. Detect Data transmission errors in communication networks.
4. Compare different data security protocols

Unit:1	**Computer Network and Internet**	**8 Hours**
Internet, the network edge, ISPs, Protocols, standards, standards of organizations **Contemporary Issues related to Topic**		
Unit:2	**Link Layer and Local Area Networks**	**7 Hours**
Error detection and correction techniques, multiple access protocols, link layer addressing **Contemporary Issues related to Topic**		
Unit:3	**Network Layer**	**8 Hours**
Network layer design issues, IP packets, IP addressing, virtual circuit and datagram networks, TCP and UDP **Contemporary Issues related to Topic**		
Unit:4	**Transport Layer**	**7 Hours**
Transport layer design issues, transport service primitives, internet transport protocol TCP/IP architecture, TCP/IP protocol **Contemporary Issues related to Topic**		
Unit:5	**Security in Communication Networks**	**8 Hours**
Network Security, cryptography, public key and private key cryptography **Contemporary Issues related to Topic**		
Unit :6	**Application Layer**	**7 Hours**
HTTP, FTP, Email, DNS, WWW, POP3, IMAP **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	Data Communication and Networking Behrouz Forouzan Fifth Edition McGraw Hill
2	Computer Networking A top down Approach Featuring and Internet James F. Kurose Third Edition Pearson
Reference Books	
1	Computer Networks Andrew Tanenbaum Fourth Edition Prentice Hall PTR
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
MOOCs Links and additional reading, learning, video material	
1	NPTEL course link Computer Networks and Internet Protocol Prof Soumya Kanti Ghosh & Prof Sandip

Semester VI

MDM4ET304 - Advanced Processor I (RISC processor)

Course Outcomes:

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

1. Explore the architectural features of ARM processors
2. Apply ARM instruction set in developing assembly language programs.
3. Explore Basic embedded C programs for GPIO and interfacing with LPC 2148 and Develop programs in interfacing of different peripherals with NODE MCU ESP8266
4. Acquire knowledge about memory management in ARM and operating system.

Unit:1	Introduction to embedded system and ARM Processor	7 Hours

Difference between RISC & CISC, Advantages of architectural features of ARM Processor, Processor modes, Register Organization, Exceptions and its handling. 3/5- stage pipeline ARM organization. LPC2148 ARM 7 microcontroller, Features of LPC2148, Block diagram of LPC2148, Pin diagram of LPC2148, Architectural overview, On-chip flash program memory, On-chip RAM

Contemporary Issues related to Topic

Unit:2	Memory and memory-mapped I/Os	8 Hours

ARM and THUMB instruction sets, ARM programmer's model, addressing modes, Instruction set in detail and programming, data processing instruction, data transfer instruction, Control flow instructions, simple assembly language programs.

Contemporary Issues related to Topic

Unit:3	ARM floating point architecture and DSP extensions	7 hours

ARM floating point architecture and DSP extensions, ARM co-processors. ARM 9 TDMI
ARCHITECTURAL STUDY: - H/W architecture, Timing diagrams for various accesses, Memory buses:AMBA, ASB, & APB. Architectural support for system development

Contemporary Issues related to Topic

Unit:4	Basic embedded C programs	8 Hours

Basic embedded C programs for GPIO and interfacing of different devices like LED, LCD, Stepper Motor, Study and programming of on-chip peripherals like timers, counters, on-chip ADC, DAC,

Contemporary Issues related to Topic

Unit:5	Memory Management	7 Hours
Memory Hierarchy, memory size and speed, on-chip memory, caches, cache design, memory Management **Contemporary Issues related to Topic**		
Unit :6	**Architectural Support of Operating System**	**8 Hours**
Architectural support for operating system. RTOS issues, The shared Data Problem, Software Architectures (Round Robin, Round Robin with Interrupts, Function Queue Scheduling,) Selecting a software Architecture, Case for Real Time Operating System, Introduction to RTOS :tasks and task states, tasks and data, semaphores and shared data, message queues, mailboxes and pipes **Contemporary Issues related to Topic**		
Total Lecture Hours		**45 Hours**

Textbooks	
1	ARM System–on-chip Architecture, Steve Furber, 2nd edition, Pearson Education Asia
2	ARM System Developer's Guide: Designing and Optimizing, Sloss Andrew N, Symes Dominic, Wright Chris, Morgan Kaufman Publication
3	Embedded Real time systems: Concepts, Design & Programming, Black Book, Dr. K V K K Prasad, Dreamtech Press
Reference Books	
1	Exploring Arduino: Tools and Techniques for Engineering Wizardry 2nd Edition, Jeremy Blum , Wiley Publication
2	Arduino: A Technical Reference, J. M. Hughes , O'Reilly Media, Inc.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
MOOCs Links and additional reading, learning, video material	
1	https://swayam.gov.in/explorer?searchText=embedded
2	Technical references and user manuals on www.arm.com, NXP Semiconductor www.nxp.com, www.arm.com