

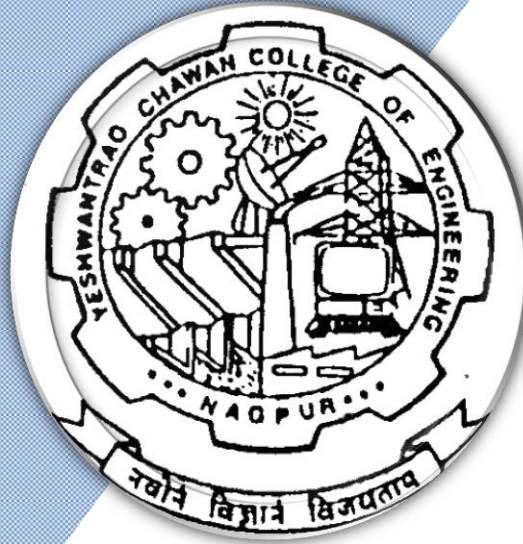
Nagar Yuwak Shikshan Sanstha's

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 4th Semester

(Department of Electrical Engineering)

B. Tech in Electrical 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 Electrical Engineering)
B. Tech in Electrical Engineering

SoE No.
23EL-101

S N	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-B)															
1	1	BS	GE	23GE1102	Differential Equations, Matrices and Statistics	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1108	Engineering Physics	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1109	Lab: Engineering Physics	P	0	0	2	2	1	60	40		
4	1	BES	ME	23ME1101	Engineering Graphics	T	1	0	0	1	1	30	20	50	3
5	1	BES	ME	23ME1102	Lab : Engineering Graphics	P	0	0	4	4	2	60	40		
6	1	BES	EL	23EL1101	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	1	BES	EL	23EL1105	Lab : Electrical and Electronics Workshop	P	0	0	2	2	1	60	40		
8	1	PC	EL	23EL1103	Fundamentals of Electrical Engineering	T	3	0	0	3	3	30	20	50	3
9	1	PC	EL	23EL1104	Lab : Fundamentals of Electrical Engineering	P	0	0	2	2	1	60	40		
10	1	VSEC	GE	23GE1117	Get Set Go	...	...	...	...	...	2	60	40		
11	1	CC2	GE		Liberal Learning Course (LLC2)	...	...	...	...	...	2	60	40		
TOTAL FIRST SEM							13	0	10	23	22				
MANDATORY LEARNING COURSES															
1	1	HS		GE2131	Universal Human Values (UHV)	A	2	0	0	2	0				
SECOND SEMESTER (GROUP-B)															
1	2	BS	GE	23GE1201	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1204	Applied Chemistry	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1205	Lab: Applied Chemistry	P	0	0	2	2	1	60	40		
4	2	HS/AEC1	GE	23GE1212	Professional Communication	T	2	0	0	2	2	30	20	50	2
5	2	HS/IKS	GE	23GE1215	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
6	2	BES	CV	23CV1201	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
7	2	BES	CV	23CV1202	Lab: Engineering Mechanics	P	0	0	2	2	1	60	40		
8	2	BES	IT	23IT1203	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
9	2	BES	IT	23IT1204	Lab: Programming for Problem Solving	P	0	0	2	2	1	60	40		
10	2	VSEC	GE	23GE1218	Functional English	...	...	...	...	...	2	60	40		
11	2	CC1	GE		Liberal Learning Course (LLC1)	...	...	...	...	...	2	60	40		
TOTAL SECOND SEM							15	0	6	21	22				

Liberal Learning Course

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



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(Department of Electrical Engineering)
B. Tech in Electrical Engineering

SoE No.
23EL-101

S N	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

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

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment
TA = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on 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	Applicable for AY 2023-24 Onwards
		Date of Release	Version	



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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	
THIRD SEMESTER															
1	3	BS	GE	23GE1302	Integral Transform	T	3	0	0	3	3	30	20	50	3
2	3	HSSM-1	GE	23GE1301	Fundamentals of Management & Economics	T	2	0	0	2	2	30	20	50	3
3	3	VEC-1	CV	23CV1311	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
4	3	PC	EL	23EL1301	Electrical Energy Generation System	T	3	0	0	3	3	30	20	50	3
5	3	PC	EL	23EL1302	Lab: Renewable Energy Sources	P	0	0	2	2	1		60	40	
6	3	PC	EL	23EL1303	Network Analysis	T	3	0	0	3	3	30	20	50	3
7	3	PC	EL	23EL1304	Lab : Electrical Engineering Workshop	P	0	0	2	2	1		60	40	
8	3	PC	EL	23EL1305	Electrical Machines	T	3	0	0	3	3	30	20	50	3
9	3	PC	EL	23EL1306	Lab : Electrical Machines	P	0	0	2	2	1		60	40	
10	3	CEP	EL	23EL1307	Lab : Energy Literacy and Social responsibility	P	0	0	2	4	2		60	40	
11	3	OE I	OE		Open Elective -I	T	2	0	0	2	2	30	20	50	3
12	3	MDM	MDM		MD Minor Course-I	T	2	0	0	2	2	30	20	50	3
TOTAL							20	0	8	30	25				

List of Mandatory Learning Course (MLC)															
1	3	HS	T&P	MLC2123	YCAPP3 : 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 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

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



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Yeshwantrao Chavan College of Engineering
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(Department of Electrical Engineering)
B. Tech in Electrical Engineering

SoE No.
23EL-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	HSSM-2	GE	23GE1401	Entrepreneurship Development	T	2	0	0	2	2	30	20	50	3
2	4	AEC-2	GE	23GE1405 23GE1406	Marathi Language Hindi Language	T	2	0	0	2	2	30	20	50	3
3	4	PC	EL	23EL1401	Electrical Measurement and Instrumentation	T	3	0	0	3	3	30	20	50	3
4	4	PC	EL	23EL1402	Lab : Electrical Measurement and Instrumentation	P	0	0	2	2	1		60	40	
5	4	PC	EL	23EL1403	Electrical Machines in Power System	T	3	0	0	3	3	30	20	50	3
6	4	PC	EL	23EL1404	Lab : Electrical Machines in Power System	P	0	0	2	2	1		60	40	
7	4	VSEC-3	EL	23EL1405	Lab : Computer Programming	P	0	0	2	4	2		60	40	
8	4	VEC-2	EL	23EL1406	Digital Signal Processing	T	2	0	0	2	2	30	20	50	3
9	4	MDM	EL		MD Minor Course-II	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
TOTAL							16	0	6	24	20				

List of Mandatory Learning Course (MLC)

1	4	HS	T&P	MLC2124	YCAP4 : YCCE Communication Aptitude Preparation	A	3	0	0	3	0				
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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

		July, 2023	1.00	Applicable for AY 2023-24 Onwards
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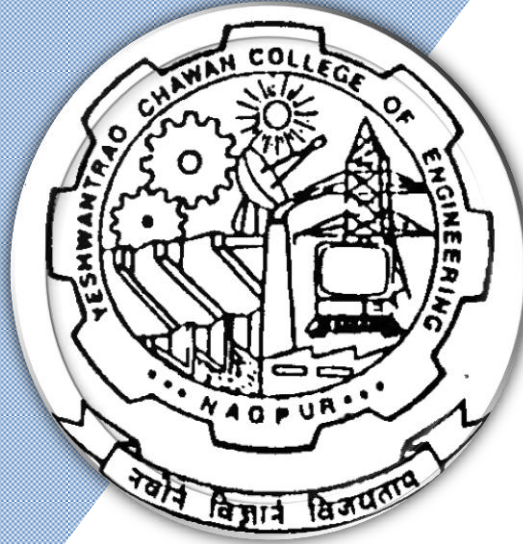
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Bachelor of Technology

SoE & Syllabus 2023

1st Semester

(Department of Electrical Engineering)

B. Tech in Electrical Engineering



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SoE No.
23EL-101

S N	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-B)															
1	1	BS	GE	23GE1102	Differential Equations, Matrices and Statistics	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1108	Engineering Physics	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1109	Lab: Engineering Physics	P	0	0	2	2	1	60	40		
4	1	BES	ME	23ME1101	Engineering Graphics	T	1	0	0	1	1	30	20	50	3
5	1	BES	ME	23ME1102	Lab : Engineering Graphics	P	0	0	4	4	2	60	40		
6	1	BES	EL	23EL1101	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	1	BES	EL	23EL1105	Lab : Electrical and Electronics Workshop	P	0	0	2	2	1	60	40		
8	1	PC	EL	23EL1103	Fundamentals of Electrical Engineering	T	3	0	0	3	3	30	20	50	3
9	1	PC	EL	23EL1104	Lab : Fundamentals of Electrical Engineering	P	0	0	2	2	1	60	40		
10	1	VSEC	GE	23GE1117	Get Set Go	...	...	...	...	...	2	60	40		
11	1	CC2	GE		Liberal Learning Course (LLC2)	...	...	...	...	...	2	60	40		
TOTAL FIRST SEM							13	0	10	23	22				
MANDATORY LEARNING COURSES															
1	1	HS		GE2131	Universal Human Values (UHV)	A	2	0	0	2	0				
SECOND SEMESTER (GROUP-B)															
1	2	BS	GE	23GE1201	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1204	Applied Chemistry	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1205	Lab: Applied Chemistry	P	0	0	2	2	1	60	40		
4	2	HS/AEC1	GE	23GE1212	Professional Communication	T	2	0	0	2	2	30	20	50	2
5	2	HS/IKS	GE	23GE1215	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
6	2	BES	CV	23CV1201	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
7	2	BES	CV	23CV1202	Lab: Engineering Mechanics	P	0	0	2	2	1	60	40		
8	2	BES	IT	23IT1203	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
9	2	BES	IT	23IT1204	Lab: Programming for Problem Solving	P	0	0	2	2	1	60	40		
10	2	VSEC	GE	23GE1218	Functional English	...	...	...	...	...	2	60	40		
11	2	CC1	GE		Liberal Learning Course (LLC1)	...	...	...	...	...	2	60	40		
TOTAL SECOND SEM							15	0	6	21	22				

Liberal Learning Course

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



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SoE No.
23EL-101

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							L	T	P	Hrs		MSEs*	TA**	ESE	

Liberal Learning Course

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

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment
TA = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on 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	Applicable for AY 2023-24 Onwards
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B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Civil Engineering)

**SoE No.
23FY-101**

B.Tech in FYC

I SEMESTER

23GE1102 : Differential Equations, Matrices and Statistics

Course Outcomes

The students will be able to

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

Unit I: Differential Equations I

(7 Hrs.)

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

Unit II: Differential Equations II

(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

			July, 2023	1.00	Applicable for AY 2023-24 Onwards
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(Department of Civil Engineering)

SoE No.
23FY-101

B.Tech in FYC

Textbooks:

1.	Erwin Kreyzig, Advance Engineering Mathematics, 6 th Edition, John Wiley and Sons, INC.
2.	H.K. Dass, Engineering Mathematics, 11 th revised edition, S. Chand, Delhi.
3.	H.K. Dass, Advanced Engineering Mathematics, 8 th revised edition, S. Chand, Delhi.
4.	Dr. B.S. Grewal, Higher Engineering Mathematics, 42 th edition, Khanna Publishers.
5.	P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4 th 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, 10 th edition, Laxmi Prakashan.

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

1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/
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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/

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SoE No.
23FY-101

B.Tech in FYC

I SEMESTER

23GE1108 : 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

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(Department of Civil Engineering)

SoE No.
23FY-101

B.Tech in FYC

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, 10 th John Wiley & Sons Inc.
2	Brijlal and Subramanyam, Text Book of Optics, Revised edition, S. Chand and Company.
3	M.N. Avadhanulu, 2 nd Edition, Laser, S.Chand and Company.
4	A.Beiser, Concept of Modern Physics, 6 th Edition, Laser, Tata McGraw-Hill.
5	Thyagarajan K. and Ghatak A.K, LASERS: Theory and Applications, 2 nd Edition, Macmillan Publication
6	S.O.Pillai, Solid State Physics, 9 th Edition, New Edge International Publishers.
7	Palanisamy, Solid State Physics, 8 th Edition, New Edge International Publishers.
8	C. Kittel, Solid State Physics, 8 th Edition, Willey Publication.
9	B. K. Pandey, S. Chaturvedi, Engineering Physics, 1 st Edition, Cengage Learning.
10	John Allision, Electronic Engineering Materials and Devices, TMH edition, 10 th 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

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(Department of Civil Engineering)

SoE No.
23FY-101

B.Tech in FYC

I SEMESTER

23GE1109 : 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.

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(Department of Mechanical Engineering)

**SoE No.
23ME-101**

B.Tech in Mechanical Engineering

I SEMESTER

23ME1101 : Engineering Graphics

Course Outcomes :

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

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

Unit I: Theory of Orthographic Projections:

(3 Hrs.)

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

Unit II: Theory of Isometric Projections:

(2 Hrs.)

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

Unit III: Lines:

(2 Hrs.)

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

Unit IV: Planes and Solids:

(4 Hrs.)

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

Unit V: Section of Solids and Development of Surfaces:

(2 Hrs.)

Types of Section planes, Sectional top view, True shape.
Development of different solids using Radial line and parallel line methods.

Unit VI: Intersection of Surfaces of solids:

(2 Hrs.)

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

Total Lecture 15 Hours

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(Department of Mechanical Engineering)

B.Tech in Mechanical Engineering

SoE No.
23ME-101

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. Kanniah , 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_2iUCG87Bw9XPfEF3r3EW5UIAOv8iz |
| 2. | Eng https://nptel.ac.in/courses/112105294 |

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(Department of Mechanical Engineering)

B.Tech in Mechanical Engineering

**SoE No.
23ME-101**

I SEMESTER

23ME1102 : Lab. Engineering Graphics

Course Outcomes :

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

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

Practical's to be performed from the list as below

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

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(Department of Electrical Engineering)

B.Tech in Electrical Engineering

**SoE No.
23EL-101**

I SEMESTER

23EL1101 : Basic Electrical and Electronics Engineering

Course Outcomes:

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

Unit I: Circuit Elements and Energy Sources	(7 Hrs.)
Circuit Elements, Series and Parallel Combination of Resistances, Inductance and Capacitances, Energy Sources, Source Transformation, Sources with Periodic Waveforms, A.C. in Inductance and Capacitance, Star-Delta Connection. (Contemporary Issues related to Topic)	
Unit II: Analysis of Network	(7 Hrs.)
Kirchhoff'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. (Contemporary Issues related to Topic)	
Total Lecture	40 Hours

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(Department of Electrical Engineering)

B.Tech in Electrical Engineering

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23EL-101**

Textbooks:

- | | |
|----|--|
| 1. | Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford Higher Education, First Edition 2005 |
| 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 |
|----|---|

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B.Tech in Electrical Engineering

SoE No.
23EL-101

I SEMESTER

23EL1105 : 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.

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B.Tech in Electrical Engineering

**SoE No.
23EL-101**

I SEMESTER

23EL1103 : Fundamentals of Electrical Engineering

Course Outcomes:

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

1. Reproduce fundamentals of dc circuits, magnetic circuits, single phase, and three phase ac circuits.
2. Compute basic electrical and magnetic quantities for electrical and magnetic circuits respectively.
3. Explain construction, working, testing, and applications of single-phase transformers.

Unit I: D. C. Circuits	(7 Hrs.)
Basics of electrical circuits, Equivalent resistance, Kirchoff's Laws. Current and Voltage division rule. Mesh and Nodal analysis of dc circuits. Superposition theorem. (Contemporary Issues related to Topic)	
Unit II: Electromagnetism & Magnetic Circuits	(6 Hrs.)
Magnetic Field, Magnetic Flux, Magnetic Flux Density, Permeability, Relation between magnetic flux density and field intensity, Magnetic field due to current carrying conductor and a coil. Right hand grip rule, Force on a current carrying conductor placed in a magnetic field, Magnetomotive Force, Magnetic Field Strength. Reluctance, Magnetization curves of magnetic materials, Magnetic hysteresis and hysteresis loss. Eddy current and eddy current loss, Leakage flux and fringing, Faraday's laws of electromagnetic induction, Lenz's Law, Types of induced EMF, Magnetic Circuits (Contemporary Issues related to Topic)	
Unit III: A.C. Fundamentals & Single-Phase Series A. C. Circuits	(7 Hrs.)
Generation of alternating voltage. Values of alternating quantity. Average and rms value by mid – ordinate method and method of integration. Form factor and peak factor. Concept of phasor and its mathematical representation. Concept of phasor diagram. Phasor algebra. Power in a.c. circuit. Concept of power factor, reactive power and apparent power with power triangle. Analysis of purely resistive (R), inductive (L), and capacitive (C) circuits. Concept of inductive and capacitive reactance. Analysis of series R – L, R – C, and R – L – C circuits for voltages and current, their waveforms, phasor diagram, impedance triangle, power factor. Series resonance. (Contemporary Issues related to Topic)	
Unit IV: Single Phase Parallel & Series – Parallel A. C. Circuits	(6 Hrs.)
Concept of conductance, susceptance and admittance. Admittances in series and parallel. Analysis of single phase parallel and series – parallel a.c. circuits with their phasor diagram. Parallel resonance. (Contemporary Issues related to Topic)	

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(Department of Electrical Engineering)

**SoE No.
23EL-101**

B.Tech in Electrical Engineering

Unit V: Three Phase A.C. Circuits	(7 Hrs.)
Advantages of three – phase systems over single – phase systems. Generation of three phase a.c. supply. Phase sequence. Interconnection of three phases. Star or Wye connection. Phase and line voltages/currents in star connection and their relationships. Delta or Mesh connection. Phase and line voltages/currents in delta connection and their relationships. Concept of balanced load. Active, reactive, and apparent power in balanced three phase circuits. (Contemporary Issues related to Topic)	
Unit VI: Single Phase Transformer	(6 Hrs.)
Working principle. EMF equation. Voltage ratio and turns ratio. Step up and step-down transformers. Construction of a single-phase transformer. Types of transformers and their applications. Ideal transformer. Transformer on no load with phasor diagram and equivalent circuit. Practical transformer and its equivalent circuit. Referred values. Transformer on load with phasor diagram and equivalent circuit. Voltage Regulation. Losses in transformer. Load Test. Open circuit and Short circuit tests on transformers. Efficiency and condition for maximum efficiency. Autotransformer operation, kVA rating of autotransformer (Contemporary Issues related to Topic)	
Total Lecture	39 Hours

Textbooks:

1.	D. C. Kulshreshtha , “Basic Electrical Engineering” ,Tata McGraw - Hill Education Private Limited.
2.	T. K. Nagsarkar , M. S. Sukhija , “Basic Electrical Engineering” , Oxford University Press , Third Edition.

Reference Books:

1.	V. N. Mittle , Arvind Mittal , “Basic Electrical Engineering” , Tata McGraw - Hill Publishing Company Limited , Second Edition.
2.	B. L. Theraja , A. K. Theraja , “A Text Book Of Electrical Technology Volume I & II” , S. Chand & Company Pvt. Ltd. , Twenty Third Edition.

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

1	http://link.springer.com/openurl?genre=book&isbn=978-3-540-43965-3
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MOOCs Links and additional reading, learning, video material

1.	Course on Basic Electrical Technology By Prof. Dr. L. Umanand https://archive.nptel.ac.in/courses/108/108/108108076
2.	Course on Fundamentals Of Electrical Engineering By Prof. Debapriya Das https://nptel.ac.in/courses/108105112
3.	Course on Basic Electrical Technology By Prof. N.K. De, Prof. G.D. Roy, Prof. T.K. Bhattacharya https://nptel.ac.in/courses/108105053

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(Department of Electrical Engineering)

B.Tech in Electrical Engineering

SoE No.
23EL-101

I SEMESTER

23EL1104 : Lab. Fundamentals of Electrical Engineering

Course Outcomes:

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

1. Reproduce fundamentals of dc circuits, magnetic circuits, single phase, and three phase ac circuits.
2. Compute basic electrical and magnetic quantities for electrical and magnetic circuits respectively.
3. Explain construction, working, testing, and applications of single-phase transformers.
4. Determine performance of single-phase transformers.
5. Perform laboratory experiments and demonstrate competency in collecting, interpreting, analysing data, communicating and presenting effectively through laboratory journals.

SN	Experiments based on
1	To verify Kirchhoff's voltage law and Kirchhoff's current law.
2	To study R - L - C series circuit.
3	To verify Superposition theorem.
4	To study R - L - C parallel circuit.
5	To study balanced three phase star (Y) connected load.
6	To find transformation ratio, regulation, and efficiency of a single-phase transformer by direct loading.
7	To study balanced three phase delta (Δ) connected load.
8	To perform open circuit test and short circuit test on a single-phase transformer.
9	To draw B - H curve of a magnetic material.

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(Department of Civil Engineering)

SoE No.
23FY-101

B.Tech in FYC

I SEMESTER

23GE1117-Get Set Go

Course Outcomes:

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

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

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

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(Department of Civil Engineering)

SoE No.
23FY-101

B.Tech in FYC

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

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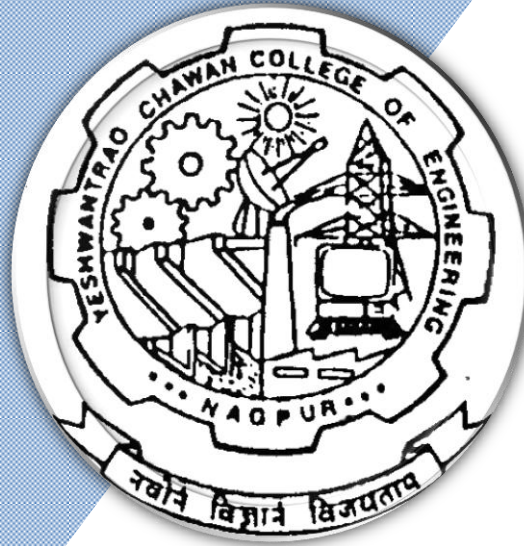
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Yeshwantrao Chavan College of Engineering

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

Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology

SoE & Syllabus 2023

2nd Semester

(Department of Electrical Engineering)

B. Tech in Electrical Engineering



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(Department of Electrical Engineering)
B. Tech in Electrical Engineering

SoE No.
23EL-101

S N	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-B)															
1	1	BS	GE	23GE1102	Differential Equations, Matrices and Statistics	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1108	Engineering Physics	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1109	Lab: Engineering Physics	P	0	0	2	2	1	60	40		
4	1	BES	ME	23ME1101	Engineering Graphics	T	1	0	0	1	1	30	20	50	3
5	1	BES	ME	23ME1102	Lab : Engineering Graphics	P	0	0	4	4	2	60	40		
6	1	BES	EL	23EL1101	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	1	BES	EL	23EL1105	Lab : Electrical and Electronics Workshop	P	0	0	2	2	1	60	40		
8	1	PC	EL	23EL1103	Fundamentals of Electrical Engineering	T	3	0	0	3	3	30	20	50	3
9	1	PC	EL	23EL1104	Lab : Fundamentals of Electrical Engineering	P	0	0	2	2	1	60	40		
10	1	VSEC	GE	23GE1117	Get Set Go	...	...	...	...	...	2	60	40		
11	1	CC2	GE		Liberal Learning Course (LLC2)	...	...	...	...	...	2	60	40		
TOTAL FIRST SEM							13	0	10	23	22				
MANDATORY LEARNING COURSES															
1	1	HS		GE2131	Universal Human Values (UHV)	A	2	0	0	2	0				
SECOND SEMESTER (GROUP-B)															
1	2	BS	GE	23GE1201	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1204	Applied Chemistry	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1205	Lab: Applied Chemistry	P	0	0	2	2	1	60	40		
4	2	HS/AEC1	GE	23GE1212	Professional Communication	T	2	0	0	2	2	30	20	50	2
5	2	HS/IKS	GE	23GE1215	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
6	2	BES	CV	23CV1201	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
7	2	BES	CV	23CV1202	Lab: Engineering Mechanics	P	0	0	2	2	1	60	40		
8	2	BES	IT	23IT1203	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
9	2	BES	IT	23IT1204	Lab: Programming for Problem Solving	P	0	0	2	2	1	60	40		
10	2	VSEC	GE	23GE1218	Functional English	...	...	...	...	...	2	60	40		
11	2	CC1	GE		Liberal Learning Course (LLC1)	...	...	...	...	...	2	60	40		
TOTAL SECOND SEM							15	0	6	21	22				

Liberal Learning Course

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



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S N	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

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

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment
TA = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activities decided by course teacher, TA3 - 3 marks on class attendance**
TA = for Practical : MSPA will be 15 marks each**

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B.Tech First Year

II SEMESTER

23GE1201: Calculus and Vector

Course Outcomes :

The students will be able to

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

Unit I: Differential Calculus	(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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SoE No.
23FY-101

B.Tech First Year

Textbooks:

- | | |
|----|--|
| 1. | Erwin Kreyzig, Advance Engineering Mathematics, 10 th Edition, John Wiley and Sons, INC. |
| 2. | H.K. Dass, Engineering Mathematics, 11 th revised edition, S. Chand, Delhi. |
| 3. | H.K. Dass, Advanced Engineering Mathematics, 8 th revised edition, S. Chand, Delhi. |
| 4. | Dr. B.S. Grewal, Higher Engineering Mathematics, 42 th edition, Khanna Publishers. |
| 5. | P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4 th 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, Vol I & Vol II 2 nd edition, Wiley. |
| 3. | N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10 th edition, Laxmi Prakashan. |

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

- | | |
|---|---|
| 1 | http://103.152.199.179/YCCE/Suported%20file/Suprtd%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://nitkr.ac.in/docs/5-Multiple%20Integrals%20and%20their%20Applications.pdf |

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(Department of Chemistry)

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23FY-101

B.Tech First Year

II SEMESTER

23GE1204 : Applied Chemistry

Course Outcomes:

Upon successful completion of the course students will be able to

1. **Illustrate** qualitative and quantitative aspects of water for industrial and domestic applications. (L3)
2. **Apply** concepts of electrochemistry for energy storage devices and corrosion. (L3)
3. **Establish** significance of engineering materials in technological applications. (L3)
4. **Develop** insight into advanced materials. (L3)

Unit I: Water Chemistry

(7 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

(7 Hrs.)

Electrochemistry: Introduction, metallic and electrolytic conductance, resistance, specific resistance, conductance, specific conductance, equivalent and molar conductance. Variation of conductance with dilution. Electrode and electrode potential. Nernst Equation and applications. Faraday's laws and Numerical. Industrial applications: Electroplating, Electrolytic refining, Electroforming, Electrowinning.
Corrosion- Definition, Causes, theories of corrosion- dry, wet and differential aeration. Contemporary issues related to the topic

Unit III: Energy storage device:

(6 Hrs.)

Introduction, Characteristics, and general applications.
Lithium-ion battery, Glass battery, H₂-O₂ Fuel cell. Differences between battery and a fuel cell.
Supercapacitors: Definition, types, characteristics, and application.
H₂ as a green fuel: Introduction, production, storage, and utilization.

Unit IV: Fuels

(7 Hrs.)

Introduction, Calorific value, HCV & LCV. Determination of calorific value of fuels by Bomb & Boy's calorimeter. Dulong's formula numericals.
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.

Unit V: Engineering Materials

(6 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.

Lubricants:

Introduction, Classification, Mechanisms.

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.

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Unit VI: Advanced Materials

(6 Hrs.)

Advanced Materials

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

Total Lecture 39 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=i1hYXx79QiE>
3. <https://www.youtube.com/watch?v=JfJ7MIP9Dco>
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/Bmj85Ihf7w>

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B.Tech First Year

II SEMESTER

23GE1205 : Lab. Applied Chemistry

Course Outcomes

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

1. **Illustrate** qualitative and quantitative aspects of water for industrial and domestic applications. (L3)
2. **Apply** concepts of electrochemistry for energy storage devices and corrosion. (L3)
3. **Establish** significance of engineering materials in technological applications. (L3)
4. **Develop** insight into advanced materials. (L3)

Total 10 experiments are to be performed

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

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

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

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(Department of Mathematics & Humanities)

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23FY-101

B.Tech First Year

II SEMESTER

23GE1212 : Professional Communication

Course Outcomes :

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

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

Unit I: Basics of Communication

(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-Etiquette, 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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B.Tech First Year

II SEMESTER

23GE1215 : Indian Knowledge System

Course Outcomes:

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

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

Unit:1	Introduction to Indian Civilization	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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SoE No.
23FY-101

B.Tech First Year

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" IGNC 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:UcHWp8X0CEIC

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

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(Department of Civil Engineering)

SoE No.
23CV-101

B.Tech in Civil Engineering

II SEMESTER

23CV1201 : Engineering Mechanics

Course Outcomes :

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

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

Unit I: Resultant of planar force System

(7 Hrs.)

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

Unit II: Equilibrium of planar force System

(6 Hrs.)

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

Unit III: Friction and Trusses

(7 Hrs.)

Friction: Coulomb's laws of dry friction, plane friction, belt friction.
Trusses: Types of trusses, assumptions in analysis of truss, Analysis of truss by method of joint. (Contemporary Issues related to Topic)

Unit IV: Properties of Surfaces

(6 Hrs.)

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

Unit V: Virtual Work Method and Kinetics of Particle

(7 Hrs.)

Virtual Work Method: Introduction, Principle of virtual work, Application to beam and frame.
Kinetics of Particle: Introduction, Newton's law of motion for a Particle, D' Alembert's principle, Translation of particle and connected system. (Contemporary Issues related to Topic)

Unit VI: Work Energy and Impulse Momentum Method

(6 Hrs.)

Work Energy Method: Introduction, Work energy equation for translation, Work energy applied to particle motion and connected system.
Impulse Momentum Method: Introduction, Linear Impulse momentum, Conservation of linear momentum, coefficient of restitution, elastic impact, Impulse momentum in plane motion. (Contemporary Issues related to Topic)

Total Lecture 39 Hours

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SoE No.
23CV-101

B.Tech in Civil Engineering

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>

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(Department of Civil Engineering)

SoE No.
23CV-101

B.Tech in Civil Engineering

II SEMESTER

23CV1202 : Lab. Engineering Mechanics

Course Outcomes

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

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

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

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

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SoE No.
23IT-101

B.Tech in Information Technology

II SEMESTER

23IT1203 : Programming for Problem Solving

Course Outcomes :

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

Unit I: Computer System Basics:

(3 Hrs.)

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

Unit II: Basic of C Programming

(6 Hrs.)

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

Unit III: Loop Structures:

(5 Hrs.)

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

Unit IV: Modular Programming:

(6 Hrs.)

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

Unit V: Arrays:

(6 Hrs.)

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

Unit VI: String, Structure and Union:

(4 Hrs.)

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

Total Lecture 30 Hours

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23IT-101**

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
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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

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B.Tech in Information Technology

II SEMESTER

23IT1204 : Lab. Programming for Problem Solving

Course Outcomes: Students will be able to

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

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

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(Department of Information Technology)

B.Tech in Information Technology

SoE No.
23IT-101

Text books

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

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2	Programming with C, Byron Gottfried, Schaum;s Outline Series
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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

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B.Tech in Information Technology

List of Practical

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

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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.		

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(Department of Mathematics & Humanities)

SoE No.
23FY-101

B.Tech First Year

Assignment Presentation on Mad Ads, Quiz on Tenses and social media-Internet Communication

Topic: Activity Extempore

EVALUATION			1 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

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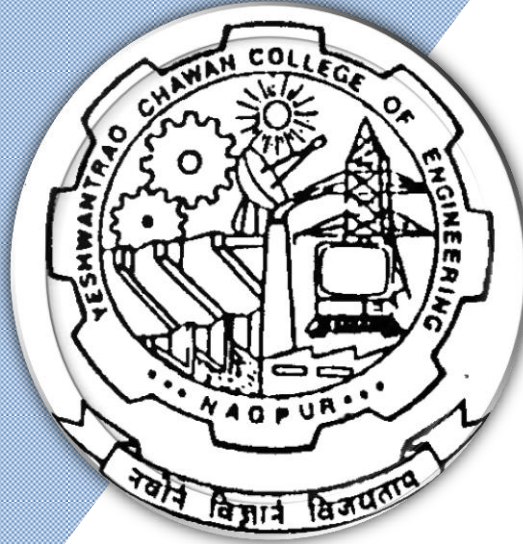
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Yeshwantrao Chavan College of Engineering

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

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

Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology

SoE & Syllabus 2023

3rd Semester

(Department of Electrical Engineering)

B. Tech in Electrical 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 Electrical Engineering)
B. Tech in Electrical Engineering

SoE No.
23EL-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	BS	GE	23GE1302	Integral Transform	T	3	0	0	3	3	30	20	50	3
2	3	HSSM-1	GE	23GE1301	Fundamentals of Management & Economics	T	2	0	0	2	2	30	20	50	3
3	3	VEC-1	CV	23CV1311	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
4	3	PC	EL	23EL1301	Electrical Energy Generation System	T	3	0	0	3	3	30	20	50	3
5	3	PC	EL	23EL1302	Lab: Renewable Energy Sources	P	0	0	2	2	1		60	40	
6	3	PC	EL	23EL1303	Network Analysis	T	3	0	0	3	3	30	20	50	3
7	3	PC	EL	23EL1304	Lab : Electrical Engineering Workshop	P	0	0	2	2	1		60	40	
8	3	PC	EL	23EL1305	Electrical Machines	T	3	0	0	3	3	30	20	50	3
9	3	PC	EL	23EL1306	Lab : Electrical Machines	P	0	0	2	2	1		60	40	
10	3	CEP	EL	23EL1307	Lab : Energy Literacy and Social responsibility	P	0	0	2	4	2		60	40	
11	3	OE I	OE		Open Elective -I	T	2	0	0	2	2	30	20	50	3
12	3	MDM	MDM		MD Minor Course-I	T	2	0	0	2	2	30	20	50	3
TOTAL							20	0	8	30	25				

List of Mandatory Learning Course (MLC)															
1	3	HS	T&P	MLC2123	YCAPP3 : 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 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

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23EL-101

III /IV SEMESTER

23GE1302/23GE1402 : Integral Transforms

Course Outcomes:

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

- 1 Apply the knowledge of Laplace and Fourier transforms to solve the continuous problems.
2. Apply the knowledge of Z transforms to solve the discrete mathematical equations.
3. Determine Fourier series expansion of periodic functions, Fourier Transform.
4. Use appropriate methods to solve partial differential equations.

Unit I:

7 Hrs.

Laplace Transforms : Definition and examples of Laplace transforms, properties of Laplace transforms, Examples by using properties of Laplace transforms, Unit step function, periodic function.

Unit II:

8 Hrs.

Inverse of Laplace Transform: Definition and examples of Inverse Laplace transforms, Inverse Laplace transform by using properties, Partial fraction method to find Inverse Laplace transforms, convolution theorem, Applications of Laplace transform to solve ordinary differential equations.

Unit III:

7 Hrs.

Z-Transform: Some elementary concepts, Definition of Z-Transform, Examples of Z-Transform, Properties (without proof), Inversion by partial fraction decomposition and residue theorem, Applications of Z-transform to solve difference equations with constant co-efficient.

Unit IV:

8 Hrs.

Fourier Series: Periodic Functions, standard results, Fourier series expansion, Convergence of Fourier Series, Fourier Series for even and odd function, Change of interval, half range Fourier Series, Examples on half range sine and cosine series.

Unit V:

8 Hrs.

Fourier Integral: Fourier Integral of a function formula and examples, Fourier Cosine integral, Fourier Sine integral, Complex Fourier integral, Evaluation of integration using Fourier integral.

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Unit VI:	7 Hrs.
Fourier Transforms: Fourier Transform, Fourier sine and cosine transformation and its examples, Properties of Fourier sine and cosine transform and its examples, Application of Fourier sine and cosine transform on Partial differential equation, Parseval's Identity.	
Total Lecture	45 Hours

Textbooks:	
1	Erwin Kreyzig, Advance Engineering Mathematics, 9 th Edition, John Wiley and Sons, INC.
2	Dr. B. S. Grewal, Higher Engineering Mathematics, 40 th edition, Khanna Publisher.
3	H.K. Dass, Advanced Engineering Mathematics, 8 th revised edition, S. Chand, Delhi.

Reference Books:	
1	Chandrika Prasad, Mathematics for Engineers, 19 th Edition, John Wiley and Sons, INC.
2	L. A. Pipes and Harville, Applied Mathematics for Engineers, 3 rd Edition, McGraw Hill.
3	P.N. and J. N. Wartikar, A text book of Applied Mathematics, 3 rd edition, Pune Vidyarthi Griha Prakashan
4	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10 th edition, Laxmi Prakashan.

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

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/111106111
2	https://onlinecourses.nptel.ac.in/noc22_ma41/preview
3	https://archive.nptel.ac.in/courses/111/101/111101153/

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III SEMESTER

23GE1301: Fundamentals of Management & Economics

Course Outcomes:

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

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

Unit I:

7 Hrs.

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

Unit II:

8 Hrs.

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

Unit III:

7 Hrs.

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

Unit IV:

8 Hrs.

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

Total Lecture

30 Hours

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Textbooks:

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

Reference Books:




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

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III/IV SEMESTER

23CV1311/23CV1411

Environmental Sustainability, Pollution and Management

Course Outcomes :

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

The student will be able to

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

Unit:1	Environment and Sustainable Development	8 Hours
The man-environment interaction; Overview of natural resources: renewable, and non-renewable energy resources; Introduction to sustainable development: Sustainable Development Goals (SDGs)- targets and indicators, challenges and strategies for SDGs; Environmental issues: Global change, Climate Change and Mitigation.		
Unit:2	Environmental Pollution and Health	7 Hours
Understanding pollution: Production processes and generation of wastes, Air pollution, Water pollution, Soil pollution and solid waste, Noise pollution, Thermal and Radioactive pollution. Impact on biotic and abiotic things.		
Unit:3	Environmental Management	8 Hours
Environmental management system: ISO 14001, Concept of Circular Economy, Life cycle analysis; Cost-benefit analysis, Environmental audit and impact assessment; Waste Management and sustainability; Ecolabeling /Eco mark scheme		
Unit:4	Environmental Treaties and Legislation	7 Hours
Introduction to environmental laws and regulation, An overview of instruments of international cooperation, Major International Environmental Agreements, Major Indian Environmental Legislations, Major International organizations, and initiatives		
Total Lecture		30 Hours

Text books

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

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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

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MOOCs Links and additional reading, learning, video material

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23EL-101**

III SEMESTER

23EL1301 : Electrical Energy Generation System

Course Outcomes:

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

1. Classify types of renewable energy sources and different factors associated with a generating station
2. Explain various parameters related to selection and application of Solar ,Wind Energy and Biogas
3. Illustrate design parameters for Hydro and Thermal Power generating Systems.
4. Explain various parameters related to generation of Nuclear Power

Unit:1	Introduction to generation systems	7 Hours
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Importance of Electrical Energy, Generation of Electrical Energy, Relationships among Energy units, Calorificvalue of fuels.

Sources of Electrical energy- Coal, oil and natural gas, hydro, solar, wind and nuclear energy.Different factors associated with a generating station : connected load, maximum demand, demand factor, load factor, diversity factor, plant capacity and utilization factor, load curve and load duration curve load survey, base load and peak load station, advantages of interconnection.

Tariff-: Definition, Objective, Characteristics of tariff, Types of Tariff (Numerical), economical choice of tariff.

Contemporary Issues related to Topic

Unit:2	Solar Energy	8 Hours
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Solar radiation & its Measurement: - Solar constant, Solar radiation at earth's surface, Solar radiation geometry, Solar radiation on tilted surfaces, Solar radiation measurement, Solar Energy Collectors: - Physical principles of the conversion of solar radiation into heat, flat plate collectors. Applications of Solar energy: Solar Dryer, Solar Still, Solar cooker

Solar Photovoltaic Cell: Principle of solar photovoltaic energy conversion, Equivalent circuit of solar cell

Contemporary Issues related to Topic

Unit:3	Wind Energy	7 Hours
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Principle of wind energy conversion, Power in the wind, Cut In, Cut Off Wind Speed ,Site selection considerations, Basic components of wind energy conversion systems(WECS),Classification of WEC systems, Advantages and Limitations of WECS.,Types of wind Machines(HAWT and VAWT), Application of wind energy.

Contemporary Issues related to Topic

Unit:4	Hydro Power Station	8 Hours
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Schematic arrangement of Hydroelectric Power Station, Constituents of Hydroelectric power plant, Advantages and Limitations of Hydro-electric Plants , Hydrology, stream flow, flow duration curve, power duration curve, mass curve, reservoir capacity, Water Power equation (Numerical), type of hydro power plants and their field of use, pumped storage plant and their utility, surge tanks. General study of Hydro Turbine, Introduction to Small hydro plants.

Contemporary Issues related to Topic

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Unit:5 Thermal Power Station	7 Hours
Introduction, Site selection, size and number of units, general layout, major equipment, auxiliaries, electric supply to auxiliary, cost of generation, effect of different factors on costs. General study of steam Turbine. Condenser: Different types of condensers. Construction and Working principle of Condenser Contemporary Issues related to Topic	
Unit :6 Nuclear Power Plant and Biomass Energy	8 Hours
Site selection for nuclear power plant, introduction to nuclear physics, chain reaction, Working Principle of nuclear Power Plant, Components of a nuclear reactor, types of nuclear reactor, material for moderator and control rods, control of nuclear reactors, , economics of nuclear power generation. Biogas production from waste biomass, classification of biogas plants, operational parameters, availability of raw material and gas yield. Contemporary Issues related to Topic	
Total: 45 Hours	

Text books

1	M.L.Soni,P.V.Gupta,U.S.Bhatnagar,A Textbook on Power System Engineering, 2nd edition 2014, Dhanpat Rai and Co.
2	V.K.Mehta, Rohit Mehta, Principles of Power System, 2nd edition 2008,S.Chand
3	B.R.Gupta,Generation of Electrical Energy,5th edition 2007 ,S.Chand
4	G. D. Rai,Non-Conventional Energy Sources, 5th edition 2011, Khanna Publication

Reference Books

1	T.K. Nagsarkar, M.S. Sukhija,Power System Analysis,1st edition 2007, Oxford Publication
2	Ashfaq Hussain,Electrical Power System,5th edition 2007, CBS 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/Electrical%20Engineering/Power%20System%20Engineering/Principles%20of%20Power%20Systems%20V.K%20Mehta.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Renewable%20Energy%20Sources/B.H.Khan%20Book%20ORES.pdf
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Renewable%20Energy%20Sources/Solar%20Energy%20pdf.pdf

MOOCs Links and additional reading, learning, video material

1	Renewable Energy Engineering: Solar, Wind and Biomass Energy Systems [Intro Video]
2	http://103.152.199.179/YCCE/DTEL%20Material/3.Electrical%20Engineering/DTEL%20PPTs/IV%20SEMI-STER/EL-2253%20EEGS/

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III SEMESTER

23EL1302: Lab. Renewable Energy Sources

Course Outcomes:

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

1. Summarize, classify types of renewable energy sources, outline as per Global and Indian context
2. Utilize ,analyze solar energy for various applications.
3. Classify, analyze wind energy conversion systems and estimate its parameters.

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

S. N.	Experiments based on
1	To analyze I-V and P-V characteristics of single PV module
2	To analyze I-V and P-V characteristics of series connected PV modules
3	To analyze I-V and P-V characteristics of parallel connected PV modules
4	To observe effect of shading on power output of single PV module
5	To observe effect of tilt angle on power output of single PV module
6	To explain working of Solar Water Heater in natural convection and force convection mode
7	To explain the Biogas generation plant model set up at YCCE College
8	To explain working of Solar Cooker A)Box type B)Concentrated type
9	To design home Solar PV system
10	To explain Hydroelectric Power plant

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III SEMESTER

23EL1303 : Network Analysis

Course Outcomes:

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

- 1) Apply node voltage and mesh current analysis methods to electric circuits.
- 2) Apply network theorems to electric circuits.
- 3) Determine initial and final values of current and voltage of electric circuits containing energy storage elements.
- 4) Apply Laplace transform to electric circuits.

Unit:1	Nodal Analysis of Electric Circuits	7 Hours
Basics of electric circuits, circuit elements and their voltage – current relationship, classification of circuit elements, sources - their types and characteristics, concept of equivalent sources, source transformation, concept of supernode and V – shift, nodal analysis of circuits containing resistors, inductors, capacitors, transformers, 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	8 Hours
Concept of supermesh and I – shift, mutual inductance, coefficient of coupling, dot convention, dot marking in coupled coils, mesh analysis of circuits containing resistors, inductors, capacitors, transformers, and both independent and dependent sources to determine current, voltage, power, and energy.		
Contemporary Issues related to Topic		
Unit:3	Network Theorem	7 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.	8 Hours
Concept of initial and final conditions, behavior of resistor, inductor and capacitor at $t = 0^-$ and at $t = 0^+$, procedure for evaluating initial and final conditions, analytical treatment. Review of Laplace Transform, 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. Contemporary Issues related to Topic		
Unit:5	Transforms of other Signal Waveforms, Network Functions, Poles and Zeros Of Network Functions	7 Hours
Unit step, ramp and impulse functions with and without time delay, their Laplace transform, waveform synthesis and its application to electrical networks. Terminal pairs or ports, network functions for one port and two port networks, definition and physical interpretation of poles and zeros, pole-zero plot for network functions, restrictions on pole and zero locations for driving point and transfer functions, time domain behavior from the pole – zero plot, network synthesis using pole – zero plot.		

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Unit :6	Two Port Parameters	8 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, conditions for reciprocity and electrical symmetry in terms of two – port parameters, interconnections of two - port networks.		
Contemporary Issues related to Topic		
Total Lecture Hours		45 Hours

Text books	
1	M. E. Van Valkenburg , “Network Analysis” , PHI Learning Private Limited , Third Edition.
2	William H. Hayt, Jack E. Kemmerly, Steven M. Durbin , “Engineering Circuit Analysis” , McGraw – Hill , Eighth Edition.
3	Decarlo , Lin , “Linear Circuit Analysis” , Oxford Univ. Press , Second Edition

Reference Books	
1	Syed A. Nasar , “Schaum’s 3000 Solved Problems In Electric Circuits Book 1 & 2” , McGraw - Hill , First Edition.
2	Joseph A. Edminister , “Schaum’s Outline Series : Theory and Problems of Electric Circuits” , McGraw - Hill , Fifth Edition.
3	Lawrence P. Huelsman , “Basic Circuit Theory” , PHI Learning Private Limited , Third Edition.
4	Ravish R. Singh , “Network Analysis And Synthesis” , McGraw - Hill Education (India) Private Limited.

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1	http://link.springer.com/openurl?genre=book&isbn=978-90-481-9442-1
2	https://web.p.ebscohost.com/ehost/detail/detail?vid=2&sid=4051e547-e3c2-4c21-8a54-384a6b804d38%40redis&bdata=JnNpdGU9ZWZhc3QtbGl2ZQ%3d%3d#AN=2196243&db=e230xww
3	http://link.springer.com/openurl?genre=book&isbn=978-0-412-38310-6

MOOCs Links and additional reading, learning, video material	
1	Course on Circuit Theory By Prof. S. C. Dutta Royhttps://nptel.ac.in/courses/108102042
2	Course on Network Analysis By Prof. Tapas Kumar Bhattacharya https://archive.nptel.ac.in/courses/108/105/108105159/
3	Course on Basic Electric Circuits By Prof. Ankush Sharma https://nptel.ac.in/courses/108104139

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

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

SoE No.
23EL-101

B.Tech in Electrical Engineering

III SEMESTER

23EL1304 : Lab : Electrical Engineering Workshop

Course Outcomes:

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

1. Describe the basic concept of various electrical components.
2. Demonstrate, formulate and solve the basic maintenance and troubleshooting of household Equipments, energy saving etc.
3. Outline the fundamentals of major electrical devices and actual operation of devices like AC and DC machines.

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

Sr. No.	Experiments based on
1	To study the construction and working of ceiling fan and troubleshooting.
2	To find the fault of electric iron (ordinary and automatic) and study about them and prepare the maintenance chart of the possible faults and their remedies
3	To study about electric mixer and find out fault in it
4	To measure Earth Resistance by Earth Tester
5	To measure the value of insulation resistance of a given electrical equipment using the Megger instrument.
6	To construct the single phase centre tapped shell type transformer
7	To identify terminals and testing of DC Compound Motor
8	To assemble the Direct Online Starter – DOL Starter for Motors
9	To assemble the Star Delta Starter – (Y- Δ) for Motors
10	To demonstrate Solar Rooftop Installation
11	To study Electrical Insulator and Types of Insulator
12	To explain the basic design of a Transmission tower.
13	To study the Types of Electrical Power Cables (Sizes & Ratings)

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(Department of Electrical Engineering)

SoE No.
23EL-101

B.Tech in Electrical Engineering

III SEMESTER

23EL1305 : Electrical Machines

Course Outcomes:

1. Analyze the performance of Transformers.
2. Illustrate proficiency in understanding the performance of D.C. Machines
3. Evaluate the performance of Induction Motors.
4. Explain working of Special Machines.

Unit:1	Three Phase Transformer	7 Hours
Types of 3 phase transformers, Construction, Labelling of terminals, Vector Groups, Polarity marking & Test, Transformer connections and their comparative features, Open Delta Connection, Parallel operation of three phasetransformers, All day efficiency. Harmonics effect due to saturation. Contemporary Issues related to Topic		
Unit:2	D.C. Generator	8 Hours
Construction, Magnetic structure, Field and Armature systems, Field and Armature windings (Both Lap and Wave Types),EMF Equation, Characteristics and applications of different types of D.C. Generators, Building of Emf in D.C. Shunt generator, Armature reaction, commutation, straight line commutation, inter-poles, compensating winding. Contemporary Issues related to Topic		
Unit:3	D.C. Motor	7 Hours
Principle, Torque Equation, Characteristics and applications of various types of D.C. Motors, Starting of D.C. Motors, Speed control of Series and Shunt motors, Power flow in DC machines, Losses and Efficiency in D.C. machines. Contemporary Issues related to Topic		
Unit:4	Single Phase Induction Motor	8 Hours
Production of rotating magnetic field, Double-field revolving theory of Induction motor, Types of single phase Induction motors, Comparison of single phase and three phase Induction motor, Application of single phase Induction Motor. Contemporary Issues related to Topic		
Unit:5	Three Phase Induction Motor	7 Hours
Construction , Production of rotating magnetic field, Principle of operation, Speed and Slip, frequency of rotor voltage and current, Relationship between rotor copper loss and rotor input, Developed torque, Torque of an Induction Motor, Condition for maximum torque, Torque-slip and torque-speed characteristics. Equivalent circuit, No load and blocked rotor tests and determination of parameters of equivalent circuit, Losses and efficiency. Starting, Speed control, Crawling and Cogging, Application of three phase Induction Motor. Contemporary Issues related to Topic		

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Unit :6	Special Machines	8 Hrs
Double cage induction motor: principle, construction, torque slip characteristics. Induction Generator: principle, isolated operation, double fed induction generator, Applications. Stepper Motors, Permanent Magnet Brushless DC Motor: Constructional features, Principle of Operation, Torque prediction, Types, Applications. Contemporary Issues related to Topic		
Total Lecture Hours		45 Hours

Text books	
1	Dr. P. K. Mukherjee and S. Chakravarti, "Electrical Machines", Dhanpat Rai Publications (P) Ltd, 2nd Edition -1993
2	I.J.Nagrath and Dr. D.P.Kothari, "Electrical Machines", Tata McGraw Hill, 3rd Edition-2010
3	Ashfaq Husain, "Electric Machines", Dhanpat Rai Publications (P) Ltd., 2nd Edition-2014
4	K.Venkataratnam, 'Special Electrical Machines', Universities Press (India) Private Limited, 2008.
5	A.E.Fitzgerald, C.Kingsley, S.D.Umans, "Electrical Machinery", Tata McGraw Hill. Sixth Edition 2002.

Reference Books	
1	Alexander S. Langdorf, "D.C. Machines"; McGraw-hill Book Company, 1915.
2	Nasser Syed, "Electrical Machines and Transformers", A New York, Macmillan 1984.
3	R.Srinivasan, 'Special Electrical Machines', Lakshmi Publications, 2013.
4	P.S.Bhimbra, 'Generalised Theory of Electrical Machine', Khanna Publishers, Edition 7th -2008.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-642-25904-3
2	http://link.springer.com/openurl?genre=book&isbn=978-1-4614-0399-9
3	http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Electrical%20Machines/

MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/108/105/108105155/

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B.Tech in Electrical Engineering

**SoE No.
23EL-101**

III SEMESTER

23EL1306 : Lab. Electrical Machines

Course Outcomes:

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

1. Analyze the performance of Transformers.
2. Illustrate proficiency in understanding the performance of D.C. Machines
3. Evaluate the performance of Induction Motors.
4. Explain working of Special Machines.

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

Sr. No.	Experiments based on
1	To study phasing out and polarity marking of a 3-phase transformer
2	To study voltage and current relations in a 3-phase, Delta-Star connected transformer
3	To perform Open Circuit and Short Circuit test on a 3-phase transformer
4	To plot magnetization characteristic of a DC generator
5	To study speed control of a DC shunt motor by varying – (a) field excitation and (b) armature voltage
6	To perform load test on a DC shunt motor
7	To study measurement of slip of a 3-phase induction motor by different methods
8	To study control of a 3-phase slip-ring induction motor by – (a) variation of a rotor resistance and (b) varying supply voltage
9	To perform open circuit test and blocked rotor test on a 3-phase induction motor
10	To perform load test on a 3-phase induction motor by direct loading.
11	To perform No-Load and Blocked rotor tests on a 1-phase induction motor
12	To study Induction generator operation.
13	To measure inrush current of three phase, 60 Hp induction motor

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B.Tech in Electrical Engineering

SoE No.
23EL-101

III SEMESTER

23EL1307 : Lab: Energy Literacy and Social responsibility

Course Outcomes:

Activities related to following topics will be undertaken under this lab:

1. Calculation of electrical load of a particular site
2. Safety measures to be undertaken to avoid accidents at domestic level.
3. Safety measures to be undertaken to avoid accidents at commercial level.
4. Measures to undertake for saving of electricity bill.

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

Sr. No.	Experiments based on
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	

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III SEMESTER Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1EL101 : Electric Vehicles
MDM-I	3	(MDM1EL101) Introduction to Electric Vehicles
MDM-II	4	(MDM2EL102) Energy storage devices
MDM-III	5	(MDM3EL103) Electric Machines
MDM-IV	6	(MDM4EL104) Power Electronics and Motor drives
MDM-V	7	(MDM5EL105) Drives and Autonomous Vehicle
MDM-VI	8	(MDM6EL106) Hybrid Electric Vehicle

Track 2

Courses	Sem	MDMT2EL201 : Solar Engineering
MDM-I	3	(MDM1EL201) Introduction to Solar -Thermal Energy
MDM-II	4	(MDM2EL202) Semi-conductor material for Solar Photovoltaic cells
MDM-III	5	(MDM3EL203) Solar Power Plant Design
MDM-IV	6	(MDM4EL204) Solar rooftop:Design and Installation
MDM-V	7	(MDM5EL205) Technical and economic analysis of Solar PV
MDM-VI	8	(MDM6EL206) Applications of Solar Energy

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B.Tech in Electrical Engineering

III SEMESTER

MDM1EL101: Introduction to Electric Vehicles

Unit:1	Electric Vehicle	7 Hours
Introduction: History of EV, Components of Electric Vehicle, Comparison with Internal combustion Engine: Technology, Comparison with Internal combustion Engine: Benefits and Challenges, EV classification and their electrification levels.		
Unit:2	Types of EV Chargers	8 Hours
Electric Vehicle Technology and Charging Equipment's, Basic charging Block Diagram of Charger, Difference between Slow charger and fast charger, Slow charger design rating, Fast charger design rating, AC charging and DC charging, Inboard and off board charger specification, Type of Mode of charger Mode -2 , Mode-3 and Mode-4, EVSE associated charge times calculation.		
Unit:3	Selection and sizing of Common types of connectors and applications	7 Hours
Selection of AC charger type-1, type -2 and type -3, Communication between AC charger and EV, Selection of DC charger connector GB/T, CHAdeMO, CCS-1 and CSS-2, Communication methodology of DC fast chargers, IS/ IEC/ARAI/ standard of Charging topology, Communication and connectors (IEC 61851-1, IEC 61851-24,62196-2), Selection sizing of Charger connector cable.		
Unit:4	Public Charging infrastructure / Electrical system design	8 Hours
Assessment of site Location for Public charging station, Selection and Sizing of – Distribution transformer, HT Equipment (VCB, CT, PT, Metering), HT Cables and LT cables, Distribution Board / feeders, LT and HT cable, Compact Substation (CSS for EV CS)/ Power Substation), relay and calculation, EV Charger Single Line Diagram		
		30 Hours

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B.Tech in Electrical Engineering

SoE No.
23EL-101

III SEMESTER

MDM1EL102: Introduction to Solar -Thermal Energy

Unit I: Flat plate collectors	(7 Hrs.)
Radiative Properties and Characteristics of Materials, Performance analysis, Transmissivity of the cover system, Transmissivity-Absorptivity product, Overall loss co-efficient and heat transfer calculations	
Unit II: Concentrating Collectors	(8 Hrs.)
General characteristics, Thermal analysis of concentrating collectors, Solar Concentration Ratio (C), Cylindrical parabolic collector	
Unit III: Thermal energy storage	(7 Hrs.)
Introduction, Sensible heat storage, Latent heat storage, Thermochemical storage	
Unit IV: Solar Pond	(8 Hrs.)
Introduction to Solar Pond, Description , Applications	
	30 Hours

Textbooks:

1.	Solar photovoltaic: Fundamentals, Technologies and Applications by Chetan Singh Solanki, Published by PHI
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Reference Books:

1.	B.H.Khan , “ Non Conventional Energy Resources” , 3rd edition 2017, Mc Graw Hill Publication
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YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1.	http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Power%20System%20Engineering/Principles%20of%20Power%20Systems%20V.K%20Mehta.pdf
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MOOCs Links and additional reading, learning, video material

1.	Renewable Energy Engineering: Solar, Wind and Biomass Energy Systems [Intro Video] http://103.152.199.179/YCCE/DTEL%20Material/3.Electrical%20Engineering/DTEL%20PPTs/IV%20SEM%20ESTER/EL-2253%20EEGS/
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B.Tech in Electrical Engineering

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23EL-101**

III SEMESTER

MDM1EL103: Introduction to PLC

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(Department of Electrical Engineering)

SoE No.
23EL-101

B.Tech in Electrical Engineering

III SEMESTER

Open Elective -I : Basket

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	3	OE1	GE	23OE1301	OE-I : Combinatorics
2	3	OE1	GE	23OE1302	OE-I : Fuzzy Set Theory, Arithmetic And Logic
3	3	OE1	GE	23OE1303	OE-I : Green Chem. & Sustainability
4	3	OE1	GE	23OE1304	OE-I : Hydrogen Fuel
5	3	OE1	GE	23OE1305	OE-I : Electronic Materials And Applications
6	3	OE1	GE	23OE1306	OE-I : Laser Technology And Applications
7	3	OE1	MGT	23OE1307	OE-I : Finance And Cost Management
8	3	OE1	MGT	23OE1308	OE-I : Operation Research Techniques
9	3	OE1	MGT	23OE1309	OE-I : Project Evaluation & Management
10	3	OE1	MGT	23OE1310	OE-I : Total Quality Management
11	3	OE1	MGT	23OE1311	OE-I : Value Engineering
12	3	OE1	MGT	23OE1312	OE-I : Maintenance Management
13	3	OE1	MGT	23OE1313	OE-I : Industrial Safety
14	3	OE1	MGT	23OE1314	OE-I : Industry 4.0
15	3	OE1	MGT	23OE1315	OE-I : Operation Management
16	3	OE1	MGT	23OE1316	OE-I : Material Management
17	3	OE1	MGT	23OE1317	OE-I : Hospitality Management
18	3	OE1	MGT	23OE1318	OE-I : Human Resource Management & Organizational Behaviour
19	3	OE1	MGT	23OE1319	OE-I : Agri-Business Management
20	3	OE1	MGT	23OE1320	OE-I : Rural Marketing
21	3	OE1	MGT	23OE1321	OE-I : Marketing Management
22	3	OE1	MGT	23OE1322	OE-I : Health Care Management

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

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B.Tech in Electrical Engineering

**SoE No.
23EL-101**

III SEMESTER

Mandatory Learning Course (Audit Course)

MLC2123 : YCAP3

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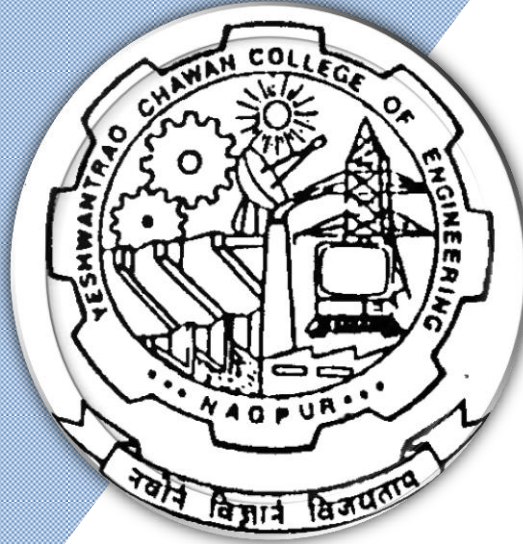
Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology

SoE & Syllabus 2023

4th Semester

(Department of Electrical Engineering)

B. Tech in Electrical 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 Electrical Engineering)
B. Tech in Electrical Engineering

SoE No.
23EL-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	HSSM-2	GE	23GE1401	Entrepreneurship Development	T	2	0	0	2	2	30	20	50	3
2	4	AEC-2	GE	23GE1405 23GE1406	Marathi Language Hindi Language	T	2	0	0	2	2	30	20	50	3
3	4	PC	EL	23EL1401	Electrical Measurement and Instrumentation	T	3	0	0	3	3	30	20	50	3
4	4	PC	EL	23EL1402	Lab : Electrical Measurement and Instrumentation	P	0	0	2	2	1		60	40	
5	4	PC	EL	23EL1403	Electrical Machines in Power System	T	3	0	0	3	3	30	20	50	3
6	4	PC	EL	23EL1404	Lab : Electrical Machines in Power System	P	0	0	2	2	1		60	40	
7	4	VSEC-3	EL	23EL1405	Lab : Computer Programming	P	0	0	2	4	2		60	40	
8	4	VEC-2	EL	23EL1406	Digital Signal Processing	T	2	0	0	2	2	30	20	50	3
9	4	MDM	EL		MD Minor Course-II	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
TOTAL							16	0	6	24	20				

List of Mandatory Learning Course (MLC)

1	4	HS	T&P	MLC2124	YCAPP4 : YCCE Communication Aptitude Preparation	A	3	0	0	3	0				
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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

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(Department of Electrical Engineering)

B.Tech in Electrical Engineering

SoE No.
23EL-101

IV SEMESTER

23GE1401 : Entrepreneurship Development

Course Outcomes:

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

1. Appreciate role of entrepreneurs in society and develop entrepreneurial abilities by providing information about skill sets.
2. Develop an understanding of how and what form of business organization to choose for 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

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(Department of Electrical Engineering)

SoE No.
23EL-101

B.Tech in Electrical Engineering

IV SEMESTER

23EL1401: Electrical Measurement & Instrumentation

Course Outcomes:

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

1. Discuss the working principle of measuring instruments and circuit parameters
2. Explain the concepts of measurement of power and Energy.
3. Illustrate the fact and ideas related to instrument transformer.
4. Apply the knowledge of analog and digital instruments with transducers to measure physical quantities

Unit:1	Measuring Instruments	7 Hours
Electrical Measurement : Classification of Instruments , Deflection and null type instruments ,forces acting in Indicating instruments , Construction and working principle of PMMC and MI type instruments , Measurement of Resistance : Classification of Resistance, Wheatstone bridge , Kelvin's Double Bridge , Loss of charge method. Construction and working principle of Megger , Measurement of Earth Resistance.		
Contemporary Issues related to Topic		
Unit:2	Potentiometers and AC Bridges	8 Hours
D.C. Potentiometer: Basic Potentiometer circuit, Lab Type Potentiometer voltage ratio box. A.C. Potentiometer:- Standardization of AC Potentiometer, Drysdale Polar potentiometer, Gall-Tinsley (Co-ordinate type) Potentiometer. AC Bridges: General equation of AC bridge balance, measurement of Inductance by Maxwell Inductance-capacitance Bridge, detectors used in AC Bridges, Measurement of Capacitance By High voltage Schering bridge , Measurement of Relative Permittivity by Schering bridge, Measurement of frequency By Wien's Bridge.		
Contemporary Issues related to Topic		
Unit:3	Measurement of Power and Energy	7 Hours
Wattmeter : Construction and operation of Electrodynamometer type wattmeter , LPF Wattmeter, Measurement of power using instrument transformer, Blondal's Theorem , Measurement of three phase power By single wattmeter, Two wattmeter , and Three wattmeter method , measurement of Reactive power for Balanced load using single wattmeter method. Energy Measurement : Induction type Energy meter (construction and operating principle)Errors and their compensation , Two element energy meter , maximum demand energy meter , phantom Loading (Merz – price). Power factor Meter : Three phase Electrodynamometer type power factor meter.		
Contemporary Issues related to Topic		

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Unit:4	Instrument Transformers	8 Hours
Instrument Transformer : Use of instrument transformer , ratios in instrument transformer , burden , characteristics of CT , Effect of secondary open in CT. Potential transformer : Difference between CT and PT , Errors in PT , Reduction of errors in PT , characteristics of PT.		
Unit:5	Analog Transducers	7 Hours
Transducers: Introduction, Types (Piezoelectric Transducer, Active , Passive transducers) Transducers : Transducers required for the measurement of (Non electrical quantities) Linear displacement (LVDT), Strain , (Strain gauge, Un bounded metal Strain gauge, semi conductor Strain gauge),Pressure (Bourden Tube,Bellows, Pirani Gauge),Torque , Linear velocity, Angular Velocity Temperature,(Thermocouples ,First and Second Law of Thermocouple, Thermistors , Bimetallic Thermocouples), Flow (Electromagnetic Flow meter), Acceleration : LVDT Accelerometer. Digital Encoding transducers – Contacting or Brush type, Shaft encoder. Contemporary Issues related to Topic		
Unit :6	Digital Instruments and Transducers	8 Hours
Digital Voltmeters, Digital Ammeters: Ramp type digital Voltmeter and Ammeter, Integrating type digital voltmeter and ammeter. Digital Frequency Meter: Basic circuit, Time base, start and stop Gate circuit for measurement of frequency. Electrical resonance type frequency meter, Weston frequency meter Contemporary Issues related to Topic		
Total Hours		45 Hours

Student activities:

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

Textbooks

1. Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd.,Ram Nagar, New Delhi, 2013.
2. Donald F Kuratko, "Entrepreneurship – Theory, Process and Practice", 9th Edition, Cengage Learning 2014.
3. Corporate Law, 33rd ed. 2016, Taxman New Delhi.
4. Narayanan, V. K., Managing technology and innovation for competitive advantage, first edition, Pearson education, New Delhi, (2006)
5. Idris, K. (2003), Intellectual property: a power tool for economic growth, second edition, WIPO publication no. 888, Switzerland
6. Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd.,Ram Nagar, New Delhi, 2013.
7. Ramaiya's Guide to the Companies Act, 18th ed. 2014, Lexis Nexis New Delhi.

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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

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**SoE No.
23EL-101**

IV SEMESTER

23EL1402: Lab. Electrical Measurement & Instrumentation

Course Outcomes:

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

1. Discuss the working principle of measuring instruments and circuit parameters
2. Explain the concepts of measurement of power and Energy.
3. Illustrate the fact and ideas related to instrument transformer
4. Apply the knowledge of analog and digital instruments with transducers to measure physical quantities

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

Sr. No.	Experiments based on
1	To find high resistance using loss of charge method
2	To determine low resistance using Kelvin's double bridge.
3	To compute medium resistance using Wheatstone bridge
4	To measure inductance using Anderson's bridge.
5	To evaluate three phase power using two wattmeter method
6	To calculate electrical energy using electromechanical energy meter
7	To measure capacitance using Schering Bridge
8	Testing of single phase induction type energy meter
9	To calculate reactive power in balanced three phase ac circuit using single wattmeter.
10	To explain working of Strain gauge
11	To estimate Torque using sensors.
12	To explain working of an instrumentation amplifier
13	To explain working of Cathode Ray Oscilloscope.

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23EL-101**

IV SEMESTER

23EL1403: Electrical Machines in Power System

Course Outcomes:

1. Analyze steady state performance of synchronous machines
2. Illustrate Synchronization, load sharing and effect of variable excitation in parallel operation of alternators.
3. Evaluate the performance of Synchronous machine connected to infinite bus.
4. Describe the transient behaviour of Synchronous Machine.

Unit:1	Armature Winding	7 Hours
Full pitch coil, short pitched coil, Coil span factor, concentrated winding, distributed winding, distribution factor, introduction to armature winding and field winding, MMF of armature winding, induced EMF with and without harmonics.		
Contemporary Issues related to Topic		
Unit:2	Steady State Operation of Three phase synchronous generators	8 Hours
Introduction, Constructional features of cylindrical and salient pole rotor machines, Effect of loading on terminal voltage, Armature reaction, Effect of load power factor on armature reaction, concept of synchronous reactance, Phasor diagram on load, regulation by Direct loading, Emf method, Load characteristics, External Characteristic, Zero power factor characteristics (ZPFC), construction of Potier triangle..		
Contemporary Issues related to Topic		
Unit:3	Parallel Operation of Synchronous Generators	7 Hours
Conditions of synchronization of generator with another generator and or Infinite busbars, Parallel operation, Loadsharing between parallel connected generators. Effect of variable excitation and power input (speed) on generator operation		
Contemporary Issues related to Topic		
Unit:4	Synchronous Motor	8 Hours
Principle of operation, Methods of starting, phasor diagram, expression for torque, Excitation Emf, load/torque angle, Effect of variable excitation and load on motor operation, V and inverted V curves, Concept of synchronous condenser, Introduction to Permanent Magnet Synchronous motor, Reluctance and Hysteresis motor.		
Contemporary Issues related to Topic		
Unit:5	Synchronous Machine Connected to Infinite Bus	7 Hours
Power Angle Characteristic of Synchronous machines with and without armature resistance. Expression forelectrical and electromechanical power developed, losses and efficiency in synchronous machines.		
Contemporary Issues related to Topic		

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Unit :6	Transient Behaviour	8 Hours
Short circuit ratio, unbalanced Loading, Sequence Component, Sudden 3-phase short circuit, Constant flux linkage theorem, Transient and sub-transient reactances, Time constants and equivalent circuit diagram, role of damper winding in both generator and motor operation. Experimental determination of steady state & transient parameters		
Contemporary Issues related to Topic		
Total Lecture Hours		45 Hours

Text books

1	Dr. P. K. Mukherjee and S. Chakravarti, "Electrical Machines", Dhanpat Rai Publications (P) Ltd ,Edition 2nd -1993
2	I.J.Nagrath and Dr. D.P.Kothari, "Electrical Machines" , Tata McGraw Hill ,edition 3rd -2010.

Reference Books

1	M.G. Say , "Alternating Current Machines" ,Publishers ,Edition 1st -1983
2	P.S.Bhimbra , "Electrical Machinery" , Khanna Publisers, Edition 7TH -2008.
3	A.E.Fitzgerald, C.Kingsley, S.D.Umens , "Electrical Machinery" , Mc Graw Hill, Edition 1ST-1985
4	Ashfaq Husain , "Electric Machines" , Dhanpat Rai Publications (P) Ltd., 2nd -2008

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

1	http://link.springer.com/openurl?genre=book&isbn=978-3-642-25904-3
2	http://link.springer.com/openurl?genre=book&isbn=978-1-4614-0399-9
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Electrical%20Machines/

MOOCs Links and additional reading, learning, video material

1	https://archive.nptel.ac.in/courses/108/105/108105131/
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**SoE No.
23EL-101**

IV SEMESTER

23EL1404 : Lab. Electrical Machines in Power System

Course Outcomes:

1. Analyze steady state performance of synchronous machines
2. Illustrate Synchronization, load sharing and effect of variable excitation in parallel operation of alternators.
3. Evaluate the performance of Synchronous machine connected to infinite bus.
4. Describe the transient behaviour of Synchronous Machine.

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

Sr. No.	Experiments based on
1	To determine voltage regulation of an alternator by direct loading
2	To determine voltage regulation of an alternator by synchronous impedance method.
3	To plot external characteristics of synchronous generator at different power factor loads
4	To perform slip test on a 3-phase synchronous machine.
5	To study synchronization of a 3-phase alternator with infinite bus-bars.
6	To determine sub-transient reactance of synchronous machine.
7	To determine negative sequence reactance of a 3-phase synchronous machine
8	To determine zero sequence reactance of a 3-phase synchronous machine.
9	To observe armature voltage and current waveforms of a 3-phase alternator during slip-test on C.R.O.
10	To plot V and inverted V curves of a 3-phase synchronous motor

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23EL-101**

IV SEMESTER

23EL1405 : Lab : Computer Programming

Course Outcomes:

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

1. Explain various programming constructs of SCILAB
2. Develop programs using SCILAB
3. Analyse and plot the results using SCILAB

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

Sr. No.	Experiments based on
1	To discuss functions and keywords of SCILAB
2	To demonstrate operations on matrices
3	To Construct a function and demonstrate how functions are called
4	To Solve linear differential equations
5	To Calculate the roots of quadratic equation using if else statement
6	To Construct a function that returns the mean and standard deviation of a vector of numbers
7	To Construct a function that reverses the order of letters in a string, and returns the new string
8	To Compute the power factor of the RL series circuit. Plot the voltage and current
9	To Create the vector $0:\pi/20:2*\pi$ and use it to sample the $\sin()$ function. Plot the results with labels
10	To Determine the mesh currents for the given circuit diagram
11	Determine the node voltages for the given circuit diagram
12	Observe the for loop construct in Vlabs
13	Observe the if else, if else if constructs in Vlabs

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IV SEMESTER

23EL1406 : Digital Signal Processing

Course Outcomes:

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

1. Classify mathematical representation of signals and systems in various domains.
2. Determine and analyze signals in time and frequency domain using Fourier series and Fourier transform.
3. Evaluate and analyze signals using Z-transform.
4. Analyze and design digital filter

Unit:1	Continuous and Discrete time signals	7 Hours
Continuous and discrete Signal representation, classification of signals, Signal Energy and Power, Periodic, Even & Odd, Real and Exponential Signals Discrete Signal properties: Linearity, causality, stability, static/dynamic. Time invariance/Time variance Convolution		
Unit:2	Fourier Series Representation of Periodic Signals	8 Hours
Fourier Series Representation of Continuous-Time Periodic Signals. Convergence of the Fourier Series. Properties of Continuous-Time Fourier Series. Fourier Series Representation of Discrete-Time Periodic Signals. Properties of Discrete-Time Fourier Series.		
Unit:3	Fourier Transform and Z-Transform	7 Hours
Fourier Transform - Convergence of Fourier Transform and its Properties, Representation of Aperiodic Signals, The Fourier Transform for Periodic Signals. 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. Block Diagram Representations. The Unilateral z-Transform.		
Unit:4	Introduction to Digital Signal Processing	8 Hours
Sampling theorem, Basic Digital Filtering, FIR, and IIR Filter Designs		
Total Lectures		30 Hours

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Text books

1 Signals and Systems 2nd Edition, 2013, Alan V. Oppenheim, Alan S. Willsky, with S. Hamid

Reference Books




- 1 Signals & Systems, 2nd Edition., 2005 Simon Haykin and Van Veen Wiley
- 2 Signals, Systems and Transforms 3rd Edition, 2004 C. L. Philips, J.M.Parr and Eve A. Riskin Pearson education
- 3 Schaum's Outlines of Signals and Systems 3rd Edition, 2002 Hwei P. Hsu McGraw Hill
- 4 Linear Systems and Signals 2nd Edition B.P. Lathi Oxford University Press

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- 1 <http://link.springer.com/openurl?genre=book&isbn=978-1-4614-5331-4>
- 2 <http://link.springer.com/openurl?genre=book&isbn=978-3-540-92953-6>

MOOCs Links and additional reading, learning, video material

- 1 nptel video lect/ <https://youtu.be/xrVWB9VYZ64> by Prof. Aditya K. Jagannatham
- 2 nptel video lect/ <https://youtu.be/7Z3LE5uM-6Y> by Prof. K.S. Venkatesh

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IV SEMESTER Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1EL101 : Electric Vehicles
MDM-I	3	(MDM1EL101) Introduction to Electric Vehicles
MDM-II	4	(MDM2EL102) Energy storage devices
MDM-III	5	(MDM3EL103) Electric Machines
MDM-IV	6	(MDM4EL104) Power Electronics and Motor drives
MDM-V	7	(MDM5EL105) Drives and Autonomous Vehicle
MDM-VI	8	(MDM6EL106) Hybrid Electric Vehicle

Track 2

Courses	Sem	MDMT2EL201 : Solar Engineering
MDM-I	3	(MDM1EL201) Introduction to Solar -Thermal Energy
MDM-II	4	(MDM2EL202) Semi-conductor material for Solar Photovoltaic cells
MDM-III	5	(MDM3EL203) Solar Power Plant Design
MDM-IV	6	(MDM4EL204) Solar rooftop:Design and Installation
MDM-V	7	(MDM5EL205) Technical and economic analysis of Solar PV
MDM-VI	8	(MDM6EL206) Applications of Solar Energy

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IV SEMESTER

Track1 : MDMT1EL101 : Electric Vehicles

MDM2EL102: Energy Storage Devices

Course Outcomes:

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

1. To understand the fundamentals of advanced batteries, their sizing, and applications of super-capacitors.
2. To understand the aspects of battery hybridization, and fuel reforms.
3. To understand the various battery recycling, testing procedures, and verification of battery performances.
4. To understand the battery management systems, thermal management systems, and aspects of battery safety.

Unit:1	BATTERIES	7 Hours
Advanced Lithium-iron (Li-ion) battery, Nickel-metal hybrid battery, Advanced Nickel-metal hydride battery (Ni-MH) batteries for transportation, Advanced lead-acid batteries, applications of batteries for use of High-temperature, load leveling, large-scale grid operation, and space.		
Unit:2	Battery hybridization and its application	8 Hours
Hybridization and the applications of Battery and Supercapacitor, Battery and Fuel-Cell, Battery and Solar-Cell, Battery and Wind Turbine		
Unit:3	Battery Recycling Technologies, Battery Chargers, and Battery Testing Procedures	7 Hours
Technology and economic aspects of battery recycling, its applications, Constant current and constant voltage methods, Hybrid methods, Inductive chargers, Battery testing.		
Unit:4	Battery Management Systems (BMS)	8 Hours
Fundamentals of battery management systems and controls, passive and active cooling, regulations and safety aspects of high voltage batteries using codes and standards, Safe handling of lithium batteries, the safety of high voltage devices.		
		30 Hours

Text Books:

Sr. No.	Title	Author Details	Publication Details
1	Battery Technology Handbook	A. Kiehne	Marcel Dekker, NYC, 2003
3	Handbook of Batteries, 3rd Edition	D. Linden and T. S. Reddy	McGraw-Hill, 2002
4	Maintenance-Free Batteries	D. Berndt	John Wiley & Sons, NY, 1997

References:

Sr. No.	Title	Author Details	Publication Details
1	Electric Vehicle Technology Explained	James Larminie and John Lowry	John Wiley, NY, 2003

Online Resources

Sr. No.	Link
1	https://archive.nptel.ac.in/courses/113/105/113105102/

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IV SEMESTER

Track2 : MDMT2EL201 : Solar Engineering

MDM2EL202: Semi-conductor material for Solar Photovoltaic cells

Unit I: Fundamentals of semi-conductor	(7 Hrs.)
Semi-conductors as solar cell material, arrangements of atoms in space, Bohr model of Hydrogen atom Metal, insulator and semiconductor, direct and indirect band gap, charge carriers in semiconductors, carrier motion in semiconductors	
Unit II: An introduction to solar cell	(7 Hrs.)
P-N junction-equilibrium condition, P-N junction in non-equilibrium condition, P-N junction under illumination, generation of photo voltage, light generated current, I-V equation of solar cell, solar cell characteristics.	
Unit III: Design of solar cell	(8 Hrs.)
Upper Limits of cell parameter: short circuit current, open circuit voltage, fill factor, efficiency Losses in solar cell	
Unit IV: Solar cell technologies	(7 Hrs.)
Production of Si, Si wafers, Si sheets, Si uses in solar PV, Use of Anti-reflective coating , introduction to bifacial solar cell.	
Total Lecture	30 Hours

Textbooks:	
1.	C.S.Solanki, Solar Photovoltaics - Fundamentals, Technologies and Applications, 2nd edition 2013, PHI Publication
Reference Books:	
1.	B.H.Khan , “ Non Conventional Energy Resources”, 3rd edition 2017, Mc Graw Hill 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/Electrical%20Engineering/Power%20System%20Engineering/Principles%20of%20Power%20Systems%20V.K%20Mehta.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Renewable%20Energy%20Sources/B.H.Khan%20Book%20RES.pdf
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Renewable%20Energy%20Sources/Solar%20Energy%20pdf.pdf
MOOCs Links and additional reading, learning, video material	
1	Renewable Energy Engineering: Solar, Wind and Biomass Energy Systems [Intro Video]
2	http://103.152.199.179/YCCE/DTEL%20Material/3.Electrical%20Engineering/DTEL%20PPTs/IV%20SEMESTER/EL-2253%20EEGS/

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IV SEMESTER Open Elective -II : Basket

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

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

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Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

(Department of Electrical Engineering)




B.Tech in Electrical Engineering

**SoE No.
23EL-101**

IV SEMESTER

Mandatory Learning Course (Audit Course)

MLC2124 : YCAP4

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