

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology

SoE & Syllabus 2023

1st to 6th Semester

(Department of Mechanical Engineering)

B. Tech in Mechanical 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 Mechanical Engineering)
B. Tech in Mechanical Engineering

SoE No.
23ME-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	ME	23ME1107	Lab : FAB Shop	P	0	0	2	2	1		60	40	
8	1	PC	ME	23ME1105	Material Science & Metallurgy	T	3	0	0	3	3	30	20	50	3
9	1	PC	ME	23ME1106	Lab : Material Science & Metallurgy	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	23GE1216	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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B. Tech in Mechanical Engineering

SoE No.
23ME-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**

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



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23 ME-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration
							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	HSSM-1	GE	23GE1301	Fundamentals of Management & Economics	T	2	0	0	2	2	30	20	50	3
2	3	VEC-II	ME	23ME1301	Computer Aided Design	T	2	0	0	2	2	30	20	50	3
3	3	CEP	ME	23ME1302	Community Engagement Project	P	0	0	2	4	2		60	40	
4	3	PC	ME	23ME1303	Manufacturing Processes	T	3	0	0	3	3	30	20	50	3
5	3	PC	ME	23ME1304	LAB: Manufacturing Processes	P	0	0	2	2	1		60	40	
6	3	PC	ME	23ME1305	Mechanics of Materials	T	3	1	0	4	4	30	20	50	3
7	3	PC	ME	23ME1306	LAB:- Mechanics of Materials	P	0	0	2	2	1		60	40	
8	3	PC	ME	23ME1307	Kinematics of Machineries	T	3	0	0	3	3	30	20	50	3
9	3	OE - I	OE		Open Elective -I	T	2	0	0	2	2	30	20	50	3
10	3	MDM - I	ME		MD Minor Course-I	T	2	0	0	2	2	30	20	50	3
TOTAL							17	1	6	26	22				

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

Open Elective - I

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	3	OE1	GE	23OE1301	OE-I : Combinatorics
2	3	OE1	GE	23OE1302	OE-I : Fuzzy Set Theory, Arithmetic And Logic
3	3	OE1	GE	23OE1303	OE-I : Green Chemistry & Sustainability
4	3	OE1	GE	23OE1304	OE-I : Hydrogen Fuel
5	3	OE1	GE	23OE1305	OE-I : Electronic Materials And Applications
6	3	OE1	GE	23OE1306	OE-I : Laser Technology And Applications
7	3	OE1	MGT	23OE1307	OE-I : Finance And Cost Management
8	3	OE1	MGT	23OE1308	OE-I : Operation Research Techniques
9	3	OE1	MGT	23OE1309	OE-I : Project Evaluation & Management
10	3	OE1	MGT	23OE1310	OE-I : Total Quality Management
11	3	OE1	MGT	23OE1311	OE-I : Value Engineering
12	3	OE1	MGT	23OE1312	OE-I : Maintenance Management
13	3	OE1	MGT	23OE1313	OE-I : Industrial Safety
14	3	OE1	MGT	23OE1314	OE-I : Industry 4.0
15	3	OE1	MGT	23OE1315	OE-I : Operation Management
16	3	OE1	MGT	23OE1316	OE-I : Material Management
17	3	OE1	MGT	23OE1317	OE-I : Hospitality Management
18	3	OE1	MGT	23OE1318	OE-I : Human Resource Management & Organizational Behaviour
19	3	OE1	MGT	23OE1319	OE-I : Agri-Business Management
20	3	OE1	MGT	23OE1320	OE-I : Rural Marketing
21	3	OE1	MGT	23OE1321	OE-I : Marketing Management
22	3	OE1	MGT	23OE1322	OE-I : Health Care Management
23	3	OE1	MGT	23OE1323	OE-I : Designated approved online NPTEL/KKSU Course
24	3	OE1	MGT	23OE1324	OE-I : Indian Archeology
25	3	OE1	MGT	23OE1325	OE-I : Social & Positive Psychology
26	3	OE1	MGT	23OE1326	OE-I : Seismology & Earthquake

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23 ME-101

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							L	T	P	Hrs		MSEs*	TA**	ESE	
FOURTH SEMESTER															
1	4	BS	GE	23GE1402	Integral Transform	T	3	0	0	3	3	30	20	50	3
2	4	HSSM-2	GE	23GE1401	Entrepreneurship Development	T	2	0	0	2	2	30	20	50	3
3	4	AEC-2	GE	23GE1405 23GE1406	Marathi Language / Hindi Language	T	2	0	0	2	2	30	20	50	3
4	4	VEC - I	CV	23CV1411	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
5	4	PC	ME	23ME1401	Machining Processes	T	3	0	0	3	3	30	20	50	3
6	4	PC	ME	23ME1402	Lab - Machining Processes	P	0	0	2	2	1		60	40	
7	4	PC	ME	23ME1403	Lab - Computer Aided Design	P	0	0	2	2	1		60	40	
8	4	VSEC - III	ME	23ME1404	Lab - Machine Drawing	P	0	0	4	4	2		60	40	
9	4	OE - II	OE		Open Elective -II	T	2	0	0	2	2	30	20	50	3
10	4	MDM - II	ME		MD Minor Course-II	T	2	0	0	2	2	30	20	50	3
TOTAL							16	0	8	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				

Open Elective - II

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

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							L	T	P	Hrs		MSEs*	TA**	ESE	
FIFTH SEMESTER															
1	5	PC	ME	23ME1501	Engineering Thermodynamics	T	3	0	0	3	3	30	20	50	3
2	5	PC	ME	23ME1502	Measurement, Metrology & Quality Control	T	3	0	0	3	3	30	20	50	3
3	5	PC	ME	23ME1503	Lab : Measurement, Metrology & Quality Control	P	0	0	2	2	1		60	40	
4	5	PC	ME	23ME1504	Fluid Mechanics	T	3	1	0	4	4	30	20	50	3
5	5	PC	ME	23ME1505	Lab : Fluid Mechanics	P	0	0	2	2	1		60	40	
6	5	PC	ME	23ME1506	Operation Research Technique	T	3	0	0	3	3	30	20	50	3
7	5	PE	ME		Professional Elective - I	T	3	0	0	3	3	30	20	50	3
8	5	PE	ME		Lab : Professional Elective - I	P	0	0	2	2	1		60	40	
9	5	OE-3	OE		Open Elective -III	T	3	0	0	3	3	30	20	50	3
10	5	MDM	ME		MD Minor Course-III	T	3	0	0	3	3	30	20	50	3
11	5	STR	ME	23ME1507	Internship and Indsutrial Visit	P	0	0	1	1	1		60	40	
TOTAL							21	1	7	29	26				

List of Mandatory Learning Course (MLC)

1	5	HS	T&P	MLC2125	YCAPP5 : YCCE Communication Aptitude Preparation	A	3	0	0	3	0				
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Professional Elective - I

1	5	PE-I	ME	23ME1521	PE-I : Finite Element Methods	
2	5	PE-I	ME	23ME1522	PE-I : Lab : Finite Element Methods	
3	5	PE-I	ME	23ME1523	PE-I : Industrial Fluid Power	
4	5	PE-I	ME	23ME1524	PE-I : Lab : Industrial Fluid Power	
5	5	PE-I	ME	23ME1525	PE-I : Electric and Hybrid Vehicle	
6	5	PE-I	ME	23ME1526	PE-I : Lab : Electric and Hybrid Vehicle	
7	5	PE-I	ME	23ME1527	PE-I : Advance Welding Techniques	
8	5	PE-I	ME	23ME1528	PE-I : Lab : Advance Welding Techniques	
9	5	PE-I	ME	23ME1529	PE-I : CNC & Robotics	
10	5	PE-I	ME	23ME1530	PE-I : Lab : CNC & Robotics	
11	5	PE-I	ME	23ME1531	PE-I : Mechatronics	
12	5	PE-I	ME	23ME1532	PE-I : Lab : Mechatronics	
13	5	PE-I	ME	23ME1533	PE-I : Computer Aided Manufacturing	
14	5	PE-I	ME	23ME1534	PE-I : Lab : Computer Aided Manufacturing	
15	5	PE-I	ME	23ME1535	PE-I : Two Wheeler technology	
16	5	PE-I	ME	23ME1536	PE-I : Lab : Two Wheeler technology	

Open Elective - III

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

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SIXTH SEMESTER															
1	6	PC	ME	23ME1601	Heat Transfer	T	3	0	0	3	3	30	20	50	3
2	6	PC	ME	23ME1602	Lab : Heat Transfer	P	0	0	2	2	1		60	40	
3	6	PC	ME	23ME1603	Dynamics of Machines	T	3	0	0	3	3	30	20	50	3
4	6	PC	ME	23ME1604	Lab : Dynamics of Machines	P	0	0	2	2	1		60	40	
5	6	PC	ME	23ME1605	Design of Machine Element	T	3	0	0	3	3	30	20	50	3
9	6	PE	ME		Professional Elective-II	T	3	0	0	3	3	30	20	50	3
10	6	PE	ME		Lab : Professional Elective-II	P	0	0	2	2	1		60	40	
11	6	PE	ME		Professional Elective-III	T	3	0	0	3	3	30	20	50	3
12	6	MDM	ME		MD Minor Course-IV	T	3	0	0	3	3	30	20	50	3
6	6	VSEC-4	ME	23ME1606	Lab : Computer Aided Engineering	P	0	0	2	4	2		60	40	
7	6	STR	ME	23ME1607	Project Phase-I	P	0	0	4	4	2		60	40	
8	6	STR	ME	23ME1608	Design Thinking and Research Methodology	T	2	0	0	2	2	30	20	50	3
TOTAL							20	0	12	34	27				

List of Mandatory Learning Course (MLC)

1	6	HS	T&P	MLC126	YCAPP6 :	A	3	0	0	3	0				
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Professional Elective - II

1	6	PE-II	ME	23ME1621	PE-II : Vibration
2	6	PE-II	ME	23ME1622	PE-II : Lab : Vibration Lab
3	6	PE-II	ME	23ME1623	PE-II : Refrigeration Air conditioning and Cryogenics
4	6	PE-II	ME	23ME1624	PE-II : Lab : Refrigeration Air conditioning and Cryogenics
5	6	PE-II	ME	23ME1625	PE-II : Vehicle Engineering
6	6	PE-II	ME	23ME1626	PE-II : Lab : Vehicle Engineering
7	6	PE-II	ME	23ME1627	PE-II : Computer Integrated Manufacturing
8	6	PE-II	ME	23ME1628	PE-II : Lab : Computer Integrated Manufacturing
9	6	PE-II	ME	23ME1629	PE-II : I.C. Engines
10	6	PE-II	ME	23ME1630	PE-II : Lab : I.C. Engines
11	6	PE-II	ME	23ME1631	PE-II : Earth Moving Equipments
12	6	PE-II	ME	23ME1632	PE-II : Lab : Earth Moving Equipments
13	6	PE-II	ME	23ME1633	PE-II : Computational Fluid Dynamics
14	6	PE-II	ME	23ME1634	PE-II : Lab : Computational Fluid Dynamics
15	6	PE-II	ME	23ME1635	PE-II : Solar Energy and Utilization
16	6	PE-II	ME	23ME1636	PE-II : Lab : Solar Energy and Utilization

Professional Elective - III

1	6	PE-III	ME	23ME1641	PE-III : Tool Design
2	6	PE-III	ME	23ME1642	PE-III : Reliability Engineering
3	6	PE-III	ME	23ME1643	PE-III : Advanced Manufacturing Techniques
4	6	PE-III	ME	23ME1644	PE-III : Total Quality Management
5	6	PE-III	ME	23ME1645	PE-III : Thermal Engineering Systems
6	6	PE-III	ME	23ME1646	PE-III : Optimization Techniques
7	6	PE-III	ME	23ME1647	PE-III : Project Evaluation & Management
8	6	PE-III	ME	23ME1648	PE-III : Fuel Cell Technology
9	6	PE-III	ME	23ME1649	PE-III : Design of Experiments and Taguchi Methods

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

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology

SoE & Syllabus 2023

1st Semester

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering



Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
 (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

SoE No.
 23ME-101

B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

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	ME	23ME1107	Lab : FAB Shop	P	0	0	2	2	1		60	40			
8	1	PC	ME	23ME1105	Material Science & Metallurgy	T	3	0	0	3	3	30	20	50	3		
9	1	PC	ME	23ME1106	Lab : Material Science & Metallurgy	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	23GE1216	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



Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
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B.TECH SCHEME OF EXAMINATION 2023
 (Scheme of Examination w.e.f. 2023-24 onward)
(Department of Mechanical Engineering)
B. Tech in Mechanical Engineering

SoE No.
23ME-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**

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



Nagar Yuwak Shikshan Sanstha's Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Mathematics & Humanities)

**SoE No.
23FY-101**

B.Tech First Year

I SEMESTER

23GE1102 : Differential Equations, Matrices and Statistics

Course Outcomes	
The students will be able to <ol style="list-style-type: none"> 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
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Mathematics & Humanities)

SoE No.
23FY-101

B.Tech First Year

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:


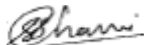
1.	G B Thomas and R L Finney, Calculus and Analytical Geometry, 9th edition, Addison-Wesley, 1999.
2.	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10 th edition, Laxmi Prakashan.

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

1	http://103.152.199.179/YCCE/Supported%20file/Supported%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/

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



Yeshwantrao Chavan College of Engineering

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

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

(Department of Physics)

B.Tech First Year

SoE No.
23FY-101

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

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



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23FY-101**

B.Tech First Year

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

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



Yeshwantrao Chavan College of Engineering

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

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

(Department of Physics)

B.Tech First Year

SoE No.
23FY-101

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.

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



Nagar Yuwak Shikshan Sanstha's

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 Mechanical Engineering)

B.Tech in Mechanical Engineering

**SoE No.
23ME-101**

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

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



Nagar Yuwak Shikshan Sanstha's

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 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 |

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



Nagar Yuwak Shikshan Sanstha's

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 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

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



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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**

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

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



Nagar Yuwak Shikshan Sanstha's

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

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 |
|----|---|

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



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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 Mechanical Engineering)

B.Tech in Mechanical Engineering

**SoE No.
23ME-101**

I SEMESTER

23ME1107 : Lab. FAB Shop

Course Outcomes :

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

1. Interpret the general safety/precautions on shop floor; identify and use the different materials, machines and measuring and cutting tools.
2. Practice on manufacturing of components using workshop trades including fitting, plumbing, carpentry, smithy/foundry and welding, etc.
3. Demonstrate practical knowledge of the dimensional accuracies and tolerances applicable for different manufacturing processes.
4. Produce simple/small devices of their interest in project/product development or research purpose.

Sr.No	Experiments based on	CO	Level
1	Study and demonstration of safety norms, unfair practices, meaning of different signs/symbols and use of fire extinguishers	I	L-II
2	Study and demonstration of different materials, devices/machines, cutting and measuring devices used in fitting, plumbing, carpentry, smithy/foundry, welding and machining shop.	I	L-II
3	Create simple job/part/pattern in fitting, plumbing, carpentry, smithy/foundry and welding shop.	II	L-III
4	Elaborate the created job/part/pattern with proper justification of its dimensional accuracies and tolerances.	III	L-III
5	Case study: To prepare simple/small models (Group Activity)	IV	L-III
6	Demonstration of Advance Machining Facility: (With manufacturing of sample job on any one machine)	I	L-II
	a) Lathe, Drilling, Milling, Shaper, Press etc OR		
	b) CNC Trainer Lathe/Milling Machines OR		
	c) CNC Router OR		
	d) EDM		

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



Nagar Yuwak Shikshan Sanstha's

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 Mechanical Engineering)

B.Tech in Mechanical Engineering

SoE No.
23ME-101

Text books

1	Workshop Technology - Part I, Chapman W.A. Fifth edition CBS Publishers
2	Elements of Workshop Technology, (Vol-I), S.K. Hajra Choudhary, A.K. Hajra Choudhary, Nirjhar Roy, Media Promoters & Publishers Pvt Ltd
3	Workshop Technology (Volume-II) Hajra Choudhary 2nd Edition (2012) The McGraw-Hill Companies
4	Manufacturing Technology (Metal Cutting & Machine Tools) P N Rao 2nd Edition (2009) The McGraw-Hill Companies
5	A Course in Workshop Technology, Vol-I, B S Raghwanishi, Dhanpat Rai & Company
6	A Text Book on Workshop Technology by R S Khurmi & J K Gupta, S K Chand & Co
7	Workshop Manual by P Kannaiah & K L Narayana, SCITECH Publications

Reference Books




1	Manufacturing Engineering & Technology S Kalpakjian & SR Schmid 1st Edition (2009) Pearson Education Canada
2	Technology of machine Tools Krar & Oswald 1st Edition (1984) Gregg Division, McGraw-Hill
3	Manufacturing Processes M Begman 1st Edition (1974) Ballinger Pub. Co
4	Manufacturing Science Ghosh & Malik 2nd Edition (2010) East West

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, and video material

1	https://nptel.ac.in/courses/112/103/112103280/
2	https://nptel.ac.in/courses/106/106/106106179/
3	https://nptel.ac.in/courses/127/105/127105007/

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



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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 Mechanical Engineering)

B.Tech in Mechanical Engineering

**SoE No.
23ME-101**

I SEMESTER

23ME1105 : Material Science & Metallurgy

Course Outcomes :

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

1. Distinguish between ferrous and Non-ferrous materials. Illustrate crystal structures for various materials and Differentiate or Distinguish between ferrous and Non-ferrous materials.
2. Interpret Iron-Iron carbide equilibrium diagram and analyse microstructure, general properties of commercial steels and Cast Iron.
3. Discuss the various heat treatment processes for steels.
4. Demonstrate the basics of powder Metallurgy for powder metallurgical components.

Unit I:

(7 Hrs.)

Introduction to materials, classification of materials. Properties and applications of materials. Crystalline nature of metals, specially microscopic and macroscopic examinations of metals. Alloys and solid solutions, types and their formations, modified Gibbs's phase rule, Lever rule for phase mixtures and their application in system.

Unit II:

(6 Hrs.)

Study of equilibrium diagrams and invariant reactions. Iron-Iron carbide equilibrium diagram, critical temperatures. Microstructure of slowly cooled steels. Estimation of carbon from microstructures; structure property relationship. Welding Metallurgy and solidification.

Unit III:

(6 Hrs.)

Classification and application of plain carbon steels. Examples of alloy steel such as Hadfield Manganese Steel, ball Bearing Steels, etc. Effect of alloying elements. Tool Steels – Classification, composition, application and commercial heat treatment practice for HSS, Secondary hardening. Stainless Steels - Classification, composition, application and general heat treatment practice for Stainless Steels.

Unit IV:

(7 Hrs.)

Heat treatment and its importance. Annealing, Normalizing, Hardening, Quench Cracks, Hardenability test. TTT diagram and its construction and related Heat Treatment Processes such as Austempering, Martempering, Patenting etc. Retention of Austenite, Effects and elimination of retained austenite, Tempering. Case / Surface hardening treatments such as Carburising, Nitriding, Cyaniding, Carbonitriding, Flame and Induction hardening.

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



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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 Mechanical Engineering)

B.Tech in Mechanical Engineering

SoE No.
23ME-101

Unit V:	(7 Hrs.)
Cast Iron – Classification, White cast Iron, Gray Cast Iron, Nodular Cast Iron, Malleable Cast Iron, Chilled and alloy Cast Iron. (Production route, Composition, Microstructure and applications) Effects of various parameters on structure and properties of Cast Iron, Alloy cast Iron such as Ni-resist, Ni-hard. Non-Ferrous Alloys – Study of non-ferrous alloys such as brasses (Cu-Zn diagram), Bronzes (Cu-Sn diagram), Aluminum Alloys (e.g. Al-Si & Al-Cu diagram), Bearing materials.	
Unit VI:	(6 Hrs.)
Powder Metallurgy: Powder manufacture and Conditioning, Production of Sintered Structural Components, Self lubricating bearing, Cemented Carbides, Ceramics, Sintered Carbide cutting tools.	
Total Lecture	39 Hours

Textbooks:	
1	Dr. V.D. Kodgire, Material Science and Metallurgy, Edition, 1 st Jan 2011, Everest Publication House
2	Dr. B K Agrawal, Introduction to Engineering Metallurgy, 21 st revised edition, 2007, Tata Mc. Graw Hill Education Pvt. Ltd., New Delhi.

Reference Books:	
1	Sidney H. Avner, Introduction to Physical Metallurgy, 29 th revised edition, 2009, Mc. Graw Hill Publication, New Delhi, 1964.
2	Yu Lakhtin, Engineering Physical Metallurgy and Heat Treatment, 21 st revised edition, 1988, Mir publishers, Moscow, Russia
3	E C Rollason, Metallurgy for Engineers, 4 th Revised edition 1987, E. Arnold.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://drive.google.com/file/d/1zKi0psulXBNLQux7CZnrFIjxfJ3NWoRb/view?usp=share_link
2	https://drive.google.com/file/d/1uVUHGG8-2vWahUnuBEE6rjAFelZtJNnI/view?usp=share_link

MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=vkraap0k6FE
2	https://www.youtube.com/watch?v=cJm-jeb_c9U
3	https://www.youtube.com/watch?v=2IHhIEfzoOo

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



Nagar Yuwak Shikshan Sanstha's

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 Mechanical Engineering)

B.Tech in Mechanical Engineering

**SoE No.
23ME-101**

I SEMESTER

23ME1106 : Lab. Material Science & Metallurgy

Course Outcomes :

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

1. Distinguish between ferrous and Non-ferrous materials. Illustrate crystal structures for various materials and Differentiate or Distinguish between ferrous and Non-ferrous materials.
2. Interpret Iron-Iron carbide equilibrium diagram and analyse microstructure, general properties of commercial steels and Cast Iron.
3. Discuss the various heat treatment processes for steels.
4. Demonstrate the basics of powder Metallurgy for powder metallurgical components.

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

SN	Experiments based on
1	Study of Metallurgical Microscope.
2	Preparation of Specimen for metallographic examinations.
3	Study and drawing of microstructures of Steels.
4	Study and drawing of microstructures of Cast Iron
5	Study and drawing of microstructures of Non Ferrous Metals.
6	Study of the effect of annealing and normalizing on properties of steels.
7	Determination of hardenability of steels by Jominy End Quench test.
8	Measurement of hardness of ferrous and non-ferrous materials with the help of Brinell hardness tester.
9	Measurement of hardness of ferrous and non-ferrous materials with the help of Rockwell hardness tester.
10	Study the heat treatment of high speed steels.
11	Study of mechanisms of quenching.
12.	Study of Pack carburizing of steel samples.
13.	Study of effect of alloying elements on properties of steel.

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



Yeshwantrao Chavan College of Engineering

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

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

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
<p>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”</p> <p>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</p> <p>Activity – Practice Conversations, Pause-Part-Punch, Group Activity</p>		
Unit:2	Increase Self Confidence	6 Hours
<p>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</p> <p>Individual Activity – Sharing of defining moment, Skit to demonstrate Leadership Principles, Stranded on Island .</p>		
Unit:3	Fundamentals of Communication	6 Hours
<p>Fundamentals of Communication (Earn the right – Excite -Eagerness) ♣ Elevator Pitch ♣ Develop more Flexibility, ♣ Recap and Summarize</p> <p>Activities - – Individual Presentation, Flexibility Drills, Individual Presentations – My Vision Assignment</p>		
Unit:4	Team Management and Organization skills	5 Hours
<p>Team Management and Organization skills, Leadership Styles, Effective Communication</p> <p>Activity- Team Presentation, Team building activities.</p>		
EVALUATION	1 Hour	EVALUATION
WRITTEN TEST		
Total Lecture Hours		24 Hours

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



Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering

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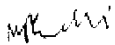

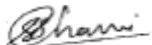
B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Civil Engineering)

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 |

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

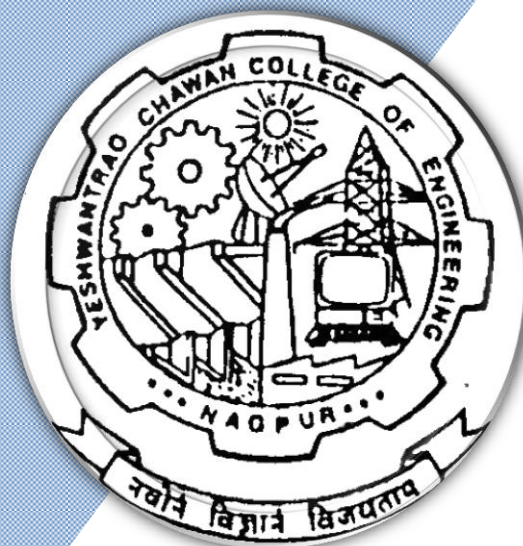
Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology

SoE & Syllabus 2023

2nd Semester

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering



Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
 (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

SoE No.
 23ME-101

B.TECH SCHEME OF EXAMINATION 2023

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

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

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	ME	23ME1107	Lab : FAB Shop	P	0	0	2	2	1		60	40	
8	1	PC	ME	23ME1105	Material Science & Metallurgy	T	3	0	0	3	3	30	20	50	3
9	1	PC	ME	23ME1106	Lab : Material Science & Metallurgy	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	23GE1216	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



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 Mechanical Engineering)
B. Tech in Mechanical Engineering

SoE No.
23ME-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**

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



Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Mathematics & Humanities)

SoE No.
23FY-101

B.Tech First Year

II SEMESTER

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.)


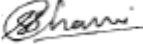
Vector fields, Vector differentiation, Gradient, Divergence and Curl, Directional derivatives with physical interpretation, Solenoidal and irrotational motions. **(Contemporary Issues related to Topic)**

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

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



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Mathematics & Humanities)

SoE No.
23FY-101

B.Tech First Year

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:


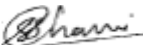
- | | |
|----|--|
| 1. | G B Thomas and R L Finney, Calculus and Analytical Geometry, 9th edition, Addison-Wesley, 1999. |
| 2. | Michael Spivak and Tom Apostol, Calculus, Vol I & Vol II 2 nd edition, Wiley. |
| 3. | N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10 th edition, Laxmi Prakashan. |

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

- | | |
|---|---|
| 1 | http://103.152.199.179/YCCE/Supported%20file/Supported%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/111/106/111106146/ |
| 2. | https://nitkkr.ac.in/docs/5-Multiple%20Integrals%20and%20their%20Applications.pdf |

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



Nagar Yuwak Shikshan Sanstha's

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 Applied Chemistry)
B.Tech First Year

SoE No.
23FY-101

I/II SEMESTER

23GE1104/23GE1204: Applied Chemistry

Course Outcomes:

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

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

Unit I: Water Chemistry

(8 Hrs.)

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

Unit II: Electrochemistry

(8 Hrs.)

Introduction, Redox reactions, EMF of a cell, standard electrode potential, Nernst equation, numerical and applications to chemical cells. Conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Electrolysis, laws of electrolysis and numerical.

Industrial applications: Electroplating, Electrolytic refining.

Corrosion: Definition, Causes, theories of corrosion- dry, wet and differential aeration.

Contemporary issues related to the topic

Unit III: Energy storage devices

(7 Hrs.)

Battery: Introduction, Characteristics, and General applications

Lithium-ion battery, Glass battery, H₂-O₂ Fuel cell. Differences between Battery and Fuel cell. Recycling and safe disposal of batteries.

Supercapacitors: Definition, Types, Characteristics, and Application.

H₂ as a green fuel: Introduction, Production, Storage, and Utilization. Contemporary issues related to the topic

Unit IV: Fuels

(8 Hrs.)

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



Significance of Proximate and Ultimate analysis.

Knocking in Internal combustion petrol and diesel engines, Octane and Cetane number, Knocking and its relationship with structure of fuels. Catalytic cracking & advantages. Contemporary issues related to the topic

Unit V: Engineering Materials

(7 Hrs.)

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

			July, 2025	1.00	Applicable for AY 2025-26 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

(Department of Applied Chemistry)

B.Tech in ME/CV/EE/ETC/EL/VLSI

SoE No.
23FY-101

Lubricants: Introduction, Classification, Mechanism of Lubrication.

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

Unit VI: Advanced Materials

(7 Hrs.)

Nanomaterials: Definition, Carbon Nanotubes and types. Applications of Nanomaterials in Electronics, Environment and Medicine.

Liquid Crystal Polymers: Introduction, General properties and applications.

Polymers in electronic industries: Introduction, Piezo, pyroelectric, Ferroelectric polymers.

Smart materials: Introduction, Properties and applications of Chromoactive, Photoactive and Magneto rheological materials.

Spectroscopic techniques: Introduction and applications. Contemporary issues related to the topic

Total Lecture 45 Hours

Textbooks:

1. S S. Dara , A Text book of Engineering Chemistry , S.Chand & Co New Delhi. Eleventh Edition.
2. P.C. Jain and Monica Jain , Engineering Chemistry , Dhanpat Rai & sons New Delhi , Sixteenth Edition.
3. P. W. Atkins, Physical Chemistry ,Oxford Publications, Eighth edition .

Reference Books:

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

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

- 1 <http://103.152.199.179/YCCE/Supported%20file/Supported%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/Bmj85Ihfv7w>

			July, 2025	1.00	Applicable for AY 2025-26 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Chemistry)
B.Tech First Year

SoE No.
23FY-101

I/II SEMESTER

23GE1105/23GE1205: Applied Chemistry Lab

Course Objectives (PR)

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

Course Outcomes

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

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

Total 9 experiments are to be performed
(4 each from Lab I and Lab II and one demonstration experiment)

SN	Experiments based on
List of Experiments-Lab- I	
1	Estimation of Nickel.
2	Estimation of Fe^{2+} ions by redox titration
3	Determination of copper by iodometric titration
4	Determination of Cation exchange capacity of an ion exchange resin
5	To determine the strength of a given potassium dichromate solution with N/20 sodium thiosulphate solution
6	Determination of COD of water sample.
List of Experiments-Lab- II	
1	Determination of viscosity of lubricating oil by Redwood Viscometer I or II
2	Determination of molecular weight of a polymer.
3	Proximate analysis of coal

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



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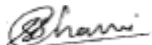
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(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Chemistry)
B.Tech First Year

SoE No.
23FY-101

4	Determination of electrochemical equivalence of copper using Faradays Law
5	Determination of strength of the given acid conductometrically.
6	To verify Beer-Lambert law for KMnO_4 calorimetrically and determine the concentration of the given solution of KMnO_4 .
	List of Demonstration Experiments
1	Synthesis of urea formaldehyde.
	Advanced Topics (CBS)
1.	To Determine optimum alum dosage for water or wastewater treatment by turbidity measurement using nephelometer and residual chlorine testing using chloroscope.
2.	Comparative study of effects of different drying techniques on the quality of fruits and vegetables.

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



Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Mathematics & Humanities)

SoE No.
23FY-101

B.Tech First Year

II SEMESTER

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.

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



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Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Mathematics & Humanities)

SoE No.
23FY-101


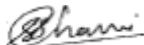
B.Tech First Year

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

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



Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Mathematics & Humanities)

SoE No.
23FY-101

B.Tech First Year

II SEMESTER

23GE1215 : Indian Knowledge System

Course Outcomes:


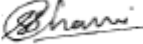
Upon successful completion of the course the students will be able to

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

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



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Mathematics & Humanities)

SoE No.
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B.Tech First Year

Reference Books


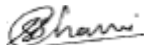
1	B S Harishankar; Art and Archaeology of India: Stone Age to the Present, 2003.
2	Gupte R S and Mahajan B D; Ajanta, Ellora and Aurangabad, 1962.
3	Dharampal, Some Aspects of Earlier Indian Society and Polity and Their Relevance Today, New Quest Publications, Pune, 1987.
4	Michel Lorblanchet, "Rock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

PPT's/Research papers

1	https://www.researchgate.net/publication/360889208_STONE_AGE_TOOL_TECHNOLOGY_and_CULTURAL_DEVELOPMENT
2	https://scholar.google.com/citations?view_op=view_citation&hl=en&user=iT1KSV8AAAAJ&sortBy=pubdate&citation_for_view=iT1KSV8AAAAJ: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

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



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

**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

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



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23CV-101**

B.Tech in Civil Engineering

Textbooks:

1. Nelson A., Engineering Mechanics (Statics and Dynamics), ed 2009, Tata Mc. Graw 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:

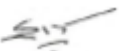


1. Timoshenko S, Young D.H and Rao J.V, Engineering Mechanics, Mc. Graw Hill Publication, New Delhi, 2007.
2. Bhattacharyya B., Engineering Mechanics, Oxford University Press, New Delhi, 2008.
3. Hibbeler R.C, Engineering Mechanics (Statics and Dynamics), Pearson Publication, Singapore, 2000.
4. Shames 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.

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- 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>

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



Yeshwantrao Chavan College of Engineering

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

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

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,

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



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

(Department of Information Technology)

B.Tech in Information Technology

SoE No.
23IT-101

II SEMESTER

23IT1203 : Programming for Problem Solving

Course Outcomes :

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

Unit I: Computer System Basics:

(3 Hrs.)

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

Unit II: Basic of C Programming

(6 Hrs.)

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

Unit III: Loop Structures:

(5 Hrs.)

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

Unit IV: Modular Programming:

(6 Hrs.)

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

Unit V: Arrays:

(6 Hrs.)

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

Unit VI: String, Structure and Union:

(4 Hrs.)

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

Total Lecture 30 Hours

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



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

(Department of Information Technology)

B.Tech in Information Technology

SoE No.
23IT-101

Text books

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

Reference Books

1	Problem Solving And Program Design In C, Jeri. R. Hanly, Elliot B. Koffman, Pearson Education.
2	Programming with C, Byron Gottfried, Schaum;s Outline Series
3	How to solve it by computers, R. G. Dromey, Prentice Hall India

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

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



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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 Information Technology)

B.Tech in Information Technology

**SoE No.
23IT-101**

II SEMESTER

23IT1204 : Lab. Programming for Problem Solving

Course Outcomes: Students will be able to

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

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

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



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

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SoE No.
23IT-101

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3	Programming in ANSI C, E. Balaguruswamy, Mc Graw Hill Education

Reference Books

1	Problem Solving And Program Design In C, Jeri. R. Hanly, Elliot B. Koffman, Pearson Education.
2	Programming with C, Byron Gottfried, Schaum;s Outline Series
3	How to solve it by computers, R. G. Dromey, Prentice Hall India

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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

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



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

(Department of Information Technology)

B.Tech in Information Technology

SoE No.
23IT-101

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

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



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Mathematics & Humanities)

SoE No.
23FY-101

B.Tech First Year

II SEMESTER

23GE1218 : Functional English

Course Outcomes:

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

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

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

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



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Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Mathematics & Humanities)

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

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

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Yeshwantrao Chavan College of Engineering

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

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Bachelor of Technology SoE & Syllabus 2023 3rd Semester

(Department of Mechanical Engineering)

B. Tech in Mechanical 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 Mechanical Engineering)
B. Tech. in Mechanical Engineering

SoE No.
23 ME-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration
							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	HSSM-1	GE	23GE1301	Fundamentals of Management & Economics	T	2	0	0	2	2	30	20	50	3
2	3	VEC-II	ME	23ME1301	Computer Aided Design	T	2	0	0	2	2	30	20	50	3
3	3	CEP	ME	23ME1302	Community Engagement Project	P	0	0	2	4	2		60	40	
4	3	PC	ME	23ME1303	Manufacturing Processes	T	3	0	0	3	3	30	20	50	3
5	3	PC	ME	23ME1304	LAB: Manufacturing Processes	P	0	0	2	2	1		60	40	
6	3	PC	ME	23ME1305	Mechanics of Materials	T	3	1	0	4	4	30	20	50	3
7	3	PC	ME	23ME1306	LAB:- Mechanics of Materials	P	0	0	2	2	1		60	40	
8	3	PC	ME	23ME1307	Kinematics of Machineries	T	3	0	0	3	3	30	20	50	3
9	3	OE - I	OE		Open Elective -I	T	2	0	0	2	2	30	20	50	3
10	3	MDM - I	ME		MD Minor Course-I	T	2	0	0	2	2	30	20	50	3
TOTAL							17	1	6	26	22				

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

Open Elective - I

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	3	OE1	GE	23OE1301	OE-I : Combinatorics
2	3	OE1	GE	23OE1302	OE-I : Fuzzy Set Theory, Arithmetic And Logic
3	3	OE1	GE	23OE1303	OE-I : Green Chemistry & Sustainability
4	3	OE1	GE	23OE1304	OE-I : Hydrogen Fuel
5	3	OE1	GE	23OE1305	OE-I : Electronic Materials And Applications
6	3	OE1	GE	23OE1306	OE-I : Laser Technology And Applications
7	3	OE1	MGT	23OE1307	OE-I : Finance And Cost Management
8	3	OE1	MGT	23OE1308	OE-I : Operation Research Techniques
9	3	OE1	MGT	23OE1309	OE-I : Project Evaluation & Management
10	3	OE1	MGT	23OE1310	OE-I : Total Quality Management
11	3	OE1	MGT	23OE1311	OE-I : Value Engineering
12	3	OE1	MGT	23OE1312	OE-I : Maintenance Management
13	3	OE1	MGT	23OE1313	OE-I : Industrial Safety
14	3	OE1	MGT	23OE1314	OE-I : Industry 4.0
15	3	OE1	MGT	23OE1315	OE-I : Operation Management
16	3	OE1	MGT	23OE1316	OE-I : Material Management
17	3	OE1	MGT	23OE1317	OE-I : Hospitality Management
18	3	OE1	MGT	23OE1318	OE-I : Human Resource Management & Organizational Behaviour
19	3	OE1	MGT	23OE1319	OE-I : Agri-Business Management
20	3	OE1	MGT	23OE1320	OE-I : Rural Marketing
21	3	OE1	MGT	23OE1321	OE-I : Marketing Management
22	3	OE1	MGT	23OE1322	OE-I : Health Care Management
23	3	OE1	MGT	23OE1323	OE-I : Designated approved online NPTEL/KKSU Course
24	3	OE1	MGT	23OE1324	OE-I : Indian Archeology
25	3	OE1	MGT	23OE1325	OE-I : Social & Positive Psychology
26	3	OE1	MGT	23OE1326	OE-I : Seismology & Earthquake

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



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

III SEMESTER

23GE1301: Fundamentals of Management & Economics

Course Outcomes:

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

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

Unit I:

7 Hrs.

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

Unit II:

8 Hrs.

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

Unit III:

7 Hrs.

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

Unit IV:

8 Hrs.

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

Total Lecture 30 Hours

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

SoE No.
23ME-101

Textbooks:

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

Reference Books:

1	Foundations of Financial Markets and Institutions, 3 rd Edition, Fabozzi, Pretice 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, 17th 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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**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

III SEMESTER

23ME1301 : Computer Aided Design

Course Outcomes :

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

1. Describe the fundamental concepts of CAD tools.
2. Apply the basic concepts of 2D and 3D transformation for solving engineering problems.
3. Analyze the importance of computer graphics for plotting curves.
4. Evaluate the use of different data exchange formats as per the applications.

Unit I:	6 Hrs.
CAD Tools: Definition of CAD Tools, Introduction to use of computer in Product Life Cycle, Software for mechanical engineering CAD/CAM/CAE	
Unit II:	7Hrs.
Two dimensional geometric and co-ordinate transformations like scaling, translation, rotation reflection, shear. Concept of homogeneous representation and concatenated transformations, Inverse transformations.	
Unit III:	7Hrs.
Three dimensional geometric and co-ordinate transformations, Orthographic and Perspective projection, Types of mathematical representation of curves, wire frame models, wire frame entities.	
Unit IV:	8 Hrs.
Geometric modeling techniques, Wireframe modeling, Surface Modeling and Solid Modeling, B-Rep, CSG and Hybrid modellers Evaluation of data-exchange formats, IGES data representations and structure, STEP architecture and applications	
	Total Lecture 28 Hours

Textbooks:

1. CAD/CAM, theory & practice: Ibrahim Zeid
2. Procedural elements for computer graphics: D Rogers
3. Computer Graphics: D Hearn & M.P. Baker

Reference Books:

1. Computer Graphics: S Harrington.
2. Mikell. P. Groover "Automation, Production Systems and Computer Integrated Manufacturing", Prentice Hall of India, 2008.
3. Radhakrishnan P, Subramanyan S. and Raju V., "CAD/CAM/CIM", 2nd Edition, New Age International (P) Ltd, New Delhi, 2000

MOOCs Links and additional reading, learning, video material

1. <https://nptel.ac.in/courses/112103019/>
2. <https://nptel.ac.in/syllabus/112106075/>

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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




(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

**SoE No.
23ME-101**

III SEMESTER

23ME1302 : LAB - Industrial Case Study

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

III SEMESTER

23ME1303 : Manufacturing Processes

Course Outcomes :

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

1. The student will be able to illustrate the moulding process and compare various casting processes.
2. The student will be able to analyse various Forming processes and become familiar with the working of dies.
3. The student will be able to evaluate different welding processes.
4. The student will be able to describe unconventional machining processes.

Unit I:

7 Hrs.

Casting Process: Introduction, Pattern making: Types, materials used, Pattern making allowances, color codes. Core making: - Types, core material & its properties. Molding: Types of sand molds, molding sand composition, molding sand properties, molding machines. Gating design – Elements of gating systems, pouring time, riser design (Analytical treatment). Real time estimation of pouring time for casting.

Unit II:

7 Hrs.

Foundry mechanism: Special casting processes such as investment Casting, Centrifugal Casting, Shell Molding, CO Molding, Slush Casting, Die Casting, Cleaning, inspection & casting defects. Identification of various defects and possible causes with remedies through the fish bone diagram.

Unit III:

7 Hrs.

Forming Processes: Mechanics of forming processes (including analytical treatment), Determination of forging forces, equipment (Hammer/Press) capacity required. Rolling, Forging, Extrusion & Wire Drawing. Melting furnaces – Types, Electric furnace, Induction furnace, Cupola-construction & operation. Prerequisite for commencing furnace operation for Cupola.

Unit IV:

8 Hrs.

Sheet Metal Working: Sheet Metal Working, Terminology, Types of Operation, Classification of Dies. Intro to Design Parameters and Types of Presses. Optimum utilization of metal strip in SMW

Unit V:

8 Hrs.

Joining processes: Introduction to Welding, Soldering, Brazing Processes. Types of Welding, Arc Welding & Gas Welding Processes, Defects & Inspection of Welding Joints, Electrodes, Weldability of Metals, Welding equipments of Fixtures. Advance Welding Methods: Introduction to TIG, MIG, spot welding, Welding Design (Analytical Treatment)- Heat Input, Heat Flow, Cooling Rate Calculations. Identification of various defects & possible causes with remedies through fish bone dig.

Unit VI:

8 Hrs.

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

Jigs & fixture: Introduction, locating & clamping - principle of location, principle of pin location, locating devices, radial or angular location, V - location, bush location. Drilling Jigs: - Types of drilling jigs - Template jig, plate type jig, open type jig, swinging leaf jig, Box type jig, channel type jig . Jig feet. Milling Fixtures: - Essential features of a milling fixtures, milling machine vice, Indexing jig & fixtures, Automatic clamping Devices

Total Lecture 45 Hours

Textbooks:

1. P.n.Rao, Manufacturing Technology (Forming & Welding)), ed 2009, Tata Mc. Grew Hill Education Pvt. Ltd., New Delhi, 2009.
2. Ghosh and Malik ,Manufacturing Science,East West Second edition,2010.
3. Hajra Choudhary, Workshop Technology (Volume-I), The McGraw-Hill Companies 2nd ED-2010

Reference Books:

1. S Kalpakjian & Schmid ,Manufacturing Engineering & Technology, Pearson education Canada. 2 ed 2010
2. W Chapman, Workshop Technology: Vol. I –III, St. Martin's Press, 5 ed 2019.
3. M Begman,Manufacturing Processes, Ballinger Pub. Co

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

1. <http://103.152.199.179/YCCE/SUPPORTED%20FILE/SUPPORTED%20file/SERIES20WISE%20BOOKS/MECHANICAL%20ENGINEERING>

MOOCs Links and additional reading, learning, video material

1. <https://archive.nptel.ac.in/courses/112/107/112107083/>
2. <https://www.youtube.com/watch?v=Xf08dgnlwXg>
3. <https://nptel.ac.in/courses/112107089>

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



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 Mechanical Engineering)

SoE No.
23ME-101

B. Tech in Mechanical Engineering

III SEMESTER

23ME1304 : Lab Manufacturing processes

Course Outcomes

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

1. The student will be able to illustrate the molding process and compare various casting processes.
2. The student will be able to Analyze various Forming processes and become familiar with the working of dies.
3. The student will be able to evaluate different welding processes.
4. The student will be able to Describe unconventional machining processes

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

SN	Experiments based on
1	Preamble about Foundry practices used in industries.
2	Study of various moulding processes along with preparation of moulding sand.
3	Preparation of wooden pattern in pattern making shop along with study of different types of wooden pattern.
4	To determine grain fineness number of given moulding sand.
5	Demonstration of mould making along with study of foundry tools.
6	Preparation of mould cavity along-with steps involved in mould making.
7	Study of various types of melting furnaces and cupola in detail.
8	Preparation of job on punching press and design of blanking and piercing die.
9	Performance on various welding machines such as MIG, TIG along-with study of different welding processes.
10	Preparation of casting job along-with study of different casting processes.
11	Report/Case Study of foundry visit.
12	A Visit: A visit to a foundry shop for more understanding of the casting practices

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

III SEMESTER

23ME1305 : Mechanics of Materials

Course Outcomes :

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

1. Apply the basic concepts of stress, strain and their variations under different types of loading to calculate Stresses.
2. Construct bending moment, shear force diagram for statically determinate beams and determine stress distribution.
3. Compute slope and deflection in statically determinate beam and calculate strain energy under varying load conditions.
4. Evaluate the torsional shear stress in shaft and examine the buckling failure in columns

Unit I:

8 Hrs.

Concept of simple stresses and strains : Introduction, Stress, strain, types of stresses, stress - strain diagram for brittle & ductile material, elastic limit, Hooks law, modulus of elasticity, modulus of rigidity, factor of safety, analysis of tapered rod, analysis of composite section, thermal stress and strain, thermal stresses with heat flow in cylinders and plates. Longitudinal strain & stress, lateral stresses and strains, Poisson's ratio, volumetric stresses and strain with uni-axial, bi-axial & tri-axial loading, bulk modulus, relation between Young's modulus and modulus of rigidity, Poisson's ratio and bulk modulus. Contemporary issues

Unit II:

7 Hrs.

Shear force and bending moments in Beam: Types of beam (cantilever beam, simply supported beam, overhung beam etc.), Types of loads (Concentrated and UDL), shear force and bending moment diagrams for different types of beams subjected to different types of loads, sign conventions for bending moment and shear force, shear force and bending moment diagrams for beams subjected to couple, Relation between load, shear force and bending moment. Contemporary issues

Unit III:

8 Hrs.

Stresses in beams: Pure bending, theory of simple bending with assumptions & expressions for bending stress, derivation of bending equation, bending stresses in symmetrical sections, section modulus for various shapes of beam sections. **Shear stresses in beams:** - Concept, derivation of shear stress distribution formula, shear stress distribution diagram for common symmetrical sections, maximum and average shear stress Contemporary issues.

Unit IV:

7Hrs.

Deflection of beams: Derivation of differential equation of elastic curve, Deflection & slope of cantilever, simply supported, overhung beams subjected to concentrated loads, UDL, Relation between slope, deflection & radius curvature McCauley's method, area moment method to determine deflection of beam. **Strain energy and impact:** Concept of strain energy, derivation and use of expressions for

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

deformation of axially loaded members under gradual sudden and impact loads. Strain energy stored in bending & torsion. Castigliano's theorem. Contemporary issues

Unit V: **8 Hrs.**

Torsion of circular shafts, Column & Struts: Derivation of torsion equation. Torsional shear stress induced in the shaft, when it is subjected to torque. Torque transmitted by solid & hollow circular shaft. Derivation of maximum, minimum principal stresses and maximum shear stress induced in shaft when it is subjected to bending moment, torque & axial load.

Unit VI: **7 Hrs.**

Combined Stresses: Definition of principal planes & principal stresses, analytical method of determining stresses on oblique section when member is subjected to direct stresses in one plane in mutually perpendicular two planes, when member is subjected to shear stress and direct stresses in two mutually perpendicular planes, Mohr's circle for representation of stresses. Derivation of maximum and minimum principal stresses & maximum shear stresses when the member is subjected to different types of stresses simultaneously (i.e. combined stress) Contemporary issues

Total Lecture **45 Hours**

Textbooks:




1. Strength of Materials, Ramamrutham S., 16th Edition (2010), Dhanpat Rai Publishing
2. Strength of Materials Beer and Johnston 4th Edition (2009) McGraw-Hill
3. Popov E. P, "Engineering Mechanics of Solids", Prentice-Hall of India, New Delhi, 2007.

Reference Books:

1. Strength of Materials Timoshenko and Young Seventh Edition 1984, CSB Publisher
2. Applied Strength of Materials, Sixth Edition SI Units Version, Robert L. Mott, Joseph A. Untener, CRC Press, 2017
3. Subramanian R., "Strength of materials", 2nd Edition (2010) Oxford University Press, New Delhi,
4. Shames I.H. "Introduction to Solid Mechanics", PHI Publication, 3rd Edition, 2002
5. William A. Nash, "Theory and Problems of Strength of materials, Schaum's Outline series", Tata McGraw-Hill, New Delhi, 2007.

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- 1 chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Supported%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/Supported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf
- chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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




(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

SoE No.
23ME-101

MOOCs Links and additional reading, learning, video material

1.	https://nptel.ac.in/courses/112107146
2.	https://nptel.ac.in/courses/112106141
3.	https://archive.nptel.ac.in/courses/105/105/105105108/

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

**SoE No.
23ME-101**

III SEMESTER

23ME1306 : Lab Mechanics of Materials

Course Outcomes

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

1. Apply the basic concepts of stress, strain and their variations under different types of loading to calculate Stresses.
2. Construct bending moment, shear force diagram for statically determinate beams and determine stress distribution.
3. Compute slope and deflection in statically determinate beam and calculate strain energy under varying load conditions.
4. Evaluate the torsional shear stress in shaft and examine the buckling failure in columns

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

SN	Experiments based on
1	Demonstration of UTM
2	Tension test on a mild steel rod
3	Compression test on Aluminium specimen
4	Hardness test on metals with Rockwell Hardness tester
5	Flexure test on Wooden beam
6	Spring stiffness test
7	Torsion test on mild steel rod
8	Impact Test
9	Demonstration of Fatigue Test

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

III SEMESTER

23ME1307 : Kinematics of Machineries

Course Outcomes :

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

1. Apply the basic concepts of stress, strain and their variations under different types of loading to calculate Stresses.
2. Construct bending moment, shear force diagram for statically determinate beams and determine stress distribution.
3. Compute slope and deflection in statically determinate beam and calculate strain energy under varying load conditions.
4. Evaluate the torsional shear stress in shaft and examine the buckling failure in columns

Unit I:

8 Hrs.

Simple mechanisms: Lower and higher pairs, degrees of freedom, various types of mechanisms, their inversions and applications, universal joints, introduction to spatial linkages

Unit II:

7 Hrs.

Quantitative kinematics analysis of mechanism: Quantitative kinematics analysis of mechanism: - Displacement, Velocity and Acceleration analysis of planer mechanism by graphical method as well as analytical method [complex number method/matrix method], Instantaneous center method, Kennedy's theorem

Unit III:

8 Hrs.

Cam and follower : Concepts of cam mechanism, comparison of cam mechanism with linkages. Types of cams and followers and applications. Synthesis of cam for different types of follower motion like constant velocity, parabolic, SHM, cycloid etc. Analysis of follower motion for cams with specified contours like eccentric cam, tangent cam and circular arc cam with concave and convex curvature. Pressure angle in cam, parameters affecting cam performance

Unit IV:

7 Hrs.

Gears : Concept of motion transmission by toothed wheels, comparison with cams and linkages, various tooth profiles, their advantages and limitations, gear tooth terminologies, concept of conjugate action, law of conjugate action, kinematics of involute gear tooth pairs during the contact duration, highlighting locus of the point of contact, arc of contact, numbers of pairs of teeth in contact, path of approach and path of recess, interference, undercutting for involute profile teeth

Unit V:

8 Hrs.

Gear Trains : Kinematics of helical, bevel, spiral, worm gears, rack and pinion gears, kinematics analysis, and torque analysis of simple epicyclical and double epicyclical gear trains

Unit VI:

7 Hrs.

Static force analysis: Static force analysis: Free body diagram, condition of equilibrium. Analysis of all links of given linkage, cam, gear mechanism and their combinations without friction

Total Lecture 45 Hours

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

Textbooks:

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| 1. | Theory of mechanism and machines Tata Mc. Graw Hill Education Pvt. Ltd., New Delhi, 2014 |
| 2. | Theory of mechanism and machines Khurmi and Gupta, S chand publication |
| 3. | Mechanisms and machines J.S.Rao ,R.V.Dukkupati new age international limited. |
| 4. | Theory of machines V.P.Singh, Dhanpat Rai & Co. |

Reference Books:




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|----|---|
| 1. | Theory of machines Thomas beven, Pearson Education. |
| 2. | Theory of machines Sandor & Erdman, Tata Mc. Graw Hill Education Pvt. Ltd |

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| 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

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|----|---|
| 1. | https://www.youtube.com/watch?v=EVqBzOGQIkI |
| 2. | https://onlinecourses.nptel.ac.in/noc24_me44/preview |
| 3. | https://www.youtube.com/watch?v=kXXfz6acsyU |

			June,2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

SoE No.
23ME-101

III SEMESTER

Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1ME101 : Computer-Aided Design
MDM-I	3	(MDM1ME101) Engineering Materials
MDM-II	4	(MDM2ME102) Basics of Mechanism
MDM-III	5	(MDM3ME103) Basics of Machine Design
MDM-IV	6	(MDM4ME104) Computer Aided Design
MDM-V	7	(MDM5ME105) Product Design and Development
MDM-VI	8	(MDM6ME106) INDUSTRY 5.0

Track 2

Courses	Sem	MDMT2ME201 : Robotics and Computer Integrated Manufacturing
MDM-I	3	(MDM1ME201) Introduction to Robotics
MDM-II	4	(MDM2ME202) Industrial Robotics
MDM-III	5	(MDM3ME203) Computer Integrated Manufacturing
MDM-IV	6	(MDM4ME204) Subtractive Manufacturing
MDM-V	7	(MDM5ME205) Additive Manufacturing
MDM-VI	8	(MDM6ME206) Supply Chain Management

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

III SEMESTER

Track 1 - Computer Aided Design

MDM1ME101 : Engineering Materials

Course Outcomes :

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

1. Distinguish between ferrous and Non-ferrous materials. Illustrate crystal structures for various materials and Differentiate or Distinguish between ferrous and Non-ferrous materials.
2. Discuss the various applications of steel and cast iron.
3. Discuss the various super alloys.
4. Demonstrate the basics of powder Metallurgy for powder metallurgical components.

Unit I:

8 Hrs.

Introduction to Materials: Introduction to materials, classification of materials. Properties and applications of materials. Crystalline nature of metals, specially microscopic and macroscopic examinations of metals. Alloys and solid solutions, types and their formations.

Contemporary Issues related to Topic

Unit II:

8 Hrs.

Steel and Cast Iron: Classification and application of plain carbon steels. Composition and application of Tool Steels & Stainless Steels. Cast Iron – Classification, White cast Iron, Gray Cast Iron, Nodular Cast Iron, Malleable Cast Iron.

Contemporary Issues related to Topic

Unit III:

7 Hrs.

Super alloys: Introduction, Classification, Applications and properties of Ni, Fe, Co based super alloys and their thermo-mechanical treatments.

Contemporary Issues related to Topic

Unit IV:

7 Hrs.

Powder Metallurgy: Powder manufacture and Conditioning, Production of Sintered Structural Components

Contemporary Issues related to Topic

Total Lecture

30 Hours

Textbooks:

1. Dr. V.D. Kodgire, Material Science and Metallurgy, Edition, 1st Jan 2011, Everest Publication House
2. Dr. B K Agrawal, Introduction to Engineering Metallurgy, 21st revised edition, 2007, Tata Mc. Graw Hill Education Pvt. Ltd., New Delhi.

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

SoE No.
23ME-101

Reference Books:

1.	Sidney H. Avner, Introduction to Physical Metallurgy, 29st revised edition, 2009, Mc. Graw Hill Publication, NewDelhi, 1964
2.	Yu Lakhtin, Engineering Physical Metallurgy and Heat Treatment, 21st revised edition, 1988, Mir publishers, Moscow, Russia
3.	E C Rollason, Metallurgy for Engineers, 4 th Revised edition 1987, E. Arnold

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2	

MOOCs Links and additional reading, learning, video material

1.	https://nptel.ac.in/courses/112101098
2.	https://nptel.ac.in/courses/112101099

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

III SEMESTER

Track 2- Robotics and Computer Integrated Manufacturing

MDM1ME201 : Introduction to Robotics

Course Outcomes :

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

1. Describe the components and working principles of robots.
2. Program robots using different programming languages.
3. Demonstrate proficiency in using computer vision techniques for robot applications.
4. Identify and analyze real-world applications of robotics with ethical and societal implications.

Unit I:

8 Hrs.

Fundamentals of Robotics: Introduction to Robotics: Definition, history, and applications, Components of a Robot: Sensors, actuators, controllers, and effectors, Basics of Robot Kinematics, Basics of Robot Dynamics.

Contemporary Issues related to Topic

Unit II:

8 Hrs.

Robot Programming: Introduction to Robot Programming: Programming languages used in robotics, Robot Operating System (ROS): Basics of ROS, nodes, topics, messages, Motion Planning: Path planning algorithms, obstacle avoidance, Robot Simulation: Introduction to simulation environments like Gazebo/MATLAB Robotics Toolbox/Robot Analyzer.

Contemporary Issues related to Topic

Unit III:

7 Hrs.

Robot Perception: Introduction to Robot Perception: Sensors used in robotics - vision, proximity, touch, etc., Computer Vision: Image processing techniques, object detection, and recognition, Sensor Fusion: Integration of data from multiple sensors for better perception, Localization and Mapping: SLAM (Simultaneous Localization and Mapping) algorithms.

Contemporary Issues related to Topic

Unit IV:

7 Hrs.

Applications and Future Trends: Industrial Robotics: Applications in manufacturing, assembly, and automation, Service Robotics: Applications in healthcare, agriculture, and domestic tasks, Research Trends in Robotics: Emerging technologies like soft robotics, swarm robotics, and bio-inspired robotics, Ethical and Societal Implications of Robotics: Discussions on job displacement, privacy concerns, and ethical considerations.

Contemporary Issues related to Topic

Total Lecture

30 Hours

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

Textbooks:

1.	Robot Engineering An Intergrated approach 2004 Klafter R.D., Chmielewski T.A. and Negin M Springer
2.	Industrial Robotics: Technology, Programming and Applications, 2012 Mikell P. Groover, Mitchel Weiss, Roger N. Nagel, Nicholas G. Odrey and Ashish Dutta 2nd Edition, Tata McGraw Hill, 2012.
	Automation in Production system 2002 Mikell P. Groover Prentice-Hall of India Pvt. Ltd., New Delhi, 2002
3.	Bruno S and Sciavicco L, Robotics: Modelling, Planning and Control, Springer (2009)
4.	Robot Engineering An Intergrated approach 2004 Klafter R.D., Chmielewski T.A. and Negin M Springer

Reference Books:

1.	Robotics control, sensing, vision, and intelligence
2.	Robotics Technology and Flexible Automation
3.	Introduction to Robotics Mechanics and Control
4.	Industrial Robotics, By Ganesh S. Hegde • 2006, Laxmi Publications, June 2006

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1	
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MOOCs Links and additional reading, learning, video material

1.	https://nptel.ac.in/courses/112101098
2.	https://nptel.ac.in/courses/112101099

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



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 Mechanical Engineering)

SoE No.
23ME-101

B. Tech in Mechanical 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/>

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

(Department of Mechanical Engineering)




B. Tech in Mechanical Engineering

**SoE No.
23ME-101**

III SEMESTER

Mandatory Learning Course (Audit Course)

MLC2123 : YCAP3

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

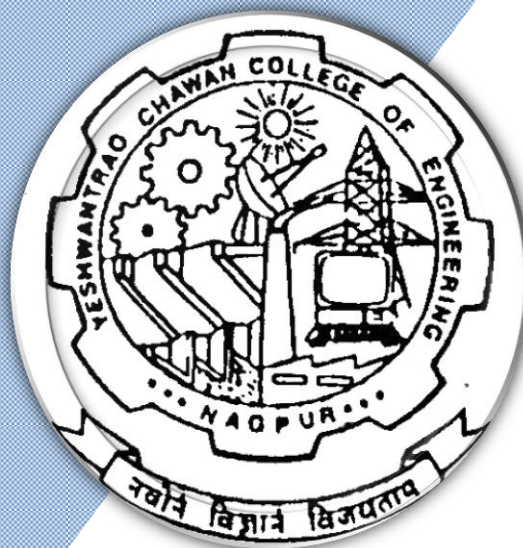
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Yeshwantrao Chavan College of Engineering

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

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

Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology SoE & Syllabus 2023 4th Semester

(Department of Mechanical Engineering)

B. Tech in Mechanical 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 Mechanical Engineering)
B. Tech. in Mechanical Engineering

SoE No.
23 ME-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration
							L	T	P	Hrs		MSEs*	TA**	ESE	
FOURTH SEMESTER															
1	4	BS	GE	23GE1402	Integral Transform	T	3	0	0	3	3	30	20	50	3
2	4	HSSM-2	GE	23GE1401	Entrepreneurship Development	T	2	0	0	2	2	30	20	50	3
3	4	AEC-2	GE	23GE1405 23GE1406	Marathi Language / Hindi Language	T	2	0	0	2	2	30	20	50	3
4	4	VEC - I	CV	23CV1411	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
5	4	PC	ME	23ME1401	Machining Processes	T	3	0	0	3	3	30	20	50	3
6	4	PC	ME	23ME1402	Lab - Machining Processes	P	0	0	2	2	1		60	40	
7	4	PC	ME	23ME1403	Lab - Computer Aided Design	P	0	0	2	2	1		60	40	
8	4	VSEC - III	ME	23ME1404	Lab - Machine Drawing	P	0	0	4	4	2		60	40	
9	4	OE - II	OE		Open Elective -II	T	2	0	0	2	2	30	20	50	3
10	4	MDM - II	ME		MD Minor Course-II	T	2	0	0	2	2	30	20	50	3
TOTAL							16	0	8	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
23	4	OE2	MGT	23OE2423	OE-II : Designated approved online NPTEL/KKSU Course
24	4	OE2	MGT	23OE2424	OE-II : Indian Archeology
25	4	OE2	MGT	23OE2425	OE-II : Social & Positive Psychology
26	4	OE2	MGT	23OE2426	OE-II : Seismology & Earthquake

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



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 Mechanical Engineering)

**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

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.

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

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/Supported%20file/Supported%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/

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

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

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

Student activities:

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

Textbooks

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

Reference Books




1. Mehta, Monica- The Entrepreneurial Instinct : How everyone has the innate ability to start a successful small business – McGraw – Hill Education, New Delhi 2012, ISBN 978-0-07-179742-9
2. Prasanna Chandra "Protect Preparation, Appraisal, Implementation" Tata McGraw Hill. New Delhi
3. S Anil Kumar "Entrepreneurship Development" New Age International Publishers
4. Nishith Dubey "Entrepreneurship Development" PHI Learning

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

- 1 <http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0>
- 2 <https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042>

MOOCs Links and additional reading, learning, video material

- 1 https://onlinecourses.swayam2.ac.in/cec23_mg24/course- entrepreneurship development
- 2 https://onlinecourses.nptel.ac.in/noc23_mg74/announcements?force=true-entrepreneur
- 3 https://onlinecourses.nptel.ac.in/noc23_mg126/announcements?force=true- Business fundamentals for entrepreneurship

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



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 Mechanical Engineering)

SoE No.
23ME-101

B. Tech in Mechanical Engineering

IV SEMESTER 23GE1405 : Marathi Language

Course Objectives		
1. मराठी भाषेच्या समृद्धीची जाणीव करून देणे. 2. विद्यार्थ्यांमध्ये भाषा कौशल्याचा विकास करणे आणि त्यातून रोजगाराच्या संधींचा शोध घेणे.		
Course Outcomes		
3. भाषेचा जीवन व्यवहारात योग्य पद्धतीने वापर करण्याचा प्रयत्न करणे. 4. संत साहित्याच्या शिकवणुकीमुळे मानवता आणि मानवी व्यवहाराची सांगड घालणे, नैतिक मूल्ये रुजविणे. 5. विद्यार्थ्यांना रोजगाराभिमुख बनविणे.		
Unit:1	गद्य विभाग	8 Hours
१.	भारतीय लोकशाहीचे भवितव्य काय?	- डॉ. बाबासाहेब आंबेडकर
२.	काळी आई	- व्यंकटेश माडगूळकर
३.	संत तुकारामांचे अभंग	- निर्मलकुमार फडकुले
४.	माझी शाळा	- प्रकाश खरात
५.	समतेचे वारकरी संत गाडगेबाबा आणि राष्ट्रसंत तुकडोजी महाराज	- अशोक राणा
६.	लोककल्याणकारी राजा :	- शरयू तायवाडे
Unit:2	पद्य विभाग	8 Hours
१.	ज्ञानेश्वरांचे अभंग	- संत ज्ञानेश्वर
२.	वनसुधा	- वामन पंडित
३.	नवा शिपाई	- केशवसुत
४.	मेंढरं	- विठ्ठल वाघ
५.	पोरी	- अनुराधा पाटील
६.	गाव	- हेमंतकुमार कांबळे

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

Unit:3	व्यावहारिक मराठी	7 Hours
१. म्हणी		
२. मुलाखतलेखन	- डॉ. वैशाली धनविजय	
३. वाक्प्रचार		
४. जाहिरातलेखन	- डॉ. अजय देशपांडे	
Unit:4	रोजगाराभिमुख मराठी व्यावहारिक कौशल्ये	7 Hours
१. प्रत्यक्ष मुलाखत कौशल्य		
२. वाचन कौशल्य - (अ) बातमी वाचन (ब) कथा वाचन		
३. ऑनलाईन कौशल्य - (अ) ग्राहक सेवा केंद्राशी संवाद, (ब) ऑनलाईन अर्ज करणे		

Reference Books

- पाठ्यपुस्तक : शब्दसाधना - भाग १
- रोजगाराभिमुख मराठी व्यावहारिक कौशल्ये

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



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 Mechanical Engineering)

SoE No.
23ME-101

B. Tech in Mechanical Engineering

IV SEMESTER 23GE1406 : Hindi Language

Course Objectives

- विद्यार्थियों में देशभक्तिपरक एवं पारिवारिक मूल्यों का विकास |
- विद्यार्थियों पर्यावरण-संरक्षण के प्रति सजग करना |
- एकांकी, कहानी, निबंध आदि विधाओं के मध्य का अंतर अवगत कराना |
- हिंदी के प्रयोजनमूलक स्वरूप से परिचित कराना |
- विद्यार्थियों को आधुनिक प्रौद्योगिकी (तकनीक) का प्रयोग करने में सक्षम बनाना |.

Course Outcomes

- पौराणिक अथवा ऐतिहासिक घटनाओं को तार्किक आधार पर स्वीकार करेंगे | अपने परिवेश के उचित और अनुचित व्यवहारों के प्रति आकलन शक्ति बढ़ेगी |
- एकांकी, कहानी, निबंध आदि विधाओं के मध्य का अंतर बताने में सक्षम होंगे |
- कविता का रसास्वादन करने में समर्थ होंगे |
- 'अनुवाद' के स्वरूप एवं प्रक्रिया से अवगत होंगे |
- 'मार्गिक नक्शे' का दैनिक जीवन में उपयोग करने में सक्षम होंगे |

Unit:1	गद्य विभाग	8 Hours
१. भाईसाहब (कहानी)	- प्रेमचंद	
२. स्मृति (निबंध)	- श्रीराम शर्मा	
३. गिल्लू (रेखाचित्र)	- महादेवी वर्मा	
४. अभाव (कहानी)	- विष्णु प्रभाकर	
५. महाभारत की साँझ (एकांकी)	- भारतभूषण	

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

**SoE No.
23ME-101**

६. उखड़े खंबे (व्यंग्य)।

- हरिशंकर परसाई

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

Unit:2	पद्य विभाग	8 Hours
१. कबीर के दोहे	- कबीरदास	
२. ले चल यहाँ भुलावा देकर	- जयशंकर प्रसाद	
३. स्नेह-निर्झर बह गया	- हैसूर्यकांत त्रिपाठी "निराला"	
४. प्रथम रश्मि	- सुमित्रानंदन पंत	
५. जीवन का झरना	- आरसीप्रसाद सिंह	
६. कविता के साथ	- दामोदर खड़से	
Unit:3	अन्य पाठ्य सामग्री	7 Hours
१. मुहावरे और लोकोक्तियाँ: पाठ्यपुस्तक में मुहावरे और लोकोक्तियाँ का अर्थ एवं वाक्य प्रयोग		
२. विज्ञापन कला : अर्थ, परिभाषा, प्रकार, शीर्षक का महत्त्व, विज्ञापन के प्रयोजन, सत्य, लक्ष्य, विज्ञापन की भाषा, अच्छे विज्ञापन के गुण इत्यादि ।		
Unit:4	कौशल्य आधारित घटक	7 Hours
१. वाचन कौशल्य (समाचार-वाचन, कहानी-वाचन)		
२. सोशल मीडिया के शिष्टाचार		
३. ऑनलाइन आवेदन, ग्राहक-सेवा केंद्र से संवाद		

Reference Books

३. पाठ्यपुस्तक : "पलाश"

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

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

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

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

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

SoE No.
23ME-101

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 Lane (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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			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

IV SEMESTER

23ME1401 : Machining Processes

Course Outcomes :

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

1. Demonstrate and design the tool geometry of SPCT, mechanism of chip formation and principle of orthogonal/oblique cutting.
2. Analyze the cutting tool geometry of MPCT, mechanism of chip formation, mechanism used and working principle with applications.
3. Identify basic parts and operations of machine tools including lathe, shaper, planer.
4. Categorize basic parts and operations of machine tools including boring, milling, and grinding machines.
5. Select a machining operation and corresponding machine tool for a specific application in real-time.

Unit I:

8 Hrs.

Mechanics of Machining and Machinability: Introduction to machining, geometry of SPCT. Mechanism of chip formation, Orthogonal and Oblique cutting, Use of chip breaker in machining, Merchant Circle. (Application of force analysis Analytical treatment expected), thermal aspects of machining, Cutting Fluids, Machinability, Estimation of Tool life, Tool materials.

Unit II:

7 Hrs.

Lathe: Kinematic systems and operations of lathes, attachments for various operations, machine specifications, basis for selection of cutting speed, feed and depth of cut, time estimation for turning operations such as facing, step turning, taper turning, threading, knurling. Capstan and Turret Lathe and special purpose Machines: Construction, Operation and selection of Machining Parameters, Machining Centers, Tool Heads and indexers

Unit III:

8 Hrs.

Shaper: Introduction, type, specification, description of machines, hydraulic drives in shapers, cutting parameters, attachments for shaper, work holding devices, shaper operations. Planer: Introduction, specifications, description, type of planner, Mechanism for planner: Driving mechanism, feeding mechanism, planner cutting tools, cutting parameters Slotter: Introduction, specifications, description, type of drives for slotter, types of slotting

Unit IV:

7 Hrs.

Milling: Kinematic systems and operations of milling machines, attachments for Milling. Cutting parameters, Types of milling cutters, Tool geometry & their specifications. Indexing- simple, compound and differential. Screw threads and Gear Manufacturing Methods. Applications of milling in gear production process.

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

Unit V:	8 Hrs.
<p>Grinding operations: Grinding operations, grinding wheel, specifications & selection, cylindrical & centre less grinding operation, surface grinding, tool & cutter grinding, time estimation for grinding operations.</p> <p>Super finishing process: Honing, Lapping, super finishing, polishing, buffing, metal spraying, galvanizing and electroplating. Process parameters and attainable grades of surface finish, surface roughness measurement. Applications of these process in product development</p>	
Unit VI:	7 Hrs.
<p>Drilling: Reaming: Broaching: Unconventional Machining and Joining Processes: Characteristics, Operation, applications, Limitation and selection of process parameters of the following processes, Abrasive Jet Machining, Ultrasonic Machining, Water Jet Machining, EDM, and ECM. Plasma Arc welding, Electron Beam, and Electron Laser Beam welding. Real time applications of unconventional processes.</p>	
	Total Lecture 45 Hours

Textbooks:

1.	Workshop Technology - Part I, Chapman W.A. Fifth edition CBS Publishers
2.	Manufacturing Technology (Metal Cutting & Machine Tools) P N Rao 2nd Edition (2009) The McGraw-Hill Companies
3.	Manufacturing Science Ghosh & Malik 2nd Edition (2010) East West
4.	Workshop Technology (Volume-II) Hajra Choudhary 2nd Edition (2012) The McGraw-Hill Companies

Reference Books:

1.	Manufacturing Engineering & Technology S Kalpakjian & SR Schmid 1st Edition (2009) Pearson Education Canada
2.	Technology of machine Tools Krar & Oswald 1st Edition (1984) Gregg Division, McGraw-Hill
3.	Manufacturing Processes M Begman 1st Edition (1974) Ballinger Pub. Co

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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://nptel.ac.in/courses/112/103/112103280/
2.	https://nptel.ac.in/courses/106/106/106106179/
3.	https://nptel.ac.in/courses/127/105/127105007/

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

IV SEMESTER

23ME1402 : Lab Machining Processes

Course Outcomes

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

1. Demonstrate and design the tool geometry of SPCT, mechanism of chip formation and principle of orthogonal/oblique cutting.
2. Analyze the cutting tool geometry of MPCT, mechanism of chip formation, mechanism used and working principle with applications
3. Identify basic parts and operations of machine tools including lathe, shaper, planer
4. Categorize basic parts and operations of machine tools including boring, milling and grinding machines.
5. Select a machining operation and corresponding machine tool for a specific application in real-time.

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

SN	Experiments based on
1.	Demonstration of Single point cutting tool their Nomenclature , geometry, materials and applications.
2.	Demonstration of Multi point cutting tool their Nomenclature , geometry, materials and applications.
3.	Demonstration of working of Lathe machine and study of its mechanisms.
4.	Demonstration of working of Shaper machine and study of its mechanism.
5.	Demonstration of working of Milling machine and study of its mechanism.
6.	Demonstration of working of Drilling machine and study of its mechanism..
7.	Practical on Lathe for turning, facing, step turning, taper turning, and I threading.
8.	Practical on Shaper with exposure to auto feed.
9.	Practical on Milling machine for slot cutting.
10.	Practical on Drilling machines for drilling.
11.	Demonstration of Boring operations.
12.	Study of Grinding machines and Super finishing processes.
13.	Introduction to NC, CNC machines.

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



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 Mechanical Engineering)

SoE No.
23ME-101

B. Tech in Mechanical Engineering

IV SEMESTER

23ME1403 : Lab Computer Aided Design

Course Outcomes

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

Apply the knowledge of CAD software for product development in an Industry

1. Apply the knowledge of CAD software for product development in an Industry
2. Create CAD assemblies for real time product.
3. Prepared drafting drawing which required for manufacturing.
4. Simulate the CAD model or CAD assembly.
5. Analyse different CAD models for 3D printing applications.

SN	Experiments to be performed
1.	Creation of three dimensional CAD models using CAD software.
2.	Basic surface modeling using CAD software.
3.	Advanced model creation using surface modeling.
4.	Assembly of CAD models using CAD software.
5.	Kinematics of CAD assembly using CAD software.
6.	Drafting of CAD models using CAD software.
7.	Drafting of CAD assemblies using CAD software.
8.	CAD Model preparation for 3D Printing.
9.	3D Printing of CAD models using 3D printer.
10.	Advanced rendering features for CAD model.

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

IV SEMESTER

23ME1404 : Lab Machine Drawing

Course Outcomes

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

1. **Understand** and **Apply** the detailed drawing of a given object.
2. **Interpret** and **Prepare** the drawing.
3. **Construct** details and assembly of different mechanical systems.
4. **Create** an assembly drawing into a detailed drawing using modeling software

SN Experiments to be performed

Drawing Sheets

1	Representation of different types of lines, Name Block, Dimensioning, Machining Symbols, Heat Treatment, Allowances, Convention Representation of Engineering Part (CO1)
2	Welding symbol and Riveting: - Shapes of rivet heads. (Diagonal pitch, Margin, Back pitches, etc.) Types of riveting lap and butt joint, zigzag, and chain structure. All types of welding symbols are common representations of welding.(CO2)
3	Type of Bolt and Nut: -Hexagonal bolt and nut with washer, SQ headed bolt, Eye bolt, Eye foundation bolt, Bent foundation, and Lewis and Rag foundation bolt. Locking of bolt (All 5 types) T-headed bolt Hook bolt, Flanged nut Cap nut Dome nut Capstan nut Ring nut Wing nut, and Stud.(CO2)
4	Type of Coupling, Key, and Joint Saddle Keys, Sunk Keys, Gib Headed keys, parallel and feather (All Four types) round Keys, Woodruff key, Spline Shafts, Cotter joints, Knuckle joints, Coupling (flange, protective, muff, Oldham, universal) (CO2)

Assembly Drawings

Drawings of assembled views for the part drawings of the following using conventions and easy drawing proportion. Note: First angle projection to be adopted. The student should be able to provide working drawings of actual parts.

5	Steam Engine parts – Stuffing boxes, Crossheads, Eccentrics, pistons, Valves and Pumps.(CO3,4)
6	Bearings -Bushed journal bearing, Foot-step bearing, and Plummer block.(CO3,4)
7	Machine tool parts –Lathe Tail-stock, Square Tool Post, Machine Vices.(CO3,4)
8	Other machine parts –Screws jacks, Square Tool post, and Petrol engine connecting rod.(CO3,4)
9	Simple designs of a steam stop valve, spring-loaded safety valve and feed check valve.(CO3,4)
10.	Cotter and pin joints and coupling. (CO3,4)
11.	Production Drawing: Name Plates, Part List and Revisions.(CO4)

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

Textbooks:

- | | |
|----|---|
| 1. | K L Narayana, P Kannaiah and K Venkata Reddy, Machine Drawing, 3rd edition, New Age Publications, 2006. |
| 2. | N D Bhatt, Engineering Drawing, Charotar Publications, 2000. |

Reference Books:




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| 1. | N Sidheswar, P Kannaiah and V V S Sastry, Machine Drawing, Tata McGraw Hill, 1980. |
| 2. | K L Narayana, P Kannaiah and K Venkata Reddy, Production Drawing, 2nd edition, New Age Publications, 2009. |
| 3. | P S Gill, A Textbook of Machine Drawing, S.K. Kataria & Sons Publishers, 2013. |
| 4. | R K Dhawan, Machine drawing, S. Chand Publications, 1998. |
| 5. | Basudev Bhattacharyya, Machine Drawing, Oxford University Press, 2011. |
| 6. | G Pohit, G Ghosh, Machine Drawing with Auto CAD, Pearson Education India, 2004. |
| 7. | Ajeet Singh, Machine Drawing, Tata McGraw Hill, 2012. |
| 8. | Gopalkrishna K. R, Machine Drawing, Subhas Publications, Bangalore, 1985. |
| 9. | Naryana K.L., Kannaiah R., Venkata Reddy K "Production Drawing ", New Age Int.Pub, 1st |

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| 1. | https://nptel.ac.in/courses/112103019/ |
| 2. | https://nptel.ac.in/syllabus/112106075/ |

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

IV SEMESTER
Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1ME101 : Computer-Aided Design
MDM-I	3	(MDM1ME101) Engineering Materials
MDM-II	4	(MDM2ME102) Basics of Mechanism
MDM-III	5	(MDM3ME103) Basics of Machine Design
MDM-IV	6	(MDM4ME104) Computer Aided Design
MDM-V	7	(MDM5ME105) Product Design and Development
MDM-VI	8	(MDM6ME106) INDUSTRY 5.0

Track 2

Courses	Sem	MDMT2ME201 : Robotics and Computer Integrated Manufacturing
MDM-I	3	(MDM1ME201) Introduction to Robotics
MDM-II	4	(MDM2ME202) Industrial Robotics
MDM-III	5	(MDM3ME203) Computer Integrated Manufacturing
MDM-IV	6	(MDM4ME204) Subtractive Manufacturing
MDM-V	7	(MDM5ME205) Additive Manufacturing
MDM-VI	8	(MDM6ME206) Supply Chain Management

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

IV SEMESTER

Track 1 - Computer Aided Design

MDM2ME102 : Basics of Mechanisms

Course Outcomes :

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

1. **Understand** the various kinematic concepts in different mechanisms.(L3)
2. **Explain** the working Principles of various Mechanism. (L3)
3. **Demonstrate** the various working principles of plants.(L3)
4. **Construct** the various model using CAD software. (L4)

Unit I:	7 Hrs.
Basic Concept of Mechanism: link, kinematics pairs, kinematics chain, mechanism, machine, simple & compound chain, Degree of freedom, estimation of degree of freedom, inversion of four-bar-chain. (CO-1)	
Unit II:	8 Hrs.
Working Principles of Mechanism: Seesaw mechanism, Reciprocating Mechanism, Brake Mechanism, Clutch mechanism, Gear mechanism. (CO-2)	
Unit III:	8 Hrs.
Mechanisms of: Working of EV vehicles, Thermal power plants, solar power plants, Hydro power plant, wind power and Nuclear power plant. Refrigeration and Air conditioning. (CO-3)	
Unit IV:	7 Hrs.
Concept of modelling and analysis: Generation of model using CAD software, Analysis and synthesis of Various Mechanisms. (CO-4)	
	Total Lecture 30 Hours

Textbooks:

1. Theory of mechanisms & machines, Shigley J. E, 4TH Edition 2014, Tata McGraw-Hill
2. Theory of Machine, Rattan S.S, 4th Edition 2015, Tata McGraw-Hill

Reference Books:

1. Non-Conventional Energy Resources, Khan B.H., 3rd Edition, Tata McGraw-Hill.
2. Electric and Hybrid Vehicles, DENTON T., 2ED (PB 2020), Institute of motor Industry

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

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

1	
2	

MOOCs Links and additional reading, learning, video material

1.	
2.	
3.	

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

IV SEMESTER

Track 2- Robotics and Computer Integrated Manufacturing

MDM2ME202: Industrial Robotics

Course Outcomes :

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

1. Apply the knowledge of robot motion analysis for product development in an Industry
2. Design robot programs for various manufacturing operations
3. Analyze Robotics based automation and its different roles in industry
4. Analyze the working methodology of robotics and automation, motion and control, machine vision and programming, application of robots in industry.

Unit I:

7 Hrs.

Introduction: Overview of Industrial Robotics: Definition, history, and evolution, Types of Industrial Robots: Manipulators, articulated robots, SCARA robots, etc., Robot Components and Architecture: End effectors, actuators, controllers, and sensors, Applications of Industrial Robots: Manufacturing, assembly, welding, painting, etc.

Contemporary Issues related to Topic

Unit II:

8 Hrs.

Robot Motion Analysis and Control and Robot End-Effectors: Introduction to Manipulator Kinematics, Homogeneous Transformations and Robot Kinematics, Manipulator Path Control, Robot Dynamics, Configuration of a Robot Controller, Control System Analysis, Robot Activation and Feedback Components, Types of End Effectors, Mechanical Grippers, Other Types of Grippers, Considerations in Gripper Selection and Design, End Effector Integration: Mounting, calibration, and programming of end effectors.

Contemporary Issues related to Topic

Unit III:

8 Hrs.

Sensors in Robotics and Machine Vision: Transducers and Sensors, Sensors in Robotics, Tactile Sensors, Proximity and Range Sensors, Miscellaneous Sensors and Sensor-Based Systems, Uses of Sensors in Robotics, Introduction to Machine Vision, The Sensing and Digitizing Function in Machine Vision, Image Processing and Analysis, Training and Vision System, Applications in Manufacturing industry.

Contemporary Issues related to Topic

Unit IV:

7 Hrs.

Robot Programming and Languages: Robot Programming Languages: Teach pendant programming, offline programming, and programming interfaces, Robot Control Systems: Open-loop vs. closed-loop control, PID control, trajectory planning, Robot Safety: Safety standards, risk assessment, and safety features in industrial robots, Simulation and Offline Programming: Introduction to simulation software for robot programming and validation. AI and Robotics.

Contemporary Issues related to Topic

Total Lecture

30 Hours

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
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(Department of Mechanical Engineering)

SoE No.
23ME-101

B. Tech in Mechanical Engineering

Textbooks:

1.	Robot Engineering An Intergrated approach	2004	Klafter R.D., Chmielewski T.A. and Negin M	Springer
2.	Industrial Robotics: Technology, Programming and Applications,	2012	Mikell P. Groover, Mitchel Weiss, Roger N. Nagel, Nicholas G. Odrey and Ashish Dutta	2nd Edition, Tata McGraw Hill, 2012.
3.	Automation in Production system	2002	Mikell P. Groover	Prentice-Hall of India Pvt. Ltd., New Delhi, 2002
4.	Bruno S and Sciavicco L, Robotics: Modelling, Planning and Control,	Springer (2009)		

Reference Books:

1.	Robotics control, sensing, vision, and intelligence	2004	Fu K.S., Gonzalez R.C., and Lee C.S.G.	Tata McGraw-Hill Education
2.	Robotics Technology and Flexible Automation	2001	Deb S.R	Tata McGraw-Hill Education
3.	Introduction to Robotics Mechanics and Control	2008	Craig J.J	Pearson Education India
4.	Industrial Robotics, By Ganesh S. Hegde	2006, Laxmi Publications, June 2006		

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

1	
2	

MOOCs Links and additional reading, learning, video material

1.	https://nptel.ac.in/courses/112101098
2.	https://nptel.ac.in/courses/112101099

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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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23ME-101**

IV SEMESTER

Mandatory Learning Course (Audit Course)

MLC2124 : YCAP4

			June, 2024	1.00	Applicable for AY 2023-24 Onwards
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