

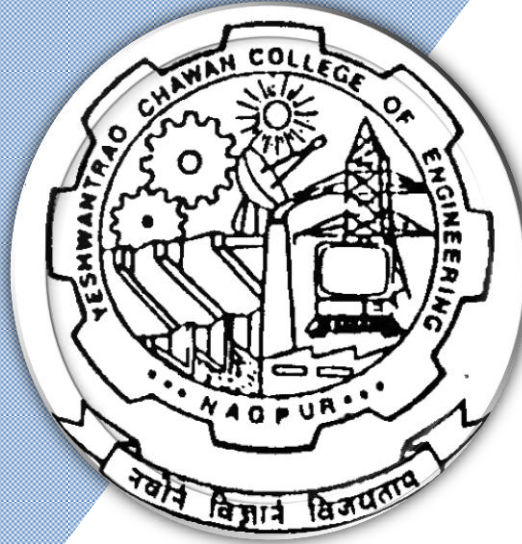
Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

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

Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology

SoE & Syllabus 2023

1st to 4th Semester

(Department of 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 |



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SoE No.
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 (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 | |

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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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 | LAB: Industrial Case Study | 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 Chem. & Sustainability |
| 4 | 3 | OE1 | GE | 23OE1304 | OE-I : Hydrogen Fuel |
| 5 | 3 | OE1 | GE | 23OE1305 | OE-I : Electronic Materials And Applications |
| 6 | 3 | OE1 | GE | 23OE1306 | OE-I : Laser Technology And Applications |
| 7 | 3 | OE1 | MGT | 23OE1307 | OE-I : Finance And Cost Management |
| 8 | 3 | OE1 | MGT | 23OE1308 | OE-I : Operation Research Techniques |
| 9 | 3 | OE1 | MGT | 23OE1309 | OE-I : Project Evaluation & Management |
| 10 | 3 | OE1 | MGT | 23OE1310 | OE-I : Total Quality Management |
| 11 | 3 | OE1 | MGT | 23OE1311 | OE-I : Value Engineering |
| 12 | 3 | OE1 | MGT | 23OE1312 | OE-I : Maintenance Management |
| 13 | 3 | OE1 | MGT | 23OE1313 | OE-I : Industrial Safety |
| 14 | 3 | OE1 | MGT | 23OE1314 | OE-I : Industry 4.0 |
| 15 | 3 | OE1 | MGT | 23OE1315 | OE-I : Operation Management |
| 16 | 3 | OE1 | MGT | 23OE1316 | OE-I : Material Management |
| 17 | 3 | OE1 | MGT | 23OE1317 | OE-I : Hospitality Management |
| 18 | 3 | OE1 | MGT | 23OE1318 | OE-I : Human Resource Management & Organizational Behaviour |
| 19 | 3 | OE1 | MGT | 23OE1319 | OE-I : Agri-Business Management |
| 20 | 3 | OE1 | MGT | 23OE1320 | OE-I : Rural Marketing |
| 21 | 3 | OE1 | MGT | 23OE1321 | OE-I : Marketing Management |
| 22 | 3 | OE1 | MGT | 23OE1322 | OE-I : Health Care Management |

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



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 (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 | YC4P4 : 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 |

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

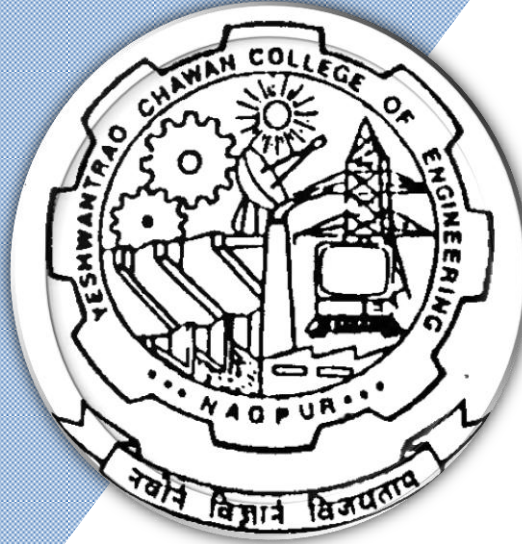
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(Accredited 'A++' Grade by NAAC with a score of 3.6)

Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology

SoE & Syllabus 2023

1st Semester

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering



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SoE No.
23ME-101

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(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 |



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|--------|-----|------|---------------|-----------|---------|-----|---------------|---|---|-----|---------|-------------|------|-----|--------------------------|
| | | | | | | | L | T | P | Hrs | | MSEs* | TA** | ESE | |

Liberal Learning Course

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

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

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

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

| | | | | |
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(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

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

| | | | | | |
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(Department of Mathematics & Humanities)

SoE No.
23FY-101

B.Tech First Year

Textbooks:

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

Reference Books:

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

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

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

MOOCs Links and additional reading, learning, video material

1. <https://nptel.ac.in/courses/111103070>
2. https://onlinecourses.nptel.ac.in/noc19_ma28/preview
3. <https://nptel.ac.in/courses/111/106/111106100/>

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(Department of Physics)

SoE No.
23FY-101

B.Tech First Year

I SEMESTER

23GE1108 : Engineering Physics

Course Outcomes :

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

1. Correlate fundamentals of quantum mechanics to solve problems dealing with quantum particles.
2. Assess the characteristics of semiconductor materials in terms of crystal structures, charge carriers and Energy bands.
3. Examine the intensity variation of light due to interference, diffraction, laser and its applications.
4. Analyze the motion of charged particles in electric and magnetic field and its applications to electron optic devices.
5. Illustrate the nature and characterization of magnetic materials and superconductors for engineering applications.

Unit I: Quantum Physics

(7 Hrs.)

Wave-particle duality, de-Broglie's hypothesis, Wave packet, Heisenberg's uncertainty principle: significance and applications, Wave function and its probability interpretation, Schrodinger Equation, Particle in infinite potential well. (Contemporary Issues related to Topic)

Unit II: Semiconductor Physics

(7 Hrs.)

Formation of energy bands in solids; Classification of solids, Energy band diagram of Si and Ge, Intrinsic and extrinsic semiconductors, Conductivity, Law of mass action, Fermi function, Fermi level in intrinsic and extrinsic semiconductors, Dependence of Fermi level on impurity concentration and temperature, Hall effect. (Contemporary Issues related to Topic)

Unit III: Geometrical Optics

(7 Hrs.)

Interference: Interference in thin films, Wedge shaped film, Newton's rings, Applications of interference
Diffraction: Fraunhofer diffraction from a single slit. (Contemporary Issues related to Topic)

Unit IV: Laser

(6 Hrs.)

Coherence and its types, Interaction of radiation with matter, Population Inversion, Pumping: methods and schemes, Optical resonant cavity, Ruby laser, Semiconductor diode laser, Properties and engineering applications of laser. (Contemporary Issues related to Topic)

Unit V: Electron Ballistics

(7 Hrs.)

Motion of a charged particle in uniform electric and magnetic field, Cross field configuration; Electron refraction, Electron lens. Cathode ray oscilloscope and its application. (Contemporary Issues related to Topic)

Unit VI: Magnetic Materials & Superconductors

(6 Hrs.)

Introduction to magnetic materials, Interpretation of Hysteresis curves, Superconductors: Type-I and Type-II, Meissner effect, Applications. (Contemporary Issues related to Topic)

Total Lecture 40 Hours

| | | | | | |
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(Department of 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 |

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(Department of Physics)

SoE No.
23FY-101

B.Tech First Year

I SEMESTER

23GE1109 : Lab. Engineering Physics

Course Outcomes:

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

1. Correlate fundamentals of quantum mechanics to solve problems dealing with quantum particles.
2. Assess the characteristics of semiconductor materials in terms of crystal structures, charge carriers and Energy bands.
3. Examine the intensity variation of light due to interference, diffraction, laser and its applications.
4. Analyze the motion in electric field and magnetic field and its applications to electron optic devices.
5. Illustrate the nature and characterization of magnetic materials and superconductors for engineering Applications.

List of Experiments :

| Sr. No. | Experiments based on |
|---------|---------------------------------------------------------------------------------------------------------------|
| 1 | Determination of Planck's constant. |
| 2 | Study of Tunnel Diode. |
| 3 | Determination of Hall coefficient and density of charge carriers using Hall effect. |
| 4 | Dependence of Hall coefficient on temperature. |
| 5 | Determination of Band gap in a semiconductor by four probe method. |
| 6 | Determination of Band gap in a semiconductor using reverse biased p-n junction diode. |
| 7 | Determination of radius of curvature of Plano convex lens using Newton's rings. |
| 8 | Determination of thickness of thin paper using air wedge. |
| 9 | Determination of wavelength of sodium light using diffraction grating. |
| 10 | Determination of wavelength of laser using diffraction grating. |
| 11 | Determination of divergence of laser beam. |
| 12 | Determination of amplitude and frequency of sinusoidal signal using CRO. |
| 13 | To measure the phase shift introduced by a phase shift network using Dual beam CRO. |
| 14 | Determination of the velocity of Ultrasonic waves in a non -electrolytic liquid by ultrasonic interferometer. |

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(Department of Mechanical Engineering)

**SoE No.
23ME-101**

B.Tech in Mechanical Engineering

I SEMESTER

23ME1101 : Engineering Graphics

Course Outcomes :

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

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

Unit I: Theory of Orthographic Projections:

(3 Hrs.)

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

Unit II: Theory of Isometric Projections:

(2 Hrs.)

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

Unit III: Lines:

(2 Hrs.)

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

Unit IV: Planes and Solids:

(4 Hrs.)

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

Unit V: Section of Solids and Development of Surfaces:

(2 Hrs.)

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

Unit VI: Intersection of Surfaces of solids:

(2 Hrs.)

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

Total Lecture 15 Hours

| | | | | | |
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(Department of Mechanical Engineering)

B.Tech in Mechanical Engineering

**SoE No.
23ME-101**

Textbooks:

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

Reference Books:




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

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

| | |
|---|------------------------------------------------------------------------------|
| 1 | Intranet on address 172.16.1.10. data/CCC/software / AutoCAD Software Setup. |
|---|------------------------------------------------------------------------------|

MOOCs Links and additional reading, learning, video material

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| 1. | https://youtube.com/playlist?list=PLLy_2iUCG87Bw9XPfEF3r3EW5UIAOv8iz |
| 2. | Eng https://nptel.ac.in/courses/112105294 |

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(Department of Mechanical Engineering)

B.Tech in Mechanical Engineering

**SoE No.
23ME-101**

I SEMESTER

23ME1102 : Lab. Engineering Graphics

Course Outcomes :

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

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

Practical's to be performed from the list as below

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

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(Department of Electrical Engineering)

B.Tech in Electrical Engineering

SoE No.
23EL-101

I SEMESTER

23EL1101 : Basic Electrical and Electronics Engineering

Course Outcomes:

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

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

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(Department of Electrical Engineering)

B.Tech in Electrical Engineering

**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 |
|----|---------------------------------------------------------------------------------------------------------------------------|

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(Department of Mechanical Engineering)

**SoE No.
23ME-101**

B.Tech in Mechanical Engineering

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 | | | |

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(Department of Mechanical Engineering)

**SoE No.
23ME-101**

B.Tech in Mechanical Engineering

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/ |

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|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------|---------|--------------------------------------|
|  |  |  | 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)

SoE No.
23ME-101

B.Tech in Mechanical Engineering

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.

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Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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B. Tech SoE and Syllabus 2023

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(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 st 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 |

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(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. |

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Yeshwantrao Chavan College of Engineering

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B. Tech SoE and Syllabus 2023
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(Department of Civil Engineering)

SoE No.
23FY-101

B.Tech in FYC

I SEMESTER

23GE1117-Get Set Go

Course Outcomes:

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

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

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

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(Department of Civil Engineering)

SoE No.
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B.Tech in FYC

Reference Books

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

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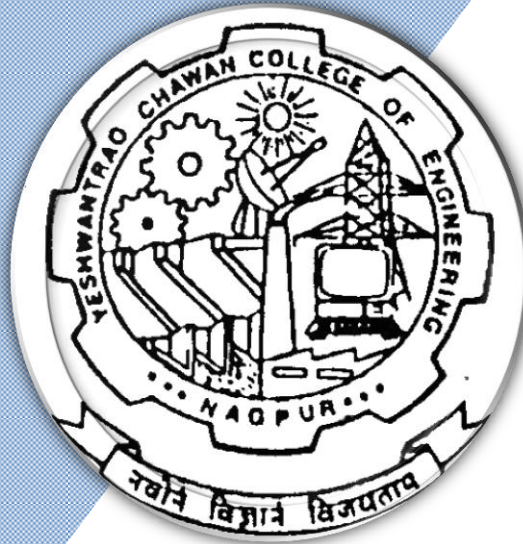
Nagar Yuwak Shikshan Sanstha's

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)

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 | |

Liberal Learning Course

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

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

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

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

| | | | | |
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(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 |

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(Department of Mathematics & Humanities)

SoE No.
23FY-101

B.Tech First Year

Textbooks:

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

Reference Books:

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

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

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

MOOCs Links and additional reading, learning, video material

1. <https://nptel.ac.in/courses/111/106/111106146/>
2. <https://nitkr.ac.in/docs/5-Multiple%20Integrals%20and%20their%20Applications.pdf>

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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)

SoE No.
23FY-101

B.Tech First Year

II SEMESTER

23GE1204 : Applied Chemistry

Course Outcomes:

Upon successful completion of the course students will be able to

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

Unit I: Water Chemistry

(7 Hrs.)

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

Unit II: Electrochemistry

(7 Hrs.)

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

Unit III: Energy storage device:

(6 Hrs.)

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

Unit IV: Fuels

(7 Hrs.)

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

Unit V: Engineering Materials

(6 Hrs.)

Cement:

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

Lubricants:

Introduction, Classification, Mechanisms.

Properties & Significance of liquid lubricants-Viscosity and viscosity index, Flash and fire point, Cloud and pour point, Aniline point, acid value, saponification number. Numerical on V.I.

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Unit VI: Advanced Materials (6 Hrs.)

Advanced Materials

Nanomaterials: Definition, Carbon Nanotubes and types. Applications of Nanomaterials in electronics, environment and medicine.

Liquid Crystal Polymers: Introduction, General properties and applications.

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

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

Spectroscopic techniques: Introduction and applications

Total Lecture | **39 Hours**

Textbooks:

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

Reference Books:

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

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

1. <http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/CHEMISTRY/>

MOOCs Links and additional reading, learning, video material

1. <https://www.youtube.com/watch?v=XTt3gXB0a84>
2. <https://www.youtube.com/watch?v=iihYXx79QiE>
3. <https://www.youtube.com/watch?v=JfJ7MIP9Dco>
4. <https://www.youtube.com/watch?v=L2VSOccUrSk>
5. <https://www.youtube.com/watch?v=p5pk4Um6lsk>
6. <https://youtu.be/-R7s17hD104>
7. <https://youtu.be/Bmj85Ihf7w>

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II SEMESTER

23GE1205 : Lab. Applied Chemistry

Course Outcomes

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

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

Total 10 experiments are to be performed

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

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

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

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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

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| Unit I: Basics of Communication | (6 Hrs.) |
| Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Classification of Barriers (Intrapersonal, Interpersonal, Organizational). | |
| Unit II: English Phonetics | (7 Hrs.) |
| Speech Mechanism, Organs of speech, Consonant and Vowels sounds symbols, word stress rules | |
| Unit III: Presentation & Interview Skills | (6 Hrs.) |
| Presentation-Nuances of presentation- Kinesics, Proxemics, Chronemics, Vocalics, Modes of Presentation, Interview-Purpose , expectations of employer and preparation for Interview, Types, Types of Questions & Answering Techniques, Telephonic Interviews – preparation and guidelines | |
| Unit IV: Technical Reports, Memo & E-Mail Etiquettes | (7 Hrs.) |
| Report -Types, Characteristics, prewriting aspects of report and preparing writing of reports Memo- Objectives, Types, Structure and Layout Email-Etiquette, acronyms. | |
| Total Lecture | 26 Hours |

Textbooks:

| | |
|----|-----------------------------------------------------------------------------------------------------------------------------|
| 1. | Meenakshi Raman & Sangeeta Sharma, Technical Communication, Raman & Sharma, Oxford University Press Orford University Press |
| 2. | T. Balasubramaniam, Textbook of English Phonetics for Indian Students, Macmillan India Ltd |
| 3. | |

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Reference Books:

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

MOOCs Links and additional reading, learning, video material

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

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II SEMESTER

23GE1215 : Indian Knowledge System

Course Outcomes:

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

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

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

Textbooks

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

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

| PPT's/Research papers | |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | https://www.researchgate.net/publication/360889208_STONE_AGE_TOOL_TECHNOLOGY_and_CULTURAL_DEVELOPMENT |
| 2 | https://scholar.google.com/citations?view_op=view_citation&hl=en&user=iT1KSV8AAAAJ&sortBy=pubdate&citation_for_view=iT1KSV8AAAAJ:UcHWp8X0CEIC |

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

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(Department of Civil Engineering)

SoE No.
23CV-101

B.Tech in Civil Engineering

II SEMESTER

23CV1201 : Engineering Mechanics

Course Outcomes :

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

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

Unit I: Resultant of planar force System

(7 Hrs.)

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

Unit II: Equilibrium of planar force System

(6 Hrs.)

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

Unit III: Friction and Trusses

(7 Hrs.)

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

Unit IV: Properties of Surfaces

(6 Hrs.)

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

Unit V: Virtual Work Method and Kinetics of Particle

(7 Hrs.)

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

Unit VI: Work Energy and Impulse Momentum Method

(6 Hrs.)

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

Total Lecture 39 Hours

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Textbooks:

1. Nelson A., Engineering Mechanics (Statics and Dynamics), ed 2009, Tata Mc. Grew Hill Education Pvt. Ltd., New Delhi, 2009.
2. Dubey N.H., Engineering Mechanics (Statics and Dynamics) first edition 2013, Tata Mc. Graw Hill Education Pvt. Ltd., New Delhi, 2013.
3. Singer F.L, Engineering Mechanics (Statics and Dynamics), Harper and Rowe publication, New Delhi, 1994.

Reference Books:

1. Timoshenko S, Young D.H and Rao J.V, Engineering Mechanics, Mc. Graw Hill Publication, New Delhi, 2007.
2. Bhattacharyya B., Engineering Mechanics, Oxford University Press, New Delhi, 2008.
3. Hibbeler R.C, Engineering Mechanics (Statics and Dynamics), Pearson Publication, Singapore, 2000.
4. Shames I.H. and Rao J.V., Engineering Mechanics (Statics and Dynamics), First Edition, Pearson Publication, New Delhi, 2003.
5. Beer F.P. and Johnston E.R; Vector Mechanics for Engineers, 9th edition Tata Mc. Graw Hill Publication, New Delhi. 2007.

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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>

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II SEMESTER

23CV1202 : Lab. Engineering Mechanics

Course Outcomes

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

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

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

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

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(Department of Information Technology)

SoE No.
23IT-101

B.Tech in Information Technology

II SEMESTER

23IT1203 : Programming for Problem Solving

Course Outcomes :

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

Unit I: Computer System Basics:

(3 Hrs.)

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

Unit II: Basic of C Programming

(6 Hrs.)

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

Unit III: Loop Structures:

(5 Hrs.)

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

Unit IV: Modular Programming:

(6 Hrs.)

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

Unit V: Arrays:

(6 Hrs.)

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

Unit VI: String, Structure and Union:

(4 Hrs.)

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

Total Lecture 30 Hours

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(Department of Information Technology)

B.Tech in Information Technology

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23IT-101**

Text books

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

Reference Books

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

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|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | https://nptel.ac.in/courses/106104128 |
| 2 | https://nptel.ac.in/courses/106104128 |
| 3 | https://www.youtube.com/watch?v=rQoqCP7LX60&list=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5hMt |

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|-------------|----------------------|----------|-----------------|---------|--------------------------------------|
| | | | 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)

SoE No.
23IT-101

B.Tech in Information Technology

II SEMESTER

23IT1204 : Lab. Programming for Problem Solving

Course Outcomes: Students will be able to

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

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

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(Department of Information Technology)

B.Tech in Information Technology

SoE No.
23IT-101

Text books

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

Reference Books

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

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

| | |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books |
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MOOCs Links and additional reading, learning, video material

| | |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | https://nptel.ac.in/courses/106104128 |
| 2 | https://nptel.ac.in/courses/106104128 |
| 3 | https://www.youtube.com/watch?v=rQoqCP7LX60&list=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5hMt |

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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 Information Technology)

SoE No.
23IT-101

B.Tech in Information Technology

List of Practical

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

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Yeshwantrao Chavan College of Engineering

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

SoE No.
23FY-101

B.Tech First Year

II SEMESTER

23GE1218 : Functional English

Course Outcomes:

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

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

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

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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

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

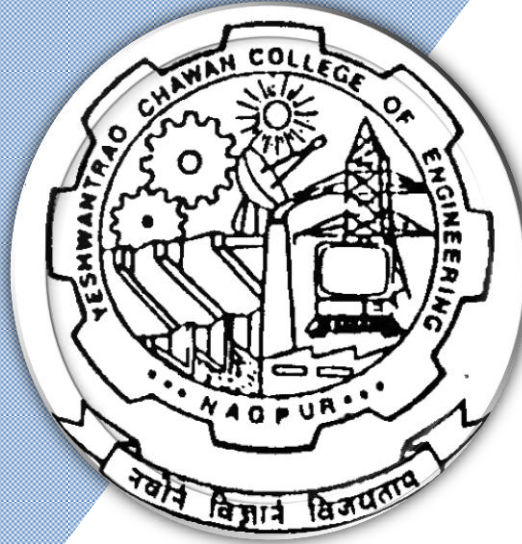
Nagar Yuwak Shikshan Sanstha's

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

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 | LAB: Industrial Case Study | 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 Chem. & Sustainability |
| 4 | 3 | OE1 | GE | 23OE1304 | OE-I : Hydrogen Fuel |
| 5 | 3 | OE1 | GE | 23OE1305 | OE-I : Electronic Materials And Applications |
| 6 | 3 | OE1 | GE | 23OE1306 | OE-I : Laser Technology And Applications |
| 7 | 3 | OE1 | MGT | 23OE1307 | OE-I : Finance And Cost Management |
| 8 | 3 | OE1 | MGT | 23OE1308 | OE-I : Operation Research Techniques |
| 9 | 3 | OE1 | MGT | 23OE1309 | OE-I : Project Evaluation & Management |
| 10 | 3 | OE1 | MGT | 23OE1310 | OE-I : Total Quality Management |
| 11 | 3 | OE1 | MGT | 23OE1311 | OE-I : Value Engineering |
| 12 | 3 | OE1 | MGT | 23OE1312 | OE-I : Maintenance Management |
| 13 | 3 | OE1 | MGT | 23OE1313 | OE-I : Industrial Safety |
| 14 | 3 | OE1 | MGT | 23OE1314 | OE-I : Industry 4.0 |
| 15 | 3 | OE1 | MGT | 23OE1315 | OE-I : Operation Management |
| 16 | 3 | OE1 | MGT | 23OE1316 | OE-I : Material Management |
| 17 | 3 | OE1 | MGT | 23OE1317 | OE-I : Hospitality Management |
| 18 | 3 | OE1 | MGT | 23OE1318 | OE-I : Human Resource Management & Organizational Behaviour |
| 19 | 3 | OE1 | MGT | 23OE1319 | OE-I : Agri-Business Management |
| 20 | 3 | OE1 | MGT | 23OE1320 | OE-I : Rural Marketing |
| 21 | 3 | OE1 | MGT | 23OE1321 | OE-I : Marketing Management |
| 22 | 3 | OE1 | MGT | 23OE1322 | OE-I : Health Care Management |

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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 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

| | | | | | |
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Nagar Yuwak Shikshan Sanstha's

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

SoE No.
23ME-101

B. Tech in Mechanical Engineering

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, Prentice Hall |
| 2 | Fundamentals of Financial Instruments, 2 nd Edition, Parameshwaran, Wiley India |
| 3 | Marketing Management, 3 rd Edition, Rajan Saxena, Tata McGraw Hill |
| 4 | Advance Economic Theory, 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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(Department of Mechanical Engineering)

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

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Unit I: | 6 Hrs. |
| Drawing Standards: Drawing Sheets, Name Blocks, Lines, Sections, Dimensioning, Dimensioning of Tolerances, Standard Components, Machining Symbols, Welding Symbols, Heat Treatment, Manufacturing, Allowances, and Materials | |
| Unit II: | 7 Hrs. |
| Study Qualitative Selection of type / Size (Excluding Design Calculations) and Standard Practices for the Following Elements Threads, Bolts, Nuts, Washers, Rivets, Welds, Keys and Keyways, splines, and Couplings | |
| Unit III: | 7 Hrs. |
| Assembly and Dismantling Principles using CAD Software: Fits and Tolerances (Standards, Types Application, and Selection), Tolerance Charting, Surfaces Finishing Requirements for Assembly, Steam Engine parts – Stuffing boxes, Crossheads, Eccentrics, Piston, Valves and Pumps. | |
| Unit IV: | 8 Hrs. |
| Geometry suitable for Assembly, Assembly / Dismantling Tools using CAD Software Bearing Assemblies- Bushed journal bearing, Foot-step bearing, and Plummer block Machine tool parts – Lathe Tail-stock, Square Tool Post, Machine Vices | |
| Unit V: | 9 Hrs. |
| Study of some Standard Assemblies using CAD Software Assembly Drawings: Principles, Techniques, and Standards for Preparing Component Drawings, Subassembly Drawing, Full Assembly Drawing, Exploded Views. Other machine parts – Screws jacks, Square Tool post, and Petrol engine connecting rod. Simple designs of a steam - Stop valve, Spring-Loaded Safety Valve, and Feed Check Valve | |
| Unit VI: | 8 Hrs. |
| Production Drawing Using CAD Software: Name Plates, Part List, Revisions Etc., Essential Parts/ Formats Required for Production Drawings, Process Sheet | |
| | Total Lecture |
| | 45 Hours |

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(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:

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

III SEMESTER

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|-------------|----------------------|----------|-----------------|---------|--------------------------------------|
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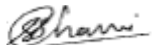
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(Department of Mechanical Engineering)

SoE No.
23ME-101

B. Tech in Mechanical Engineering

23ME1302 : LAB - Industrial Case Study

| | | | | | |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------|---------|--------------------------------------|
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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.

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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

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- 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>

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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 |

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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

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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/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

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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/>

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B. Tech in Mechanical Engineering

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 |

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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.

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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

Textbooks:

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.Dukupati new age international limited.
4. Theory of machines V.P.Singh, Dhanpat Rai & Co.

Reference Books:

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

1. <https://www.youtube.com/watch?v=EVqBzOGQlkl>
2. https://onlinecourses.nptel.ac.in/noc24_me44/preview
3. <https://www.youtube.com/watch?v=kXXfz6acsyU>

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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 |

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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.

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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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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

| | | | | | |
|-------------|----------------------|----------|-----------------|---------|--------------------------------------|
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(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 |

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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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 |

Open Elective syllabus link : <https://ycce.edu/syllabus/>

| | | | | | |
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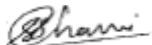
SoE No.
23ME-101

B. Tech in Mechanical Engineering

III SEMESTER

Mandatory Learning Course (Audit Course)

MLC2123 : YCAP3

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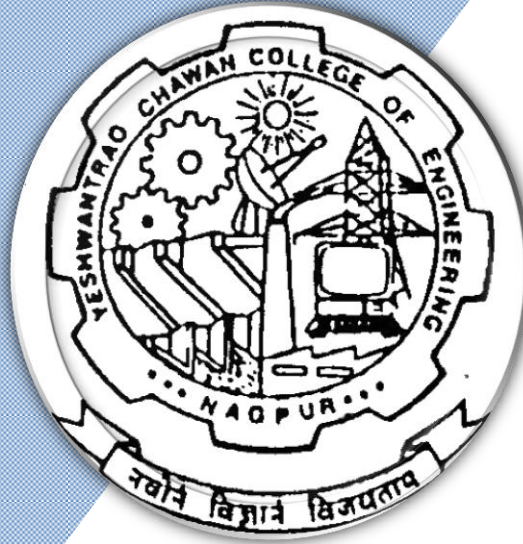
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(Accredited 'A++' Grade by NAAC with a score of 3.6)

Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology

SoE & Syllabus 2023

4th Semester

(Department of Mechanical Engineering)

B. Tech in Mechanical 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.
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 | YC4P4 : 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 |

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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.

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

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

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

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

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

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IV SEMESTER

23GE1401 : Entrepreneurship Development

Course Outcomes:

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

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

Unit I:

7 Hrs.

Entrepreneur & Entrepreneurship: Meaning of Entrepreneur, Evolution of the concept – Theories and Models, Types of Entrepreneur, Stages in entrepreneurial process- Idea Generation, Screening, Selection and Managing Resources.

Unit II:

8 Hrs.

Legal Compliances for Incorporating Start up: Fundamentals of choosing the Business Organization form for startup, Incorporation of Partnership, LL.P & Co – operative, Incorporation of One Person Company, Pvt. Ltd., Pub. Ltd. and not for profit company, Financing the legal Venture and Legal Compliances.

Unit III:

7 Hrs.

Entrepreneurship and IP Strategy: Intellectual Property : Definition and Concept of Trade Mark, Patent, Copyright, Industrial Design, IP Strategy and Entrepreneurship.

Unit IV:

8 Hrs.

Support to Entrepreneurs: Financing new ventures, Business Incubators – Government Policy for Small Scale Enterprises, Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Subcontracting.

Total Lecture

30 Hours

| | | | | | |
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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

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IV SEMESTER

23GE1405 : Marathi Language

Course Objectives

1. मराठी भाषेच्या समृद्धीची जाणीव करून देणे.
2. विद्यार्थ्यांमध्ये भाषा कौशल्याचा विकास करणे आणि त्यातून रोजगाराच्या संधीचा 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 | |

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| Unit:3 | <u>व्यावहारिक मराठी</u> | 7 Hours |
|--------------------------------------------------------------------------|----------------------------------------------|---------|
| १. म्हणी | | |
| २. मुलाखतलेखन | - डॉ. वैशाली धनविजय | |
| ३. वाक्प्रचार | | |
| ४. जाहिरातलेखन | - डॉ. अजय देशपांडे | |
| Unit:4 | <u>रोजगाराभिमुख मराठी व्यावहारिक कौशल्ये</u> | 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

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B. Tech in Mechanical Engineering

IV SEMESTER

23GE1406 : Hindi Language

Course Objectives

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

Course Outcomes

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

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६. उखडे खंभे (व्यंग्य)।

- हरिशंकर परसाई

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| Unit:2 | <u>पद्य विभाग</u> | 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 | <u>अन्य पाठ्य सामग्री</u> | 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 | <u>कौशल्य आधारित घटक</u> | 7 Hours |
| १. वाचन कौशल्य (समाचार-वाचन, कहानी-वाचन) | | |
| २. सोशल मीडिया के शिष्टाचार | | |
| ३. ऑनलाइन आवेदन, ग्राहक-सेवा केंद्र से संवाद | | |

Reference Books

3. पाठ्यपुस्तक : "पलाश"

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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 |

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| Reference Books | |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Headrick, Daniel R. (2020) Humans versus Nature- A Global Environmental History, Oxford University Press |
| 2 | Gilbert M. Masters and W. P. (2008). An Introduction to Environmental Engineering and Science, Ela Publisher (Pearson) |
| 3 | William P. Cunningham and Mary A. (2015). Cunningham Environmental Science: A global concern, Publisher (Mc-Graw Hill, USA) |
| 4 | Varghese, Anita, Oommen, Meera Anna, Paul, Mridula Mary, Nath, Snehlata (Editors) (2022) Conservation through Sustainable Use: Lessons from India. Routledge. |
| 5 | Central Pollution Control Board Web page for various pollution standards. https://cpcb.nic.in/standards |
| 6 | Barnett, J. & S. O'Neill (2010). Maladaptation. Global Environmental Change—Human and Policy Dimensions 20: 211–213 |
| 7 | Richard A. Marcantonio, Marc Lame (2022). Environmental Management: Concepts and Practical Skills. Cambridge University Press |
| 8 | Ministry of Environment, Forest and Climate Change (2019) A Handbook on International Environment Conventions & Programmes. https://moef.gov.in/wp-content/uploads/2020/02/convention-V-16-CURVE-web.pdf |
| YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] | |
| 1 | |
| MOOCs Links and additional reading, learning, video material | |
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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.

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| Unit V: | 8 Hrs. |
| Grinding operations: Grinding operations, grinding wheel, specifications & selection, cylindrical & centre less grinding operation, surface grinding, tool & cutter grinding, time estimation for grinding operations. 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 | |
| Unit VI: | 7 Hrs. |
| 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. | |
| | 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

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://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/>

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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. |

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IV SEMESTER

23ME1403 : Lab Computer Aided Design

Course Outcomes

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

1. Apply the knowledge of additive and subtractive manufacturing for product development in an Industry
2. Conduct additive manufacturing using 3D printing methods and subtractive manufacturing using CNC machines
3. Design CADmodels for accurately representing physical characteristics, kinematics, and dynamics of robotic systems using CAD data in Robot Simulation environment.
4. Analyse different 3D printing parameters and pre and post processing techniques of 3D Printed Parts for application in different industry.

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

| SN | Experiments based on |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Exploring CAD File Formats and their compatibility, advantages, and limitations. |
| 2. | Overview of CAM fundamentals with procedures for creation of CAM environment using CAD models. |
| 3. | Developing and simulating programs for planar milling operation |
| 4. | Developing and simulating programs for floor and wall and cavity milling operation |
| 5. | Developing and simulating programs for turning operations, encompassing OD, ID turning, grooving, threading. |
| 6. | Postprocessing operations using a variety of postprocessors to generate CNC programs effectively. |
| 7. | Creating comprehensive shop documentation to support manufacturing operations. |
| 8. | CAD Model preparation for 3D Printing. |
| 9. | Analysis of different 3D printing parameters. |
| 10. | Post-Processing Techniques for 3D Printed Parts. |
| 11. | Integrating CAD files into robot simulators for virtual prototyping and simulation (Simulators: ABB Robot Studio/ Gazebo/ MATLAB/Simulink) |
| 12. | Explore methods for accurately representing physical characteristics, kinematics, and dynamics of robotic systems using CAD data |

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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

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

| SN | Experiments based on |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Representation of different types of lines, Name Block, Dimensioning, Machining Symbols, Heat Treatment, Allowances, Convention Representation of Engineering Part |
| 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. |
| 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. |
| 4. | Type of Coupling, Key, and Joint |
| 5. | Steam Engine parts – Stuffing boxes, Crossheads, Eccentrics, pistons, Valves and Pumps. |
| 6. | Bearings - Bushed journal bearing, Foot-step bearing, and Plummer block. |
| 7. | Machine tool parts – Lathe Tail-stock, Square Tool Post, Machine Vices. |
| 8. | Other machine parts – Screws jacks, Square Tool post, and Petrol engine connecting rod. |
| 9. | Simple designs of a steam stop valve, spring-loaded safety valve and feed check valve. |
| 10. | Cotter and pin joints and coupling. |

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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 |

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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

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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)

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| 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

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SoE No.
23ME-101

B. Tech in Mechanical Engineering

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

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MOOCs Links and additional reading, learning, video material

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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

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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]

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MOOCs Links and additional reading, learning, video material

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

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SoE No.
23ME-101

B. Tech in Mechanical Engineering

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 |

Open Elective syllabus link : <https://ycce.edu/syllabus/>

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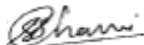
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B. Tech in Mechanical Engineering

IV SEMESTER

Mandatory Learning Course (Audit Course)

MLC2124 : YCAP4

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