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**SYLLABUS OF DIPLOMA IN ENGINEERING**

**Edition-2018**

**DEPARTMENT OF**

**DIPLOMA IN AUTOMOBILE ENGINEERING**

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**LIST OF COURSES OFFERED**

**Edition-2018**

**DEPARTMENT OF**

**DIPLOMA IN AUTOMOBILE ENGINEERING**

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| GYAN VIHAR SCHOOL OF ENGINEERING AND TECHNOLOGY |
| **DIPLOMA IN AUTOMOBILE ENGINEERING (3 Year Course)** |
| **PROGRAMME OUTCOMES OF DIPLOMA IN AUTOMOBILE ENGINEERING** |

1. Apply basic knowledge of mathematics, science, and engineering as it applies to Automobile Engineering to solve broadly defined engineering problems**. *(Engineering Knowledge)***
2. Use logical step by step methods to investigate, analyse and interpret data in trouble shooting various broadly defined Automobile problems. ***(Problem Analysis)***
3. Design an Automobile system, component, or process to meet the desired economic, social, and environmental needs with appropriate consideration for public health and safety. ***(Design/ development of solutions)***
4. Design and conduct experiments and interpreting the data of experimental results to reach valid conclusions**.(*Investigation)***
5. Create and use the techniques, models and processes, and modern software/hardware tools necessary for Automobile engineering. ***(Modern Tool Usage)(include FOSS)***
6. Produce technical solutions in global and societal context and demonstrate the need for sustainable development of Automobile industries. ***(The Engineer and Society)***
7. Evolve strategies to address problems arising in automobile field considering their environmental effects and sustainability issues. ***(Environment and Sustainability)***
8. Inculcate professional and ethical responsibilities and marshal in all situations. *(****Ethics)***
9. Function effectively as an individual and as a team member, and in multi-disciplinary environment. ***(Individual and Team Work)***
10. Communicate and present ideas effectively for quicker and efficient results.. ***(Communication)***
11. Incorporate appropriate economics and business practices for project, risk and change management. ***(Project Management and Finance)***
12. Self-improvement through continuous professional development, and independent and lifelong learning in the context of technological changes in the field of Automobile Engineering. ***(Lifelong learning)***

To,

The Convener BOS

SGVU, Jaipur

The syllabus of Diploma in Automobile Engineering has been updated for the edition 2018. Kindly find enclosed the details for further guidance and approval

1. The syllabus has been revised as per the needs of Industry and trends in premier academic institutions after 1 year.
2. It is to bring to your notice that a student of Automobile branch is not supposed to study Automobile subjects only, via our syllabus, we have to provide a global perspective to the student.
3. Details of the courses added and removed:-

* In III Semester Introducing new subject MACHINE DESIGN LAB(DME 285) at the place of MATERIAL TESTING AND MEASUREMENT LAB(DME271).
* In IV Semester THERMODYNAMICS LAB(DAE276) & IC ENGINE LAB(DME280) merged with each other with name THERMODYNAMICS & IC ENGINE LAB(DAE282)
* In V Semester MODERN AUTOMOTIVE SYSTEM(DAE333) changed to ADVANCED AUTOMOTIVE SYSTEM(DAE337).
* In VI Semester a new subject MARKETING MANAGEMENT(DAE340) added at the place of AUTOTRONICS (DAE338)

DHARMENDRA KUMAR DR. RASHID HUSSAIN COURSE CO-ORDINATOR HEAD DIPLOMA

**JUSTIFIED REASONS TO CHANGE THE SYLLABUS FOR COMING SESSION- 2018**

* In III Semester Introducing new subject MACHINE DESIGN LAB(DMR285) at the place of MATERIAL TESTING AND MEASUREMENT LAB(DME271) because of Machine Design lab covering design aspects of all automobile components like gear, piston, cylinder etc.
* In IV Semester THERMODYNAMICS LAB(DAE276) & IC ENGINE LAB(DME280) merged with each other with THERMODYNAMICS & IC ENGINE LAB(DAE282) with best topics from both because of merging these two subjects student can read one extra subject from program elective.
* In V Semester MODERN AUTOMOTIVE SYSTEM(DAE333) changed to ADVANCED AUTOMOTIVE SYSTEM(DAE337) because of it in new we introduce new automotive system like hybrid as well as marine system.
* In VI Semester a new subject MARKETING MANAGEMENT(DAE340) added at the place of AUTOTRONICS (DAE338) because of in Mining Industry, Automotive Industry requirement a large no. of automobile professionals with marketing skills.

Dharmendra Kumar Dr. Rashid Hussain

Course Co-ordinator Head Diploma



**GYAN VIHAR SCHOOL OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT OF DIPLOMA IN ENGINEERING**

**DIPLOMA IN AUTOMOBILE ENGINEERING (3 Year Course)**

**Year: II Edition-2018 Semester:III**

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**Year: II Semester: IV**

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| **Course Code** | **Course Name** | **Credits** | **Contact Hrs./Wk.** | | | **Exam Hrs.** | **Weight age (in %)** | |
| **L** | **T/S** | **P** | **CE** | **ESE** |
|  | **University Core** |  |  |  |  |  |  |  |
| MA231 | Advance Mathematics | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| PC201 | Proficiency in Co-Curricular Activity | 2 | 0 | 0 | 0 | 0 | 100 |  |
| EM102 | Employability Skills II | 1 | 0 | 2 | 0 | 2 | 60 | 40 |
|  | **Program Core** |  |  |  |  |  |  |  |
| DME231 | Strength of materials | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DME233 | Material Science | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DME235 | Automobile Engineering | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DME271 | Strength of materials lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DME273 | Material Science Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE285 | Machine Design Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DME275 | Automobile Engineering Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
|  | **University Elective** |  |  |  |  |  |  |  |
| DHS231 | Basic Economics & Social Science | 2 | 2 | 0 | 0 | 3 | 40 | 60 |
|  | Consumer Affairs | 2 | 2 | 0 | 0 | 2 | 60 | 40 |
|  | **Program Elective** |  |  |  |  |  |  |  |
| DCS221 | OAT LAB | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DME283 | Workshop Technology Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Code** | **Course Name** | **Credits** | **Contact Hrs./Wk.** | | | **Exam Hrs.** | **Weight age (in %)** | |
| **L** | **T/S** | **P** | **CE** | **ESE** |
|  | **University Core** |  |  |  |  |  |  |  |
| PC202 | Proficiency in Co-Curricular Activity | 2 | 0 | 0 | 0 | 0 | 100 |  |
| EM102 | Employability Skills – III | 1 | 2 | 0 | 0 | 2 | 60 | 40 |
|  | **Program Core** |  |  |  |  |  |  |  |
| DME232 | Fluid Mechanics & Machine | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DME234 | Thermodynamics & IC Engine | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE232 | Vehicle Management & Estimation | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE234 | Manufacturing Technology | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DME274 | Fluid Mechanics & Machine Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE272 | CAD Practice Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DME282 | Thermodynamics & IC Engine Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE274 | Machine Shop Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
|  | **University Elective** |  |  |  |  |  |  |  |
| DHS232 | Entrepreneurship | 2 | 2 | 0 | 0 | 3 | 40 | 60 |
|  | Swachh Bharat Abhiyan | 2 | 2 | 0 | 0 | 2 | 60 | 40 |
|  | **Program Elective** |  |  |  |  |  |  |  |
| DAE278 | Engine Testing Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE280 | Repair & Maintenance Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |

**Year: III Edition-2017 Semester: V**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Code** | **Course Name** | **Credits** | **Contact Hrs./Wk.** | | | **Exam Hrs.** | **Weight age (in %)** | |
| **L** | **T/S** | **P** | **CE** | **ESE** |
|  | **University Core** |  |  |  |  |  |  |  |
| PC301 | Proficiency in Co-Curricular Activity | 2 | 0 | 0 | 0 | 0 | 100 |  |
| ES101/102 | Environmental Studies | 2 | 2 | 0 | 0 | 2 | 60 | 40 |
| EM302 | Employability Skills IV | 1 | 2 | 0 | 0 | 2 | 60 | 40 |
| DEP301 | Industry Summer Internship Project | 3 | 0 | 0 | 3 | 3 | 100 |  |
|  | **Program Core** |  |  |  |  |  |  |  |
| DAE331 | Tractor & Farm Equipment | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE337 | Advanced Automotive System | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE335 | Industrial Engineering & Transport Management | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE371 | Modern Automotive System Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE373 | Auto shop & Garage Practice lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE375 | Process In Manufacturing Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
|  | **University Elective** |  |  |  |  |  |  |  |
| DHS301 | Industrial Management | 2 | 2 | 0 | 0 | 3 | 40 | 60 |
|  | **Program Elective** |  |  |  |  |  |  |  |
| DAE377 | Vehicle Technology Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE379 | Automotive Thermodynamics Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |

**Year: III Semester: VI**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Code** | **Course Name** | **Credits** | **Contact Hrs./Wk.** | | | **Exam Hrs.** | **Weight age (in %)** | |
| **L** | **T/S** | **P** | **CE** | **ESE** |
|  | **University Core** |  |  |  |  |  |  |  |
| PC302 | Proficiency in Co-Curricular Activity | 2 | 0 | 0 | 0 | 0 | 100 |  |
| DEP302 | Industry Association Project | 6 | 0 | 0 | 3 | 3 | 100 |  |
|  | **Program Core** |  |  |  |  |  |  |  |
| DAE332 | Fuel & Pollution control of vehicle | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE372 | Automotive Fuel And Lubrication Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE374 | CNC Machine & Automation Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE376 | Auto Electrical & Electronics Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
|  | **University Elective** |  |  |  |  |  |  |  |
| DEE377 | MAT Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
|  | Disaster Management | 2 | 2 | 0 | 0 | 2 | 60 | 40 |
|  | **Program Elective** |  |  |  |  |  |  |  |
| DAE334 | CNC Machine & Automation | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE336 | Body Engineering And Earth Movers | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE340 | Marketing Management | 3 | 3 | 0 | 0 | 3 | 40 | 60 |

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| GYAN VIHAR SCHOOL OF ENGINEERING AND TECHNOLOGY | | | | | | | | |
| **DIPLOMA IN AUTOMOBILE ENGINEERING (3 Year Course** | | | | | | | | |
| **LIST OF SUBJECTS (2017)** | | | | | | | | |
| COURSE CODE | COURSE NAME | CREDITS | CONTACT HR/WK | | | EXAM HRS | WEIGHTAGE (in %) | |
|  |  |  | L | T/S | P |  | CE | ESE |
| DAE232 | Vehicle Management & Estimation | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE234 | Manufacturing Technology | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE285 | Machine Design Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE272 | CAD Practice Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE274 | Machine Shop Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE278 | Engine Testing Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE280 | Repair & Maintenance Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE331 | Tractor & Farm Equipment | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE332 | Fuel & Pollution control of vehicle | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE337 | Advanced Automotive System | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE334 | CNC Machine & Automation | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE335 | Industrial Engineering & Transport Management | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE336 | Body Engineering And Earth Movers | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE340 | Marketing Management | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE371 | Modern Automotive System Lab | 2 | 0 | 0 | 0 | 3 | 60 | 40 |
| DAE372 | Automotive Fuel and Lubrication Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE373 | Auto shop & Garage Practice lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE374 | CNC Machine & Automation Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE375 | Process In Manufacturing Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE376 | Auto Electrical & Electronics Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE377 | Vehicle Technology Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DAE379 | Automotive Thermodynamics Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DCS221 | OAT LAB | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DEE377 | MAT Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DEP301 | Industry Summer Internship Project | 3 | 0 | 0 | 3 | 3 | 100 |  |
| DEP302 | Industry Association Project | 6 | 0 | 0 | 3 | 3 | 100 |  |
| DHS231 | Basic Economics & Social Science | 2 | 2 | 0 | 0 | 3 | 40 | 60 |
| DHS232 | Entrepreneurship | 2 | 2 | 0 | 0 | 3 | 40 | 60 |
| DHS301 | Industrial Management | 2 | 2 | 0 | 0 | 3 | 40 | 60 |
| DME231 | Strength of materials | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DME232 | Fluid Mechanics & Machine | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DME233 | Material Science | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DME234 | Thermodynamics & IC Engine | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DAE282 | Thermodynamics & IC Engine Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DME235 | Automobile Engineering | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| DME271 | Strength of materials lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DME273 | Material Science Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DME274 | Fluid Mechanics & Machine Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DME275 | Automobile Engineering Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| DME283 | Workshop Technology Lab | 2 | 0 | 0 | 3 | 3 | 60 | 40 |
| EM102 | Employability Skills II | 1 | 0 | 2 | 0 | 3 | 60 | 40 |
| EM102 | Employability Skills – III | 1 | 2 | 0 | 0 | 3 | 60 | 40 |
| EM302 | Employability Skills IV | 2 | 2 | 0 | 0 | 3 | 60 | 40 |
| MA231 | Advance Mathematics | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| PC201 | Proficiency in Co-Curricular Activity | 2 | 0 | 0 | 0 | 0 | 100 |  |
| PC202 | Proficiency in Co-Curricular Activity | 2 | 0 | 0 | 0 | 0 | 100 |  |
| PC301 | Proficiency in Co-Curricular Activity | 2 | 0 | 0 | 0 | 0 | 100 |  |
| PC302 | Proficiency in Co-Curricular Activity | 2 | 0 | 0 | 0 | 0 | 100 |  |

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**DETAIL OF COURSES**

**DEPARTMENT OF DIPLOMA IN**

**AUTOMOBILE ENGINEERING**

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| --- | --- |
| Course Title: **VEHICLE MANAGEMENT & ESTIMATION** | Course Code : DAE232 |
| Semester : **V** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students have knowledge about fleet, basic knowledge of traffic rules, auto garage etc

**Course Objectives:**

1. Understand about fleet management.

2. Know the Motor vehicle act.

3. Understand the functioning of stores.

4 .Understand and Know about Service station & its records.

5. Understand different types of Maintenance.

6. Understand Estimation and Costing.

7. Understand methods of Depreciation & causes of Depreciation.

8. Understand Specifications.

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| UNIT-1: Fleet management | 06 | 20 |
| Introduction – structure of fleet organization – fleet organization structure at depot level – administrative setup of state transport undertaking – EPKM, CPKM – route – vehicle schedule – trip – dead mileage |  |  |
| UNITS-2: Motor vehicle Act | 08 | 20 |
| Introduction – necessity of registration – registration procedure – transfer of ownership – fitness certificate – permit & is types – driving license & conductor license – international driving license – conductor license – traffic signs – road markings – vehicle insurance – scrapping of vehicle. |  |  |
| UNITS-3: Stores & Vehicle maintenance | 06 | 20 |
| Introduction – purpose of store keeping – duties of store keeper – methods of storing – bin card and indent – advantages of good store keeping.  Necessity and types of vehicle maintenance – preventive, operative, periodic and break down maintenance. |  |  |
| UNIT-4: Estimation and costing | 08 | 20 |
| Definition of estimation & costing – aims of estimating – qualities of an estimator – procedure of estimating – sources of error in estimation – constituents of estimation – objectives of costing – difference between estimation & costing – elements and components of costing. |  |  |
| UNIT 5: Depreciation & Repair estimation | 08 | 20 |
| Definition of depreciation and obsolescence – causes of depreciation – methods of calculating depreciation – problems on each method  Procedure of preparing repair estimation of automobile components |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

1. Vehicle transport management - S.L. BHANDARKAR Dhanpat rai & co. (pvt.) Ltd. Delhi
2. Automobile engineering - G.B.S. Narang
3. Automobile engineering - C.P. Nakara
4. Estimation & costing - T.R. Banga & S.C. Sharma
5. Industrial Management - Banga & Sharma

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Ability to have adequacy with fleet management, dead mileage etc

2. Students able to know about stores and vehicle maintenance

3. They gained knowledge about Motor Vehicle Act

4. Ability to calculate depreciation and other estimation cost.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 |  |  |  |  |  |  |  | S |  |  |  |  |
| 2 |  |  |  | M | S |  | M |  |  |  | M | S |
| 3 | S |  |  |  |  | S |  |  |  |  |  |  |
| 4 |  | S |  |  |  |  |  |  |  | S |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

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| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

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| Course Title:  **MANUFACTURING TECHNOLOGY** | Course Code : DAE234 |
| Semester : **V** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students have knowledge about fleet, basic knowledge of traffic rules, auto garage etc

**Course Objectives:**

1. Understand the various materials used in manufacturing of the products.

2. Understand the metal casting techniques used in manufacturing

3. Understand the concepts of forging, its types & importance in manufacturing

4. Understand the various advanced welding methods & applications

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| UNIT-1: Materials for manufacturing | 06 | 20 |
| Manufacturing, Ferrous and non-ferrous materials. Heat treatment, Carbon Equilibrium diagram, Review of heat treatment processes, Advanced materials used in manufacturing, Ceramics, Polymers, Plastics,Composite materials |  |  |
| UNITS-2: Metal casting process | 08 | 20 |
| Introduction to metal casting, Casting: steps involved in casting, Pattern for casting, Pattern making materials, Pattern Types & allowances, Moulding- Moulding sands-Moulding process, green sand moulding, Special casting processes - Die casting, Centrifugal casting & Investment casting, Defects in casting and their remedies |  |  |
| UNITS-3: Forging & Welding | 06 | 20 |
| Introduction, Presses & Hammers, Forging Processes, Forging operations, Defects in forging and their remedies, Classification of welding process, Resistance welding - Spot, Seam and Projection welding, Arc welding process-Electrodes, arc welding equipment’s, Advanced Arc welding types-Shielded metal arc welding, TIG & MIG welding, Gas welding process-types of flames, equipment’s for gas welding, Defects in welding and their remedies, Soldering and brazing. |  |  |
| UNIT-4: Press work & Drilling machine | 08 | 20 |
| Introduction, Presses-Types-Power press, Press operations: Cutting, bending, drawing, punching, blanking & notching, Die sets-Types-Accessories. Classification of drilling machines, Radial drilling machine-working-drilling operations, Twist drill nomenclature, Machining parameters-cutting speed, feed, depth of cut and machining time |  |  |
| UNIT 5: Lathe | 08 | 20 |
| Introduction to lathe, Classification of lathes -specification of lathe, Constructional features of Engine lathe, Lathe attachments, accessories & work holding devices, Lathe operations, Taper turning and thread cutting, Machining parameters-cutting speed, feed, depth of cut and machining time |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

1. Workshop Technology - R. S. Khurmi & J.K Gupta
2. Manufacturing Technology-1 - Dr.P.C.Sharma., S Chand & Co
3. Workshop technology - B.S.Raghuvamshi
4. Introduction to Manufacturing Processes - P N Rao, Vol I & Vol II
5. Production Technology - R.K.Jain.
6. Manufacturing Technology I & II , - Dr P C Sharma , S Chand & Co
7. Workshop Technology - Hazara choudary VOL - I & VOL – II.

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Understand the basic press work practices, machines & applications
2. Understand the basic working of lathe, its operations & applications
3. Understand the basic working of drilling machines, its operations & applications
4. Understand the basics of CNC Machines.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 |  | S |  |  |  |  |  | S |  |  |  |  |
| 2 | S |  | M |  | M |  |  |  |  | M |  | M |
| 3 |  |  |  | S |  |  | M |  |  |  |  |  |
| 4 |  | S |  |  |  |  |  |  |  | S |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

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| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

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| --- | --- |
| Course Title: MATERIAL TESTING AND MEASUREMENT LAB | Course Code : DAE271 |
| Semester : **III** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : 0**:0:3** | Credits : **2 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have knowledge on engineering materials and technology.

**Course Objectives:**

1. To train students in the preparation of samples to perform characterization such as microstructure, volume fraction of phases, determination of porosity, film thickness, grain size and avoid measurement.

2. To help the students understand the microstructure of engineering materials, phase diagrams, various testing standards and acquire knowledge on the material behaviour by conducting tests.

3. To teach students how to improve the mechanical properties of materials by various methods.

**Course Content:**

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| **Topic and Contents** |
| 1. To study the Engineering Materials, significance and classifications.  2. Study of crystals structures, Study of Models BCC, FCC, HCP, stacking sequence, tetrahedral and Octahedral voids  3. To calculate the effective numbers of atoms, co-ordination no. packing factors, c/a ratio for BCC, FCC & HCP structures.  4. To prepare metallic samples for metallographic examination and to study the principle and construction of the Metallurgical Microscope.  5. Effect of carbon percentage on hardness of steel  6. Study of Phase Diagrams: concept of phase rule: Fe-C & Cu-Zn.  7. Study of Creep, Study of anistropy: Glass 'Fibre and Carbon' Fibre Composites.  9. Study of various types of fractures, Brittle fracture/ductile.  10. Study of Iron-Carbon Equilibrium Diagram and sketch the various structures present at room temperature. |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Acquire experimentation skills in the field of metallurgy.

2. Develop theoretical understanding of the mechanical properties of materials by performing experiments.

3. Apply the knowledge of phase diagrams and testing methods in related areas.

Know how to improve structure of materials for various industrial applications.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 |  | S | M |  |  |  |  | S |  | M |  |  |
| 2 |  |  |  | M |  |  | M |  |  |  | S |  |
| 3 | S | S |  |  | S |  |  |  | S |  |  | M |

S: Strong relationship M: Moderate relationship

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Assessment and Evaluation:**  The Course will be delivered through lectures, class room interaction, exercises and self-study cases.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** | | **DIRECT ASSMENT** | CIE | Attendance | Student | Every lab | 10 | Attendance Register |  | | Performance+ Record+ viva | Every lab | 30 | Lab Record |  | | Project | Every lab | 20 | Project Report |  | | **Total** | **60** |  |  | | ESE | End Sem Evaluation | End of the course | 40 | Answer scripts at SGVU |  | | **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms |  | | End of Course survey | | End of course | Questionnaire |  |   **CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination  **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

|  |  |
| --- | --- |
| Course Title: CAD PRACTICE LAB | Course Code : DAE272 |
| Semester : **III** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : 0**:0:3** | Credits : **2 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have basics knowledge of engineering drawing.

**Course Objectives:**

1. Introduce students to the complexity of engineering practice and to follow the development of an idea from its conception to the construction of a prototype.
2. Develop the technical skills necessary to generate an engineering drawing and an engineering assembly using a modern CAD system.
3. Develop a 'hands on' experience through shop training and the construction of a physical artifact.
4. Introduce the elements of engineering communications, including graphical representation of artifacts, teamwork, written reports, and oral presentations.
5. Introduce uncertainty as an element of engineering practice, including material properties, process performance, and market demands.
6. Obtain a basic understanding of various engineering materials and the manufacturing techniques used to produce these materials into useful products.

**TOPIC ANALYSIS**

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Topic** |  |
| 1  2  3  4  5  6  7  8  9  10  12  13  14  15 | Introduction  Getting started  Drawing objects  Object selection and drawing aids  Controlling drawings and display  Creating Text  Editing object / entities  Dimensions  Hatching  Blocks  Printing/plotting of drawing  2D Drawing  Introduction to 3D modeling  Creating objects in 3D  Tests |  |
|  | **NOTE-** **ABOVE PRACTICALS SHOULD PERFORM BY USING AUTOCAD SOFTWARE** |  |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Students are able to read engineering drawings with different views, including orthographic views, hidden lines and cross sectional views. They understand the description of surface roughness, lay waviness and the representations of tolerances and surface finish on engineering drawings.
2. Students can create 3D models of engineering objects, engineering drawings with different views, and an assembly of the objects that make up engineered systems, using a CAD system.
3. Students are able to use basic hand tools in a safe manner [3]
4. Students are able to move from CAD to CAM and use numerically controlled machines to produce simple artifacts

**Mapping Course Outcomes with Program Outcomes:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 |  |  |  |  |  |  |  | M |  |  |  | S |
| 2 |  |  | M |  | S | M |  |  |  | M |  |  |
| 3 |  | S |  |  |  |  | S |  | S |  | S |  |
| 4 | S |  |  | S |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Attendance | Student | Every lab | 10 | Attendance Register |  |
| Performance+ Record+ viva | Every lab | 30 | Lab Record |  |
| Project | Every lab | 20 | Project Report |  |
| **Total** | **60** |  |  |
| ESE | End Sem Evaluation | End of the course | 40 | Answer scripts at SGVU |  |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms |  |
| End of Course survey | | End of course | Questionnaire |  |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

|  |  |
| --- | --- |
| Course Title: MACHINE SHOP LAB | Course Code : DAE274 |
| Semester : **III** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : 0**:0:3** | Credits : **2 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have knowledge on different properties of materials.

**Course Objectives:**

1. Introduce students to the complexity of engineering practice and to follow the development of an idea from its conception to the construction of a prototype
2. Develop the technical skills necessary to generate an engineering drawing and an engineering assembly using a modern CAD system.
3. Develop a 'hands on' experience through shop training and the construction of a physical artefact.
4. Introduce the elements of engineering communications, including graphical representation of artifacts, teamwork, written reports, and oral presentations.
5. Introduce uncertainty as an element of engineering practice, including material properties, process performance, and market demands.
6. Obtain a basic understanding of various engineering materials and the manufacturing techniques used to produce these materials into useful products.

**Course Content:**

**Topic Analysis**

|  |  |
| --- | --- |
| Sl  No | Contents |
| 1  2  3  4  5  6  7  8  9  10 | Identify the parts of Lathe machine and different tools used on lathe.  Know various measuring instruments used in machine shop  Practice on grinding of tool  Facing, centring and plane-turning operations.  Perform other turning operations on a lathe.  Different taper turning methods on a lathe  Practice on internal and external thread cutting  Practice on drilling operation- tapping, counter sinking and reaming  Servicing of lathe  Test & revisions |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1 Students are able to use basic hand tools in a safe manner

2 Students are able to name the most common processing techniques for metals: Cutting, casting, forging, rolling, extrusion, drawing, and heat treating. They are able to describe each process and give an example of an artifact made by the process

3 students are also able to know all basic types types of tool which is used in foundry shop, welding shop.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  | M |  |  | S |  |  |  |  | S |  |
| 2 |  | S |  |  | M |  |  | S |  | M |  | M |
| 3 |  |  |  | S |  |  | M |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Attendance | Student | Every lab | 10 | Attendance Register |  |
| Performance+ Record+ viva | Every lab | 30 | Lab Record |  |
| Project | Every lab | 20 | Project Report |  |
| **Total** | **60** |  |  |
| ESE | End Sem Evaluation | End of the course | 40 | Answer scripts at SGVU |  |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms |  |
| End of Course survey | | End of course | Questionnaire |  |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

|  |  |
| --- | --- |
| Course Title: THERMODYNAMIC LAB | Course Code : DME276 |
| Semester : **IV** | Core / Elective : **Elective** |
| Teaching Scheme in Hrs (L:T:P) : 0**:0:3** | Credits : **2 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have the knowledge on thermodynamics subject.

**Course Objectives:**

1. To give students the understanding of the working of different components of steam power plant and the thermodynamic cycle on which it works.

2. To equip students with the knowledge of the initiation of combustion in Internal Combustion Engines, their classification, basic operating cycle and the functioning of various parts like carburettor and fuel injection pump.

3. Definition of absolute and relative humidities and the representation of psychometric process on T-s diagram.

4. making students understand the working of a reversed heat engine (both refrigerator and heat pump).

5. Differentiate between various types of cooling towers and analyse their working.

**Course Content:**

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| --- |
| **Topic and Contents** |
| 1. Study and trial on solar water heating system.  2. Report on visit to wind power generation plant / biogas plant / hydraulic power plant.  3. Trace the flue gas path and water‐steam circuit with the help of boiler model and  write a report.  4. Study or Report on visit to sugar factory / Dairy / steam power plant with specifications of boiler and list of mountings and accessories..  5. Study of separating and throttling calorimeter.  6. Study of steam turbine.  7. Study of different types of I.C. engines (four stroke and two stroke C.I. and S.I.)  8. Study of various systems of I.C. engines.  a. Fuel supply system  b. Cooling system  c. Ignition system  d. Government system.  e. Lubrication system  9. Study of  a. Fuel pump  b. Fuel injector  c. Carburetor.  10. Study and compare various heat exchangers such as radiators, evaporators, condensers, plate heat exchangers etc.  11. Numerical on vapour processes and ideal gas processes (minimum two problems on each) |

**Reference:**

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Explain the working of Steam power plant.

2. Distinguish between S.I/C.I, Two- stroke and Four-stroke Internal Combustion Engines.

3. Estimate relative humidity using adiabatic saturator and compare different Hygrometers.

4. Calculate Coefficient of Performance of Vapor compression refrigeration system for Reversed Carnot, Ideal and Actual cycles.

5. Explain the working and estimate the heat transfer rates in a forced draft cooling tower.

**Mapping Course Outcomes with Program Outcomes:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | M | S |  |  |  |  |  | M |  |  |  |  |
| 2 |  |  |  | S |  | S |  |  |  | M |  | M |
| 3 |  | S | M |  |  |  |  |  | S |  |  |  |
| 4 |  |  |  |  | M |  | M |  |  |  | S | S |
| 5 | S |  |  |  |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationshiP

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

|  |  |
| --- | --- |
| Course Title: **ENGINE TESTING LAB** | Course Code : **DAE278** |
| Semester : **VI** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **0:0:3** | Credits : **2 Credits** |
| Type of course : **Practical** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Knowledge of basics automotive parts and function of their parts.

**Course Objectives:**

1. Know about different types of engine dynamometers.
2. Perform engine performance tests using different engine dynamometers
3. Study Valve and Port timing diagrams.
4. Understand servicing and testing of Fuel Injectors

**Course Content:**

|  |  |
| --- | --- |
| **LIST OF EXPERIMENTS** | |
| 01. | Engine Performance Testing |
| 02. | Valve/ Port timings |
| 03. | Fuel Injector Servicing & Testing |
| 04. | Fuel Injection Pump Servicing, Phasing & Calibration |
| 05. | Emission Testing |
| 06. | Engine Scanners |
| 07. | Test & Revision |
| 08. | Engine Performance Testing |
| 09. | Valve/ Port timings |
| 10. | Fuel Injector Servicing & Testing |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Understand servicing, phasing and calibration of Fuel Injection pump.
2. Understand the use of Emission Testing equipments.

3 Analyze the condition of Engine using Engine Scanners.

4 Understand the breaking system in the vehicle

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  | M |  |  |  |  |  | S |  |
| 2 |  | S |  |  |  |  |  | M |  |  |  |  |
| 3 | M |  | S |  |  |  |  |  |  |  |  |  |
| 4 | S | S |  |  |  |  |  |  |  | S |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 30 |
| 2 | Applying the knowledge acquired from the course | 35 |
| 3 | Analysis and Evaluation | 35 |

|  |  |
| --- | --- |
| Course Title: **REPAIR & MANTAINANCE LAB** | Course Code : **DAE280** |
| Semester : **IV** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **0:0:3** | Credits : **2 Credits** |
| Type of course : **Practical** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Knowledge of Basic automotive parts and working of parts.

**Course Objectives:**

1 Understand the safety precautions to be observed in the workshop

2 Understand the overhauling of different types of clutches and its adjustments

3 Understand overhauling of different types of gear boxes & transfer case.

4 Understand the overhauling of universal joints and propeller shaft.

**Course Content:**

|  |  |
| --- | --- |
| **LIST OF EXPERIMENTS** | |
| 01. | Safety precautions |
| 02. | Over hauling of clutch |
| 03. | Over hauling of gearbox and transfer case |
| 04. | Over hauling of universal joint and propeller shaft |
| 05. | Over hauling of rear wheel and differential |
| 06. | Over hauling of front axle |
| 07. | Understand the over hauling of steering system |
| 08. | Over hauling independent suspension |
| 09. | Over hauling of leaf springs |
| 10. | Over hauling of brake system |
| 11. | Wheel alignment |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Understand the overhauling of steering system

2. Understand the overhauling of front independent suspension system

3. Understand the overhauling of leaf springs

4. Understand the breaking system in the vehicle

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  | M |  |  |  |  |  | S |  |
| 2 |  | S |  |  |  |  |  | M |  |  |  |  |
| 3 | M |  | S |  |  |  |  |  |  |  |  |  |
| 4 | S | S |  |  |  |  |  |  |  | S |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 30 |
| 2 | Applying the knowledge acquired from the course | 35 |
| 3 | Analysis and Evaluation | 35 |

|  |  |
| --- | --- |
| Course Title:  **TRACTOR & FARM EQUIPMENTS** | Course Code : **DAE331** |
| Semester : **V** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Students should have knowledge about various types of tractors and equipment uses in farm.

**Course Objectives:**

* Safely operate tractors with or without attached equipment
* Identify components, controls, checks, operation status
* Set and secure equipment for operation
* WHS Licensing and Legislation

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| **UNIT-1: General Design of Tractor Components** | 08 | 20 |
| Design of cylinder, piston, valves, tappets, valve train, design of crank shaft, design of flywheel. Design of sliding contact bearings, design for static and fluctuating loads, Design of cyclic loads and speeds |  |  |
| **UNITS-2: Design of Tractors & Tractor controls** | 06 | 20 |
| Classification of Tractors-Maincomponents of Tractor-Safety Rules. Control of the Tractor and Fundamentals of Engine Operation. Basic notionsand definition-Engine cycles-Operation of multi cylinder engines-General engine design - Basic engine performance characteristics. |  |  |
| **UNITS-3: Engine Frame Work and Valve Mechanism of Tractor** | 08 | 20 |
| Cylinder andpistons-Connecting rods and crankshafts Engine balancing - Construction and operation of the valve mechanism-Valve mechanism components - Valve mechanism troubles. |  |  |
| **UNIT-4:** **Cooling System** | 06 | 20 |
| Lubrication System and Fuel System of a Tractor:Cooling system - Classification - Liquid cooling system - Components, Lubricating system servicing and troubles -Air cleaner and turbo charger - Fuel tanks and filters -Fuel pumps. |  |  |
| **UNIT 5: Farm Equipments** | 08 | 20 |
| Working attachment of tractors-Farm equipment - Classification -Auxiliary equipment-Trailers and body tipping mechanism. Various Irrigation equipments. |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

1.Rodichev and G.Rodicheva, *Tractor and Automobiles,* MIR Publishers,

 2.Kolchin. A., and V.Demidov, *Design of Automotive engines for* *tractor,*MIR Publishers,

3.Farm Tractor, *Maintenance and Repair,* S.C.Jain, C.T.Raj**,** TATA MCGrawHill.

 4.Jagdishwar Sahay, *Elements of Agricultural Engineering.*

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

* Prepare a tractor for operation (including routine checks)
* Operate a tractor safely
* Complete and check tractor operations (including shutdown procedures)

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S | S |  |  |  |  |  |  |  |  |  |  |
| 2 | S | S |  |  |  |  |  |  |  |  |  |  |
| 3 | S | S |  |  |  |  |  |  |  |  |  |  |
| 4 | S | S |  |  |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 50 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 25 |

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |  |
| --- | --- |
| Course Title:  **FUEL POLLUTION & CONTROL of VEHICLE** | Course Code : **DAE332** |
| Semester : **V** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Students should have knowledge about fuels properties and environmental pollution.

**Course Objectives:**

1.0 Understand types of fuel and their uses

2.0 Understand the Alternate fuels

3.0 Understand various calorimeters

4.0 Understand the stratified engines

5.0 Understand the pollution their effects and control methods

6.0 Understand BHARAT and EURO Emission standards

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| **Introduction** | 08 | 20 |
| Vehicle population assessment in metropolitan cities and contribution to pollution, effects on human health and environment, global warming, types of emission, transient operational effects on pollution. |  |  |
| **UNITS-2: Alternative fuels** | 06 | 20 |
| **Introduction** Need of alternative fuels, classifications, barriers in implementing alternative fuels.  **Gaseous alternative fuels.** Introduction, properties, fuels kits, combustion, emissions and advantages and disadvantages of LPG, CNG and Hydrogen.  **Bio fuels.** Introduction, properties, fuels kits, combustion, emissions and advantages and disadvantages of methanol, ethanol and bio diesel. |  |  |
| **UNIT-3: Fuels** | 08 | 20 |
| Introduction, Types of fuel, structure of petroleum, Petroleum refining, products of, refining process, Heat values of fuels, Types of calorimeter, simple problems on calorific , value, requirements of fuels for S.I & C.I. Engine, Knock rating of S.I engine, Rating of .I C Engine fuels, LPG as S.I Engine fuels Additives of fuel |  |  |
| **UNIT-4:** **Pollution and its control** | 06 | 20 |
| Introduction, Types of pollution, pollutants from gasoline engine, control of gasoline engine emission, Diesel emission, control of diesel engine emission. |  |  |
| **UNIT 5: Emission standards** | 08 | 20 |
| Meaning of emission standards, emission standards in India, emission standards Abroad, Bharat & Euro Emission standards in 2, 3, 4 wheeler petrol & diesel vehicles. |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

1. A course in I.C Engine - M.L. Mathur and R.P. Sharma

2. I.C Engines - H.B. KESHWANI

3. Automobile Engineering - K.M. Gupta

4. Automobile Engineering - Ganeshan

5. I.C Engines - R.C. Patel and Karamchandani

6. Automobile Engg (V-I, engines) - Anil Chikara

**7**. Thermal Engineering - R S Kurmi & J K Gupta

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. The learner will be exposed to various types of fuels e.g. solid, liquid and gaseous fuels, their origin, properties, processing and applications.
2. In addition the learner will be exposed to combustion stoichiometry and thermodynamics, combustion related pollution.
3. Know about various emission standards.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  |  |  |  |  |  | M |  | M |
| 2 |  | S | M |  | M | S |  |  | S |  |  |  |
| 3 |  |  |  | S |  |  | M |  |  |  | S |  |

S: Strong relationship M: Moderate relationship

|  |
| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 50 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 25 |

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |  |
| --- | --- |
| Course Title:   **MODERN AUTOMOTIVE SYSTEM** | Course Code : **DAE333** |
| Semester : **V** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Students have knowledge about component of automotive vehicle and function of components

**Course Objectives:**

1. Understand the working principle of wankel diesel & petrol engines.
2. Understand the working principle of gas turbines.
3. Understand the construction of gas turbine combustion chamber.
4. Understand the need of variable compression ratio engine.
5. Know about the working principles of different hybrid vehicle technology.
6. Know about the working of automatic transmission.

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| **UNIT-1: Power plant** | 08 | 20 |
| Working of rotary petrol and diesel Wankel engine. Classification and working of gas turbines. Construction of typical gas turbine combustion chamber, types. Need of variable compression engine, types. Variable compression ratio piston. Under stand the need and working of supercharging and turbo charging. Types and working of hybrid propulsion systems. |  |  |
| **UNITS-2: Automotive Transmission** | 06 | 20 |
| relative merits and demerits when compared to conventional transmission, automatic control of gears, study of typical automatic transmissions, Ford and Chevrolet drive, automatic control of gear box. |  |  |
| **UNITS-3: FINAL DRIVE & SUSPENSION SYSTEM** | 08 | 20 |
| Need and working of limited slip differential and differential lock Understand the working of air suspension and hydro elastic suspension. |  |  |
| **UNIT-4:** **BRAKES** | 06 | 20 |
| Need of servo brakes, types, working of servo brakes, power brakes, types and working of power brakes. Fail safe parking brake and engine exhaust brakes. |  |  |
| **UNIT 5: Steering** | 08 | 20 |
| Need of power steering, types and working of different types of power steering. Need of collapsible steering, working of different types of collapsible steering column. |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

1. Automobile engineering vol -1 - Kripal Singh
2. Automobile engineering vol -11 - Kripal Singh
3. Internal combustion engines - Mathur & Sharma
4. Automotive Mechanics - Crouse & Anglin
5. Automobile engineering vol – I - K.M. Gupta
6. Automobile engineering vol -11 - K.M. Gupta
7. Automobile engineering - Banga & Nathu Singh
8. Automotive Mechanics - Joseph Hietner
9. Automobile engineering - R.B. Gupta
10. Internal combustion engines - V. Ganeshan

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Understand the need of four wheel drive.

2. Understand the need & working of air suspension.

3. Understand the need & working of hydro elastic suspension.

4. Understand the need & working of servo brakes.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  | S |  |  |  |  |  |  | M |  |
| 2 |  | S |  |  | M |  | S | S |  |  |  | M |
| 3 |  |  | M | S |  |  |  |  |  |  |  |  |
| 4 |  | S |  |  |  | M |  |  |  | S |  |  |

S: Strong relationship M: Moderate relationship

|  |
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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 50 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 25 |

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |  |
| --- | --- |
| Course Title:   **CNC Machine & Automation** | Course Code : **DAE334** |
| Semester : **V** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Students have knowledge about automations of machines

**Course Objectives:**

1. Understand the basic procedures and concepts of programming,
2. set up and operation of a CNC Machining Center.
3. Identify and understand the basic programming codes.
4. Identify and define the functions of the CNC machine control.
5. Manufacture simple parts on the CNC machining center

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| **UNIT-1: Introduction** | 08 | 20 |
| NC machines, CNC machines, DNC machines, Advantages of NC machines over conventional machines, Difference between NC machines and SPM, Advantage and disadvantages of CNC machines over NC machines, Application of CNC machines |  |  |
| **UNITS-2: Component of NC Machines** | 06 | 20 |
| Basic components of NC system, Input mediums- punched cards, magnetic tapes, floppy disks and papers tape, NC coding, Machine control unit (MCU), Sub units of MCU, Machines tool, Numerical control procedure |  |  |
| **UNITS-3: Constructional Details of CNC Machines** | 08 | 20 |
| Introduction, Machine structure, Slide ways, Spindle, Drive System, Motion transmission, Location of transducers, Swarf removal, Safety and guarding, |  |  |
| **UNIT-4:** **Tooling for CNC Machines** | 06 | 20 |
| Introduction, Cutting tools for CNC machines, Pre set tools, Indexable inserts, Qualified tools, Cutting tools material for CNC machines, Automatic tool changer, Work holding devices |  |  |
| **UNIT 5: Robotics** | 08 | 20 |
| Introduction, Advantages of a robot, Robot terminology, Major Features of a robot, Manipulator, Controller, Sensors, Power supply unit, Types of Robots, According to the structure of Manipulator, According to type of system, According to type of control loops, Application of robots. |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

1. CNC Machine- Programming & Application Adithan & Pabla New Age International

2. CNC Machine Dhanpat Rai & Sons

3. CAD/CAM Groover (TMH)

4. Computer Aided Manufacturing Rao, Kundra, Tiari (TMH)

5. CAM Vikram Sharma (S. K. Kataria & Sons)

6. CAM S. Vishal (S. K. Kataria & Sons)

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Understand the possible applications of the CAD/CAM systems in motion analysis,
2. Structure analysis, optimization, rapid prototyping, reverse engineering and virtual engineering, - Implement CNC programs for milling and turning machining operations.
3. Create a computer aided manufacturing (CAM) model and generate the machining codes automatically using the CAM system.
4. Integrate the CAD system and the CAM system by using the CAD system for modeling design information and converting the CAD model into a CAM model for modeling the manufacturing information.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  |  |  | S |  |  |  | M |  |
| 2 |  |  | M |  | S |  |  |  | M |  |  | S |
| 3 | S |  | M |  |  | M |  | M |  |  |  |  |
| 4 |  | S |  |  |  |  |  |  |  | S |  |  |

S: Strong relationship M: Moderate relationship

|  |
| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 50 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 25 |

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |  |
| --- | --- |
| Course Title:  **Industrial Engineering & Transport Management** | Course Code : **DAE335** |
| Semester : **v** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Students have a basic knowledge about industrial engineering, and traffic rules.

**Course Objectives:**

1. This course supposed to give the knowledge plant location and plant layout.
2. Analyze the Applications of production planning and control.
3. Analyze the Concept of inventory control & wages incentive.
4. Basic concept of Structure of a Fleet Organisation.
5. Give the knowledge of Motor Vehicle Laws.

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| **UNIT-1: PLANT LOCATION & LAYOUT** | 08 | 20 |
| **Plant Location and Layout-** Factors affecting plant location, Factor effecting plant layout , Types of plant layout  **Production Planning and Control-** Definition and importance, Types of production - Jobs, batch, mass Forecasting, Routing, Scheduling, Dispatching, Follow up, CPM & PERT techniques, Analysis and control of project cost in CPM & PERT, Simple numerical problems. |  |  |
| **UNITS-2: INSPECTION & QUILITY CONTROL** | 06 | 20 |
| Inspection and its objectives, Types of inspection Remedial, preventive and operative stage of inspection, Inspection of incoming material, Inspection of work in process, Inspection of finished goods, Objectives and advantages of quality control, Functions of quality control department |  |  |
| **UNITS-3: INVENTORY CONTROL** | 08 | 20 |
| **Inventory Control-** Definition and Objectives**,** Methods of inventory control, Economic ordering quantity, Carrying cost, Procurement cost, Lead-time, Re-order point, ABC Analysis.  **Depreciation**- Definition, Causes of depreciation, Different method of calculating depreciation **Wages and Incentives-**Definition and requirements of a good wage system methods of wage payment Wage incentives - type of incentive, difference in wage incentive and bonus. incentive to supervisor. | | | |
|  |  |  |
| **UNIT-4:** **STRUCTURE OF A FLEET ORGENISATION** | 06 | 20 |
| **Structure of a Fleet Organization-** Route planning, Necessity for route planning, Road and traffic surveys, Urban route planning, Running time, Fare stage, Bus stops, Vehicle and crew scheduling Road worthiness requirement of a vehicle, Vehicles and scheduling, Maintenance schedules, Need of vehicle history sheet, log sheets, spare part catalogue, service manuals, Crew scheduling **Road Accident-**Definition, Classification of accidents, Causes of accidents Accident, investigation procedure Accident, prevention |  |  |
| **UNIT 5: MOTOR VEHICLE LAWS** | 08 | 20 |
| **Motor Vehicle Laws-**Motor vehicle act and rules, Driving license, Age limit, Addition and renewal of driving license, Control of transport vehicle, Registration, Permit, Insurance, Offences, Penalties, Traffic rules and regulation, Speed limit, Parking places, Signals and signal devices, Traffic symbols, Driving safety devices |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

1. Industrial Management V.K. Sharma & O.P. Harkut

2. Industrial Engg. & Management O.P. Khanana

3. Industrial Engg. & Management T.R. Banga

4. Hand Book of Small Scale Industry P.M. Bhandari

5. Hand Book on Entrepreneurship Development O.P. Harkut

6. Entrepreneurial Development S.S. Khanka

6. Statistical Quality Control Mahohar Mahajan

8. ISO : 9000 Quality System S. Dalela

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. The course content gives full knowledge to learn industrial engg. And transport management.
2. Able to understand inventory control.
3. Knows traffic rules better.
4. Enable students to aware about cause & prevention of road accident.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  |  |  |  |  | S |  | M |  |
| 2 |  | S | M |  | M |  |  | M |  |  |  |  |
| 3 |  |  |  | S |  | S |  | S |  | M |  | S |
| 4 | S |  |  |  |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

|  |
| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 40 |
| 2 | Applying the knowledge acquired from the course | 30 |
| 3 | Analysis and Evaluation | 30 |

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |  |
| --- | --- |
| Course Title:**BODY ENGINEERING & EARTH MOVERS** | Course Code : **DAE336** |
| Semester : **V** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Students have knowledge about component of automotive vehicle and function of components

**Course Objectives:**

1. To understand the working of tractors and its different mechanisms.
2. To understand different agricultural implements with their functions.
3. Understand different construction equipment with their applications.
4. Understand the objectives of painting, components of paint.
5. Understand the general procedure of painting, types of painting.

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| **UNIT-1: Tractors** | 08 | 20 |
| Types of tractors, application, PTO shaft, types of steering of crawler tractors, depth and Draft control. hydraulic system in tractors, hydraulic controls used in tractors, integral & mounted implement carriers, steering mechanism used in crawler tractor |  |  |
| 1. **UNITS-2: Agricultural implements for tractors** | 06 | 20 |
| integral & mounted implement carriers, farming operations ,plough (cultivator),Disc plough, Mould board plough, Harrow plough, Rotary plough, Thresher, Winnowing, Pulverizer, Sprayer |  |  |
| **UNITS-3: Construction equipment** | 08 | 20 |
| Classification of construction equipment’s, 3.2.1 Dumpers, Scrapers, Shovels, Motor graders, Dozers, Rollers, Rippers, Applications of rollers, Applications of dozers. |  |  |
| **UNIT-4:** **Vehicle body engineering** | 06 | 20 |
| Introduction to vehicle body, Classification of vehicle body, Types of vehicle body construction, vehicle body panels/parts procedure of unitary body construction materials used in vehicle body construction stream lining of vehicle body glasses used in automobile window actuating mechanisms |  |  |
| **UNIT 5: Vehicle body painting** | 08 | 20 |
| Define painting, elements of painting functions of resins, functions of pigment functions of solvent, types of solvent, process of paint drying, paint drying, different types of paint drying, spray painting, procedure of air spray painting, procedure of electrostatic painting, |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

1. Farm tractors - C.P. Nakara

2. Construction equipments & Management - S.C. Sharma

3. Automotive Engineering

(Heating & Air conditioning) class room manual - Mark Schnubel

Cengage Learning.

4. Automobile Engineering vol VI - Anil Chhikara

(Air Conditioning System)

5. Automobile Engineering - K.K. Ramlingam

6. Automobile Engineering vol IV - Anil Chhikara

(Body Repair Technology)

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Understand the need of tractor and its applications

2. Understand the need & working various farming operations.

3. Understand the need of construction equipment.

4. Understand the need & working vehicle dynamics and painting.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 |  |  | M |  |  |  |  |  | S |  |  | S |
| 2 | S |  |  | S |  | S |  |  |  |  |  |  |
| 3 |  |  |  |  | M |  | M |  |  |  | M |  |
| 4 |  |  |  |  |  |  |  |  |  | M |  |  |

S: Strong relationship M: Moderate relationship

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 50 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 25 |

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |  |
| --- | --- |
| Course Title: AUTOTRONICS | Course Code : DAE338 |
| Semester : **VI** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : 3**:0:0** | Credits : **3Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have knowledge on basic electronics and automobile engineering.

**Course Objectives:**

1. Understand the basics of Autotronics.
2. Know the working of sensors and actuators used in vehicle control.
3. Understand the working of electronic fuel supply system.
4. Understand the working electronic steering system.

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| UNIT-1: SIMPLE STRESS AND STRAINS | 08 | 20 |
| **Simple Stress and Strains :** Introduction types of loads and deformation, types of stresses and strain. Hooke's law, stress strain diagram for ferrous and non ferrous materials modulus of elasticity. rigidity and bulk modules of materials Stress in bars of varying cross sections, composite sections and compound sections Thermal stresses and strains, thermal stresses in composite sections. Poisson's ratio, volumetric strain, relation between different modulus, strain energy. |  |  |
| UNITS-2: S.F. AND B.M. DIAGRAMS | 08 | 20 |
| **S.F. and B.M. Diagrams :** Definition, types of loading types of beams, shear force and bending moment sign conventions S.F. and B.M. diagrams for cantilever simply supported and overhanging beams with point or concentrated loads uniformly distributed loads and combination of point and U.D.L. Point of contra flexure, numerical problems. |  |  |
| UNITS-3: Spring | 08 | 20 |
| **Spring:** Definition types and use of springs, leaf spring, helical and spiral springs, Stiffness of a spring and maximum shear stress, defection of spring . Spring Classification based on size shape and load. |  |  |
| UNIT-4: PRINCIPLE STRESSES AND STRAIN | 06 | 20 |
| **Principle stresses and strain:-**  Transformation of plane stresses, Principle stresses, Maximum shear stresses, Mohr’s circle for plane stresses, Plain strain and its Mohr’s circle representation, Principle strains, Maximum shear strain. Combined Loading: Components subjected to bending, torsion & axial loads. |  |  |
| UNIT 5: DEFLECTION OF BEAM | 06 | 20 |
| **Deflection of beam:-**  Relation between slope deflection and radius of curvature, solution of beam deflection, problem by Macaulay’s method, Direct integration method, Method of super position, Moment Area Method. |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

* S. C. Crandall, N. C. Dahl, and T. J. Lardner, An Introduction to the Mechanics of Solids, 2nd Ed, McGraw Hill, 1978.
* E. P. Popov, Engineering Mechanics of Solids, Prentice Hall, 1990.
* I. H. Shames, Introduction to Solid Mechanics, 2nd Ed, Prentice Hall, 1989.
* S. P. Timoshenko, Strength of Materials, Vols. 1 & 2, CBS publ., 1986.

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1 Describe the details of anti-lock braking system.

2 Understand the working of electronic suspension system.

3 Describe the details of air bag system.

4 Understand the computer based automotive instrumentation system.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S | M |  |  |  |  |  |  | S |  |  |  |
| 2 |  |  | M | S |  | M |  |  |  |  | S |  |
| 3 |  |  |  |  |  |  | S |  |  | M |  | M |
| 4 | S | S |  |  |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

|  |  |
| --- | --- |
| Course Title: **MODERN AUTOMOTIVE SYSTEM LAB** | Course Code : **DAE371** |
| Semester : **VI** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **0:0:3** | Credits : **2 Credits** |
| Type of course : **Practical** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Knowledge of Basic PN Junction, Number System in Digital, logical operation, Boolean algebra, semiconductor properties (intrinsic and extrinsic).

**Course Objectives:**

* Understand the power steering system.
* Understand servo and power brake system.
* Know the concept of turbo charger.

**Course Content:**

|  |  |
| --- | --- |
| **LIST OF EXPERIMENTS** | |
| 01. | **Steering system**   * 1. Practice on servicing of hydraulic power steering system.   2. Practice on servicing of hydraulic pump.   3. Practice on servicing of hydraulic actuator. |
| 02. | 1. **Brakes.**    1. Practice on servicing of vacuum servo brake booster    2. Practice on servicing of air brake valve.    3. Practice on servicing of un loader valve.    4. Practice on servicing of brake chamber. |
| 03. | 1. **Turbochargers**    1. Demonstrate the working of turbo charger.    2. Practice on servicing of turbo chargers. |
| 04. | 1. **Wheel alignment**    1. Practice on checking of wheel alignment and adjustment (computerized / mechanical).    2. Practice on measuring minimum turning circle radius. |
| 05. | 1. **Wheel balancing**    1. Practice on wheel balancing. |
| 06. | 1. **Air conditioning**     1. Practice on servicing of automobile air conditioning system. |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

* Understand the procedure of wheel balancing.
* Understand the wheel geometry and wheel alignment
* Demonstrate the working of Air Condition system.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  | M |  |  |  |  |  | S |  |
| 2 |  | S |  |  |  |  |  | M |  |  |  |  |
| 3 | M |  | S |  |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 30 |
| 2 | Applying the knowledge acquired from the course | 35 |
| 3 | Analysis and Evaluation | 35 |

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Attendance | Student | Every lab | 10 | Attendance Register |  |
| Performance+ Record+ viva | Every lab | 30 | Lab Record |  |
| Project | Every lab | 20 | Project Report |  |
| **Total** | **60** |  |  |
| ESE | End Sem Evaluation | End of the course | 40 | Answer scripts at SGVU |  |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms |  |
| End of Course survey | | End of course | Questionnaire |  |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |  |
| --- | --- |
| Course Title:AUTOMOTIVE FUELS AND LUBRICANTS LAB | Course Code : **DAE372** |
| Semester : **VI** | Core / Elective : **Elective** |
| Teaching Scheme in Hrs (L:T:P) : **0:0:3** | Credits : **2 Credits** |
| Type of course : **Practical** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Knowledge of Basic properties of fuel and lubricants.

**Course Objectives:**

1. To study of the national and international standards
2. To know the testing methods of fuels and Lubricants.

**Course Content:**

|  |  |
| --- | --- |
| **LIST OF EXPERIMENTS** | |
| 01. | STUDY OF INTERNATIONAL AND NATIONAL STANDARDS FOR FUELS AND LUBRICANTS |
| 02. | STUDY OF CETANE AND OCTANE NUMBER OF FUELS |
| 03. | ASTM DISTILLATION TEST OF GASOLINE |
| 04. | ANILINE POINT TEST OF FUEL |
| 05. | CALORIFIC VALUE OF LIQUID FUEL |
| 06. | CALORIFIC VALUE OF GASEOUS FUEL |
| 07. | REID VAPOUR PRESSURE TEST |
| 08. | FLASH AND FIRE POINTS OF FUELS AND LUBRICANTS |
| 09. | TEMPERATURE DEPENDENCE OF VISCOSITY OF LUBRICANTS & FUELS BY REDWOOD VISCOMETER |
| 10. | TEMPERATURE DEPENDENCE OF VISCOSITY OF LUBRICANTS & FUELS BY SAYBOLE VISCOMETER |

**Course outcomes:**

*On successful completion of the course, the student will be able to know:*

1. Different fuel properties
2. Different lubricants properties
3. Working of lubricants.
4. Servicing of Vehicle

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  | M |  |  |  |  |  | S |  |
| 2 |  | S |  |  |  |  |  | M |  |  |  |  |
| 3 | M |  | S |  |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Attendance | Student | Every lab | 10 | Attendance Register |  |
| Performance+ Record+ viva | Every lab | 30 | Lab Record |  |
| Project | Every lab | 20 | Project Report |  |
| **Total** | **60** |  |  |
| ESE | End Sem Evaluation | End of the course | 40 | Answer scripts at SGVU |  |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms |  |
| End of Course survey | | End of course | Questionnaire |  |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 30 |
| 2 | Applying the knowledge acquired from the course | 35 |
| 3 | Analysis and Evaluation | 35 |

**s**

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| --- | --- |
| Course Title: **AUTO SHOP AND GARAGE PRACTICE LAB** | Course Code : **DAE373** |
| Semester : **V** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **0:0:3** | Credits : **2 Credits** |
| Type of course : **Practical** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Knowledge of Basic automotive parts and function of them

**Course Objectives:**

1. Students able to know various functions of their parts.
2. Know about vehicle tools.
3. Know about cylinder, piston, connecting road and crank shaft.

**Course Content:**

|  |  |
| --- | --- |
| **LIST OF EXPERIMENTS** | |
| 01. | Study of layout of Auto shop and Garage. |
| 02. | Study and operations of the auto shop equipment.. |
| 03. | Study and uses of vehicle tools. |
| 04. | Prepare measurement sheet for cylinder, piston, connecting road and crank shaft. |
| 05. | Repairing of cylinder head, Refinishing of cylinder head by surface grinder and Testing for leakage. |
| 06. | Repairing of cylinder block surface, Boring of main journal, cam shaft journal by line boring machine. |
| 07. | Checking of twist and bend with the help of connecting rod alignment machine and rectifying the defects. |
| 08. | Complete overhauling and Testing of injector. |
| 09. | Servicing of vehicles. |
| 10. | Complete overhaul of clutch system. |
| 11. | Complete overhaul of gear box. |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Repairing of cylinder block
2. Boring of main journal
3. Testing of injector
4. Servicing of Vehicle

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  | S |  | M |  |  |  |  |  | S |  |
| 2 |  | S |  | S |  |  | S | M |  |  |  | S |
| 3 | M |  | S |  |  | M |  |  |  | S |  |  |
| 4 | S |  |  |  |  |  | S |  | M |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Attendance | Student | Every lab | 10 | Attendance Register |  |
| Performance+ Record+ viva | Every lab | 30 | Lab Record |  |
| Project | Every lab | 20 | Project Report |  |
| **Total** | **60** |  |  |
| ESE | End Sem Evaluation | End of the course | 40 | Answer scripts at SGVU |  |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms |  |
| End of Course survey | | End of course | Questionnaire |  |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 30 |
| 2 | Applying the knowledge acquired from the course | 35 |
| 3 | Analysis and Evaluation | 35 |

|  |  |
| --- | --- |
| Course Title: CNC MACHINE AND AUTOMATION LAB | Course Code : **DAE374** |
| Semester : **VI** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **0:0:3** | Credits : **2 Credits** |
| Type of course : **Practical** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Students have knowledge about automations of machines

**Course Objectives:**

1. Understand the basic procedures and concepts of programming,
2. set up and operation of a CNC Machining Center.
3. Identify and understand the basic programming codes.
4. Identify and define the functions of the CNC machine control.
5. Manufacture simple parts on the CNC machining center

**Course Content:**

|  |  |
| --- | --- |
| **LIST OF EXPERIMENTS** | |
|  | To prepare various jobs on CNC machine |
| 01. | Turning |
| 03. | Facing |
| 04. | Taper Turning |
| 05. | Step Turning |
| 06. | Profile Cutting |
| 07. | Threading |
| 08. | Chamfering |
| 09. | To develop various types of CNC machine programmes |
| 10. | Industrial Visit |
|  | **NOTE- ABOVE PRACTICAL SHOULD BE PERFORM WITH THE HELP OF CAM SOFTWARE(CREO/SOLIDWORKS)** |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Understand the possible applications of the CAD/CAM systems in motion analysis,
2. Structure analysis, optimization, rapid prototyping, reverse engineering and virtual engineering, - Implement CNC programs for milling and turning machining operations.
3. Create a computer aided manufacturing (CAM) model and generate the machining codes automatically using the CAM system.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  | M |  |  |  |  |  | S |  |
| 2 |  | S |  |  |  |  |  | M |  | S |  |  |
| 3 | M |  | S |  |  |  |  |  |  |  |  | M |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Attendance | Student | Every lab | 10 | Attendance Register |  |
| Performance+ Record+ viva | Every lab | 30 | Lab Record |  |
| Project | Every lab | 20 | Project Report |  |
| **Total** | **60** |  |  |
| ESE | End Sem Evaluation | End of the course | 40 | Answer scripts at SGVU |  |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms |  |
| End of Course survey | | End of course | Questionnaire |  |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 30 |
| 2 | Applying the knowledge acquired from the course | 35 |
| 3 | Analysis and Evaluation | 35 |

|  |  |
| --- | --- |
| Course Title: **PROCESS IN MANUFECTRING LAB** | Course Code : **DAE375** |
| Semester : **V** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **0:0:3** | Credits : **2 Credits** |
| Type of course : **Practical** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Knowledge of basics of machine shop, foundry shop.

**Course Objectives:**

1. Students need to know various machining process like milling operations.
2. Needs to know newer machining processes / metal cutting process/ plastic process.
3. Needs to know buffing, lapping, Electro plating.

**Course Content:**

|  |  |
| --- | --- |
| **LIST OF EXPERIMENTS** | |
| 01. | Exercise on forging operation by power hammers |
| 02. | Study of USM. |
| 03. | Exercise on buffing. |
| 04. | Exercise on lapping. |
| 05. | Exercise on super finishing. |
| 06. | Exercises on Electro plating. |
| 07. | Demonstration of Engine cylinder honing with the help of honing machine through industrial visit. |
| 08. | Design and manufacture of one drilling jig. |
| 09. | Design and manufacture of one milling fixture. |
| 10. | Demonstration of newer machining processes / metal cutting process/ plastic process through industrial visits. |

**Course outcomes:**

*On successful completion of the course, the student will be able to know:*

1. Know about buffing, lapping
2. Know about super finishing, electro plating
3. Drilling operation

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  | M |  |  |  |  |  | S |  |
| 2 |  | S |  |  |  |  |  | M |  | M |  |  |
| 3 | M |  | S |  |  |  |  |  |  |  |  | S |

S: Strong relationship M: Moderate relationship

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 30 |
| 2 | Applying the knowledge acquired from the course | 35 |
| 3 | Analysis and Evaluation | 35 |

|  |  |
| --- | --- |
| Course Title: Auto Electrical & Electronics Lab | Course Code : **DAE376** |
| Semester : **VI** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **0:0:3** | Credits : **2 Credits** |
| Type of course : **Practical** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Knowledge of Basic electrical engineering.

**Course Objectives:**

1. Understand testing of electronic components.
2. Understand servicing, testing, charging & maintenance of battery.
3. Understand servicing& testing of Dynamo.
4. Understand servicing& testing of alternator.
5. Understand servicing& testing of starting motor.

**Course Content:**

|  |  |
| --- | --- |
| **LIST OF EXPERIMENTS** | |
| 01. | Testing of electronics components |
| 02. | Battery Testing: Servicing, Charging and troubleshooting. |
| 03. | Dynamo: Testing, Servicing and troubleshooting |
| 04. | Alternator: Testing, Servicing and troubleshooting |
| 05. | Starter Motor: Testing, Servicing and troubleshooting |
| 06. | Ignition System: Components Testing, Servicing and troubleshooting |
| 07. | Accessories: Inspection and servicing. |
| 08. | Preparation of individual wiring circuits of different systems. |
| 09. | Local workshop visits |
| 10. | Test and revision |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Understand servicing, testing fault finding of ignition system.
2. Understand servicing, testing fault finding of ignition system.
3. Understand servicing, testing of accessories

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  | M |  |  |  |  |  | S |  |
| 2 |  | S |  |  |  |  |  | M |  |  |  |  |
| 3 | M |  | S |  |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Attendance | Student | Every lab | 10 | Attendance Register |  |
| Performance+ Record+ viva | Every lab | 30 | Lab Record |  |
| Project | Every lab | 20 | Project Report |  |
| **Total** | **60** |  |  |
| ESE | End Sem Evaluation | End of the course | 40 | Answer scripts at SGVU |  |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms |  |
| End of Course survey | | End of course | Questionnaire |  |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 30 |
| 2 | Applying the knowledge acquired from the course | 35 |
| 3 | Analysis and Evaluation | 35 |

|  |  |
| --- | --- |
| Course Title: **VEHICLE TECHNOLOGY LAB** | Course Code : **DAE377** |
| Semester : **V** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **0:0:3** | Credits : **2 Credits** |
| Type of course : **Practical** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Knowledge of basics of automotive components and their functions.

**Course Objectives:**

1. Students needs to Know
2. Power brakes
3. Cylinder liner, head, block and oil pan
4. Piston, piston ring etc.

**Course Content:**

|  |  |
| --- | --- |
| **LIST OF EXPERIMENTS** | |
| 01. | Study of Air power brakes used in heavy vehicle. |
| 02. | Study of transaxle unit of a car. |
| 03. | Balancing of the wheel of a vehicle. |
| 04. | Study and checking the front wheel geometry by wheel alignment unit. |
| 05. | Study of cylinder liner, head, block and oil pan . |
| 06. | measurement of cylinder liner ovality and taper. |
| 07. | Study of piston, piston rings, piston pins, connecting rod and crank shaft. |
| 08. | Study, checking and adjusting the steering system.  8.1 Steering linkage check.  8.2 Front wheel bearing  8.3 Ball joints  8.4 Steering gear box. |
| 09. | Tyre study and service:  9.1 To study the construction of radial and cross ply tyres.  9.2 Tyre rotation, and tyre retrading.  9.3 Repair of tubes and tyre.  9.4 Study of cold retreading procedure |

**Course outcomes:**

*On successful completion of the course, the student will be able to know:*

1. Know about different material for different automotive parts.
2. Know about steering system
3. Know about Tyre study and service

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  | M |  |  |  |  |  | S |  |
| 2 |  | S |  |  |  |  |  | M |  |  |  |  |
| 3 | M |  | S |  |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Attendance | Student | Every lab | 10 | Attendance Register |  |
| Performance+ Record+ viva | Every lab | 30 | Lab Record |  |
| Project | Every lab | 20 | Project Report |  |
| **Total** | **60** |  |  |
| ESE | End Sem Evaluation | End of the course | 40 | Answer scripts at SGVU |  |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms |  |
| End of Course survey | | End of course | Questionnaire |  |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 30 |
| 2 | Applying the knowledge acquired from the course | 35 |
| 3 | Analysis and Evaluation | 35 |

**s**

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| --- | --- |
| Course Title: **AUTOMOTIVE THERMODYNAMICS LAB** | Course Code : **DAE379** |
| Semester : **V** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **0:0:3** | Credits : **2 Credits** |
| Type of course : **Practical** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Knowledge of basics of automotive components and their functions.

**Course Objectives:**

1. Students needs to know various material properties for different automotive parts.
2. Needs to know Pressure testing, Final testing etc.
3. Needs to know about various types of clutches and thermostats.

**Course Content:**

|  |  |
| --- | --- |
| **LIST OF EXPERIMENTS** | |
| 01. | Study of different type of S. I. combustion chambers. |
| 02. | Study of different type of C. I. combustion chambers |
| 03. | Emission measurement by smoke meter and exhaust gas analyzer. |
| 04. | To aquatint with the use of refrigeration tools, charging board, special refrigeration tube fittings. |
| 05. | Charging practice including making vacuum, pressure testing, charging and final testing for performance |
| 06. | Determination of psychometric properties of air at different places with the help of sling- psychrometer and hygrometer. |
| 07. | Study of Auto air-conditioning Compressor |
| 08. | Using refrigeration trainer test rig / Air-conditioning test rig to find out its refrigerating capacity, |
| 09. | Study of Magnetic clutch. |
| 10. | Study of Thermostats |

**Course outcomes:**

*On successful completion of the course, the student will be able to know:*

1. Know about different types of combustion chambers.
2. Know about automotive air conditioning compressor.
3. Know about various types of testing.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  | M |  |  |  |  |  | S |  |
| 2 |  | S |  |  |  |  |  | M |  |  |  | S |
| 3 | M |  | S |  |  |  | S |  |  |  | M |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Attendance | Student | Every lab | 10 | Attendance Register |  |
| Performance+ Record+ viva | Every lab | 30 | Lab Record |  |
| Project | Every lab | 20 | Project Report |  |
| **Total** | **60** |  |  |
| ESE | End Sem Evaluation | End of the course | 40 | Answer scripts at SGVU |  |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms |  |
| End of Course survey | | End of course | Questionnaire |  |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 30 |
| 2 | Applying the knowledge acquired from the course | 35 |
| 3 | Analysis and Evaluation | 35 |

|  |  |
| --- | --- |
| Course Title: **OFFICE AUTOMATION LAB** | Course Code : **DCS221** |
| Semester : **III** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **0:0:3** | Credits : **2 Credits** |
| Type of course : **Practical** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Basic computer Knowledge

**Course Objectives:**

1. Learn operating system Installation
2. Can Install Hard disk, RAM, CD, ROM, CPU and other computer components.
3. Can work with MS-word, and use MS word features
4. Learn MS word Mail options.
5. Can work with MS-Excel, and use MS Excel features.

**Course Content:**

|  |
| --- |
| Installation of Operating Systems. |
| Introduction to control panel, Add remove hardware and software, |
| Installation of Hard disk, RAM,CD, ROM,CPU, Mother Board, Keyboard, Mouse, |
| Ms-Word Basics: Working with MS Word; Menus Commands; Toolbars & Buttons; Shortcut Menus, Wizards & Templates; Creating a New Document |
| Ms-Word Lab 2:Spell Check, Thesaurus, Find & Replace; Headers & Footers; inserting-Page Number, Pictures, File, Auto texts, Symbols etc. |
| Ms-Word lab 3 Working with Columns, Tabs & Indent; Creation & Working with Tables including conversion to and from text; Margins & Space management in Document; adding References and Graphics. |
| Ms-Word lab 4: Mail Merge, Envelops& Mailing Labels. Importing and exporting to and from various formats. |
| MS Excel Lab 1: Working with Ms Excel; concepts of Workbook & Worksheets; using Wizards; Various Data Types; Using Different features with Data, Cell and Texts; Inserting |
| Removing & Resizing of Columns & Rows; Working with Data & Ranges; different Views of Worksheets; Column Freezing, Labels, Hiding, Splitting etc. |
| Ms Power Point: Working with MS Power Point; Creating a New Presentation; Working with Presentation & Presentation of Slide Show, Printing Presentation. |

**Reference:**

Lab manual

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Install operating system.
2. Install Hard disk, RAM, CD, ROM, CPU and other computer components.
3. Work with MS-word, and use MS word features
4. Use MS word Mail options.
5. Work with MS-Excel, and use MS Excel features.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S | S | S | S |  | M |  |  |  |  |  | S |
| 2 | S |  | S | S | M |  | M | M |  |  |  | M |
| 3 | S | S | S | S |  |  |  |  |  |  |  | S |
| 4 | S | S | S |  | M |  |  |  |  |  |  | M |
| 5 | S | S |  | S |  | M | M | M |  |  | M |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Attendance | Student | Every lab | 10 | Attendance Register |  |
| Performance+ Record+ viva | Every lab | 30 | Lab Record |  |
| Project | Every lab | 20 | Project Report |  |
| **Total** | **60** |  |  |
| ESE | End Sem Evaluation | End of the course | 40 | Answer scripts at SGVU |  |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms |  |
| End of Course survey | | End of course | Questionnaire |  |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 20 |
| 3 | Analysis and Evaluation | 45 |

|  |  |
| --- | --- |
| Course Title:  **MAT LAB** | Course Code : **DEE377** |
| Semester : **VI** | Core / Elective : **Elective** |
| Teaching Scheme in Hrs (L:T:P) : **0:0:3** | Credits : **2 Credits** |
| Type of course : **Practical** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Basics in Computer Programming, different curves of basic Electrical signals.

**Course Objectives:**

1. Apply and evaluate Simulation technique for the basic concept of Electrical Signals.
2. Analyse the knowledge of curves via Simulation.
3. Evaluate the different input signals used in Filters.
4. Analyse the Low Pass and High Pass filters.
5. Create the basic concept of simulation (MAT lab).

**Course Content:**

|  |  |
| --- | --- |
| **LIST OF EXPERIMENTS** | |
| 01. | WAP to draw the curve of the line |
| 02. | WAP to draw the curve of Cos (x). |
| 03. | WAP to draw the curve of exp(x). |
| 04. | WAP to draw the curve of sine |
| 05. | WAP to draw the curve of a line |
| 06. | WAP to draw the curve of parabola. |
| 07. | WAP to design an Ahebshev type-1 low pass filter. |
| 08. | WAP a program for the chebyster type-1 high pars filter. |
| 09. | WAP to design band reject filter. |
| 10. | WAP to Implements logic gates AND and OR. |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Find the Information of any input signal used in electrical equipments.
2. Find the solution of problem dependent on Low and High pass filters.
3. Determine the difference between Band reject and Band Pass Filters.
4. Solve the problems related to AND and OR gate.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  | M |  |  |  |  |  | S |  |
| 2 |  | S |  |  |  |  |  | M |  |  |  |  |
| 3 | M |  | S |  |  |  |  |  |  |  |  |  |
| 4 | S | S |  |  |  |  |  |  |  | S |  |  |

S: Strong relationship M: Moderate relationship

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| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 30 |
| 2 | Applying the knowledge acquired from the course | 35 |
| 3 | Analysis and Evaluation | 35 |

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Attendance | Student | Every lab | 10 | Attendance Register |  |
| Performance+ Record+ viva | Every lab | 30 | Lab Record |  |
| Project | Every lab | 20 | Project Report |  |
| **Total** | **60** |  |  |
| ESE | End Sem Evaluation | End of the course | 40 | Answer scripts at SGVU |  |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms |  |
| End of Course survey | | End of course | Questionnaire |  |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |  |
| --- | --- |
| Course Title:  **BASIC ECONOMICS AND SOCIAL SCIENCES** | Course Code : **DPHS203** |
| Semester : **III** | Core / Elective : **Elective** |
| Teaching Scheme in Hrs (L:T:P) : **2:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **25** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **Diploma inAutomobile Engineering** | |

**Pre-requisites:**

Knowledge of Basic Physics at Sec. and Sr. Sec. Level.

**Course Objectives:**

1. This course supposed to give the knowledge of basic concept of economics.
2. Analyze the Applications and scope of Micro Economics.
3. Analyze the Concept of Demand and supply.
4. Evaluate the Basic concept of economics in social reforms in India.
5. Analyze the problems faced by Political Economy.

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| **UNIT-1: Introduction** | 05 | 20 |
| Definition meaning, nature and scope of economics. |  |  |
| **UNITS-2: Micro Economics** | 05 | 20 |
| Definition, meaning and scope of Micro Economics. Importance and limitations. |  |  |
| **UNITS-3: Concept of Demand and supply** | 05 | 20 |
| Utility Analysis, Law of Demand, Law of Supply |  |  |
| **UNIT-4:** **Introduction to social Sciences** | 05 | 20 |
| Social Change: Causes and impacts, reforms in India. |  |  |
| **UNIT 5: Political Economy** | 05 | 20 |
| New Economic reform, Entrepreneurship and Small scale business management. |  |  |
| **TOTAL** | **25** | **100** |

**Reference:**

1. Micro Economics by M. L. Sethi
2. Micro Economics by T.R Jain

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. The course content gives full knowledge to learn nature and scope of economics.
2. Find the solution of problem dependent on Micro Economics.
3. Solve the problems related to Law of Demand, Law of Supply.
4. Enable students to solve difficulties face in social reforms and political economics.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S | S |  |  |  | S |  |  | M |  |  |  |
| 2 | M | S |  | S |  |  |  | S |  |  | S |  |
| 3 | S | M |  |  | S |  |  |  | M | S |  |  |
| 4 | S | S |  | S |  |  | S |  |  |  |  | S |

S: Strong relationship M: Moderate relationship

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 30 |
| 2 | Applying the knowledge acquired from the course | 40 |
| 3 | Analysis and Evaluation | 30 |

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |  |
| --- | --- |
| Course Title:  **ENTREPRENEURSHIP** | Course Code : **DHS232** |
| Semester : **IV** | Core / Elective : **Elective** |
| Teaching Scheme in Hrs (L:T:P) : **2:0:0** | Credits : **2 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **35** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Knowledge of Basic Business Market and Industry.

**Course Objectives:**

1. This course supposed to give the knowledge of how an entrepreneur can make his business successful.
2. Analyze the Location of Industrial Units.
3. Analyze how the size and pricing of a firm can affect the business.
4. Evaluate the Financing of Small Industries.
5. Analyze the problems faced by small enterprises.
6. Create the basic concept of Entrepreneurship.

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| **UNIT-1: PROMOTION OF ENTREPRENEURSHIP** | 08 | 20 |
| Meaning, definition and functions of an entrepreneur, qualities of a good entrepreneur; Role of Entrepreneur in economic development.  Government measures for the promotion of small scale industries with special reference to Haryana.  Cultural factors in developing entrepreneurship. |  |  |
| **UNITS-2: OWNERSHIP AND LOCATION OF INDUSTRIAL UNITS** | 06 | 20 |
| Different forms of Industrial Organization.  Theories of Industrial location.  Process of preparing project reports. |  |  |
| **UNITS-3: SIZE OF FIRM AND PRICING** | 07 | 20 |
| Concept of optimum firm, factors determining optimum size, Technical, Managerial, Marketing Uncertainties and risk.  Pricing Methods, Policies and procedures. |  |  |
| **UNIT-4:** **FINANCING OF SMALL INDUSTRIES** | 08 | 20 |
| Importance and need: Commercial Banks and term lending in India; Banks and under-writing of capital issues; Brief description about the role of other financial agencies as:   * Industrial Finance Corporation of India * State Financial Corporation * Industrial Development Bank of India * Unit Trust of India. |  |  |
| **UNIT 5: PROBLEMS FACED BY SMALL ENTERPRISES** | 06 | 20 |
| Problems connected with Marketing:   * Management of New Products * Power, Finance, Raw Material * Under-utilization of capacity   Causes of under utilization; Rehabilitation of Sick Mills. |  |  |
| **TOTAL** | **35** | **100** |

**Reference:**

1. Entrepreneurship of Small Industries- Deshpande Manohar D. (Asian Publisher, New Delhi)
2. Environment & Entrepreneur- Tandon B.C. (Asian Publishers, New delhi)
3. The Industrial Economy of India- Kuchhal S.C. (Chaitanya, Allahabad)
4. Emerging Trends in Entrepreneurship Development Theories & Practices- Singh P. Narendra (International Founder, New Delhi)

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. The course content gives full knowledge to learn hoe an entrepreneur can succeed.
2. Find the solution of problem dependent on industrial units.
3. Solve the problems related to Location and pricing of industrial units.
4. Enable students to solve difficulties face by small units.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S | S |  |  | S | S |  |  | M |  |  |  |
| 2 | S | M |  |  |  | S |  |  |  | S |  |  |
| 3 |  | M |  | S | S |  |  | S |  |  |  | S |
| 4 | S | M |  |  |  |  | S |  |  |  | S |  |

S: Strong relationship M: Moderate relationship

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| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 30 |
| 2 | Applying the knowledge acquired from the course | 40 |
| 3 | Analysis and Evaluation | 30 |

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |  |
| --- | --- |
| Course Title:  **INDUSTRIAL MANAGEMENT** | Course Code : **DHS302** |
| Semester : **V** | Core / Elective : **Elective** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Knowledge of Industries and their working.

**Course Objectives:**

1. To achieve the target and goals in an organisation it is essential to co-ordinate the entire system. For this purpose a diploma holder should have the knowledge of principles of industrial management, auditing and environmental aspects.
2. Apply the Purpose of organization and administration.
3. Analyse the Inters relation between skills and levels of management.
4. Evaluate the Scientific management.
5. Analyse the Study of different forms of layout.
6. Create the basic concept of conflict management.

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| **UNIT-1: INTRODUCTION TO INDUSTRIAL MANAGEMENT** | 06 | 12 |
| * Brief history of industries in India, Brief definition of management, organization and administration. * Characteristics of management, Principle of management, Function of management like, planning, organization, direction, co-ordination etc. |  |  |
| **UNITS-2: MANAGEMENT** | 08 | 12 |
| * Level of management, skills of management, inters relation between skills and levels of management. * Scientific management, Introduction to Schools of Management thoughts |  |  |
| **UNITS-3: INTRODUCTION TO ORGANIZATION** | 08 | 12 |
| Study of basic type of organization for ex. Line and staff organization, project organization, metrics organization, Informal organization. |  |  |
| **UNIT-4: INTRODUCTION TO INDUSTRIAL PSYCHOLOGY** | 06 | 12 |
| * Motivation theory and study of Maxlow, Need, Hierarchy Theory, Planned Location, Planned Layout. * Study of different forms of layout like line layout, process layout, product layout, combinational layout, sixth position layout etc. |  |  |
| **UNIT 5: INTRODUCTION TO MATERIAL MANAGEMENT** | 08 | 12 |
| Objective of planned layout, introduction to material management, scope of material management, study of inventory control method, introduction to different types of inventory control techniques, introduction to work study, motion study etc, introduction to conflict management. |  |  |
| **TOTAL** | **36** | **60** |

**Reference:**

1. Khanna O.P.: Industrial Engineering.

2. T.R. Banga: Industrial Engineering & Management.

3. Mahajan: Industrial & Process Management.

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Enable students for Essential Imperatives and Steps in Industrial & Process Management.
2. Find the solution of problem dependent on planning & organization.
3. Determine the Need of Schools of Management thoughts.
4. Solve the problems related to Hierarchy Theory & Planned Location.
5. Enable students to use application of material management and scope of material management.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  | S |  |  |  |  |  |  | S |
| 2 | S |  |  |  |  |  | S |  |  | M |  |  |
| 3 | S |  |  | S |  |  |  |  |  |  |  |  |
| 4 |  | S |  |  |  |  |  |  |  |  |  |  |
| 5 | S |  |  | M |  |  |  |  | S |  |  |  |

S: Strong relationship M: Moderate relationship

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weight age (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 40 |
| 3 | Analysis and Evaluation | 25 |

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |  |
| --- | --- |
| Course Title: STRENGTH OF MATERIAL | Course Code : **DME231** |
| Semester : **III** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have knowledge on basic material properties based on senior secondary school syllabus

**Course Objectives:**

The subjects is kept in diploma course so that the students of mechanical engineering discipline should know the proper use of material for common engineering problems.

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| **UNIT-1: SIMPLE STRESS AND STRAINS** | 6 | 20 |
| **Simple Stress and Strains :** Introduction types of loads and deformation, types of stresses and strain. Hooke's law, stress strain diagram for ferrous and non ferrous materials modulus of elasticity. rigidity and bulk modules of materials Stress in bars of varying cross sections, composite sections and compound sections Thermal stresses and strains, thermal stresses in composite sections. Poisson's ratio, volumetric strain, relation between different modulus, strain energy. |  |  |
| **UNITS-2: S.F. AND B.M. DIAGRAMS** | 8 | 20 |
| **S.F. and B.M. Diagrams :** Definition, types of loading types of beams, shear force and bending moment sign conventions S.F. and B.M. diagrams for cantilever simply supported and overhanging beams with point or concentrated loads uniformly distributed loads and combination of point and U.D.L. Point of contra flexure, numerical problems. |  |  |
| **UNITS-3: SPRING and Columns and Struts** | 8 | 20 |
| **Spring:** Definition types and use of springs, leaf spring, helical and spiral springs, Stiffness of a spring and maximum shear stress, defection of spring . Spring Classification based on size shape and load.  **Columns and Struts:**  Concept of column and struts Modes of failure Types of column; long and short Buckling loads Slenderness ratio Euler's formula (without proof) Rankine's formula |  |  |
| **UNIT-4: PRINCIPLE STRESSES AND STRAIN** | 8 | 20 |
| **Principle stresses and strain:-**  Transformation of plane stresses, Principle stresses, Maximum shear stresses, Mohr’s circle for plane stresses, Plain strain and its Mohr’s circle representation, Principle strains, Maximum shear strain. Combined Loading: Components subjected to bending, torsion & axial loads. |  |  |
| **UNIT 5: DEFLECTION OF BEAM** | 6 | 20 |
| **Deflection of beam:-**  Concept of deflection of a beam. Use of standard formula for calculating deflection (for point loads, U.D.L. and their combination) Cantilever beam , Simply supported beam |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

* S. C. Crandall, N. C. Dahl, and T. J. Lardner, An Introduction to the Mechanics of Solids, 2nd Ed, McGraw Hill, 1978.
* E. P. Popov, Engineering Mechanics of Solids, Prentice Hall, 1990.
* I. H. Shames, Introduction to Solid Mechanics, 2nd Ed, Prentice Hall, 1989.
* S. P. Timoshenko, Strength of Materials, Vols. 1 & 2, CBS publ., 1986.

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Apply concepts of strength of materials to obtain solutions to real time Engineering problems.

2. Able to analyze the different types of loading and the consequent deflection.

3. Able to analyze different types of stress and strain in the beam or load applied.

4. Interpret hardness curve measured after heat treatment.

5. Find correlation between material structure and its creep.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  |  |  |  |  | S |  |  |  |
| 2 |  | S |  | M |  | M |  |  |  | S |  | M |
| 3 |  |  | M |  |  |  |  | S |  |  | M |  |
| 4 |  | S |  |  | S |  |  |  | M |  |  |  |
| 5 | S |  |  |  |  |  |  |  |  | M |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |
| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

|  |  |
| --- | --- |
| Course Title: FLUID MECHANICS AND MACHINE | Course Code : **DME232** |
| Semester : **IV** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have knowledge on the physics 1 and 2

**Course Objectives:**

The aim of this course is to introduce and explain basic fundamentals of Fluid Mechanics, which is used in the applications of Aerodynamics, Hydraulics, Marine Engineering, Gas dynamics etc. Also to learn fluid properties and hydrostatic law – to understand the importance of flow measurement and its applications in Industries and to obtain the loss of flow in a flow system.

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| UNIT-1: | 6 | 20 |
| **Introduction to fluids:** Definition of fluid, Difference between solid and fluid, Application of fluid dynamics **Properties of fluids:** Intensive and Extensive properties, Continuum, density, specific gravity, specific heat, viscosity, surface tension etc. |  |  |
| UNITS-2: | 8 | 20 |
| **Fluid statics:** pressure, manometer, hydrostatic forces on submerged on plane surfaces, stability of immersed and floating bodies, fluids in rigid body motion etc. **Fluid kinematics:** Lagrangian and Eulerian description of fluid flow, Velocity and Acceleration Fields, Fundamentals of flow visualization, streamlines, stream tubes, path lines, streak lines and timelines, deformation of fluid elements. |  |  |
| UNITS-3: | 8 | 20 |
| Orifice discharging free, Jet, vena contracts, co-efficient of contraction, velocity and discharge, coefficient of resistance. Orifices and mouthpieces Nozzles and weirs. **Flow Through Pipes**: Reynolds’s experiment Darcy’s Weisback equation. Loss of head due to sudden enlargements, contraction, entrance, exit obstruction, bend, pipe fittings. Total and Hydraulic gradient lines, Flow through pipe line. Pipes in series, parallel Transmission of power through pipes. |  |  |
| UNIT-4: | 8 | 20 |
| **Laminar Flow**: Simple solution of Navier Stokes equations. Hagen – Poiseuille flow. Plans Poiseuille flow and coutte flow. Turbulent Flow; Variation of friction factor with Reynold’s number. The Prandt Mixing length hypothesis applied to pipe flow, velocity distribution in smooth pipes, Rough pipes. The Universal pipe friction laws, Colebrook. White formula. **The Boundary Layer**: Description of the boundary layer. Boundary Layer thickness boundary layer separation and control. |  |  |
| UNIT 5: | 6 | 20 |
| **Hydraulic Machines :**  Description, working principle of following machines  Hydraulic accumulator Hydraulic intensifier Hydraulic press  Hydraulic coupling and torque converter |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

* F. M. White, 1999, Fluid Mechanics, 4th Ed, McGraw-Hill.
* B. R. Munson, D. F. Young and T. H. Okhiishi, Fundamentals of Fluid Mechanics, 4th Ed, John Wiley, 2002.
* R. W. Fox and A. T. McDonald, 1998, Introduction to Fluid Mechanics, 5th Ed, John Wiley.
* S. W. Yuan, 1988, Foundations of Fluid Mechanics, Prentice Hall of India.

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. To find frictional losses in a pipe when there is a flow between two places.

2. Calculate the conjugate depths in a flow.

3. Analyze the model and the prototype.

4. Find the dependent and independent parameters for a model of fluid flow.

5. Explain the various methods available for the boundary layer separation.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  |  |  |  |  |  |  |  |  |  |
| 2 |  | S |  | S |  |  | S |  |  | M |  | S |
| 3 | S |  |  | M |  |  |  | S | M |  | S |  |
| 4 |  | S |  |  |  | M |  |  |  |  |  |  |
| 5 | S |  |  |  |  |  |  |  |  |  |  | M |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

|  |  |
| --- | --- |
| Course Title: MATERIAL SCIENCE | Course Code : **DME233** |
| Semester : **III** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have knowledge on physics 1 and physics 2 tought in 1st and 2nd semester.

**Course Objectives:**

1. The main objective of this course is to provide the basic knowledge needed to explore the discipline of materials science and engineering.

2. To develop the knowledge of how the structure of materials is described technically, including crystallography, microstructure, defects, and phase diagrams

3. To develop the knowledge of how the properties of materials are described technically and how material failure is analyzed

4. To introduce the concepts of structure-property relationships

5. To develop knowledge in various class of materials and their applications

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| UNIT-1: | 6 | 20 |
| **Structure of metal**: Crystal structure, miller indices, lattices, imperfections, elementarytreatment of point and line defects and their relation to mechanical properties. **Deformation**: Slip, twinning, effect of cold and hot working on mechanical properties, principles of recovery, re-crystallization and gain growth. |  |  |
| UNITS-2: | 8 | 20 |
| **Creep:** Basic consideration in the selection of material for high and low temperature service,creep curve, effect of material variables on creep properties, brittle failure at low temperature. **Solidification**: Phases in metal system, lever rule, solidification of metal and alloys, solid solution, eutectic, eutectoid and inter-metallic compounds, Iron carbon equilibrium diagram, TTT-diagram. |  |  |
| UNITS-3: | 08 | 20 |
| **Heat Treatment**: Principles and purpose of heat treatment of plain carbon steels, annealing, normalizing, hardening, tempering, isothermal treatment, case hardening – carburizing, nitriding etc, precipitating hardening of aluminium alloys. |  |  |
| UNIT-4: | 6 | 20 |
| **Engineering Materials:** PlainCarbon steels, Effects of alloying elements, properties, uses, springs, and wear resisting steels, IS standards codes for steels. Low alloy steels. Stainless, Magnetic materials for high and low temperature service. Brasses and bronzes; Aluminium base alloys. |  |  |
| UNIT 5: | 8 | 20 |
| **Testing of Metals and Alloys :**  Identification tests : appearance, sound, spark, weight, magnetic, microstructure, filing  **Fiber Reinforced Composites**: General characteristics, Applications, Introduction to Fibers –glass, carbon, Kevlar 49 fibers. Matrix –Polymeric, Metallic, Ceramic Matrix, Coupling agents and fillers. |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

* William D. Callister, Material science and Engineering and Introduction, Wiley, 2006.
* V. Raghavan, Materials Science and Engineering, Fifth Edition, Prentice Hall Of India, 2008.
* G. E. Dieter, Mechanical Metallurgy, McGraw Hill, 1988.
* W. F. Smith, Materials Science and Engineering (SIE), Tata-McGraw Hill, 2008.
* AVNER, Introduction to Physical Metallurgy, Tata-McGraw Hill, 2008.

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Understand how materials are formed and their classification based on atomic arrangement

2. Describe the mechanical behavior of metallic systems and its importance

3. Evaluate system for fatigue failures

4. Gain knowledge on different class of materials and their applications

5. Evaluate the failure mode of the materials and to know the steps to be taken to prevent the failures

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 |  | S |  |  |  |  |  |  |  |  |  | S |
| 2 | S |  | M |  | M |  |  |  | S | M |  |  |
| 3 |  |  |  |  |  | S |  |  |  |  | S |  |
| 4 |  | S |  | S |  |  |  | M | S |  |  | S |
| 5 | S | M |  |  |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

|  |  |
| --- | --- |
| Course Title: THERMODYNAMICS AND IC ENGINES | Course Code : **DME234** |
| Semester : **IV** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have the basic knowledge on thermodynamics.

**Course Objectives:**

1. To enable the students understand the principles, working and performance of IC engines

2. To introduce students to the working of compressors, steam nozzles and various refrigeration and air-conditioning systems.

3. To teach students the principles of waste heat recovery and thermal storage systems.

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| UNIT-1: | 8 | 20 |
| **Basic Concept and Gas Laws** : Thermodynamics, property-Intensive and Extensive, system - open, closed and isolated ,Energy - Internal energy, potential energy, kinetic energy, heat, work, specific heat, enthalpy, Boyle's law, Charles’s law, Joule's law, Characteristics gas equation, gas constant, mol, universal gas constant and molar specific heats **Laws of Thermodynamics**: Zeroth law of thermodynamics ,First law of thermodynamics, Second law of thermodynamics Concept of entropy, Constant volume, constant pressure, isothermal, adiabatic polytrophic processes, throttling and free expansion, work done during these processes. |  |  |
| UNITS-2: | 8 | 20 |
| **Steam Generators**: Definition., classification of boilers, Comparison of water tube and fire tube boilers. **Formation of Steam and its Properties :**  Generation of steam at constant pressure, various stage of steam- wet steam, dry steam saturated steam, dryness fraction, super heated steam, degree of super heat.  Critical point, triple point, thermodynamic properties of steam - specific volume, specific enthalpy, specific internal energy, specific entropy.  **Gas Power Cycles:**  Otto cycle, Diesel cycle, Dual combustion cycle, Atkinson cycle, Joule / Brayton cycle , Air standard efficiency |  |  |
| UNITS-3: | 6 | 20 |
| **Principles of Internal Combustion Engines** : Introduction and Classification of I.C Engines, Working principle of four stroke and two stroke cycle and their comparison, Working and special features of petrol and diesel engines and their comparison and applications, I.C. engine terms - Bore, stroke, dead centers, crank throw, compression ratio, clearance volume, piston displacement and piston speed, Valve timing diagrams (Theoretical & Actual), firing order, Super charging of I.C. engines |  |  |
| UNIT-4: | 6 | 20 |
| **Petrol Engines** : Concept of Carburetion, Air fuel ratio , Simple carburettors and its limitations, Description of Solex carburettors, Multi point fuel injection system, Mechanical and electrical feed pump, Description of coil ignition system and Magneto ignition system **Diesel Engines**: Description and working of Fuel feed pump, Injection of fuel, air and airless injection and fuel injectors, Introduction to swirl and open combustion chambers |  |  |
| UNIT 5: | 8 | 20 |
| **Cooling, Lubrication and Governing :** Necessity of engine cooling ,properties of coolants , Methods of cooling and their merits and demerits Function of Lubrication, lubrication systems of I.C. Engines Properties of lubricants, Governing methods of I.C. Engines. **I.C. Engines Performance:** Introduction to basic performance parameters, Measurement of brake power by rope brake, prony brake and hydraulic dynamometer, Measurement of Indicated power by engine indicator and Morse test method. Energy balance sheet of I.C. engines and finding various efficiencies |  |  |
| **TOTAL** | 36 | 100 |

**REFERENCES:**

1. Thermal Engineering (Hindi) Verma & Gulecha

2. Thermal Engineering Vol.1 Mathur & Mehta .

3. Thermal Engineering R.K.Purohit.

4. Thermal Engineering R.S. Khurmi

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Solve problems on internal combustion engines and prepare heat balance sheet.

2. Get an insight of various components and principles of engines, compressors etc.

3. Design refrigeration and air-conditioning system for a particular application.

4. Demonstrate the knowledge of waste heat recovery and thermal storage.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 |  | S |  |  | S |  |  |  |  | M |  |  |
| 2 | S |  | M |  |  |  | S |  | S |  |  | S |
| 3 |  |  |  | M |  |  |  | M |  |  |  |  |
| 4 | S | S |  |  |  | M |  |  |  |  | S |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |
| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

|  |  |
| --- | --- |
| Course Title: AUTOMOBILE ENGINEERING | Course Code : **DME235** |
| Semester : **III** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have knowledge upon dynamics of machine and design of machine elements.

**Course Objectives:**

1. To broaden the understanding of students in the structure of vehicle chassis and engines.

2. To introduce students to steering, suspension, braking and transmission systems.

3. To introduce students to engine auxiliary systems like heating, ventilation and air-conditioning.

4. To teach students about the importance of alternate fuels and modifying the engine suitably.

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| UNIT-1: | 8 | 20 |
| **Introduction:** Classification of Automobiles Chassis and body  Components of vehicle – basic structure, power unit, transmission system, accessories, superstructure. (Basic functions and arrangements) Layout of conventional type vehicle (front engine rear wheel drive) Vehicle dimensions – wheel base, wheel track, front & rear overhang, overall dimensions, minimum ground clearance, minimum turning radius. |  |  |
| UNITS-2: | 8 | 20 |
| **Transmission Systems** : Transmission requirements, general arrangement of clutch, gear box and rear axle transmission, general arrangement of rear engines and vehicles with live axles. General arrangement of Dead axle and axle-less transmission, De-Dion drive, arrangement of front engine and front wheel drives, four wheel drive transmission. **Clutches**: Principle of friction clutch, single and multiplate clutches, centrifugal clutch. Friction materials. Bonding materials. Fluid fly wheel clutch. |  |  |
| UNITS-3: | 8 | 20 |
| **Frame and Body:** Frame Function of frame, loads or frame Frame construction, sub-frame Defects in frame chassis repair and alignment  Frame less construction Body Types and construction (parts of body)  Main features – strength, stiffness, space air drag, stream lining , weight, vibration, protection against weather, corrosion, safety and economy considerations. Body alignment Bumpers – types and functions **Steering System** : Steering geometry, Ackermann steering, Center point steering, Power steering. |  |  |
| UNIT-4: | 6 | 20 |
| **Suspension** : Independent suspension; Perpendicular arm type, Parallel arm type. Dead axle suspension. Live axle suspension, air suspension, shock absorbers. **Wheels, Tyres and Brakes** : Wheel and tyre requirements, tyre dynamics, mechanical and hydraulic brakes, shoe arrangements and analysis, disc brakes, braking effectiveness relationship for 4 wheel drive. |  |  |
| UNIT 5: | 6 | 20 |
| **Automotive Air Conditioning**: Introduction, Loads, Air conditioning system Components, Refrigerants, Fault Diagnosis. **Automotive Safety**: Safety requirements, Safety Devices, Air bags, belts, radio ranging, NVS (Night Vision System) GPS (Global Positioning System) etc. |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

1. Automobile Engineering, R.K.Sharma

2. Automobile Engineering, Kirpal Singh, Vol. 1 & 2

3. Automotive Chassis and Body, P.L.Kohli, Vol.1 & 2

4. Vehicle Engine and Technology, Heisler, ELBS

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Develop chassis and identify suitable engine for different applications

2. Formulate steering, braking and suspension systems

3. Select a suitable conventional and automatic transmission system

4. Identify the usage of Electrical vehicles / Hybrid vehicles and power plants

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S | S |  |  |  |  |  |  |  |  |  |  |
| 2 | S | S |  |  |  |  |  |  |  |  |  |  |
| 3 | S | S |  |  |  |  |  |  |  |  |  |  |
| 4 | S | S |  |  |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

|  |  |
| --- | --- |
| Course Title: STRENGTH OF MATERIAL LAB | Course Code : **DME271** |
| Semester : **III** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **0:0:3** | Credits : **2 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have knowledge on strength of material subject.

**Course Objectives:**

1. To help the students gain experience in the determination of creep for various materials and understand how this property varies with time.

2. To provide students an opportunity to learn how to measure hardness of materials and analyze how heat treatment affects hardening.

3. To impart knowledge on phase development of two isomorphous metals.

4. To teach students determine phases present in a material using XRD graph.

**Course Content:**

|  |
| --- |
| **Topic and Contents** |
| 1. Study of extensometers 2. Study and operation of UTM 3. Tensile test on mild steel specimen and plotting stress strain curve 4. Bending test on timber beams. 5. Compression test on common structural materials viz. timber, cast iron etc. 6. Determination of toughness of cast iron and mild steel specimen by Charpy and Izod test. 7. Hardness test by Brinell and Rockwell test. 8. Determination of deflection for various types of loading 9. Torsion test on brass and mild steel 10. Determination of stiffness of close coiled spring |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Interpret hardness curve measured after heat treatment.

2. Find correlation between material structure and its creep.

3. Index XRD plot and determine phases of a material.

4. Perform non destructive failure analysis.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S | S |  |  |  |  |  |  |  |  |  |  |
| 2 | S | S |  |  |  |  |  |  |  |  |  |  |
| 3 | S | S |  |  |  |  |  |  |  |  |  |  |
| 4 | S | S |  |  |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

|  |  |
| --- | --- |
| Course Title: MATERIAL TESTING AND MATERIAL LAB | Course Code : **DME273** |
| Semester : **III** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : 0**:0:3** | Credits : **2 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have knowledge on different properties of materials.

**Course Objectives:**

1. To train students in the preparation of samples to perform characterization such as microstructure, volume fraction of phases, determination of porosity, film thickness, grain size and avoid measurement.

2. To help the students understand the microstructure of engineering materials, phase diagrams, various testing standards and acquire knowledge on the material behavior by conducting tests.

3. To teach students how to improve the mechanical properties of materials by various methods.

**Course Content:**

**TOPIC ANALYSIS**

|  |  |
| --- | --- |
| **S.N.** | **Name of Experiment** |
| 1 | Hardness tests |
| 2 | Impact Test |
| 3 | Viscosity of oil |
| 4 | Test on Lubricants |
| 5 | Calorific values of different fuels |
| 5 | Co-efficient of friction by Thurston oil tester |
| 6 | Tests on Universal testing machine |
| 7 | Linear measurements |
| 8 | Angular measurements |
| 9 | Testing to detect cracks |
| 10 | Dye penetration test |
| 11 | Industry Institute interaction |
| 12 | Tests and revision |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Acquire experimentation skills in the field of metallurgy.

2. Develop theoretical understanding of the mechanical properties of materials by performing experiments.

3. Apply the knowledge of phase diagrams and testing methods in related areas.

Know how to improve structure of materials for various industrial applications.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 |  | S |  | S |  |  |  |  |  |  |  | S |
| 2 |  |  | M |  |  |  |  |  | S |  | M |  |
| 3 | S | S |  |  |  |  | M |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |
| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

|  |  |
| --- | --- |
| Course Title: FLUID MECHANICS AND MACHINE LAB | Course Code : **DME274** |
| Semester : **IV** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : 0**:0:3** | Credits : **2 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Proper knowledge about the fluid mechanics and hydraulics.

**Course Objectives:**

1. To enable students understand the properties of fluid, types of fluid and types of flow.

2. To teach students about flow measuring devices such as orifice meter and venture.

3. To help the students acquire knowledge about flow through pipes.

**Course Content:**

|  |
| --- |
| **Topic and Contents** |
| 1. Determine Metacentric height of a given body.  2. Determine Cd, Cv & Cc for given orifice.  3. Determine flow rate of water by V-notch.  4. Determine velocity of water by pitot tube.  5. Verify Bernoulli’s theorem.  6. Determine flow rate of air by Venturi meter  7. Determine flow rate of air by orifice meter  8. Determine head loss of given length of pipe.  9. Determine flow rate of air by nozzle meter. |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Analyze various flow problems and fluid characteristics.

2. Determine the losses of flow through various mediums like pipes.

3. Apply the concept of fluid mechanics to design various systems.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S | S |  |  |  |  |  |  |  |  |  |  |
| 2 | S | S |  |  |  |  |  |  |  |  |  |  |
| 3 | S | S |  |  |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |
| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

|  |  |
| --- | --- |
| Course Title: Automobile Engineering Lab | Course Code : **DME275** |
| Semester : **III** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : 0**:0:3** | Credits : **2 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have basic knowledge about vehicles parts and components.

**Course Objectives:**

1. To train the students in assembling and disassembling of engine parts.

2. To impart skill in different system like fuel system, steering system etc

3. To cultivate safety aspects in turbochargers superchargers etc.

**Course Content:**

|  |
| --- |
| **Topic and Contents** |
| 1 Disassembling and assembling of multi-cylinder petrol and diesel engines and study of their parts.  2. To disassemble and assemble a 2-stroke petrol engine.  3. To disassemble and assemble a 4-stroke motor cycle engine and study of various engine parts.  4. Load test on a single cylinder 4-stroke diesel engine using a rope brake dynamometer and calculate volumetric and thermal efficiency and draw a heat balance-sheet.  5. Study of carburettors and MPFI system and disassembling and assembling of their parts.  6. To calculate valve timing of a multi-cylinder petrol engine and valve tappets adjustment.  7. Disassemble all the parts of a fuel injection pump and its parts study.  8. To disassemble the governor and study its various parts. |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Student will know how to assemble and disassemble engine parts.

2. Student will know about the different types of system like braking system, steering system

3. Student will know about the mechanism of clutches

4. Students will know the mechanism of gear box*.*

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S | M |  |  | M |  |  |  | S |  |  |  |
| 2 |  |  | M |  |  |  | M |  |  |  | M | S |
| 3 | S |  |  | S |  |  |  |  | S |  |  |  |
| 4 |  | S |  |  |  | S |  |  |  | M |  | S |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

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| --- | --- |
| Course Title: I.C ENGINE LAB | Course Code : **DME280** |
| Semester: **IV** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : 0**:0:3** | Credits : **2 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have the knowledge on internal combustion engine lab

**Course Objectives:**

Students will learn the working and construction of two stroke diesel and petrol engine. Students will also learn the working and construction of four stroke diesel and petrol engine. Students will gain knowledge on brake horse power an valve timing for the engine

**Course Content:**

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| **Topic and Contents** |
| 1) To study the constructional detail and working principles of 2 stroke/4 stroke petrol engine.  2) To study the constructional details and working principles of 2 stroke/4 stroke diesel engine.  3) Analysis of exhaust gases from single cylinder/multicylinder petrol engine by Orsat apparatus.  4) To prepare heat balance sheet on multi cylinder diesel engine/petrol engine.  5) To find the indicated horse power on multicylinder petrol engine/diesel engine by morse test.  6) To prepare variable speed performance test of a multicylinder/single cylinder petrol engine and prepare the curve (a) bhp, ihp vs speed (b) volumetric efficiency.  7) To find fhp of a multicylinder diesel engine/ petrol engine by willian’s line method.  8)To perform constant speed performance test on a single cylinder/ multicylinder diesel engine & draw curves of (i)bhp vs fuel rate, air rate and A/F (ii)bhp vs mep, mechanical efficiency.  9) To study and determine the effect of A/F ratio on the performance of two stroke, single cylinder petrol engine.  10) To study and draw the valve timing diagram four stroke, single cylinder petrol engine. |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Learn the working and construction of two stroke and four stroke petrol engine.
2. Learn the working and construction of four stroke and two stroke diesel engine.
3. Decide the amount of air fuel ratio in vehicle engine.

**Mapping Course Outcomes with Program Outcomes:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 |  |  | M | S |  |  | M |  |  | M |  | M |
| 2 |  |  |  |  | M | S |  |  |  |  | S |  |
| 3 | S | S |  |  |  |  |  |  | S |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

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| --- | --- |
| Course Title: WORKSHOP TECHNOLOGY LAB | Course Code : **DME283** |
| Semester : **III** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : 0**:0:3** | Credits : **2 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **30** |
| Continuous Internal Evaluation : **60 Marks** | SEE : **40 Marks** |
| Programmes: **DIPLOMA IN AUTOMOBILE ENGINEERING** | |

**Pre-requisites:**

Students should have knowledge on the basic engineering drawing -1 & 2

**Course Objectives:**

1. To train the students in safety handling of tools, equipment and machineries.

2. To carry out exercise in metal removal process by using drilling and lathe machines.

3. To train the student in handling lathe machine

4. To provide knowledge about the casting moulding

**Course Content:**

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| **Topic and Contents** |
| 1. To study of single point cutting tool geometry & to grind the tool to the given tool geometry. Write importance of various angles and to prepare a capacity chart of the Tool & cutter grinder. 2. Prepare a hexagonal/octagonal nut using indexing head on milling m/c and to cut bsw/ metrix internal threads on lathe (to meet with job). 3. To prepare the capacity chart for a lathe machine. 4. To cut multi-start square/metric thread. 5. To cut external metric threads & to mesh it with the nut. 6. Prepare the process chart for the job. 7. To perpare the job by eccetric turning on lathe machine drawing. 8. To study shaper machine & its mechanism and calculate its quick return ratio. 9. To prepare a job on shaper from given mild Steel rod drawing   10. To study the effect of rake angle on chip thickness ratio and the shear angle in orthogonal machining.  11. Using drill dynamometer measure the torque and thrust force in drilling and to plot the characteristics, torque, force & power v/s speed & feeds.  12. To measure effective diameter of a screw thread by three wire method.  13. To perform alignment test on a centre lathe  14. To calibrate pneumatic comparator and measure taper of a given work piece |

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. Basic operation in drilling and lathe.

2. Basic operation in shaper machine

3. Basic operation in milling machine how to cut gear and nuts.

4. Basic about how the selection of tool can be done for different machine and operation.

**Mapping Course Outcomes with Program Outcomes:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S | S |  |  |  |  |  |  |  |  |  |  |
| 2 | S | S |  |  |  |  |  |  |  |  |  |  |
| 3 | S | S |  |  |  |  |  |  |  |  |  |  |
| 4 | S | S |  |  |  |  |  |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

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| --- |
| **Composition of Educational Components:** |

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom’s taxonomy) such as:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Educational Component** | **Weightage (%)** |
| 1 | Remembering and Understanding | 35 |
| 2 | Applying the knowledge acquired from the course | 25 |
| 3 | Analysis and Evaluation | 40 |

**EMPLOYABILITY SKILLS – II**

**EM 102 C (L, T, P) = 1 (1, 0, 0)**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.NO.** | **TOPIC** | **DETAILS** | **CONTACT HOURS** |
| 1 | Communication | Role Play, Reading, Formal writing skills Listening, Interaction Process, Interpersonal Relationship | 15 |
| 2 | Attitude& Manners | Motivation, Team Building, Winning Strategy, CAN DO, | 5 |
| 3 | Preparation, presentation | Presentation skills, Preparation Skills, | 4 |
| 4 | Industry | Concept & Importance of SIP, Industrial Mentoring & Networking | 1 |

**EMPLOYABILITY SKILLS – III**

**EM 201 C (L, T, P) = 1 (1, 0, 0)**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.NO.** | **TOPIC** | **DETAILS** | **CONTACT HOURS** |
| 1 | Communication | Negotiation & Reasoning, Interaction Process, Interpersonal Relationship | 5 |
| 2 | Quantitative | Number System, Ratio & Proportion, Partnership, Percentage, Profit &Loss | 5 |
| 3 | Reasoning, | Analytical Reasoning, Coding & Decoding, Series | 5 |
| 4 | Motivation | Leadership & Styles, Self Esteem, Winning strategies, | 5 |
| 5 | Preparation, presentation | Self Esteem, Preparation of CV, Writing Application, Placement Mantra | 5 |

**EMPLOYABILITY SKILLS – IV**

**EM 202 C (L, T, P) = 1 (1, 0, 0)**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.NO.** | **TOPIC** | **DETAILS** | **CONTACT HOURS** |
| 1 | Aptitude Test Preparation | Numerical, Reasoning, Logical, Verbal | 10 |
| 2 | Employability Enhancement | Impactful Summer Internships, Statement of Purpose, Application / Cover Letter Writing, Email Application, Online Search & Registration | 5 |
| 3 | Interview Skills | Telephonic Interviews, Video Interviews, Group Discussion Techniques, Mocks – Recording & Playback | 6 |
| 4 | Miscellaneous | Industry Related Preparation, Company Specific Preparation, Current Affairs, Business News, General Knowledge | 5 |

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| --- | --- |
| Course Title:  **ADVANCE MATHEMATICS** | Course Code : **MA231** |
| Semester : **III** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **3:0:0** | Credits : **3 Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **36** |
| Continuous Internal Evaluation : **40 Marks** | SEE : **60 Marks** |
| Programmes: **Diploma in Automobile Engineering** | |

**Pre-requisites:**

Knowledge of Basic Mathematics at Sec. and Sr. Sec. Level.

**Course Objectives:**

1. This course supposed to give the knowledge of basic concept of Linear Programming.
2. Analyse the Applications of PERT and CPM Network.
3. Analyse the Concept of Transportation problem.
4. Evaluate the Basic concept of Laplace transform.
5. Analyse the problems faced in Numerical differentiation and Integration.

**Course Content:**

|  |  |  |
| --- | --- | --- |
| **Topic and Contents** | **Hours** | **Marks** |
| **UNIT-1: LINEAR PROGRAMMING** | 08 | 20 |
| Mathematical Formulation of Linear Programming problem.   * Graphical method of solving Linear Programming problem. * Simple method for solving Linear Programming problem. * Duality in Linear Programming problem. |  |  |
| **UNITS-2: PROJECT SCHEDULING** | 06 | 20 |
| Project Scheduling by PERT and CPM Network Analysis.  Sequencing Theory:   * General Sequencing problem * N-jobs through 2 machines & 3 machines * 2-jobs through m machine. |  |  |
| **UNITS-3: TRANSPORTATION PROBLEM** | 08 | 20 |
| Find the initial solution using:   * North West Corner rule, Least Cost Method.   Assignment problem:   * Solving Assignment problem |  |  |
| **UNIT-4:** **TRANSFORM CALCULUS** | 06 | 20 |
| Laplace transform with its simple properties. |  |  |
| **UNIT 5: NUMERICAL METHODS** | 08 | 20 |
| Finite differences and Interpolation, Numerical differentiation and Integration. Numerical solution of ordinary differential equations |  |  |
| **TOTAL** | **36** | **100** |

**Reference:**

1. Advanced Mathematics for Engineers by Chandrika Prasad
2. Higher Engineering Mathematics by B.S. Grewal
3. Higher Engineering Mathematics by Y.N. Gaur and C.L. Koul

4. Higher Engineering Mathematics by K.C. Jain and M.L. Rawat

**Course outcomes:**

*On successful completion of the course, the student will be able to:*

1. The course content gives full knowledge to learn Linear Programming.
2. Find the solution of problem dependent on Project Scheduling.
3. Solve the problems related to Transportation.
4. Enable students to solve difficulties face in Numerical method and transform Calculus.

**Mapping Course Outcomes with Program Outcomes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course outcomes** | **Programme Outcomes** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | S |  |  | M |  |  | S | M |  |  |  |  |
| 2 | S |  | S |  |  | M |  |  |  | S |  |  |
| 3 |  | M |  |  | S |  |  |  | M |  |  |  |
| 4 | S | S |  |  |  |  | M |  |  |  |  |  |

S: Strong relationship M: Moderate relationship

**Course Assessment and Evaluation:**

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **What** | | **To whom** | **When/where**  **(Frequency in the course)** | **Max Marks** | **Evidence collected** | **Contributing to course outcomes** |
| **DIRECT ASSMENT** | CIE | Mid Term Test | Student | Two tests | 20 | Midterm Answer books | 1 to 8 |
| Weekly Test | Two Weekly Test | 10 | Weekly Test Copies | 7 to 9 |
| Graded  Assignments | Two Assignments | 10 | Log of record | 1 to 6 |
| **Total** | **25** |  |  |
| ESE | End Sem Evaluation | End of the course | 60 | Answer scripts at BTE | 1 to 9 |
| **INDIRECT ASSESSMENT** | Student feedback | | Students | Middle of the course | -NA- | Feedback forms | 1 to 4, delivery  of the course |
| End of Course survey | | End of course | Questionnaire | 1 to 9,  Effectiveness  of delivery of  instructions  and  assessment  methods |

**CIE** – Continuous Internal Evaluation **ESE** –End Semester Examination

|  |  |
| --- | --- |
| Course Title: **CONSUMER AFFAIRS** | Course Code : |
| Semester : **III** | Core / Elective : **Elective** |
| Teaching Scheme in Hrs (L:T:P) : **2:0:0** | Credits : **2Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **24** |
| Continuous Internal Evaluation : **60Marks** | SEE : **40Marks** |
| Programmes: **Diploma in Electrical Engineering** | |

**Objective**: This paper seeks to familiarize the students with their rights and responsibilities as a consumer, the social framework of consumer rights and legal framework of protecting consumer rights. It also provides an understanding of the procedure of redress of consumer complaints, and the role of different agencies in establishing product and service standards. The student should be able to comprehend the business firms’ interface with consumers and the consumer related regulatory and business environment.

#### Unit 1: Conceptual Framework 5 Lectures

**Consumer and Markets**: Concept of Consumer, Nature of markets: Liberalization and Globalization of markets with special reference to Indian Consumer Markets, E-Commerce with reference to Indian Market, Concept of Price in Retail and Wholesale, Maximum Retail Price (MRP), Fair Price, GST, labeling and packaging along with relevant laws, Legal Metrology.

**Experiencing and Voicing Dissatisfaction**: Consumer buying process, Consumer Satisfaction/dissatisfaction-Grievances-complaint, Consumer Complaining Behaviour: Alternatives available to Dissatisfied Consumers; Complaint Handling Process: ISO 10000 suite

**Unit 2: The Consumer Protection Law in India 5 Lectures**

**Objectives and Basic Concepts**: Consumer rights and UN Guidelines on consumer protection, Consumer goods, defect in goods, spurious goods and services, service, deficiency in service, unfair trade practice, restrictive trade practice.

**Organizational set-up under the Consumer Protection Act**: Advisory Bodies: Consumer Protection Councils at the Central, State and District Levels; Adjudicatory Bodies: District Forums, State Commissions, National Commission: Their Composition, Powers, and Jurisdiction (Pecuniary and Territorial), Role of Supreme Court under the CPA with important case law.

**Unit 3: Grievance Redressal Mechanism under the Indian Consumer Protection Law 5 Lectures**

Who can file a complaint? Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy available; Temporary Injunction, Enforcement of order, Appeal, frivolous and vexatious complaints; Offences and penalties.

**Leading Cases decided under Consumer Protection law by Supreme Court/National Commission**: Medical Negligence; Banking; Insurance; Housing & Real Estate; Electricity and Telecom Services; Education; Defective Products; Unfair Trade Practices.

#### Unit 4: Role of Industry Regulators in Consumer Protection 5 lectures

1. Banking: RBI and Banking Ombudsman
2. Insurance: IRDA and Insurance Ombudsman
3. Telecommunication: TRAI
4. Food Products: FSSAI
5. Electricity Supply: Electricity Regulatory Commission
6. Real Estate Regulatory Authority

#### Unit 5: Contemporary Issues in Consumer Affairs 4 Lectures

**Consumer Movement in India:** Evolution of Consumer Movement in India, Formation of

consumer organizations and their role in consumer protection, Misleading Advertisements and

sustainable consumption, National Consumer Helpline, Comparative Product testing,

Sustainable consumption and energy ratings.

**Quality and Standardization**: Voluntary and Mandatory standards; Role of BIS, Indian

Standards Mark (ISI), Ag-mark, Hallmarking, Licensing and Surveillance; Role of International

Standards: ISO an Overview

**Suggested Readings**:

1. Khanna, Sri Ram, Savita Hanspal, Sheetal Kapoor, and H.K. Awasthi. (2007) *Consumer*

*Affairs,* Universities Press.

2. Choudhary, Ram Naresh Prasad (2005). *Consumer Protection Law Provisions and*

*Procedure,* Deep and Deep Publications Pvt Ltd.

3. G. Ganesan and M. Sumathy. (2012). *Globalisation and Consumerism: Issues*

*and Challenges*, Regal Publications

4. Suresh Misra and Sapna Chadah (2012). Consumer Protection in India: Issues

and Concerns, IIPA, New Delhi

5. Rajyalaxmi Rao (2012), *Consumer is King,* Universal Law Publishing Company

6. Girimaji, Pushpa (2002). *Consumer Right for Everyone* Penguin Books.

7. E-books :- www.consumereducation.in

8. Empowering Consumers e-book,

9. ebook, www.consumeraffairs.nic.in

10. *The Consumer Protection Act, 1986 and its later versions.* [www.bis.org](http://www.bis.org)

**Articles**

1. Misra Suresh, (Aug 2017) “Is the Indian Consumer Protected? One India One

People.

2. Raman Mittal, Sonkar Sumit and Parineet Kaur (2016) Regulating Unfair Trade

Practices: An Analysis of the Past and Present Indian Legislative Models, Journal of

Consumer Policy.

3. Chakravarthy, S. (2014). MRTP Act metamorphoses into Competition Act. CUTS

Institute for Regulation and Competition position paper. Available online at

www.cuts-international.org/doc01.doc.

4. Kapoor Sheetal (2013) “Banking and the Consumer” Akademos (ISSN 2231-0584)

5. Bhatt K. N., Misra Suresh and Chadah Sapna (2010). Consumer, Consumerism and

Consumer Protection, Abhijeet Publications.

6. Kapoor Sheetal (2010) “Advertising-An Essential Part of Consumer’s Life-Its Legal

and Ethical Aspects”, Consumer Protection and Trade Practices Journal*,* October

2010.

7. Verma, D.P.S. (2002). Regulating Misleading Advertisements, Legal Provisions and

Institutional Framework. Vikalpa. Vol. 26. No. 2. pp. 51-57.

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| --- | --- |
| Course Title: **Swachh Bharat Abhiyan** | Course Code : |
| Semester : **IV** | Core / Elective : **Elective** |
| Teaching Scheme in Hrs (L:T:P) : **2:0:0** | Credits : **2Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **24** |
| Continuous Internal Evaluation : **60Marks** | SEE : **40Marks** |
| Programmes: **Diploma in Electrical Engineering** | |

UNIT-1 Introduction to Health, Hygiene, and Sanitation ; The Need for Health, Hygiene, and Sanitation Education ; Related International projects on Health and Hygiene; Overview of the Swachh Bharat ; Qualities of Healthy Living.

UNIT-2 Hygiene - Understanding of Hygiene; Desired Definition of Hygiene; The Hygiene Practices of the different categories of family in India; Role of Family, Institutions and Corporations and government in Developing Hygiene consciousness.

UNIT -3 Sanitation ; Understanding the importance of sanitation; The facilities developed for sanitation; Means adopted to promote the use of Sanitation Facilities; Sanitation Facilities provided by government under Swachh Bharat Abhiyaan.

UNIT -4 Water Storage Methods; Water Contamination ; Prevention of Water Contamination ; The Health Risks, especially due to Water Borne Diseases; Water Purification ; Importance of Safe water use; Government’s role and actions taken for awareness generation for consumption of pure water and preventing contamination of Water.

UNIT -5 Waste Management – Introduction, importance and need; Action Plans for Healthy Living introduced under Swachh Bharat Abhiyaan; Means adopted for Waste Management under Swachh Bharat Abhiyaan.

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| Course Title: **ENVIROMENTAL STUDIES** | Course Code :ES101/102 |
| Semester : **V** | Core / Elective : **Core** |
| Teaching Scheme in Hrs (L:T:P) : **2:0:0** | Credits : **2Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **24** |
| Continuous Internal Evaluation : **60Marks** | SEE : **40Marks** |
| Programmes: **Diploma in Electrical Engineering** | |

**Unit-1** **Man & Environment**:

Definition of environment & its various components, Ecosystem concepts. Dependence of Man on nature, human population growth & its impacts on environment, Environment & human health. Environmental concerns including climate change, Global warming, Acid Rain, Ozone layer Depletion Ozone depleting substances, environmental ethics, traditional ways of utilizing various components of environment.

**Unit-2 Natural Resources**:

Forest resources, Dams & their effects on forests & tribal people. Water resources- floods, droughts and conflicts over water resources. Mineral Resources Petroleum, Coal use of various minerals for Human welfare, environmental effects of mining. Food resources, world food problem. Impacts of changing Agriculture practices on Environment. Energy Resources- Forms of Energy Nuclear power, Energy Resources & exploration of alternative energy sources. Land Resources- Desert, land degradation, soil erosion, desertification & soil contamination.

**Unit-3** **Ecosystems:**

Structure & function, energy flow, food chains, food webs, Ecological pyramids. Basics of forest, grasslands, desert and aquatic ecosystem (Ponds, Streams, Lakes, Rivers, Oceans & Estuaries) Social issues with environment. Values of a tree for a life of 50 Years, Consumption impacts and ecosystem. Urban growth and ecosystem

**Unit-4 Biodiversity and Conservations**

Classification, Biological Diversity: Genetic, species & ecosystem diversity, Values of Biodiversity, Global, National & Local Biodiversity. Hot-spots of Biodiversity, threat to biodiversity, endangered & endemic species of India. Conservation of biodiversity: in situ & ex-situ.

**Unit-5 Environment Pollution and Sustainability**.

Causes, effects & control of: Air pollution, Water pollution, Soil pollution, Noise Pollution, Thermal pollution & Nuclear Hazards. Concept of pollution Solid wastes Management. Disaster Management Flood, Drought, Earthquake, Landslides etc. Development and reorienting Science and Technology. Sustainable developments

**Suggested Readings**

1. A Text Book of Environmental Studies GR Chatwal Harish Sharma Himalaya Publishing House Mumbai 2005

2. Environmental Modeling Introduction JO Smith Pete Smith Oxford University Press 2009

3. Environmental Biology, KC Agarwal Nidhi Publishers Ltd. Bikaner. 2001

4. Textbook of Environmental Studies for Undergraduate Courses 1 Edition Erach Bharucha

5. Environmental Studies Benny Joseph) 2nd Edition, 2008 Publisher: McGraw Hill Education

6. Fundamentals of Environmental Studies B R Bamniya L N Verma and Arvind Verma Yash Publishing Bikaner

7. Fundamnetal of Ecology V Edition Eugene P odum & Gary W Barrett Cenage Learning Singapore

8. The Biodiversity of India, Bharucha Erach, Mapin Publishing Pvt. Ltd, Ahmadabad 2003.

9. Hazardous Waste Incineration, RC, Brunner McGraw Hill Inc 1989,

10. Environmental Encyclopedia, Cunningham WP, Cooper TH, Gorhani E & Hepworth MT, Jaico Publishing House, Mumbai 2001.

11. Environmental Chemistry a Global Perspectives Gary W Vanloon Stephen J Duffy 2005 Oxford university Press

12. Environmental Studies from Crisis to Cure R Rajgopalan Oxford University Press, New Delhi 2005.

13. Environmental Education, C M Gupta and Renu Sharma, Aastha Prakashan Jaipur 2007.

14. Understanding Environment Kiran B Chhokar, Mamta Pandey and Meena Raghunathan Sage Publication Inc. California.

15.Environmental Studies,   D L Manjunath Publisher: Pearson, 2006.

16. Environmental Chemistry, Anil K De New Age International Publishers. 2005.

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| --- | --- |
| Course Title: **DISASTER MANAGEMENT** | Course Code : |
| Semester : **VI** | Core / Elective : **Electctive** |
| Teaching Scheme in Hrs (L:T:P) : **2:0:0** | Credits : **2Credits** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **24** |
| Continuous Internal Evaluation : **60Marks** | SEE : **40Marks** |
| Programmes: **Diploma in Electrical Engineering** | |

**Unit I**. Introduction to Disasters: Concepts and definitions (Disaster, Hazard, Vulnerability, Resilience, Risks)

**Unit II**. Disasters: Classification Causes, Impacts (including social, economic, political, environmental, health, psychosocial, etc.), Differential impacts- in terms of caste, class, gender, age, location, disability, Global trends in disasters! Urban disasters, pandemics, complex emergencies, Climate change

**Unit III.** Approaches to Disaster Risk reduction: Disaster cycle - its analysis, Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural non-structural ensures roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), states, Centre, and other stake-holders.

**Unit IV**. Inter-relationship between Disasters and Development: Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc. Climate Change Adaptation. Relevance of indigenous knowledge, appropriate technology and local resources.

**Unit V**. Disaster Risk Management in India Hazard and Vulnerability profile of India Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, plans, programs and legislation)

**Unit VI**. Project Work: (Field Work, Case Studies)

The project /fieldwork is meant for students to understand vulnerabilities and to work on reducing disaster risks and to build a culture of safety. Projects must be conceived creatively based on the geographic location and hazard profile of the region where the college is located.

**Suggested Reading list**

1. Alexander David, Introduction in 'Confronting Catastrophe', Oxford University Press, 2000
2. Andharia J. Vulnerability in Disaster Discourse, JTCDM, Tata Institute of Social Sciences Working Paper no. 8, 2008
3. Blaikie, P, Cannon T, Davis I, Wisner B 1997. At Risk Natural Hazards, Peoples' Vulnerability and Disasters, Routledge.
4. Coppola P Damon, 2007. Introduction to International Disaster Management,
5. Carter, Nick 1991. Disaster Management: A Disaster Manager's Handbook. Asian Development Bank, Manila Philippines.
6. Cuny, F. 1983. Development and Disasters, Oxford University Press.
7. Govt. of India: Disaster Management Act 2005, Government of India, New Delhi.
8. Government of India, 2009. National Disaster Management Policy,
9. Gupta Anil K, Sreeja S. Nair. 2011 Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi , Indian Journal of Social Work 2002.Special Issue on Psychosocial Aspects of Disasters, Volume 63, Issue 2, April.
10. Kapur, Anu & others, 2005: Disasters in India Studies of grim reality, Rawat Publishers, Jaipur