

**Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBHAJINAGAR.**



CIRCULAR NO.SU/ Sci./College/NEP-2020/105/2024

It is hereby inform to all concerned that, In continuation circular No.SU./Revised B.Sc./NEP/72/2024/25588-96 dated 29.04.2024, the revised syllabi prepared by the Board of Studies/Ad-hoc Boards and recommended by the Dean, Faculty of Science & Technolgy, the Academic Council at its meeting held on 08 April 2024 has accepted **the following Revised B.Sc. Course Structure & Curriculum** as per direction by the State Government dated on 13 March 2024 under the Faculty of Science & Technology (as per National Education Policy – 2020) run at the Affiliated Colleges, Dr.Babasaheb Ambedkar Marathwada University as appended herewith.

| Sr.No. | Courses | Semester |
|---------------|--|------------------------------|
| 1 | Non Conventional & Conventional Energy (Single Major) | Ist and IInd semester |
| 2 | Home Science (Single Major) | Ist and IInd semester |
| 3 | Bachelor of Computer Application (Single Major) | Ist and IInd semester |
| 4 | Computer Science (Single Major) | Ist and IInd semester |
| 5 | Data Science (Single Major) | Ist and IInd semester |
| 6 | Inforamtion Technology (Single Major) | Ist and IInd semester |
| 7 | Networking and Multimedia (Single Major) | Ist and IInd semester |
| 8 | Automobile Technology (Single Major) | Ist and IInd semester |
| 9 | Forensic Science (Single Major) | Ist and IInd semester |
| 10 | Forensic Science & Cyber Security (Single Major) | Ist and IInd semester |

This is effective from the Academic Year 2024-25 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Chhatrapati Sambhajnagar
-431 004.
Ref.No. SU/Sci./2024/27121-28
Date:-27.05.2024.

*
*
*
*
*
*
*
*
*
*
*


**Deputy Registrar,
Academic Section.**

Copy forwarded with compliments to :-

- 1] **The Principal of all concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

- 1] The Director, Board of Examinations & Evaluation, Dr.Babasaheb Ambedkar Marathwada University,Chhatrapati Sambhajinagar.
- 2] The Section Officer,[B.Sc.Unit] Examination Branch, Dr.Babasaheb Ambedkar Marathwada University,Chhatrapati Sambhajinagar.
- 3] The Programmer [Computer Unit-1] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.
- 4] The Programmer [Computer Unit-2] Examinations, Dr.Babasaheb Ambedkar Marathwada University,Chhatrapati Sambhajinagar.
- 5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.Babasaheb Ambedkar Marathwada University,Chhatrapati Sambhajinagar.
- 6] The Public Relation Officer, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.
- 7] The Record Keeper, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajinagar- 431001



B.Sc. Degree Programme

(Three Year / Four Years (Hons) / Four Years (Hons with Research))

Course Structure

(Revised)

(AS PER NEP-2020)

Subject (Major): Automobile Technology
Single Major

Effective from 2024-25

Dr. Prashant Ambed

Dr. Prashant Ambed

[Handwritten signature]

PREFACE

As we stand on the threshold of a new era in education, the dawn of the National Education Policy 2020 illuminates our path toward a holistic, inclusive, and progressive educational landscape. The Bachelor of Science (B. Sc.) curriculum outlined herein reflects the ethos and aspirations of this transformative policy, aiming to equip learners with the knowledge, skills, and values necessary to thrive in the dynamic world of the 21st century.

At its core, the National Education Policy 2020 envisions an educational framework that is learner-centric, multidisciplinary, and geared towards fostering creativity, critical thinking, and innovation. It emphasizes the integration of knowledge across disciplines, breaking down traditional silos to encourage holistic understanding and application of concepts. The Bachelor of Science (B. Sc.) curriculum embodies these principles by offering a diverse array of courses spanning various scientific domains, while also incorporating interdisciplinary studies to nurture well-rounded graduates capable of addressing complex challenges with agility and insight.

Furthermore, the curriculum is designed to promote experiential learning, research, and hands-on exploration, recognizing the importance of practical engagement in deepening understanding and cultivating real-world skills. Through laboratory work, field experiences, internships, and project-based learning opportunities, students will have the chance to apply theoretical knowledge in practical settings, develop problem-solving abilities, and cultivate a spirit of inquiry and discovery.

Integral to the National Education Policy 2020 is the commitment to inclusivity, equity, and access to quality education for all. The Bachelor of Science (B. Sc.) curriculum reflects this commitment by embracing diversity in perspectives, backgrounds, and experiences, and by fostering an inclusive learning environment where every student feels valued, supported, and empowered to succeed.

Moreover, the curriculum emphasizes the cultivation of ethical values, social responsibility, and global citizenship, instilling in students a sense of accountability towards society and the environment. By integrating courses on ethics, sustainability, and social sciences, the Bachelor of Science (B. Sc.) program aims to produce graduates who are not only proficient in their respective fields but also compassionate, ethical leaders committed to making a positive impact on the world.

As we embark on this journey of educational transformation guided by the National Education Policy 2020, the Bachelor of Science (B. Sc.) curriculum stands as a testament to our collective vision of a more equitable, inclusive, and enlightened society. It is our hope that through rigorous academics, innovative pedagogy, and unwavering dedication to excellence, we can inspire the next generation of scientists, scholars, and change-makers to realize their full potential and contribute meaningfully to the advancement of knowledge and the betterment of humanity.

**Structure of B. Sc. (Three / Four Years Honours / Honours with Research Degree)
Programme with Multiple Entry and Exit Options**

Subject (Major): Automobile Technology

B.Sc. Automobile Technology First Year: 1st Semester

| Course Type | Course Code | Course Name | Teaching Scheme (Hrs / Week) | | Credits Assigned | | Total Credits |
|--|-------------|--|------------------------------|-----------|------------------|-----------|---------------|
| | | | Theory | Practical | Theory | Practical | |
| Major (Core) M1 Mandatory | DSC-1 | Basic Automobile System I | 2 | | 2 | | 2+2 = 4 |
| | DSC-2 | Practical based on DSC-1 | | 4 | | 2 | |
| Major (Core) M2 Mandatory | DSC-1 | Workshop Practice | 2 | | 2 | | 2+2 = 4 |
| | DSC-2 | Practical based on DSC-1 | | 4 | | 2 | |
| Major (Core) M3 Mandatory | DSC-1 | Electrical System | 2 | | 2 | | 2+2 = 4 |
| | DSC-2 | Practical based on DSC-1 | | 4 | | 2 | |
| Generic / Open Elective (GE/OE) (Choose any two from pool of courses) It should be chosen compulsorily from the faculty other than that of Major | GE/OE-1 | To be chosen from other faculty | 2 | | 2 | | 2 |
| SEC (Skill Enhancement Courses) (Choose any one from pool of courses) | SEC-1 | A) Basic Engineering Graphics B) Engineering Mechanics I | 1 | | 1 | | 2 |
| | SEC-2 | A) Practicals based Basic Engineering Graphics B) Practicals based on Engineering Mechanics I | | 2 | | 1 | |
| AEC, VEC, IKS | AEC-1 | English (Common for all the faculty) | 2 | | 2 | | 2+2 =4 |
| | IKS-1 | Choose any one from pool of courses | 2 | | 2 | | |
| OJT/ FP/CEP/CC/RP | CC-1 | Health and Wellness (Common for all the faculty) | | 4 | | 2 | 2 |
| | | | 13 | 18 | 13 | 09 | 22 |

GE/OE-1: Introduction of Automobile (for the students from other faculty)

B.Sc. Automobile Technology First Year 2nd Semester

| Course Type | Course Code | Course Name | Teaching Scheme (Hrs / Week) | | Credits Assigned | | Total Credits |
|--|-------------|--|------------------------------|-----------|------------------|-----------|---------------|
| | | | Theory | Practical | Theory | Practical | |
| Major (Core) M1 Mandatory | DSC-3 | Basic Automobile System II | 2 | | 2 | | 2+2 = 4 |
| | DSC-4 | Practical based on DSC-3 | | 4 | | 2 | |
| Major (Core) M2 Mandatory | DSC-3 | Fundamental of Metal Working | 2 | | 2 | | 2+2 = 4 |
| | DSC-4 | Practical based on DSC-3 | | 4 | | 2 | |
| Major (Core) M3 Mandatory | DSC-3 | Electronics System | 2 | | 2 | | 2+2 = 4 |
| | DSC-4 | Practical based on DSC-3 | | 4 | | 2 | |
| Generic / Open Elective (GE/OE) (Choose any two from pool of courses) It should be chosen compulsorily from the faculty other than that of Major | GE/OE-2 | To be chosen from other faculty | 2 | | 2 | | 2 |
| VSC (Vocational Skill Courses) (Choose any one from pool of courses) | VSC-1 | 1) Advance Engineering Graphics 2) Engineering Mechanics II | 1 | | 1 | | 2 |
| | VSC-2 | 1) Practicals based on Advance Engineering Graphics 2) Practicals based on Engineering Mechanics II | | 2 | | 1 | |
| AEC, VEC, IKS | AEC-1 | English (Common for all the faculty) | 2 | | 2 | | 2+2 =4 |
| | VEC-1 | Constitution of India (Common for all the faculty) | 2 | | 2 | | |
| OJT/ FP/CEP/CC/RP | CC-2 | Yoga Education / Sports and Fitness (Common for all the faculty) | | 4 | | 2 | 2 |
| | | | 13 | 18 | 13 | 09 | 22 |

Exit Option : Award of UG Certificate in 3 Majors with 44 credits and an additional 4 credits of core NSQF course / Internship OR continue with Major and Minor

GE/OE-2: Two Wheeler Servicing (for the students from other faculty)

Detailed Illustration of Courses included in 1st and 2nd semester:

- 1) **Major (Core)** subject are mandatory.

DSC-1 : This is a 2 credit theory course corresponding to Major (core) subject

DSC-2 : This is a 2 credit practical course based on DSC-1

DSC-3 : This is a 2 credit theory course corresponding to Major (core) subject

DSC-4 : This is a 2 credit practical course based on DSC-3

- 2) **Generic / Open Elective (GE/OE):** (Needs to be chosen (any two) from pool of courses available at respective college). **These courses should be chosen compulsorily from faculty other than that of Major.**

GE/OE -1 : This is a 2 credit theory course should be chosen compulsorily from faculty other than that of Major.

GE/OE -2 : This is a 2 credit theory course should be chosen compulsorily from faculty other than that of Major.

- 3) **SEC (Skill Enhancement Courses)** : Choose any one from pool of courses. These courses needs to be designed to enhance the technical skills of the students in specific area.

SEC-1 : This is a 1 credit theory course to enhance the technical skills of the students in specific area.

SEC-2 : This is a 1 credit practical course based on SEC-1.

- 4) **VSC (Vocational Skill Courses)** : Choose any one from pool of courses. These courses should be based on Hands on Training corresponding to Major (core) subject.

VSC-1 : This is a 1 credit theory course based Hands on Training corresponding to Major (core) subject.

VSC-2 : This is a 1 credit practical course based on VSC-1

- 5) **AEC (Ability Enhancement courses):** The focus of these courses should be based on linguistic and communication skills. In first semester it will be English and will be common for all the faculty.

AEC-1 : English

This is a 2 credit theory course based on linguistic proficiency. It will be common for all the faculty.

AEC-2 : English

This is a 2 credit theory course based on linguistic proficiency. It will be common for all the faculty.

- 6) **IKS (Indian Knowledge System)** : The courses related to traditional and ancient culture of India will be included in this section. The respective college will have to choose one of the courses from the pool of courses designed by the University.

IKS-1 : To be chosen from the pool of courses designed by the University

This is a 2 credit theory course based on Indian Knowledge System. It will be common for all the faculty

- 7) **VEC (Value Education Courses):** The courses such as understanding India, Environmental Science / Education, Digital and Technological solutions etc will be part of Value Education Courses.

VEC-1 : Constitution of India

This is a 2 credit theory course based on value education. It will be common for all the faculty

- 8) **CC (Curricular Courses):** The courses such as Health and wellness, Yoga education, Sports and Fitness, Cultural activities, NSS/NCC, Performing Arts.

CC-1 : Health and Wellness

This is a 2 credit practical course based on Co-curricular activities. It will be common for all the faculty

CC-2 : Yoga education / Sports and Fitness

This is a 2 credit practical course based on Co-curricular activities. It will be common for all the faculty

General Guidelines for Course Selection

- 1) The Major subject is the discipline or course of main focus, bachelors degree shall be awarded in that discipline / subject.
- 2) Students are required to select Minor subject from other discipline of the same faculty
- 3) Students are required to select Generic /Open Elective (vertical 3 in the credit framework) compulsorily from the faculty different than that of their Major / Minor subjects.
- 4) Vocational Skill Courses and Skill Enhancement Courses (VSC and SEC) shall be related to the Major subject

Programme Educational Objectives (PEOs) :

Programme Educational Objectives (PEOs) for the Bachelor of Science Curriculum under the National Education Policy 2020:

1. **Mastery of Discipline-Specific Knowledge:** Graduates of the Bachelor of Science program will demonstrate a deep understanding of fundamental principles, theories, and methodologies in their chosen scientific discipline, enabling them to analyze complex problems, propose innovative solutions, and contribute to advancements in their field.
2. **Interdisciplinary Proficiency:** Graduates will possess the ability to integrate knowledge and skills from multiple scientific disciplines, fostering a holistic approach to problem-solving and innovation. They will be equipped to address multifaceted challenges by drawing upon diverse perspectives and methodologies.
3. **Critical Thinking and Analytical Skills:** Graduates will develop strong critical thinking abilities, enabling them to evaluate information rigorously, analyze data effectively, and make informed decisions based on evidence. They will demonstrate proficiency in applying logical reasoning and scientific methods to solve problems and generate new knowledge.
4. **Leadership and Innovation:** Graduates will demonstrate leadership qualities and entrepreneurial mindset, capable of initiating and driving positive change in their organizations and communities. They will exhibit creativity, resilience, and adaptability, harnessing innovation to address complex challenges and seize opportunities for growth and advancement.
5. **Global Citizenship and Cultural Sensitivity:** Graduates will possess a global perspective and cultural sensitivity, recognizing the interconnectedness of diverse communities and the importance of collaboration across borders. They will engage in cross-cultural dialogue, embrace diversity, and contribute to the advancement of knowledge and understanding on a global scale.

These Programme Educational Objectives serve as guiding principles for the Bachelor of Science curriculum, reflecting our commitment to nurturing well-rounded graduates who are prepared to excel in their careers, contribute to society, and lead meaningful lives in a rapidly changing world.

Programme Outcomes (POs) :

The National Education Policy (NEP) 2020 for India emphasizes several key aspects for Bachelor of Science (B.Sc.) programs, aiming to produce graduates who are not only well-versed in their respective disciplines but also equipped with skills necessary for holistic development and employability. While specific program outcomes may vary between institutions and disciplines within B.Sc. programs, here are some common outcomes aligned with NEP 2020:

- **PO1. The citizenship and society:** Apply broad understanding of ethical and professional skill in science subjects in the context of global, economic, environmental and societal realities while encompassing relevant contemporary issues.
- **PO2. Environment and sustainability:** Apply broad understanding of impact of science subjects in a global, economic, environmental and societal context and demonstrate the knowledge of, and need for sustainable development.
- **PO3. Ethics:** Apply ability to develop sustainable practical solutions for science subject related problems within positive professional and ethical boundaries.
- **PO4. Individual and team work:** Function effectively as a leader and as well as team member in diverse/ multidisciplinary environments.
- **PO5. Communication:** Communicate effectively on complex science subject related activities with the scientific community in particular and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO6. Project management and finance:** Demonstrate knowledge and understanding of the first principles of science and apply these to one's own work as a member and leader in a team, to complete project in any environment.
- **PO7. Life-long learning:** Recognize the need for lifelong learning and have the ability to engage in independent and life-long learning in the broadest context of technological change.

These program outcomes align with the broader goals of NEP 2020 to transform higher education in India and prepare students for the challenges and opportunities of the 21st century. Board of Studies designing B.Sc. curricula are encouraged to incorporate these outcomes into their program objectives and learning outcomes.

Programme Specific Outcomes (PSOs):

PSO1. **Domain knowledge:** To develop proficiency in advance technology, automobile and expertise in product design and development to ensure best manufacturing practices.

PSO2. **Problem Analysis:** Identify automobile vehicles related problems at varied complexity and analyze the same to formulate/ develop substantiated conclusion using first principles of automobile system

PSO3. **Design Development of solutions:** Design/ develop solutions for problems at varied complexity in various areas of automobile to address changing challenges put forward by market demand/ stakeholder

PSO4. **Conduct Investigation of complex problems:** Use established knowledge and methods to design of experiments, analyze resulting data and interpret the same to provide valid conclusions.

PSO5. **Modern tools:** Create, select, and apply appropriate techniques, resources, and modern electronics and relevant IT tools including prediction and modelling to complex automobile technology related activities with clear understanding of the limitations.

Eligibility criteria for Admission:

1. A candidate will be eligible to join 1st semester of B. Sc. Automobile Technology course, if he/she has passed 10+2 examination (Science Stream)

Or

2. Passed 10+2 vocational related to any stream of recognized Board/university, or any other examination recognized as equivalent thereto.

Or

3. Passed Two Year ITI(Any Stream) or One year ITI(Any Stream) + One year NCTVT (National Council on Vocational Training)

or

4. Passed Three Year Diploma (Any Stream) in Automobile / Mechanical Engineering

B.Sc. (Automobile Technology)

Semester I

(NEP-2020)

Major (Core) M1 Mandatory
DSC-1: Basic Automobile System I

Total Credits: 02

Total Contact Hours : 30 Hrs

Maximum Marks: 50

Course Description:

The course "Basic Automobile Systems-I" offers a comprehensive introduction to the world of automobiles, covering their history, development, classification, and present scenario. It explores the nomenclature of automobiles, their role as a transport mode, and terminologies associated with them. The course delves into the status of modern automobiles, with a specific focus on the Indian automotive landscape, as well as emerging trends in future automobiles, including concept cars, micro cars, and peculiar vehicles.

Course Objectives:

1. Provide a foundational understanding of the history and development of automobiles.
2. Familiarize students with the classification and nomenclature of automobiles.
3. Introduce the concepts and terminologies associated with automotive systems.
4. Explore the status of modern automobiles and the Indian automotive industry.
5. Examine emerging trends and future prospects in the automotive field.
6. Lay the groundwork for in-depth knowledge of chassis, vehicle layout, and drive systems.

Course Outcomes:

1. Students will be able to describe the history and development of automobiles.
2. They will classify different types of automobiles and understand associated terminologies.
3. Students will analyze the current status and emerging trends in the Indian automotive industry.
4. They will identify the components of an automobile and explain their functions.
5. Students will comprehend the layout and drive systems of vehicles, including advantages and disadvantages.
6. They will demonstrate an understanding of frame and body construction, considering structural design and aerodynamic factors.

UNIT I : - HISTORY, DEVELOPMENT, PRESENT AND FUTURE VEHICLES (10 HRS)

- The World Of Automobiles Nomenclature Of Auto vehicles Automobile A Transport Mode
- History And Development
- Classification Of Auto vehicles
- Terminologies
- Status Of Modern Automobile, Present Scenario Of Indian Automobiles
- Automobiles Abroad 17 Future Automobiles, Concept Car
- Micro Cars, Peculiar Vehicles
- Automobile In Space

UNIT II :- CHASSIS, ARTICULATED & RIGID VEHICLES, & VEHICLE LAYOUT (10 HRS)

- The World Of Automobiles, Components Of An Automobile, Functions Of Various Components
- Layout Of An Automobile, Layout Considerations, Working Of An Automobile

- Specifications, Terminologies
- Articulated And Rigid Vehicles
- Advantages And Disadvantages Of Front-Wheel Drive, Four-Wheel Drive, Rear And Central Engine Drive

UNIT III :- FRAME AND BODY CONSTRUCTION

(10 HRS)

- The World Of Automobiles
- Frame, Types Of Frames, Frame Of Two-Wheelers
- Structural Design Of Frame
- Body, Auto vehicle Architecture
- Aerodynamic Considerations In Body Profiling
- Computer Aided Design Of Car Bodies
- Defects In Frames And Body
- Energy-Absorbing Bumpers

Text Books :

1. "Automobile Engineering" by Kripal Singh (Standard Publishers Distributors)
2. "Automobile Engineering" by R.K. Rajput (S. Chand Publishing)

Reference Books:

3. "Automobile Engineering" by G.B.S. Narang (Khanna Publishers)
4. "Automobile Engineering" by K.M. GUPTA (UMESH Publications)
5. "Automobile Engineering" by Dr. Kirpal Singh (Standard Publishers Distributors)

Major (Core) M1 Mandatory

DSC-2: Practical based on Basic Automobile System I (DSC-1)

Total Credits: 02

Total Contact Hours : 60 Hrs

Maximum Marks: 50

1. Historical Evolution of Automobiles
2. Classification of Automobiles
3. Analysis of Modern Automobiles
4. Exploration of Future Automotive Trends
5. Investigation of Chassis and Vehicle Layout
6. Comparison of Articulated and Rigid Vehicles
7. Analysis of Frame and Body Construction
8. Experiment with Computer-Aided Design of Car Bodies
9. Testing Energy-Absorbing Bumper Designs
10. Identification of Defects in Frames
11. To Study Aerodynamic Considerations In Body Profiling
12. To study Layout Considerations of vehicles
13. To study Defects In vehicle Body

Major (Core) M2 Mandatory

DSC-1: Workshop Practice

Total Credits: 02

Total Contact Hours : 30 Hrs

Maximum Marks: 50

Course Description:

"Workshop Technology I" is a foundational course designed to introduce students to the essential concepts and skills related to various workshop activities in engineering. The course provides a comprehensive overview of different shop divisions based on the nature of work, including carpentry and metal fabrication.

Course Objectives:

1. Introduce students to the fundamental concepts and activities in workshop technology.
2. Instill a strong sense of safety and the importance of adhering to safety protocols in a workshop setting.
3. Familiarize students with basic measurement tools and their application in accurate measurements.
4. Provide a thorough understanding of carpentry tools, their uses, and fundamental wood working operations.
5. Teach students how to assemble timber components using various joints and techniques.
6. Prepare students with the foundational knowledge and skills required for hands-on engineering tasks.

Course Outcomes:

1. Demonstrate a clear understanding of the scope and divisions within workshop technology.
2. Apply safety measures and precautions effectively while working in a workshop.
3. Utilize basic measurement tools and instruments to obtain precise measurements.
4. Proficiently use common carpentry tools and engage in wood working operations.
5. Develop the necessary skills and knowledge to undertake practical engineering tasks in a workshop environment.

Course Basic Requirements:

1. Regular attendance and participation in practical sessions.
2. Active engagement in safety measures and adherence to workshop guidelines.
3. Access to and proper use of basic measurement tools.
4. Willingness to learn and apply carpentry techniques and wood working operations.
5. Collaboration with peers on assembly projects.

Course Content:

UNIT-1: Introduction & Safety Precaution:

(12 Hrs)

Definition, Application in different areas, Different shop activities and broad division of the shops on the basis of nature of work done, Importance of safety and general precautions to be observed in the shop, use of fire extinguishers, storing and handling of inflammable materials, Elementary first aid.

UNIT-2: Basic Measurement Tools:

(10 Hrs)

Introduction, concepts of measurements, measuring instruments such as scale, vernier, micrometer, depth gauge, bore gauge, filler gauge, screw gauge, divider, caliber, dial gauge, compression gauge and vacuum gauge.

UNIT-3: Carpentry: Fundamental of Wood working operations:

(8 Hrs)

Common Carpentry Tools Their classification, size, specification (name of the parts and use only), Marking and measuring tools, Holding and supporting tools, Cutting and Sawing Tools, Drilling and Boring Tools, Striking Tools- Mallet and Claw hammer, Turning Tools & Equipment, Miscellaneous Tools.

Textbooks:

1. "Workshop Technology Part I" by Raghuvanshi, B. S.
2. "Workshop Technology & Practice" by Hajra Choudhury, S. K. and Hajra Choudhury, A. K.

Reference Books:

1. "Workshop Technology Part 1 & 2" by Chapman, W. A. J.
2. "Workshop Technology" by Anderson, W. A. J. and Hajra Choudhury, A. K.

Major (Core) M2 Mandatory

DSC-2: Practical based on Workshop Practice (DSC-1)

Total Credits: 02

Total Contact Hours : 60 Hrs

Maximum Marks: 50

1. To study of fire extinguishers
2. To study of general precautions taken at workshop floor
3. To study of use of first aid kit and material handling at workshop
4. To study of different types of files
5. To study of different hammers
6. To study of different screw drivers
7. To study of vernier caliper and depth gauge
8. To study of micrometer and dial gauge
9. To study of tools used in carpentry shop
10. To make given wooden joint
11. To study Drilling Tools
12. To study Boring Tools
13. To study Holding tools
14. To study supporting tools
15. To study Turning Tools

Major (Core) M3 Mandatory

DSC-1: Electrical System

Total Credits: 02

Total Contact Hours: 30 Hrs

Maximum Marks: 50

Course Description:

The "Electrical System" course introduces fundamental concepts and analysis techniques in electrical engineering. It covers topics such as current electricity, A.C. and D.C. circuits, electric cells, capacitors, and electromagnetic effects. Students learn about electrical quantities, domestic wiring, and safety measures, emphasizing the effects of electric shock and precautionary measures.

Learning Objectives:

1. To introduce fundamental concepts and analysis techniques in electrical engineering to students across all disciplines.
2. To introduce the students about domestic wiring, the functioning of various electrical apparatus and the safety measures. Emphasize the effects of electric shock and precautionary measures.
3. To impart basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
4. To provide knowledge about the basic DC and AC electric circuits and magnetic circuits.

Learning Outcomes

1. Students will gain knowledge regarding the various laws and principles associated with electrical systems.
2. Students will gain knowledge regarding electrical machines and apply them for practical problems.
3. Students will gain knowledge regarding various types' semiconductors.
4. Student will gain knowledge digital electronics.
5. Student will gain knowledge on electronic systems.

Course Basic Requirements:

1. Regular attendance in both theory and practical sessions.
2. Access to laboratory equipment and components for hands-on experiments.
3. Basic knowledge of mathematics and physics.

Course Content

UNIT 1. Current Electricity (10 Hrs)

Definition of Resistance, Voltage, Capacitor & its types Capacitor, Current, Power, Energy and their units, Relation between electrical, mechanical and thermal units, Temperature variation of resistance, Difference between AC and DC voltage and current.

UNIT 2. A.C Circuits & D.C. Circuits (10 Hrs)

Generation of A.C. voltage, its generation and wave shape. Cycle, frequency, peak value R.M.S. value, form factor, crest factor, Phase difference, power and power factor, A.C. Series Circuits with (i) resistance and inductance (ii) resistance and capacitance and (iii) resistance inductance and capacitance, Q factor of R.L.C. series circuits. Ohm's Law, Series – parallel resistance circuits, calculation of equivalent resistance, Kirchoff's Laws and their applications.

UNIT 3. Electromagnetic Effects (10 Hrs)

Introduction of Electric Cells and Its types, Construction of Electromagnets & Their uses, Faraday's Laws of Electromagnetic Induction, Dynamically induced e.m.f., its magnitude and induction, inductance and its unit. Mutually induced e.m.f., its magnitude and direction, Energy stored in an inductance. Force acting on a current carrying conductor in magnetic field, its magnitude and direction, Principles and construction of dynamo.

Practical Based on above Chapter

Textbooks:

1. "Basic Electrical Engineering" by Ritu Sahdev, Khanna Publishing House.
2. "Basic Electrical Engineering" by Pradeep Kumar, Khanna Publishing House.
3. "Basic Electronics" by S. Biswas, Khanna Publishing House.
4. "All in One Electronics Simplified" by A.K. Maini, Khanna Publishing House.

Reference Books:

1. "Principles of Electrical Engineering" by V. K. Mehta and Rohit Mehta.
2. "Electrical Technology" by B. L. Theraja and A. K. Theraja.
3. "Introduction to Electrical Engineering" by M. S. Naidu and S. Kamakshaiah.

Major (Core) M3 Mandatory

DSC-2: Practical based on Electrical System (DSC-1)

Total Credits: 02

Total Contact Hours: 60 Hrs

Maximum Marks: 50

- 1) Study of components: Identification and testing of resistors, capacitors, inductors, diodes.
- 2) STUDY of Ohm's Law
- 3) Study of Series Resistive Circuits
- 4) Study of Parallel Resistive Circuits
- 5) Study of Kirchhoff's Laws and their applications
- 6) STUDY OF Charging and Discharging of a Capacitor
- 7) AC Waveform Analysis
- 8) RLC Series Circuit Analysis
- 9) Study of Multimeter and Basic Electrical Measurement instruments
- 10) To study faraday's law of Electromagnetic Induction
- 11) To study Force acting on a current carrying conductor in magnetic field
- 12) To study Principles and construction of dynamo.
- 13) To study Construction of Electromagnets & Their uses
- 14) To study Mutually induced e.m.f., its magnitude and direction,
- 15) To study Q factor of R.L.C. series circuits

SEC (Skill Enhancement Courses)

SEC 1 (A): Basic Engineering Graphics

Total Credits: 01

Total Contact Hours: 15 Hrs

Maximum Marks: 50

Course Description :

"Engineering Graphics I" is an introductory course that focuses on teaching students the fundamental principles of engineering drawing. The course covers topics such as the effective use of drawing instruments, drawing standards, conventions, and geometrical construction.

Course Objectives :

1. Develop proficiency in using drawing instruments for precise drawing and dimensioning.
2. Understand the conventions and methods of engineering drawing.
3. Comprehend the concept of projections of points, lines, planes, solids, and sections of solids.
4. Gain the ability to construct isometric and orthographic views of given objects.
5. Enhance problem-solving skills related to engineering graphics.
6. Foster a strong foundation in engineering drawing principles.

Course Outcomes:

1. Proficiency in using drawing instruments for creating precise and well-dimensioned drawings.
2. Knowledge of engineering drawing standards, line types, lettering, and dimensioning techniques.
3. Ability to apply the principles of orthographic projection to create accurate representations of three-dimensional objects.
4. Skill in constructing isometric and orthographic views of given objects.
5. Capability to project points, lines, and planes accurately in engineering drawings.
6. Strong foundation in engineering graphics for future applications in various engineering disciplines.

Course Basic Requirements:

1. Access to drawing instruments and drawing sheets for exercises.
2. A clear understanding of mathematical and geometrical concepts.

Course Contents

Unit 1: Drawing Tools(5 Hrs)

Layout drawing sheets – drawing sheet, sizes information on drawing Sheets part list in case of sub-assemblies, Drawing Instrument

Unit 2: Drawing standards and geometrical construction: (5 Hrs)

Drawing standard SP: 46, Type of lines, lettering, dimensioning, scaling conventions. Geometrical construction: Dividing a given straight line into any number of equal parts, bisecting a given angle, drawing a regular polygon given one side, special methods of constructing a pentagon and a hexagon.

Unit 3: Orthographic Projections and Projections of Points: (5 Hrs)

Introduction to orthographic projection, drawing of orthographic views of objects from their isometric views, Projection of points lying in four quadrants

Textbooks:

1. "Engineering Drawing" by N. D. Bhatt, Charotar Publishing House, 46th Edition, 2003.
2. "A Textbook of Engineering Graphics" by K. V. Natarajan, Dhanalakshmi Publishers, Chennai, 2006.
3. "Engineering Graphics" by K. Venugopal and V. Prabhu Raja, New Age International (P) Ltd, 2008.

Reference Books:

1. "Engineering Graphics for Degree" by K.C. John.
2. "Engineering Drawing and Design" by David A. Madsen and David P. Madsen.

SEC (Skill Enhancement Courses)

SEC 2 (A): Practical Based on Sec-1 (A)

Total Credits: 01

Total Contact Hours: 30 Hrs

Maximum Marks: 50

1. Sheet on Layout drawing sheets – drawing sheet, sizes information on drawing Sheets
2. Sheet on Drawing Instrument
3. Sheet on Type of lines,
4. Sheet on lettering,
5. Sheet on dimensioning, scaling conventions.
6. Sheet on Geometrical construction
7. Sheet on drawing of orthographic views of objects from their isometric views,
8. Sheet on Projection of points lying in four quadrants

SEC (Skill Enhancement Courses)

SEC 1 (B): Engineering Mechanics I

Total Credits: 01

Total Contact Hours: 15 Hrs

Maximum Marks: 50

Course Description :

"Engineering Mechanics I" provides students with a strong foundation in the principles of engineering mechanics. The course covers fundamental concepts and laws of engineering mechanics, static equilibrium, and kinematics.

Course Objectives :

1. Understand and apply fundamental laws of engineering mechanics.
2. Analyze force systems using the conditions of static equilibrium.
3. Calculate the center of gravity and moment of inertia for plane surfaces.
4. Compute motion characteristics for bodies and particles in rectilinear and curvilinear motion.
5. Discuss the relationship between forces and motion characteristics.

Course Outcomes:

1. Proficiency in applying fundamental laws of engineering mechanics to analyze force systems.
2. Ability to determine the center of gravity and moment of inertia for plane surfaces.
3. Competence in analyzing the motion characteristics of particles and bodies in various types of motion.
4. Understanding the relationship between forces and motion characteristics.
5. Skill in solving problems related to static equilibrium.

Course Basic Requirements:

1. Access to course materials and a suitable learning environment for theoretical and practical sessions.
2. Regular attendance in both theory and practical sessions.

Course Contents

UNIT I : Forces (5 Hrs)

- Force , Types and Classification of Forces, Characteristics and Representation of a Force
- Particle and Rigid Body, Principle of Physical Independence of Forces
- Principle of Transmissibility of Forces, Systems of Forces, Resultant Force
- Composition of Forces to Find a Resultant Force
- Laws of Forces and Methods Used to Find a Resultant Force
- Analytical Methods used to Find a Resultant Force
- Parallelogram Law of Forces (Using Parallelogram Law of Forces to Find a Resultant Force)
- Resolution of a Force into Component Forces
- Principle of Resolution of Forces (or Principle of Resolved Parts)
- Using Method of Resolution of Forces to Find a Resultant Force, Triangle Law of Forces

UNIT II : Moments (5 Hrs)

- Introduction, Moment of a Force, Graphical Representation of Moment

- Units of Moment, Types of Moments, Clockwise Moment, Anticlockwise Moment
- Laws Related to Moments, Applications of Moments, Position of the
- Levers, Types of Levers , Simple Levers, Compound Levers

UNIT III: . Parallel Forces and Couples (5 Hrs)

- Parallel Forces, Classification of Parallel Forces, Like Parallel Forces
- Unlike Parallel Forces, Methods to Find Magnitude and Position of the Resultant of Parallel Forces, Analytical Method to Find the Resultant of Parallel Forces, Couple, Arm of a Couple , Moment of a Couple, Classification of Couples
- Clockwise Couple, Anti-clockwise Couple, Characteristics of a Couple

Textbooks:

1. "Engineering Mechanics" by S. Timoshenko and D. H. Young, McGraw Hill, 1995.
2. "Engineering Mechanics" by A. K. Tayal, Umesh Publications, 2010.

References books

1. "Engineering Mechanics" by S. S. Bhavikatti and K. G. Rajashekarappa, New Age International Publications, 2nd Edition.
2. "Engineering Mechanics" by R. S. Khurmi, S. Chand Publications.

SEC (Skill Enhancement Courses)
SEC 2 (A): Practical Based on Sec-1 (B)

Total Credits: 01

Total Contact Hours: 30 Hrs

Maximum Marks: 50

- 1) To experimentally verify the parallelogram law of forces for finding the resultant of two concurrent coplanar forces.
- 2) To determine the components of a given force acting on a point using graphical and analytical methods.
- 3) To find the resultant of two concurrent coplanar forces using the principle of resolution of forces.
- 4) To compare the accuracy and efficiency of analytical and graphical methods for determining the resultant of coplanar forces.
- 5) To explore the relationship between a force and its components using different angles of resolution.
- 6) To experimentally measure the moment of a force about a point using different configurations.
- 7) To experimentally verify Varignon's theorem for finding the moment of a system of coplanar forces about a point.
- 8) To classify and analyze simple levers of different classes (first, second, and third) based on the relative positions of effort, fulcrum, and resistance.
- 9) To experimentally calculate the mechanical advantage of a simple lever system.
- 10) To explore how the moment of a force changes with varying distances from the pivot point.

This course will be available for the students from other faculty

Generic / Open Elective (GE/OE)

GE/OE-1 : Introduction of Automobile

Total Credits: 02

Total Contact Hours: 30 Hrs

Maximum Marks: 50

This course provides an introductory overview of the principles and components of automobile engineering. Students will explore the fundamental concepts related to vehicle design, construction, and operation. Through a combination of theoretical instruction and hands-on laboratory experiments, participants will gain insight into various aspects of automobile technology, including vehicle layout, chassis design, aerodynamics, alternative fuels, engine technology, and transmission systems. Emphasis will be placed on developing a foundational understanding of automotive engineering principles and their practical applications in the automotive industry.

Course Objectives:

- 1) To introduce students to the basic concepts and terminology of automobile engineering.
- 2) To familiarize students with the major components and systems of automobiles and their functions.
- 3) To analyze different vehicle layouts and understand their advantages and disadvantages.
- 4) To explore the function and significance of chassis, frame, and body in vehicle construction.
- 5) To introduce students to the principles of vehicle aerodynamics and its importance in vehicle design.
- 6) To discuss alternative fuels such as LPG, CNG, and hydrogen, and their potential applications in the automotive industry.

Course Outcome:

Upon completion of the course, students should be able to:

1. Understand the definition and classification of automobiles.
2. Analyze different vehicle layouts and their advantages/disadvantages.
3. Explain the function of chassis, frame, and body in automobiles.
4. Describe the significance of body streamlining and basic aerodynamic concepts.
5. Evaluate alternative fuels such as LPG, CNG, and hydrogen.

Unit 1: Introduction & vehicle Layout (10 Hrs)

- Definition and Classification of Automobiles
- Major Components of Automobiles and their Functions
- Significance of Vehicle Layout
- Types of Vehicle Layouts (FEFWD, FERWD, RERWD, 4WD)
- Comparative Analysis of Vehicle Layouts
- Function and Requirements of Chassis, Frame, and Body
- Classification of Chassis Frames
- Basic Body Nomenclature

Unit 2: Engine Technology(10 Hrs)

- Introduction to Internal Combustion Engines
- Engine Components and Functions

- Types of Engine Configurations (e.g., Inline, V, Boxer)
- Basic Engine Performance Parameters

Unit 4: Transmission Systems (10 Hrs)

- Types of Transmission Systems (Manual, Automatic, CVT)
- Function and Components of Transmission Systems
- Comparative Analysis of Transmission Systems

Recommended Textbooks:

1. "Automobile Engineering" by Kirpal Singh
2. "Automobile Engineering" by K.M. Gupta"
3. "Introduction to Automobile Engineering" by SAE International

Reference Books:

1. "Automobile Engineering" by RB Gupta
2. "Fundamentals of Automotive Technology" by Kirk VanGelder
3. "Modern Automotive Technology" by James E. Duffy

B.Sc. Automobile Technology First Year:

2nd Semester

Major (Core) M1 Mandatory

DSC-3: Basic Automobile System II

Total Credits: 02

Total Contact Hours : 30 Hrs

Maximum Marks: 50

Course Description :

The course "Basic Automobile Systems-II" delves into the prime movers that power automobiles, focusing on internal combustion engines, gas turbines, Wankel engines, and hybrid power plants. It provides an in-depth understanding of the constructional details, working principles, advantages, and drawbacks of these prime movers. The structural and mechanism-forming components of internal combustion engines are explored, including components like cylinder blocks, crankshafts, and valves. Students will gain knowledge about the intricate parts and mechanisms.

Course Objectives:

1. Introduce different types of prime movers used in automobiles and their terminologies.
2. Explain the classification of internal combustion engines (I.C. engines) and their working cycles.
3. Compare and contrast petrol and diesel engines, including multi-valve technology.
4. Explore gas turbines, their construction, and advantages over reciprocating engines.
5. Study the Wankel engine, its construction, operation, and sealing challenges.
6. Familiarize students with steam cars and hybrid power plants.

Course Outcomes:

1. Students will identify and describe various prime movers used in automobiles.
2. They will understand the construction and working principles of internal combustion engines.
3. Students will differentiate between petrol and diesel engines and evaluate the impact of multi-valve technology on engine performance.
4. They will analyze gas turbines and compare them to reciprocating engines.
5. Students will gain knowledge of the Wankel engine, its advantages, and sealing issues.
6. They will comprehend steam cars and hybrid power plant technologies.

Course Requirements:

Prerequisites: Basic Automobile Systems-I

UNIT I :- PRIME MOVERS

(10 HRS)

- The World Of Automobiles, Types Of Prime Movers, Terminology
- Internal Combustion Engine (I.C. Engine), Classification Of Ic. Engines
- Layout Of Different Ic. Engines, Working Cycles And Strokes
- Constructional Details Of Lc. Engines
- Comparison Between Petrol Engine And Diesel Engine
- Multi-Valve Technology And Its Influence On Engine Performance
- Gas Turbine, Construction, Working,Future Prospects
- Advantages And Disadvantages Of Gas Turbine Over Reciprocating Engines
- Wankel Engine (Or Rotary Piston Engine) , Constructional Details

- Principle Of Operation, Working, Cooling System
- Advantages And Drawbacks Of Wankel Engine, Sealing Problem
- Comparison Between Wankel Engine And Ic. Engine
- Steam Car, Hybrid Power Plant (Courtesy: Toyota (Japan))

UNIT II :- I.C. ENGINE CONSTRUCTION: STRUCTURAL COMPONENTS

(10 HRS)

- The World Of Automobiles
- Components Of An Engine, Cylinder Block , Cylinder Head
- Cylinder Liner (Or Sleeve), Crankcase , Oil Pan
- Manifolds , Exhaust System , Engine Mounting
- Bearings , Main Bearings
- Fasteners, Vibration Damper

UNIT III :- ENGINE CONSTRUCTION: MECHANISM FORMING COMPONENTS

(10 HRS)

- The World Of Automobiles , Introduction
- Piston , Piston Rings, Gudgeon (Or Piston) Pin
- Crankshaft , Connecting Rod , Camshaft And Connected Drives
- Valve Operating Mechanisms , Valves
- Rocker Shaft Assembly And Rocker Arms
- Important Dimensions And Clearances In Valve Operating Mechanism
- Belt And Pulleys , Flywheel And Ring Gear
- Valve Troubles

Reference Books :

1. "Automobile Engineering" by Kripal Singh (Standard Publishers Distributors)
2. "Automobile Engineering" by R.K. Rajput (S. Chand Publishing)
3. "Automobile Engineering" by G.B.S. Narang (Khanna Publishers)
4. "Automobile Engineering" by K.M. GUPTA (UMESH Publications)

Major (Core) M1 Mandatory

DSC-4: Practical based on DSC-3 (Basic Automobile System II)

Total Credits: 02

Total Contact Hours : 60 Hrs

Maximum Marks: 50

1. To study Prime Movers
2. To study Internal Combustion Engine Layout Analysis
3. To study Petrol and Diesel Engine Comparison
4. To study Gas Turbines Examination
5. To study Wankel Engine Study
6. To study Steam Cars and Hybrid Power Plants Exploration
7. To study I.C. Engine Structural Components Analysis
8. To study Engine Mechanism Components
9. To study Bearings and Fasteners Evaluation
10. To study Valve Operating Mechanisms
11. To study Piston and Piston Rings
12. To study Rocker Shaft Assembly
13. To study Crankshaft & Connecting Rod
14. To study Valve Mechanisms Troubleshooting
15. To study Belt And Pulleys

Major (Core) M2 Mandatory

DSC-3: Fundamental of Metal Working

Total Credits: 02

Total Contact Hours : 30 Hrs

Maximum Marks: 50

Course Description :

"Workshop Technology" is a foundational course designed to introduce students to the essential concepts and skills related to various workshop activities in engineering. Students will gain hands-on experience in wood working operations, including marking, measuring, cutting, sawing, drilling, and assembly techniques for timber components.

Course Objectives :

1. Introduce students to the fundamental concepts and activities in workshop technology.
2. Instill a strong sense of safety and the importance of adhering to safety protocols in a workshop setting.
3. Familiarize students with basic measurement tools and their application in accurate measurements.
4. Provide a thorough understanding of carpentry tools, their uses, and fundamental wood working operations.
5. Teach students how to assemble timber components using various joints and techniques.
6. Prepare students with the foundational knowledge and skills required for hands-on engineering tasks.

Course Outcomes :

1. Demonstrate a clear understanding of the scope and divisions within workshop technology.
2. Apply safety measures and precautions effectively while working in a workshop.
3. Utilize basic measurement tools and instruments to obtain precise measurements.
4. Proficiently use common carpentry tools and engage in wood working operations.
5. Construct and assemble timber components using a variety of joints.
6. Develop the necessary skills and knowledge to undertake practical engineering tasks in a workshop environment.

Course Basic Requirements:

1. Active engagement in safety measures and adherence to workshop guidelines.
2. Access to and proper use of basic measurement tools.

Course Content:

UNIT-1: Metal Joining: (10 Hrs)

(a) Permanent Joining: (i) Welding methods (ii) Electric welding (b) Soldering & Brazing: (i) Its concept, comparison with welding as joining method and classification (ii) Soldering operation (iii) Materials Used (iv) Defects Occurring & its remedy

UNIT 2: Metal Shaping-Smithy: (10 Hrs)

(i) Operations involved (concept only) (ii) Tool and equipment used (Names, size, specification for identification only) (iii) Heating and fuel handling equipment (iv) Holding and supporting tools(v) Striking Tools (vi) Cutting tools (vii) Punching & Drifting Tools (viii) Bending Tools and figures (ix) Forming & Finishing Tools (x) Defects Occurring & its remedy

UNIT 3: Sheet metal Working: (10 Hrs)

Sheet metal Working-Tools and operation: (i) Operations involved (Names and concept only) (ii) Sheet metal joints (iii) Tools and equipment used (Name, size, specifications for identification only) (iv) Marking tools (v) Cutting and shearing Tools (vi) Straightening tool (vii) Striking Tools (viii) Holding Tools (ix) Supporting Tools (x) Bending tools (xi) Punching-Piercing and Drafting tools (xii) Burring Tools-Files (xiii) Defects Occurring & its remedy

Textbooks:

1. "Workshop Technology Part I" by Raghuvanshi, B. S.
2. "Workshop Technology & Practice" by Hajra Choudhury, S. K. and Hajra Choudhury, A. K.

Reference Books:

1. "Workshop Technology Part 1 & 2" by Chapman, W. A. J.
2. "Workshop Technology" by Anderson, W. A. J. and Hajra Choudhury, A. K.

Major (Core) M2 Mandatory

DSC-4: Practical based on DSC-3 (Fundamental of Metal Working)

Total Credits: 02

Total Contact Hours : 60 Hrs

Maximum Marks: 50

1. To study electric welding
2. To study soldering
3. To study brazing
4. To study tools used in smith
5. To make s Hooke by smith
6. To make chain loop by smith
7. To study striking and cutting tools
8. To study punching and marking tools
9. To make plain tray of given dimensions
10. To make tool box of given dimensions
11. To study Marking tools used in Sheet Metal Working
12. To study Cutting and shearing Tools used in Sheet Metal Working
13. To study Striking Tools used in Sheet Metal Working
14. To study Holding Tools used in Sheet Metal Working
15. To study Defects Occurring & its remedy in sheet metal working

Major (Core) M3 Mandatory

DSC-3: Electronics System

Total Credits: 02

Total Contact Hours : 30 Hrs

Maximum Marks: 50

Course Description:

"Electronics System" is an introductory course designed to provide students with fundamental knowledge in the field of electronics. The course covers essential concepts, including the overview of atoms, sub-atomic particles, and cathode-ray oscilloscopes (CRO), semiconductor basics, semiconductor materials, diodes, transistors, and transistor amplifiers. Students will learn about the principles governing electronic components and their applications in circuits.

Course Objectives

1. To introduce fundamental concepts and analysis techniques in electrical engineering to students across all disciplines.
2. To introduce the students about domestic wiring, the functioning of various electrical apparatus and the safety measures. Emphasize the effects of electric shock and precautionary measures.
3. To impart basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
4. To provide knowledge about the basic DC and AC electric circuits and magnetic circuits.

Course Outcomes

1. Students will gain knowledge regarding the various laws and principles associated with electrical systems.
2. Students will gain knowledge regarding electrical machines and apply them for practical problems.
3. Students will gain knowledge regarding various types' semiconductors.
4. Student will gain knowledge digital electronics.
5. Student will gain knowledge on electronic systems.

Course Basic Requirements:

1. Regular attendance in both theory and practical sessions.
2. Access to laboratory equipment and components for hands-on experiments.
3. Basic knowledge of mathematics and physics.

Course Content

UNIT 1. Overview of Atom, Sub-Atomic Particles and CRO (10 Hrs)

Brief History of Electronics, Atom and its elements, Electron, Force, Field intensity, Potential, Energy, current, Electric field, Magnetic field, Motion of charged particles in electric and magnetic field Overview of CRO, Electronic and Magnetic deflection in CRO, Applications.

UNIT 2. Basics of Semiconductor (10 Hrs)

Semiconductor materials, Metals and Semiconductors and Photo-electric emission, N-type and P-type semiconductor, Effects of temperature on Conductivity of semiconductor, PN junction diode, depletion layer, Forward & Reverse bias, V-I Characteristic, Effects of temperature, Zener diode, Photo diode, LED, Types and applications of diode, Diode as a rectifier, Half wave and full wave rectification, Zener diode Regulator , Introduction to Filters, Clippers, Clampers,

UNIT 3. Transistor & Amplifier (10 Hrs)

Operation of NPN and PNP transistors, Biasing of BJT, CB, CE and CC configuration, Introduction to FET, JFET, MOSFET, CMOS and VMOS, Introduction, Single and Multi-stage amplifiers, Introduction to Oscillators, Introduction to Thyristors, PNP diode, SCR, LASCR, DIAC, TRIAC

Practical based on above Chapter

Reference Books:

1. "Basic Electrical Engineering" by Ritu Sahdev, Khanna Publishing House.
2. "Basic Electrical Engineering" by Pradeep Kumar, Khanna Publishing House.
3. "Basic Electronics" by S. Biswas, Khanna Publishing House.

Additional Reference Books (for Electronics):

1. "Electronic Devices and Circuit Theory" by Robert L. Boylestad and Louis Nashelsky.
2. "Solid State Electronic Devices" by Ben G. Streetman and Sanjay Banerjee.
3. "Introduction to Electronics" by Earl D. Gates.

Major (Core) M3 Mandatory

DSC-4: Practical based on DSC-3 (Electronics System)

Total Credits: 02

Total Contact Hours: 60 Hrs

Maximum Marks: 50

- 1) Introduction to Cathode-Ray Oscilloscope (CRO)
- 2) Study the conductivity of different semiconductor materials.
- 3) Analyze the V-I characteristics of a PN junction diode.
- 4) To study the characteristics and applications of Zener diodes.
- 5) Understand the operation and configurations of bipolar junction transistors (BJTs).
- 6) Design and analyze single-stage and multi-stage transistor amplifier circuits.
- 7) Learn about FET operation and characteristics.
- 8) To study various semiconductor devices like LEDs, photodiodes, and thyristors.
- 9) Application of Diodes and Transistors in Circuits
- 10) To study the application of SCR, LASCR, DIAC, TRIAC
- 12 To study CMOS and VMOS
13. To study Oscillators
14. To study Biasing of BJT
15. To study CB, CE and CC configuration

(VSC) Vocational Skill Courses

VSC 1 (A): Advance Engineering Graphics

Total Credits: 01

Total Contact Hours: 15 Hrs

Maximum Marks: 50

Course Description:

"Advance Engineering Graphics" is a continuation of the introductory focusing on more advanced topics in engineering drawing. The course aims to build upon the foundational knowledge of engineering graphics. Students will learn about projections of straight lines, planes, and solids, as well as their traces. The course also covers sectioning of solids and isometric projections.

Course Objectives :

1. Further develop the ability to use drawing instruments effectively.
2. Enhance understanding of conventions and methods in engineering drawing.
3. Extend knowledge of projections of points, lines, planes, and solids.
4. Improve skills in constructing isometric and orthographic views of objects.
5. Foster problem-solving skills in advanced engineering graphics topics.

Course Outcomes :

1. Proficiency in using drawing instruments for advanced drawing and dimensioning.
2. Deepened understanding of conventions and methods in advanced engineering drawing.
3. Advanced knowledge of projections of points, lines, planes, and solids.
4. Ability to construct isometric and orthographic views of complex objects.
5. Strong foundation in engineering graphics for advanced applications.

Course Basic Requirements:

1. Access to advanced drawing instruments and drawing sheets for practical exercises.
2. Successful completion of Engineering Graphics I or equivalent knowledge.
3. Regular attendance in both theory and practical sessions.

Course Content

Unit 1: Projections of Straight Lines and Planes and their Traces: (5 Hrs)

Projections of lines parallel and perpendicular to one or both planes, projections of lines inclined to one or both planes. Traces of lines, Projections of planes parallel and perpendicular to one or both planes, projection of planes inclined to one or both planes.

Unit 2: Projections & Section of Solids (5 Hrs)

Types of solids, projections of solids with axis perpendicular and parallel to HP and VP, solids with axis inclined to one or both the planes, Projections of spheres touching each other. Sectioning of solids: Section planes perpendicular to one plane and parallel or inclined to other plane

Unit 3: Isometric Projections (5 Hrs)

Isometric projections: Isometric scale, drawing of isometric projections from given orthographic views.

Textbooks:

1. "Engineering Drawing" by N. D. Bhatt, Charotar Publishing House, 46th Edition, 2003.
2. "A Textbook of Engineering Graphics" by K. V. Natarajan, Dhanalakshmi Publishers, Chennai, 2006.
3. "Engineering Graphics" by K. Venugopal and V. Prabhu Raja, New Age International (P) Ltd, 2008.
4. "Engineering Drawing with an Introduction to AutoCAD" by Dhananjay A. Jolhe, McGraw-Hill Education, 2017.

Reference Books:

1. "Engineering Graphics with AutoCAD" by James D. Bethune.
2. "Engineering Drawing and Design" by David A. Madsen and David P. Madsen.
3. "Advanced Engineering Graphics" by Warren J. Luzadder and Jon M. Duff.
4. "Introduction to Engineering Drawing" by Warren J. Luzadder and Jon M. Duff.
5. "Computer Graphics for Engineers and Architects" by Roberto Scopigno and Giorgio Bacci.

(VSC) Vocational Skill Courses

VSC-2 : Practical based on VSC-1 (A)

Total Credits: 01

Total Contact Hours: 30 Hrs

Maximum Marks: 50

1. Sheet on Projections of lines parallel and perpendicular to one or both planes,
2. Sheet on projections of lines inclined to one or both planes.
3. Sheet on Traces of lines, Projections of planes parallel and perpendicular to one or both planes,
4. Sheet on projection of planes inclined to one or both planes.
5. Sheet on Types of solids, projections of solids with axis perpendicular and parallel to HP and VP,
6. Sheet on solids with axis inclined to one or both the planes,
7. Sheet on Projections of spheres touching each other.
8. Sheet on Sectioning of solids: Section planes perpendicular to one plane and parallel or inclined to other plane
9. Sheet on Isometric projections: Isometric scale,
10. Sheet on drawing of isometric projections from given orthographic views.

(VSC) Vocational Skill Courses

VSC 1 (B): Engineering Mechanics II

Total Credits: 01

Total Contact Hours: 15 Hrs

Maximum Marks: 50

Course Description:

"Engineering Mechanics II" builds upon the fundamental principles of engineering mechanics. The course covers topics related to forces, moments, kinetics, work, power, and energy. Students will learn about the resolution and composition of forces, moments, and the properties of force systems.

Course Objectives:

1. Apply fundamental laws of engineering mechanics to real-world problems.
2. Analyze force systems using the conditions of static equilibrium.
3. Calculate the centre of gravity and moment of inertia for plane surfaces.
4. Compute the motion characteristics of bodies and particles in rectilinear and curvilinear motion.
5. Understand the relationship between force and motion characteristics.
6. Develop problem-solving skills in advanced engineering mechanics.

Course Outcomes:

1. Proficiency in applying fundamental laws of engineering mechanics to analyze complex force systems.
2. Ability to determine the center of gravity and moment of inertia for various plane surfaces.
3. Competence in analyzing the motion characteristics of particles and rigid bodies in both rectilinear and curvilinear motion.
4. Understanding of the relationship between forces and the resulting motion characteristics.
5. Skill in applying principles of work, power, and energy to engineering problems.
6. Preparedness to address real-world engineering challenges that involve mechanics.

Course Basic Requirements:

1. Strong foundational knowledge of engineering mechanics, as provided in Engineering Mechanics I.
2. Access to course materials and a learning environment conducive to understanding complex mechanics concepts.

UNIT I : Centre of Gravity (5 Hrs)

- Centre of Gravity (C.G.), Centroid, Methods for Finding Centre of Gravity
- Centre of Gravity by Geometrical Considerations, Centre of Gravity by Moments
- Axis of Reference, Centre of Gravity of Plane Figures, Centre of Gravity of Symmetrical
- Centre of Gravity of Unsymmetrical Sections, Centre of Gravity of Solid Bodies

UNIT II: Moment of Inertia (5 Hrs)

- Moment of Inertia (M.I.), Moment of Inertia of a Plane Area, Units of Moment of Inertia
- Methods for Finding Moment of Inertia, Moment of Inertia by Routh's Rule
- Moment of Inertia by Integration, Moment of Inertia of a Rectangular Section
- Moment of Inertia of a Hollow Rectangular Section, Theorem of Perpendicular Axis
- Moment of Inertia of a Circular Section, Moment of Inertia of a Hollow Circular Section

- Theorem of Parallel Axis, Moment of Inertia of angular Section
- Moment of Inertia of a Semicircular Section, Moment of Inertia of a Composite Section
- Moment of Inertia of a Built-up Section, Product of Inertia, Principal Moment of Inertia and Principal Axes, Mass Moment of Inertia and Radius of Gyration

UNIT III: Principles of Friction (5 Hrs)

- Friction or Force of Friction, Static Friction, Dynamic Friction (or Kinetic Friction)
- Limiting Friction, Normal Reaction, Angle of Friction, Coefficient of Friction
- Laws of Friction, Laws of Static Friction, Laws of Dynamic or Kinetic Friction
- Equilibrium of a Body on a Rough Horizontal Plane
- Equilibrium of a Body on a Rough Inclined Plane
- Equilibrium of a Body on a Rough Inclined Plane Subjected to a Force Acting Along the Inclined Plane
- Equilibrium of a Body on a Rough Inclined Plane Subjected to a Force Acting Horizontally
- Equilibrium of a Body on a Rough Inclined Plane Subjected to a Force Acting at Some Angle with the Inclined Plane

Textbooks:

1. "Engineering Mechanics" by S. Timoshenko and D. H. Young, McGraw Hill, 1995.
2. "Engineering Mechanics" by A. K. Tayal, Umesh Publications, 2010.
3. "Engineering Mechanics" by S. S. Bhavikatti and K. G. Rajashekarappa, New Age International Publications, 2nd Edition.

References books:

1. "Engineering Mechanics" by McLean and Nelson, Schaum's Outline Series, McGraw Hill Book Company.
2. "Engineering Mechanics" by R. S. Khurmi, S. Chand Publications.

(VSC) Vocational Skill Courses

VSC-2 : Practical based on VSC-1 (B)

Total Credits: 01

Total Contact Hours: 30 Hrs

Maximum Marks: 50

- 1) To experimentally locate the centre of gravity of a planar object using geometrical considerations and the method of moments.
- 2) To experimentally verify the theoretical location of the centre of gravity for symmetrical shapes.
- 3) To determine the centre of gravity of an unsymmetrical object using analytical methods or graphical techniques.
- 4) To compare the accuracy and efficiency of different methods (geometrical, moments) for locating the centre of gravity of planar figures.
- 5) To explore how the centre of gravity of a composite section can be determined from the individual components' centre of gravity locations.
- 6) To experimentally measure the moment of inertia of a flat object using experimental techniques like the inertia pendulum.
- 7) To experimentally verify the application of Routh's rule for calculating the moment of inertia of simple shapes.
- 8) To compare the moments of inertia of various shapes (rectangular, circular, etc.) with similar dimensions.
- 9) To experimentally explore the parallel axis theorem for calculating the moment of inertia of an object relative to an off-center axis.
- 10) To determine the moment of inertia of a composite section from the individual components' moments of inertia using relevant theorems.

This course will be available for the students from other faculty

Generic / Open Elective (GE/OE)

GE/OE-2 : Two Wheeler Servicing

Total Credits: 02

Total Contact Hours: 30 Hrs

Maximum Marks: 50

Course Description:

This course provides hands-on training and theoretical knowledge in the servicing and maintenance of two-wheeled vehicles, specifically motorcycles and scooters. Participants will learn about the various components and systems of two-wheelers, diagnostic techniques, and routine maintenance procedures. Emphasis is placed on safety practices, troubleshooting skills, and developing proficiency in servicing tasks essential for ensuring optimal vehicle performance.

Course Objectives:

1. Understand the major components and systems of motorcycles and scooters.
2. Develop proficiency in basic servicing and maintenance procedures for two-wheeled vehicles.
3. Learn diagnostic techniques to identify and troubleshoot common mechanical and electrical issues.
4. Practice safety protocols and precautions essential in two-wheeler servicing.
5. Gain hands-on experience in performing routine maintenance tasks to ensure optimal vehicle performance and longevity.

Course Outcome:

Upon completion of the course, Students will be able to:

- 1) Perform routine maintenance tasks such as oil changes, filter replacements, and chain adjustments on two-wheeled vehicles.
- 2) Diagnose and troubleshoot common mechanical and electrical issues encountered in motorcycles and scooters.
- 3) Demonstrate proficiency in basic servicing procedures and use of tools and equipment for two-wheeler maintenance.
- 4) Apply safety practices and precautions to ensure a secure working environment during servicing activities.
- 5) Prepare for entry-level positions in the motorcycle repair industry or further studies in automotive technology.

Unit 1: Introduction to Two-Wheeler Servicing (10 hrs)

- Overview of the course objectives and structure
- Introduction to different types of two-wheeled vehicles
- Importance of two-wheeler servicing and maintenance
- Overview of major components: engine, chassis, suspension, brakes, electrical system.
- Functions and interactions of different systems
- Common types of two-wheeler designs and configurations

Unit 2: Basic Servicing Procedures(10 hrs)

- Safety precautions in two-wheeler servicing
- Tools and equipment used in basic servicing tasks
- Hands-on practice: oil changes, filter replacements, chain adjustments, etc.

Unit 3: Diagnostics and Troubleshooting (10 Hrs)

- Common two-wheeler problems and their causes
- Diagnostic techniques: visual inspection, listening for abnormal sounds, etc.
- Troubleshooting electrical and mechanical issues
- Performing brake inspections and adjustments
- Checking and replacing tires
- Battery maintenance and charging procedures

Recommended Textbooks:

1. "Automobile Engineering" by Kirpal Singh
2. "Automobile Engineering" by K.M. Gupta"
3. "Introduction to Automobile Engineering" by SAE International

Reference Books:

1. "Automobile Engineering" by RB Gupta
2. "Fundamentals of Automotive Technology" by Kirk VanGelder
3. "Modern Automotive Technology" by James E. Duffy

XXXXXXXXXXXX