

**KARANATAKA STATE OPEN UNIVERSITY**

**DIPLOMA IN AUTOMOBILE ENGINEERING**

**SEMESTER SYSTEM**

**SYLLABUS**

## I YEAR SYLLABUS

(Basic Engineering)  
(Common to all Branches)

Subject Code	Subject Title	Max Marks	Max Credits
<b>Semester-I</b>			
BE101	Communication English	100	4
BE102	Applied Mathematics-1	100	4
BE103	Engineering Physics-I	100	4
BE104	Engineering Chemistry-I	100	4
BE105	Computer Application Lab	100	2
BE106	Workshop Practice Lab	100	2
<b>Semester –II</b>			
BE201	Applied Mathematics-II	100	4
BE202	Engineering Physics-II	100	4
BE203	Engineering Chemistry-II	100	4
BE204	Engineering Graphics	100	4
BE205	Physics Lab	100	2
BE206	Chemistry Lab	100	2

**Automobile Engineering  
III Semester**

Subject Code	Subject Title	Max Marks	Max Credits
AE 301	Engineering Mechanics	100	4
AE 302	Manufacturing Technology-I	100	4
AE 303	Fluid Mechanics	100	4
AE 304	Machine Drawing	100	4
AE 305	Engineering Mechanics Lab	100	2
AE 306	Workshop-I	100	2

**IV Semester**

Subject Code	Subject Title	Max Marks	Max Credits
AE 401	Thermodynamics	100	4
AE 402	Manufacturing Technology-II	100	4
AE 403	Automobile Electrical and Electronics	100	4
AE 404	Automobile Chassis	100	4
AE 405	Automobile Electrical and Electronics Lab	100	2
AE 406	Workshop-II	100	2

**Automobile Engineering  
V Semester**

Subject Code	Subject Title	Max Marks	Max Credits
AE 501	Automobile Transmission	100	4
AE 502	Vehicle Body Technology	100	4
AE 503	Two & Three Wheelers Technology	100	4
AE 504	Tractor and Farm Equipment	100	4
AE 505	Automobile Chassis and Transmission Lab	100	2
AE 506	Automobile Workshop	100	2

**VI Semester**

Subject Code	Subject Title	Max Marks	Max Credits
AE 601	Industrial Engineering and Road Transport	100	4
AE 602	CAD/CAM	100	4
AE 603	Automotive Maintenance and Pollution Control	100	4
AE 604	CAD/CAM Lab	100	2
AE 605	Project	100	8

Total Marks = 3800

Total Credits = 122

**SEMESTER : I**  
**Subject Code : BE 101**  
**Subject Title : Communication English**

**Structure of the Course Content**

**BLOCK 1 Grammar (Non-Textual)**

- Unit 1: Functional Analysis
- Unit 2: Voice and parts of speech
- Unit 3: Direct and indirect speech
- Unit 4: Preposition

**BLOCK 2 Grammars**

- Unit 1: One word substitute
- Unit 2: Articles and question tags
- Unit 3: Prefixes and suffixes
- Unit 4: Tenses

**BLOCK 3 Compositions**

- Unit 1: Comprehension
- Unit 2: Simple passage
- Unit 3: Moral story
- Unit 4: Science and technology

**BLOCK 4 Letter and dialogue Writing**

- Unit 1: Letter writing - personal
- Unit 2: Letter writing - official
- Unit 3: Dialogue writing
- Unit 4: Hints development

**BLOCK 5 Proses**

- Unit 1: An Astrloger's day – R.K. Narayanan
- Unit 2: The sun, the planets and the stars – C.Jones
- Unit 3: The continuing spell of Ramanujam
- Unit 4: On saying 'please' – A.G.Gardiner

**Books:**

1. Orient Longman, Anna Salai, Chennai-600002.
2. The Advanced Learners Dictionary of Current English by A.S.Hornby, Oxford University Press. 1973
3. High School English Grammar and Composition by Wren & Martin, S.Chand & Co Ltd., 2005
4. Vocabulary in Practice - Part 1 to 4 by Glennis Pye, Cambridge University Press,
5. Learn Correct English by Shiv K. Kumar & Hemalatha Nagarajan, Pearson Longman, 2005
6. Essential English Grammar by Raymond Murphy, Cambridge University Press,
7. Common Errors in English by M.Thomas, Lotus Press, New Delhi, 2006
8. Basic English Usage by Michael Swan, ELBS/OUP, 1989
9. Communication Skills for Engineers by Mishra, Ist Edition, Pearson Longman
10. Basic English Dictionary by Longman Longman Ist Edition, Pearson Longman

**SEMESTER : I**  
**Subject Code : BE 102**  
**Subject Title : Applied Mathematics - I**

**Structure of the Course Content**

**BLOCK 1 Algebra**

- Unit 1: Determinants
- Unit 2: Matrices
- Unit 3: Permutation and combination
- Unit 4: Binomial Theorem

**BLOCK 2 Complex numbers**

- Unit 1: Real and imaginary parts
- Unit 2: Demoivre's Theorem
- Unit 3: Finding the  $n^{\text{th}}$  roots of unity
- Unit 4: Solving equations

**BLOCK 3 Analytical geometry**

- Unit 1: Pair of straight lines
- Unit 2: Circles
- Unit 3: Family of circles
- Unit 4: Concentric circles

**BLOCK 4 Trigonometry**

- Unit 1: Compound angles
- Unit 2: Multiple angles
- Unit 3: Sub multiple angles
- Unit 4: Sum and product formulae

**BLOCK 5 Differential calculus**

- Unit 1: Limits
- Unit 2: Differentiation
- Unit 3: Differentiation methods
- Unit 4: Successive differentiation

**Books :**

1. Engineering Mathematics by Dr M.K.Venkatraman, National Publishing Co.
2. Engineering Mathematics by Dr P.Kandasamy, S.Chand & Co, New Delhi
3. Higher Engineering Mathematics by Ramana, Tata McGraw Hill, New Delhi
4. Engineering Mathematics by Singh, Tata McGraw Hill, New Delhi
5. Advanced Engineering Mathematics by N.Bali,M.Goyal,C.Watkins,Lakshmi Publications (Pvt) Ltd, New Delhi
6. Engineering Maths by T.Veerarajan, Tata McGraw Hill, New Delhi
7. Schaum's Outline of Technical Mathematics by Paul Calter, Tata McGraw Hill, New Delhi
8. Engineering Mathematics Vol-III by Dr. B. Krishna Gandhi , Dr. T.K.V Iyengar, S.Ranganatham, , S.Chand & Co, New Delhi
9. Introduction to Engineering Mathematics by H.K. Dass, Dr.Rama Verma, S.Chand & Co, New Delhi
10. Applied Engineering Mathematics Vol-II by H.K.Dass, S.Chand & Co

**SEMESTER : I**  
**Subject Code : BE 103**  
**Subject Title : Engineering Physics - I**

**Structure of the Course Content**

**BLOCK 1 S I units and Statics**

- Unit 1: Fundamental quantities
- Unit 2: Derived quantities
- Unit 3: Concurrent forces
- Unit 4: parallelogram Law of forces

**BLOCK 2 Properties of matter**

- Unit 1: Stress and strain
- Unit 2: Young's modulus
- Unit 3: Viscosity
- Unit 4: Surface Tension

**BLOCK 3 Dynamics**

- Unit 1: Projectile Motion
- Unit 2: Angle of projection
- Unit 3: Circular Motion
- Unit 4: Application of circular motion

**BLOCK 4 Rotational motions of rigidity bodies**

- Unit 1: Moment of Inertia
- Unit 2: Kinetic energy
- Unit 3: Angular Momentum
- Unit 4: Kepler's Law

**BLOCK 5 Remote sensing and sound**

- Unit 1: Active and Passive remote sensing
- Unit 2: Microwave remote sensing
- Unit 3: Types of sound waves
- Unit 4: Acoustics

**Books :**

1. Physics by Resnick and Hoilday , Wisley Toppan Publishers – England
2. Mechanics by Narayana Kurup , S. Chand Publishers – New Delhi
3. Engineering Physics by B.L. Theraja , S. Chand Publishers – New Delhi
4. Remote sensing by Dr.M.Anji Reddy, Jawaharlal Nehru Technological University –Hyderabad.
5. Engineering Physics by V.Rajendran, Tata McGraw Hill, New Delhi
6. Engineering Physics by Vikram Yadav, Tata McGraw Hill, New Delhi
7. Schaum's Outline of Physics for Engineering and Science by Michael Browne, Tata McGraw Hill, New Delhi
8. Modern Engineering Physics by A.S.Vasudeva, S. Chand Publishers, New Delhi
9. Engineering Physics Fundamentals & Modern Applications by P.Khare and A.Swarup, Lakshmi Publications (Pvt) Ltd, New Delhi
10. Engineering Physics by Dipak Chandra Ghosh,Nipesh Chandra Ghosh,Prabir Kumar Halder, Lakshmi Publications (Pvt) Ltd, New Delhi

**SEMESTER : I**  
**Subject Code : BE 104**  
**Subject Title : Applied Chemistry - I**

**Structure of the Course Content**

**BLOCK 1 Acids – Bases, Catalysis**

- Unit 1: Theories of Acids and Bases
- Unit 2: Industrial application
- Unit 3: Positive and Negative catalyst
- Unit 4: Characteristics of Catalyst

**BLOCK 2 Pollution**

- Unit 1: Air Pollution
- Unit 2: Global warming
- Unit 3: Water Pollution
- Unit 4: Green Chemistry

**BLOCK 3 Electro chemistry and corrosion**

- Unit 1: Types of conductors
- Unit 2: Industrial applications of Electrochemistry
- Unit 3: Electrochemical theory
- Unit 4: Electroplating

**BLOCK 4 Organic coatings**

- Unit 1: Paint
- Unit 2: Varnish
- Unit 3: Adhesives
- Unit 4: Lubricants

**BLOCK 5 Colloids and Ceramics**

- Unit 1: Colloidal solution
- Unit 2: Brownian movement
- Unit 3: Water purification
- Unit 4: Ceramics

**Books :**

1. Inorganic chemistry by Soni PL, Sultan Chand & sons.
2. Organic chemistry by Soni PL, Sultan Chand & sons.
3. Engineering chemistry by Jain & Jain, Dhanpat rai & co
4. Engineering chemistry by Uppal , Khanna publishers
5. Environmental chemistry & Pollution control by Dara .SS, S. Chand & co
6. Environmental Pollution by . Tripathy .SN , Sunakar panda - Vrinda publication
7. Rain water Harvesting-hand book by Chennai Metro Water
8. Introduction to Engineering Chemistry by Minaxi B Lohani, Upma Misra, S.Chand & Co, New Delhi
9. Engineering Chemistry by Dr.A.K.Pahari, Dr.B.S.Chauhan, Lakshmi Publications (Pvt) Ltd, New Delhi
10. Advanced Engineering Chemistry by M.Senapati, Lakshmi Publications (Pvt) Ltd, New Delhi



**SEMESTER : I**  
**Subject Code : BE 105**  
**Subject Title : Computer Application Lab**

**Practicals**  
**Windows**

- 1.a. Starting a program, running a program.
  - b. Starting the Windows in safe mode
  - c. Running multiple Programs and switching between windows.
  - d. Moving the windows, and the task bar.
  - e. Startup to MS-DOS prompts.
- 2.a. Creating and removing a folder.
  - b. Making the taskbar wider, arranging icons on the Desktop.
  - c. Displaying and hiding the taskbar clock.
  - d. Controlling the size of start menu options.
  - e. Creating shortcuts.
- 3.a. Installing a screen saver.
  - b. Assigning Wallpaper to Desktop.
  - c. Adding a program to the start menu.
  - d. Recovering files and folders from Recycle bin.
  - e. Customizing the mouse settings.
- 4 a. Expanding and collapsing a folder.
  - b. Recognizing file types using icons.
  - c. Running a program from explorer.
  - d. Renaming a file or folder.
  - e. Selecting two or more files for an operation.
- 5.a. Displaying the properties for a file or folder.
  - b. Using cut and paste operations to copy a file.
  - c. Using copy and paste operations to copy a file.
  - d. Moving and copying files with mouse.
  - e. Sorting a folder.
- 6.a. Finding a file or folder, by name.
  - b. Defragmenting the disk using disk defragmenter.
  - c. Compressing a file using WinZip.

- d. Controlling the speaker volume.
- e. Recording and saving an audio file.

### MS Word

- a. Prepare a newsletter with borders, two columns text, header and footer and a graphic image and spell check the document.
- b. Create a table to show the paradigm of the verb “eat” in all 12 tenses

Tense		Present	Past	Future
Simple	He	Eats	Ate	Will eat
	I	Eat	Ate	Will eat
	You/They	Eat	Ate	Will eat
Continuous	He	Is eating	Was eating	Will be eating
	I	Am eating	Was eating	Will be eating
	You/They	Are eating	Was eating	Will be eating
Perfect	He	Has eaten	Had eaten	Will have eaten
	I	Have eaten	Had eaten	Will have eaten
	You/They	Have eaten	Had eaten	Will have eaten
Perfect continuous	He	Has been eating	Had been eating	Will have been eating
	I	Have been eating	Had been eating	Will have been eating
	You/They	Have been eating	Had been eating	Will have been eating

- c. Prepare your Bio-data/Resume
- d. Do the mail merge operation for sending applications to many companies with your resume

### MS EXCEL

1. Create a worksheet in Excel for a company:
  - a. Copy, Move and Merge the cells
  - b. Adding Comments
  - c. Adding, Deleting the cells, Rows and Columns
  - d. Hiding and Unhiding the columns, Rows and gridlines.
  
2. Using formula and functions prepare worksheet for storing subject marks of ten students and perform the following:
  - a. Calculate the student wise total and average
  - b. Calculate the subject wise total and average
  - c. Calculate the overall percentage and also individual percentage of the student.

3. Create Bar Graph and Pie Chart for various data

### **MS Power Point**

a. Create a simple presentation with atleast 5 slides to introduce your friend and include sounds in slides.

b. Create a presentation with 5 slides for the essay Astrologer's Day by R.K Narayanan

### **Internet**

a. Creating an E-Mail account.

b. Sending an E-Mail to a known Address

c. Viewing an E-Mail received from your friend/relative.

d. Printing an E-Mail received

e. Use of Attachment Facility

f. Use of Address Book Facility

g. Use of Sent Folder

h. Use of Save Draft Folder

i. Use of Trash Folder

j. Browse a given web-site address.

k. Search a Particular topic through a Search engine.

**SEMESTER : I**  
**Subject Code : BE 106**  
**Subject Title : Workshop Practice Lab**

### **Fitting**

1. Fitting
2. V - Joint
3. L - Joint
4. T - Joint
5. Half round joint
6. Dovetail Joint
7. U – Joint
8. Hexagonal – Joint
9. Step - Joint
10. Drilling and Tapping M8
11. Drilling and Tapping M10

### **Wiring**

1. Single lamp controlled by single switch.
2. Two Lamps controlled by Two independent switches.
3. Stair case Wiring
4. Fluorescent lamp circuit.
5. Circuit diagram of a fan
6. Circuit diagram of an iron box
7. Circuit diagram of a mixie
8. Soldering practice

### **Sheet Metal**

1. Hemming
2. Seaming
3. Tray
4. Cylinder
5. Cone
6. Hopper
7. Dust Pan
8. Funnel

**SEMESTER : II**  
**Subject Code : BE 201**  
**Subject Title : Applied Mathematics - II**

**Structure of the Course Content**

**BLOCK 1 Vector Algebra**

- Unit 1: Introduction
- Unit 2: Vector Properties
- Unit 3: Product of Vectors
- Unit 4: Application of Vectors

**BLOCK 2 Integral Calculus**

- Unit 1: Integration
- Unit 2: Standard Integrals
- Unit 3: Integration by parts
- Unit 4: Bernoulli's Theorem and Applications

**BLOCK 3 Differentiation**

- Unit 1: Velocity and Acceleration
- Unit 2: Tangents and Normals
- Unit 3: Maxima and Minima
- Unit 4: Partial differentiation

**BLOCK 4 Application of Integration**

- Unit 1: Definite Integral.
- Unit 2: Area and Volume
- Unit 3: Solution of differential equations
- Unit 4: Second order differential equation with constant coefficients

**BLOCK 5 Probability Distributions**

- Unit 1: Continuous random variable
- Unit 2: Discrete random variable
- Unit 3: Discrete Distributions (Binomial, Poisson )
- Unit 4: Continuous Distribution

**Books :**

1. Engineering Mathematics by Dr M.K.Venkatraman, National Publishing Co.
2. Engineering Mathematics by Dr P.Kandasamy, S.Chand & Co, New Delhi
3. Higher Engineering Mathematics by Ramana, Tata McGraw Hill, New Delhi
4. Engineering Mathematics by Singh, Tata McGraw Hill, New Delhi
5. Advanced Engineering Mathematics by N.Bali,M.Goyal,C.Watkins,Lakshmi Publications (Pvt) Ltd, New Delhi
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7. Schaum's Outline of Technical Mathematics by Paul Calter, Tata McGraw Hill, New Delhi
8. Engineering Mathematics Vol-III by Dr. B. Krishna Gandhi , Dr. T.K.V Iyengar, S.Ranganatham, , S.Chand & Co, New Delhi
9. Introduction to Engineering Mathematics by H.K. Dass, Dr.Rama Verma, S.Chand & Co, New Delhi
10. Applied Engineering Mathematics Vol-II by H.K.Dass, S.Chand & Co

**SEMESTER : II**  
**Subject Code : BE 202**  
**Subject Title : Engineering Physics - II**

**Structure of the Course Content**

**BLOCK 1 Heat**

- Unit 1: Heat - Kinetic Theory of Gases:
- Unit 2: Specific Heat
- Unit 3: Isothermal Changes
- Unit 4: Adiabatic Changes

**BLOCK 2 Gases & Non Conversional Energy**

- Unit 1: Liquefaction of Gases
- Unit 2: Joule Thomson Effect & Linde's process
- Unit 3: Renewable and Non-renewable sources
- Unit 4: Alternate sources of Energy-

**BLOCK 3 Light & Magnetism**

- Unit 1: Optical Instruments
- Unit 2: Lasers
- Unit 3: Basic definitions of Magnetism
- Unit 4: Hysteresis Loop

**BLOCK 4 Electricity**

- Unit 1: Basic laws
- Unit 2: Force on a moving charge
- Unit 3: Measuring Instruments
- Unit 4: Heating Effect of Electric Current

**BLOCK 5 Dielectric effect & Electronics**

- Unit 1: Chemical Effect of Electric Current
- Unit 2: Capacitor
- Unit 3: Semiconductors , PN Junction & Transistors
- Unit 4: Logic Gates

**Books :**

1. Physics by Resnick and Hoilday , Wisley Toppan Publishers – England
2. Mechanics by Narayana Kurup , S. Chand Publishers – New Delhi
3. Engineering Physics by B.L. Theraja , S. Chand Publishers – New Delhi
4. Remote sensing by Dr.M.Anji Reddy, Jawaharlal Nehru Technological University –Hyderabad.
5. Engineering Physics by V.Rajendran, Tata McGraw Hill, New Delhi
6. Engineering Physics by Vikram Yadav, Tata McGraw Hill, New Delhi
7. Schaum's Outline of Physics for Engineering and Science by Michael Browne, Tata McGraw Hill, New Delhi
8. Modern Engineering Physics by A.S.Vasudeva, S. Chand Publishers, New Delhi
9. Engineering Physics Fundamentals & Modern Applications by P.Khare and A.Swarup, Lakshmi Publications (Pvt) Ltd, New Delhi
10. Engineering Physics by Dipak Chandra Ghosh, Nipesh Chandra Ghosh, Prabir Kumar Halder, Lakshmi Publications (Pvt) Ltd, New Delhi

**SEMESTER : II**  
**Subject Code : BE 203**  
**Subject Title : Applied Chemistry - II**

**Structure of the Course Content**

**BLOCK 1 Nuclear Chemistry**

- Unit 1: Radio activity and definitions
- Unit 2: Half life period & Nuclear fission & fusion
- Unit 3: Applications of radioactive isotopes
- Unit 4: Abrasives

**BLOCK 2 Fuels and Refractory's**

- Unit 1: Fuels - classification
- Unit 2: Solid and Liquid Fuels
- Unit 3: Gas Fuels
- Unit 4: Refractory's

**BLOCK 3 Water Treatment**

- Unit 1: Water Treatment Methods
- Unit 2: EDTA Method
- Unit 3: Water -purification
- Unit 4: Lime and manufacturing process

**BLOCK 4 Plastics and Rubber**

- Unit 1: Thermoplastics,
- Unit 2: Thermo set plastics
- Unit 3: Natural rubber-
- Unit 4: Synthetic rubber

**BLOCK 5 Metallurgy**

- Unit 1: Tungsten & Titanium
- Unit 2: Powder metallurgy
- Unit 3: Purpose of alloying
- Unit 4: Non ferrous alloys

**Books :**

1. Inorganic chemistry by Soni PL, Sultan Chand & sons.
2. Organic chemistry by Soni PL, Sultan Chand & sons.
3. Engineering chemistry by Jain & Jain, Dhanpat rai & co
4. Engineering chemistry by Uppal , Khanna publishers
5. Environmental chemistry & Pollution control by Dara .SS, S. Chand & co
6. Environmental Pollution by . Tripathy .SN , Sunakar panda - Vrinda publication
7. Rain water Harvesting-hand book by Chennai Metro Water
8. Introduction to Engineering Chemistry by Minaxi B Lohani, Upma Misra, S.Chand & Co, New Delhi
9. Engineering Chemistry by Dr.A.K.Pahari, Dr.B.S.Chauhan, Lakshmi Publications (Pvt) Ltd, New Delhi
10. Advanced Engineering Chemistry by M.Senapati, Lakshmi Publications (Pvt) Ltd, New Delhi

**SEMESTER : II**  
**Subject Code : BE 204**  
**Subject Title : Engineering Graphics**

**Structure of the Course Content**

**BLOCK 1 Drawing Office Practice**

Unit 1: Basics of Engg Drawing

Unit 2: Dimensioning

Unit 3: Scales

Unit 4: Geometrical Constructions, conics and geometrical curves

**BLOCK 2 Projection**

Unit 1: Orthographic Projection

Unit 2: Projection of simple solids

Unit 3: Section of Solids

Unit 4: Half & Full Sectioning

**BLOCK 3 Pictorial drawings**

Unit 1: Introduction

Unit 2: Isometric Drawings

Unit 3: Conversion of orthographic views

**BLOCK 4 Development of Surfaces:**

Unit 1: Cube, Cylinder

Unit 2: Prism

Unit 3: Pyramids

Unit 4: Tee and Elbow

**BLOCK 5 AutoCAD**

Unit 1: Introduction

Unit 2: AutoCAD commands

Unit 3: Drawing -line, circle, arc, polygon,

Unit 4: Drawing - ellipse, rectangle

**Books :**

1. Engineering Drawing by Gopalakrishnan.K.R., (Vol.I and Vol.II), Dhanalakshmi publishers, Edition 2, 1970
2. First Year Engineering Drawing by Barkinson & Sinha, Pitman Publishers, London, Edition 3, 1961
3. A Book on AutoCAD Release 2007.
4. Engineering Drawing by Shah/Rana, Ist Edition Pearson Longman
5. Machine Drawing with AutoCAD by Pohit/Ghosh, Ist Edition Pearson Longman
6. Engineering Graphics by Prof.P.J.Shah, S.Chand & Co, New Delhi
7. Computer Graphics including CAD,AUTOCAD &C by A.M.Kuthe, S.Chand & Co, New Delhi
8. Engineering Graphics by Dhawan R.K, S.Chand & Co, New Delhi
9. Auto CAD 2005 for Engineers by Ionel Simon, Lakshmi Publications (Pvt) Ltd, New Delhi
10. Engineering Drawing by Agrawal, Tata McGraw Hill, New Delhi



# Drawing Practices

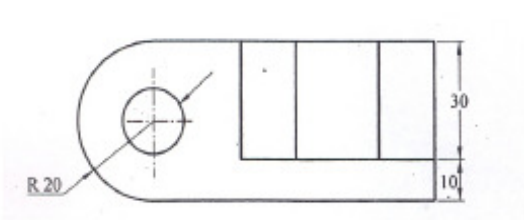


Fig - 1

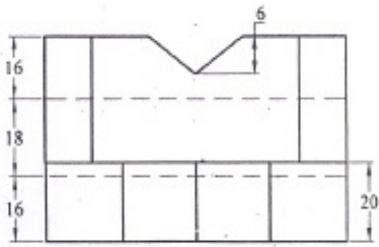


Fig- 2

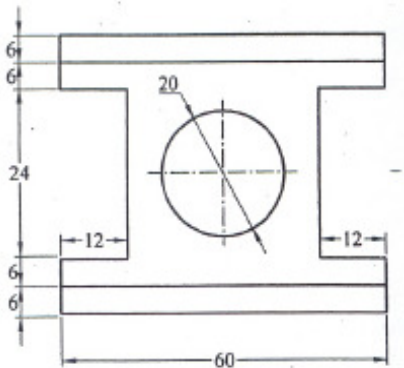


Fig. 3

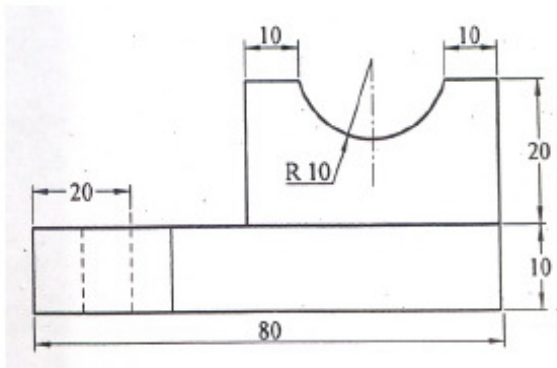


Fig. 4

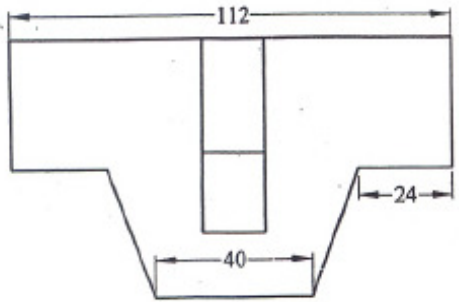


Fig. 5

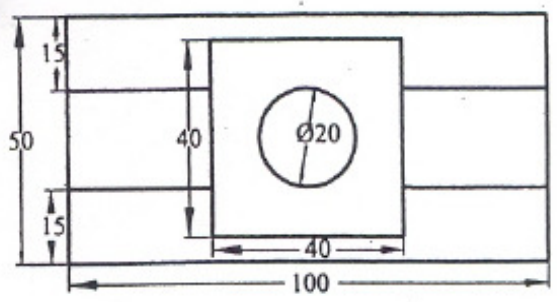


Fig. 6

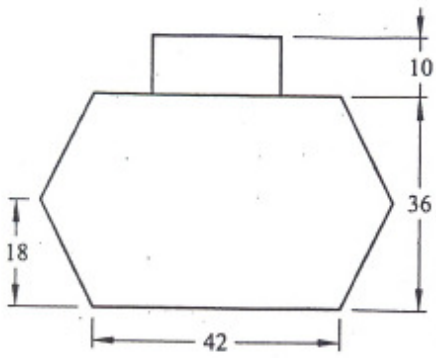


Fig. 7

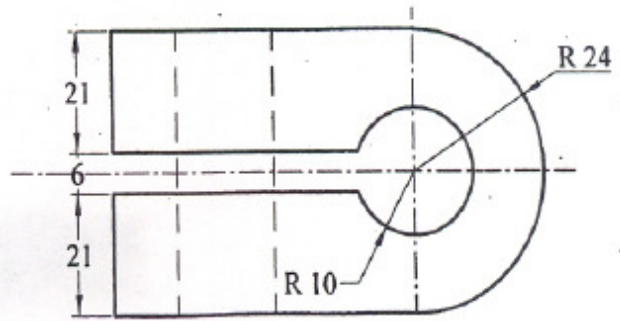


Fig. 8

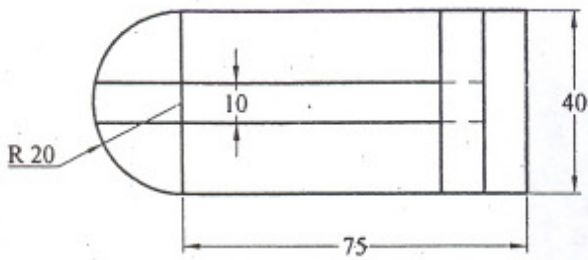


Fig. 9

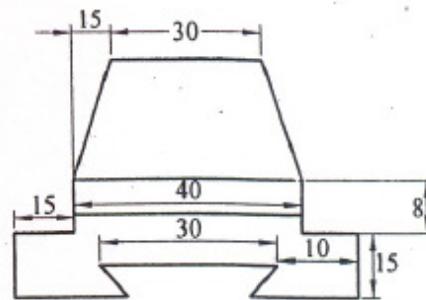


Fig. 10

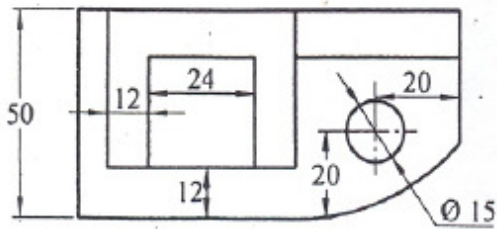


Fig. 11

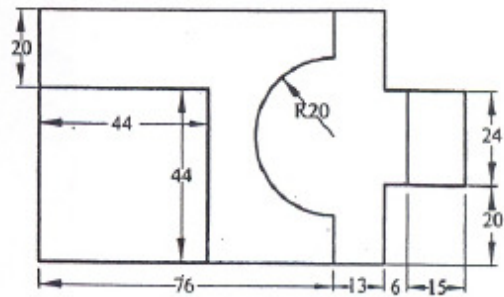


Fig. 12

**SEMESTER : II**

**Subject Code : BE 205**

**Subject Title : Engineering Physics Lab**

### **List of Experiments**

- 1 VERNIER CALIPERS - To find the volumes of the solid cylinder and hollow cylinder using vernier callipers.
- 2 SCREW GAUGE – To find the thickness of (a) glass plate (b) given sphere using screw gauge. Hence calculate the volume of the glass plate and the sphere.
- 3 SIMPLE PENDULUM – To find the acceleration due to gravity in the laboratory, using simple pendulum. Calculate the acceleration due to gravity, by  $L-T^2$  graph.
- 4 CONCURRENT FORCES -To verify the parallelogram law of forces and Lami's theorem.
- 5 COPLANAR – PARALLEL FORCES – To verify the conditions of the Co-planar parallel forces.
- 6 TORSION PENDULUM – To find the rigidity modulus of the thin wire and moment of inertia of the disc by using symmetric masses.
- 7 COMPARISON OF VISCOSITIES – To compare the coefficient of viscosities of two liquids by capillary flow method.
- 8 VISCOSITY OF A HIGHLY VISCOUS LIQUID – To find the coefficient of viscosity of a highly viscous liquid.
- 9 SURFACE TENSION: To find the surface tension of the given liquid by capillary rise method
- 10 YOUNG'S MODULUS – To find the young's modulus of the material of the given metre

scale.

11 SPECTROMETER – 1. To find the angle of the prism.

12 SPECTROMETER – 2. To find the refractive index of the material of the prism.

13 DEFLECTION MAGNETOMETER – To compare the magnetic moments of two given magnets by (a) Equal distance method and (b) Null method.

14 SONO METER – To find the frequency of the given tuning fork.

15 JOULE'S CALORIMETER – To determine the specific heat capacity of the given liquid.

16 COPPER VOLTAMETER – To determine electro – chemical – equivalent of copper.

17 OHM'S LAW – To determine the resistance of two given coils of wire using Ohm's law. Also verify the laws of resistances.

18 POTENTIO METER – To compare the e.m.fs of two given cells.

19 PN JUNCTION DIODE – For the given semiconductor diode draw (a) Forward bias (b) Reverse bias characteristic curves.

20 SOLAR CELLS – V. I. Characteristics.

**SEMESTER : II**

**Subject Code : BE 206**

**Subject Title : Applied Chemistry Lab**

### **List of Experiments**

#### **1. Qualitative Analysis**

**Acid radicals :** Chloride, Carbonate, Sulphate, Nitrate

**Basic radicals:** Lead, Cadmium, Copper, Aluminium, Zinc, Calcium, Magnesium, Ammonium

Identification of acid and basic radicals in

1. Lime Stone (Calcium Carbonate)
2. Pollutant (Lead nitrate or Cadmium Carbonate)
3. Fertilizer (Ammonium sulphate)
4. Electrolyte (Ammonium Chloride)
5. Fungicide (Copper sulphate)
6. Coagulant (Aluminium Sulphate)
7. Mordant (Zinc Sulphate)
8. Gypsum (Calcium Sulphate)
9. Epsom (Magnesium Sulphate)

10. Analysis of an Effluent (containing pollutants like Lead, Cadmium, Zinc, and Copper). Students may be given above four pollutants, in four separate test tubes in solution form and asked to report metallic pollutants with procedure (Basic Radical Analysis Procedure) and their harmful effects.

## **2. VOLUMETRIC ANALYSIS (DOUBLE TITRATIONS)**

### **ACIDIMETRY AND ALKALIMETRY**

1. Estimation of Hydrochloric acid
2. Estimation of Sodium Hydroxide
3. Estimation of Sodium Carbonate
4. Comparison of Strengths of two bases

### **PERMANGANIMETRY**

5. Estimation of Ferrous Ammonium Sulphate
6. Estimation of Ferrous Sulphate
7. Comparison of Potassium Permanganate.

### **WATER ANALYSIS**

8. Estimation of Total Hardness by EDTA method.
9. Calculation of pH of four sample solutions and calculation of H<sup>+</sup> Ion concentration for a particular sample solution.

**Subject Code : AE 301**  
**Subject Title : Engineering Mechanics**

**Structure of the Course Content**

**BLOCK 1 Mechanical Properties of Materials**

- Unit 1: Basic Definitions
- Unit 2: Stress
- Unit 3: Strain
- Unit 4: Stress-Strain Calculations

**BLOCK 2 Geometrical Properties of Sections**

- Unit 1: Basic Definitions
- Unit 2: Moment of Inertia
- Unit 3: Thin cylinders
- Unit 4: Thin Spherical Shells

**BLOCK 3 Theory of Simple Bending**

- Unit 1: Shear Force
- Unit 2: Bending Moment
- Unit 3: Cantilever
- Unit 4: Simple Bending

**BLOCK 4 Torsion and Springs**

- Unit 1: Theory of Torsion
- Unit 2: Torsional Rigidity
- Unit 3: Hollow Shaft
- Unit 4: Springs

**BLOCK 5 Deflection**

- Unit 1: Beams
- Unit 2: Friction
- Unit 3: Gear Drives
- Unit 4: Belt Drives

**Books :**

1. Applied Mechanics by A.K.Upadhyay, Charotar Publishers
2. Strength of Materials by R.S.Khurmi, S.Chand & Co
3. Applied Mechanics by SB Junnarkar, Dr. HJ Shara, Charator publishing house, Anand 388001
4. Strength of Materials by S. Ramamrutham Dhanpat Rai Pub. Co, New Delhi.
5. Strength of Materials by L.Negi, Tata McGraw Hill, New Delhi
6. Schaum's Outline Of Statics and Mechanics of Materials by William Nash, Tata McGraw Hill, New Delhi
7. Mechanics of Materials by Ferdinand Beer.E, Russell Johnson, Jr John DeWolf.David Mazurek, Tata McGraw Hill, New Delhi
8. Strength of Materials by S.Rattan, Tata McGraw Hill, New Delhi
9. Strength of Materials by B.Sarkar, Tata McGraw Hill, New Delhi
10. Mechanics of Materials by Ansel Ugural, Tata McGraw Hill, New Delhi

**SEMESTER : III**  
**Subject Code : AE 302**  
**Subject Title : Manufacturing Technology - I**

**Structure of the Course Content**

**BLOCK 1 Foundry**

- Unit 1: Patterns
- Unit 2: Moulding
- Unit 3: Casting
- Unit 4: Furnace

**BLOCK 2 Forging and Welding**

- Unit 1: Hot Working operation
- Unit 2: Welding
- Unit 3: Types of Welding
- Unit 4: Types of Testing

**BLOCK 3 Powder Metallurgy and Heat Treatment**

- Unit 1: Methods of Manufacturing
- Unit 2: Metallurgy
- Unit 3: Heat Treatment
- Unit 4: Hardening

**BLOCK 4 Lathe**

- Unit 1: Simple Lathe
- Unit 2: Semi Automatic Lathe
- Unit 3: Fully Automatic Lathe
- Unit 4: Multi Spindle Automatic Lathe

**BLOCK 5 Metrology**

- Unit 1: Measuring Instruments
- Unit 2: Marking Instruments
- Unit 3: Comparators
- Unit 4: Gauges

**Books :**

1. R.S. Khurmi & J.K. Gupta, A Text Book of workshop Technology, Edn.2, S.Chand & Co., New Delhi
2. Begeman, Manufacturing Process, Edn.-5, TMC, New Delhi.
3. Elements of workshop Technology Volume I & II, Edn by Hajra Chowdry & Bhattacharaya, Media Promoters & Publishers Pvt. Ltd., Mumbai
4. Workshop Technology, Volume I, II, & III by WAJ Chapman, Vima Books Pvt.Ltd., New Delhi
5. Workshop Technology by Raghuwanshi, Khanna Publishers
6. Production Technology, Edn. XII, by Jain & Gupta, Khanna Publishers
7. Production Technology, Edn. X by P. C. SHARMA, S.Chand & Co. Ltd., Ram Nagar, New Delhi
8. Production Technology, Edn. 18 by HMT, Tata McGraw Hill
9. Manufacturing Engineering & Technology by Kalpakjian, Tata McGraw Hill
10. A Text Book of Manufacturing Technology by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi



**SEMESTER : III**  
**Subject Code : AE 303**  
**Subject Title : Fluid Mechanics**

**Structure of the Course Content**

**BLOCK 1 Properties of Fluids**

- Unit 1: Basic Definition
- Unit 2: Pressure measurement
- Unit 3: Mechanical Gauges
- Unit 4: Diaphragm Pressure gauge

**BLOCK 2 Flow of Fluids**

- Unit 1: Type of Fluids
- Unit 2: Bernoulli's Theorem
- Unit 3: Orifice Meter
- Unit 4: Venturi Meter

**BLOCK 3 Jets and Pumps**

- Unit 1: Impact of Jets
- Unit 2: Turbine
- Unit 3: Types Turbines
- Unit 4: Pumps

**BLOCK 4 Pneumatic Systems**

- Unit 1: Basics of Pneumatic systems
- Unit 2: Flow Control Valve
- Unit 3: FRL Unit
- Unit 4: Application of Pneumatic Systems

**BLOCK 5 Hydraulic Systems**

- Unit 1: Basics of Hydraulic Systems
- Unit 2: Accumulator
- Unit 3: Fluid Power Pump
- Unit 4: Application of Hydraulic Systems

**Books :**

1. A Text Book of Hydraulics, Fluid Mechanics by R.S. Khurmi, S.Chand & Co, New Delhi
2. A Text Book of Hydraulics R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
3. Hydraulic Machines by Jagadishlal, Metropolitan Book Co, New Delhi
4. Fluid Mechanics and Hydraulic Machines , Edn. 8 by R.K.Bansal, Lakshmi Publications Pvt Ltd, New Delhi
5. Hydraulics and Pneumatics (A Technician's and Engineer's Guide) by Andrew Parr
6. Fundamentals of Pneumatic control Engineering by FESTO manual
7. Text book of Hydraulics by H. Meixner and R.Kober , FIESTO DIDACTIC KG, D 7300 Esslingen
8. Fluid Mechanics and Hydraulic Machines by T.S.Desmukh, Lakshmi Publications Pvt Ltd, New Delhi
9. Fluid Mechanics by Cengel, Tata McGraw Hill
10. Fluid Mechanics and Machinery by Rao, Tata McGraw Hill

**SEMESTER : III**  
**Subject Code : AE 304**  
**Subject Title : Machine Drawing**

**Structure of the Course Content**

**BLOCK 1 Section Views**

- Unit 1: Need Sectioning
- Unit 2: Hatching
- Unit 3: Half Sectioning and full sectioning
- Unit 4: Removed and offset sections

**BLOCK 2 Limits, Fits and Tolerances**

- Unit 1: Basic Definitions
- Unit 2: Limits
- Unit 3: Fits
- Unit 4: Tolerances

**BLOCK 3 Keys and Surface finish**

- Unit 1: Basic Definitions
- Unit 2: Types of Keys
- Unit 3: Design of shaft and keys
- Unit 4: Indication of surface roughness

**BLOCK 4 Threads and Fasteners**

- Unit 1: Basic Definition
- Unit 2: Types of Threads
- Unit 3: Types of Bolts and nuts
- Unit 4: Types of Rivets

**BLOCK 5 CAD Drawings**

- Unit 1: AutoCAD Theory
- Unit 2: Sleeve and Cotter Joint
- Unit 3: Machine Vice
- Unit 4: Screw Jack

**Books :**

1. Machine Drawing, Edn.37 by N.D.Bhatt, Charotar Publishing House
2. Engineering Drawing by R.C.Parkinson, Published by English University Press, London
3. Engineering Drawing by K. R. Goplakrishnan, Dhanalakshmi Publishers, Chennai
4. A First year Engineering Drawing. First Rep 1982 by A. C. Parkinson, A.H. Wheeler & Company (P) Ltd, Allahabad
5. Machine Drawing by Sidheswar Tata McGraw Hill
6. Machine Drawing by Singh Tata McGraw Hill

**SEMESTER : III**

**Subject Code : AE 305**

**Subject Title : Engineering Mechanics Lab**

**Laboratory Experiments :**

1. Test on Ductile Materials
2. Hardness Test
3. Torsion test
4. Bending and deflection tests
5. Impact test
6. Tests on springs of circular section
7. Shear test
8. Verifying the Bernoulli's Theorem
9. Determination of Coefficient of discharge of a Venturimeter
10. Determination of Coefficient of discharge of a Orifice meter
11. Performance test on a reciprocating pump
12. Performance test on a centrifugal pump
13. Performance test on an impulse turbine
14. Performance test on a reaction turbine

**SEMESTER : III**

**Subject Code : AE 306**

**Subject Title : Workshop –I**

**Structure of the Course Content**

**Smithy :**

**Exercises:**

1. Round rod to hexagonal rod
2. Round rod to square rod
3. Round rod to square headed bolt
4. Round rod to 'S' Shape
5. Round rod to flat with 25mm

**Foundry :**

**Exercises:**

Preparation of sand mould:

6. Solid pattern
  - a. Stepped Pulley
  - b. Bearing top
  - c. Gear Wheel
  - d. T-pipe
7. Split pattern
  - a. Bent Pipe
  - b. Dumbles
8. Loose Piece Pattern- Dowtail
9. Cylindrical core making
10. Melting and casting

**Welding :**

**Exercises:**

11. Arc welding
  - a. Lap joint (Material: 25mm x 3mm Ms Flat )
  - b. Butt joint (Material: 25mm x 6mm Ms Flat )
  - c. T-joint (Material: 25mm x 3mm Ms Flat )
  - d. Corner joint (Material: 25mm x 3mm Ms Flat )
12. Gas Welding
  - a. Lap joint (Material: 25mm x 3mm Ms Flat )
  - b. Butt Joint (Material: 25mm x 6mm Ms Flat )
13. Gas cutting: Profile cutting.
14. Spot welding-Lap joint(18/20swg)
15. Demonstration of Soldering and brazing

**SEMESTER : IV**  
**Subject Code : AE 401**  
**Subject Title : Thermodynamics**

**Structure of the Course Content**

**BLOCK 1 Thermodynamics and Expansion of Gases**

Unit 1: Basic Definitions  
Unit 2: Steam Properties  
Unit 3: Gas Properties  
Unit 4: Law of Perfect Gases

**BLOCK 2 Steady flow energy equation and Air Cycles**

Unit 1: Steady flow system  
Unit 2: Steam Boilers  
Unit 3: Air Cycles  
Unit 4: P-V Diagram

**BLOCK 3 Internal Combustion engines**

Unit 1: Diesel Engines  
Unit 2: Petrol Engines  
Unit 3: Ignition Systems  
Unit 4: Lubrication Systems

**BLOCK 4 Fuels & Performance of I.C.Engines**

Unit 1: Classification of fuels  
Unit 2: Performance of IC Engines  
Unit 3: Break power calculation  
Unit 4: Morse test

**BLOCK 5 Air Compressors**

Unit 1: Basic Definition  
Unit 2: Types of Compressor  
Unit 3: Working Principle of Compressor  
Unit 4: Problems

**Books :**

1. Thermal Engineering, Edn. 18 by R.S.Khurmi and J.K. Gupta, published by S.Chand & Co
2. Applied Thermodynamics, Edn.24 by P.K.Nag, , TMC, and New Delhi.
3. Applied Thermodynamics by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
4. A Text Book of Internal Combustion Engines by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
5. A Text Book of Engineering Thermodynamics by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
6. Thermal Science and Engineering by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
7. Thermal engineering, Edn. 24 by P.L Ballaney, Khanna Publishers, New Delhi
8. Thermal engineering, Edn. 3 by B.K Sarkar, Dhanpat Rai & Sons, New Delhi
9. Applied Thermodynamics, Edn. 2 by Domkundwar and C.P kothandaraman, Khanna Publishers, New Delhi
10. Thermal Engineering by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi

**SEMESTER : IV**  
**Subject Code : AE 402**  
**Subject Title : Manufacturing Technology -II**

**Structure of the Course Content**

**BLOCK 1 Planer, Shaper and Slotter**

- Unit 1: Planer
- Unit 2: Shaper
- Unit 3: Slotter
- Unit 4: Jig and fixtures

**BLOCK 2 Drilling Machines and Milling Machines**

- Unit 1: Types of Drilling Machines
- Unit 2: Types of Drilling Operations
- Unit 3: Types of Milling Machines
- Unit 4: Types of Milling Operations

**BLOCK 3 Grinding, Broaching & Boring**

- Unit 1: Types of Grinding Machines
- Unit 2: Principle and Operation of Grinding Machines
- Unit 3: Broaching
- Unit 4: Boring

**BLOCK 4 Gear Manufacturing**

- Unit 1: Gear Manufacturing in Milling operation
- Unit 2: Gear Manufacturing in Shaping operation
- Unit 3: Milling Procedure for Spur Gear
- Unit 4: Milling Procedure for Helical & bevel gears

**BLOCK 5 Jigs and Fixtures and Press works**

- Unit 1: Jigs
- Unit 2: Fixtures
- Unit 3: Mechanical Press
- Unit 4: Hydraulic Press

**Books :**

1. Hajra Choudry & Battacharya, Elements of Workshop Technology-Vol-I & II, Edn. 11, Mumbai.
2. Jain & Gupta, Production Technology, Khanna Publishers, New Delhi.
3. Production Technology, Edn. 18 by HMT, Tata McGraw Hill, New Delhi
4. Manufacturing process, Edn. 5 by Myro N Begman, Tata McGraw Hill, New Delhi
5. Workshop Tech Vol I,II, III by WAJ. Chapman, Viva Books Pvt. Ltd, New Delhi
6. Production processes by NITTTR, Tata McGraw Hill Publishing Co, New Delhi
7. Manufacturing Technology-II by Dr.R.Kesavan,B.Vijaya Ramnath, Lakshmi Publications Pvt Ltd, New Delhi
8. Manufacturing Engineering & Technology by Kalpakjian, Tata McGraw Hill
9. A Text Book of Manufacturing Technology by R.K.Rajput, Lakshmi Publications Pvt Ltd, New Delhi
10. R.S. Khurmi & J.K. Gupta, A Text Book of workshop Technology, Edn.2, S.Chand & Co., New Delhi

**SEMESTER : IV**  
**Subject Code : AE 403**  
**Subject Title : Automobile Electrical & Electronics**

**Structure of the Course Content**

**BLOCK 1 Basic Electrical and Electronics**

- Unit 1: Basic Laws
- Unit 2: Series, Parallel connections
- Unit 3: DC Motors and DC Generators
- Unit 4: Basic Electronics

**BLOCK 2 Automobile Electrical system**

- Unit 1: Battery
- Unit 2: Generator
- Unit 3: Alternator
- Unit 4: Regulator

**BLOCK 3 Starting motor and drive Mechanism**

- Unit 1: Starting motor Working Principle
- Unit 2: Starting motor drive mechanism
- Unit 3: Bendix Drive Mechanism
- Unit 4: Electric Starting circuits in two wheelers

**BLOCK 4 Ignition System**

- Unit 1: Battery coil ignition
- Unit 2: Distributor spark plug
- Unit 3: Magneto ignition
- Unit 4: Electronic ignition system

**BLOCK 5 Lighting and Accessories**

- Unit 1: Head Lamp Beam setting
- Unit 2: Horn
- Unit 3: Suppressors
- Unit 4: Wind screen wipers

**Books :**

1. Modern Electrical Equipment of Automobiles by JUDGE A.W, Chapman & Hall
2. Automobile Electric equipments by Crouse WH, MC Graw Hill Book & co
3. Automobile Electrical Equipments by Young & Griffiths, ELBS
4. Automobile Transmission and Power Systems, by William.H.Grouse.
5. Automobile Engineering by Narang. G.B.S., Khanna Publishers, New Delhi.
6. Automotive Engineering by Kirpal Singh, Standard Publishers, New Delhi
7. Automobile Engineering by Banga and Singh, Khanna Publishers, New Delhi
8. Motor vehicle technology and practical work by Dolan.J.A, ELBS
9. Automobile Mechanics by Dr.Giri.N.K, Khanna Publishers, New Delhi
10. Automotive Electrical Equipment by Kohli,TMC, New Delhi

**SEMESTER : IV**  
**Subject Code : AE 404**  
**Subject Title : Automobile Chassis**

**Structure of the Course Content**

**BLOCK 1 Clutch Mechanism**

- Unit 1: clutch actuating mechanism
- Unit 2: Mechanical and hydraulic types
- Unit 3: Types Dry Clutches
- Unit 4: semi centrifugal and centrifugal clutch motor cycle clutch

**BLOCK 2 Gear Box Mechanism**

- Unit 1: purpose of Gear box
- Unit 2: Tractive effort in Gear box
- Unit 3: Gradient resistance in gear box
- Unit 4: Gear shifting mechanism

**BLOCK 3 Shaft Mechanisms**

- Unit 1: Universal Joints
- Unit 2: Bendix Weiss type
- Unit 3: Propeller shaft
- Unit 4: Centre joint

**BLOCK 4 Axle Mechanism**

- Unit 1: Front axle
- Unit 2: Rear Axle
- Unit 3: Differential Axle
- Unit 4: Live and Dead Axle

**BLOCK 5 Suspension Systems**

- Unit 1: Basics of Suspension system
- Unit 2: Shock Absorber
- Unit 3: Air suspension
- Unit 4: Leaf spring

**Books :**

1. Automobile Transmission and Power Systems, by William.H.Grouse.
2. Automobile Engineering by Narang. G.B.S., Khanna Publishers, New Delhi.
3. Automobile Electrical Equipments by William.H.Grouse
4. Automotive Engineering by Kirpal Singh, Standard Publishers, New Delhi
5. Automobile Engineering by Banga and Singh, Khanna Publishers, New Delhi
6. Motor vehicle technology and practical work by Dolan.J.A, ELBS
7. Automobile Mechanics by Dr.Giri.N.K, Khanna Publishers, New Delhi
8. Automotive Mechanics, Edn. 6 by Srinivasan, McGraw Hill Co., New York
9. Automotive Electrical Equipment by Kohli,TMC, New Delhi
10. Automotive Mechanics by Crouse, McGraw Hill Co



**SEMESTER : IV**  
**Subject Code : AE 405**  
**Subject Title : Automobile Electrical & Electronics Lab.**

**List of Experiments:**

**Part A**

1. Study of General Electrical System in an Automobile.
2. Removing and REPLACING a BATTERY from a car.
3. TESTING THE BATTERY: Hydrometer Test – Open Circuit Voltage and High Rate Discharge Testing.
4. Study of the Battery Charger and Charging the Run Down Battery.
5. Identification of Various components of Ignition system, Dismantling Assembly of a Distributor, Setting Contact Breaker Points and Servicing of Spark Plugs.
6. Setting Ignition Timing with Timing Light and Start the engine.
7. Dismantling and Overhauling of a Starter Motor.
8. Dismantling and Overhauling of a Dynamo.
9. Dismantling and Overhauling of an Alternator.
10. Servicing of Regulator.
11. Adjusting the Sealed Beam Head Lamp.
12. Servicing and tune up of the Horn.
13. Servicing a Wiper Motor.

**Part B**

14. Study of BASIC ELECTRONICS ( Semi Conductor Materials – N type and P type PN junction – forward and reverse bias, characteristics of PN diode – Half wave rectifier full wave rectifier bridge rectifier, zener and avalanche break – down, Characters of Zener diode – application of Zener diode ).
15. Construction of a half wave rectifier without filter.
16. Construction of a bridge wave rectifier without a filter.
17. Measurement of voltage, current and resistance by using multimeter (both analog and digital) in all ranges.
18. Verification of truth table for AND, OR, NOT, NOR, NAND, EX OR, and EX NOR gates

**SEMESTER : IV**  
**Subject Code : AE 406**  
**Subject Title : Workshop –II**  
**Structure of the Course Content**  
**Syllabus:**

1. Introduction of safety in operating machines.
2. Introduction to lathe, drilling machine & shaping machine and its parts.
3. Introduction to work holding devices and tool holding devices.
4. Types of tools used in lathe work, drilling & shaping.
5. Types of measuring instruments and their uses.
6. Setting of work and tools.
7. Operation of lathe, drilling & shaping.
8. Practice on a lathe, drilling and shaping machine

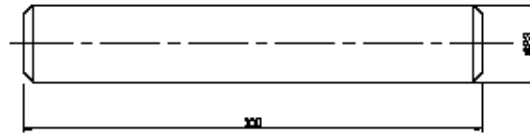
**Note:** The dimensions may be modified according to the materials specified.

**Enclosure:** Sketches of Lathe, drilling & shaping Exercises.

# LATHE

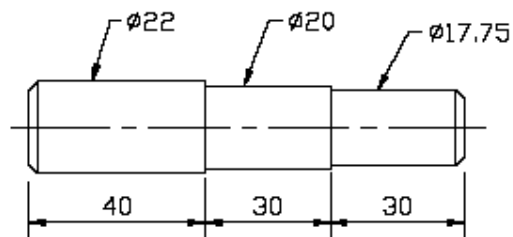
## 1.0 LATHE

EX.NO.1 PLAIN TURNING

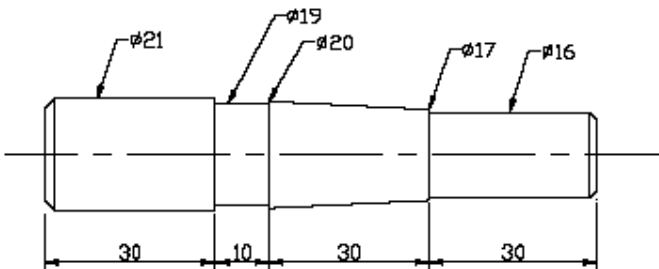


MATERIAL M.S. OF SIZE DIA  
25X105mm.

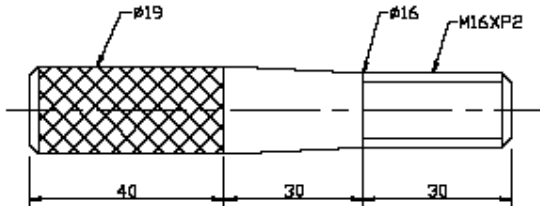
EX.NO.2 STEP TURNING



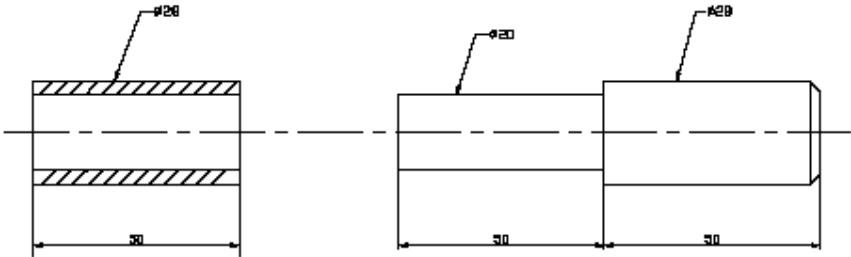
EX.NO.3 TAPER TURNING



EX.NO.4 THREAD CUTTING AND KNURLING



EX.NO.5 BUSHING

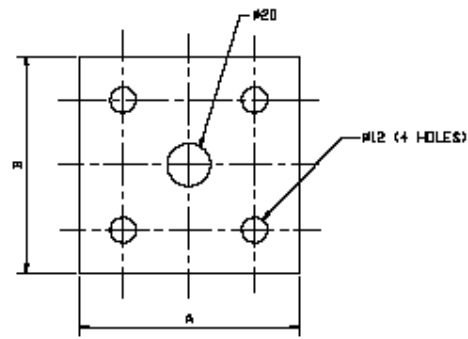


# DRILLING

## 2.0 DRILLING

EX.NO.1

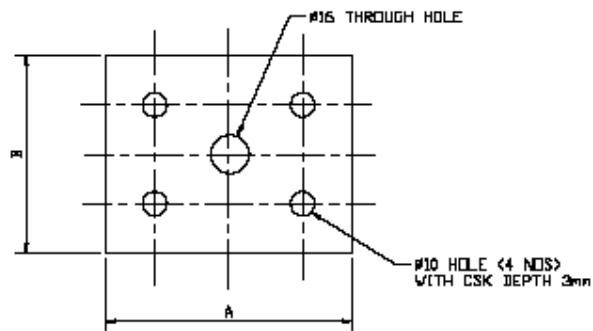
THROUGH HOLE DRILLING



MATERIAL:M.S. OF SIZE 75X50X6mm.

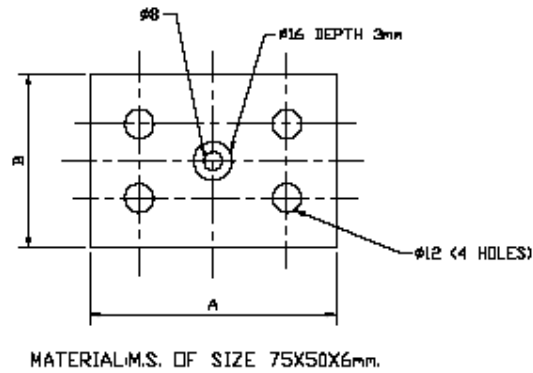
EX.NO.2

THROUGH HOLE DRILLING WITH COUNTER SUNK

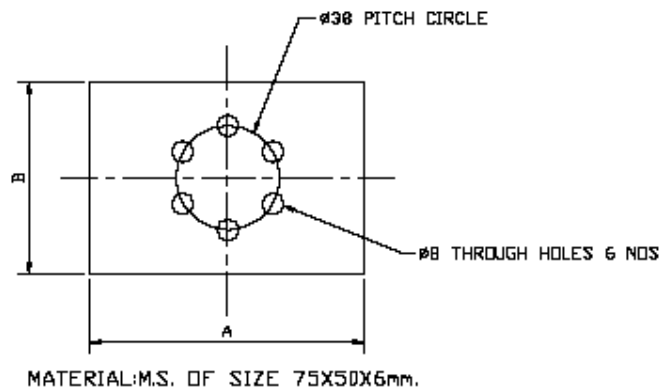


MATERIAL:M.S. OF SIZE 75X50X6mm.

EX.NO.3 PART DRILLING



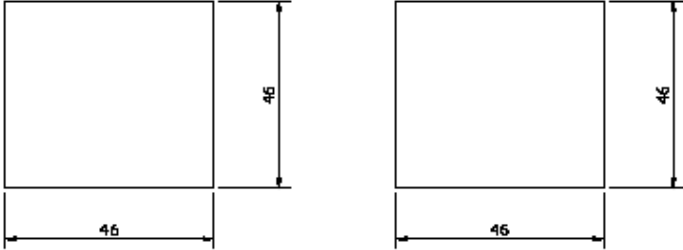
EX.NO.4 THROUGH HOLE DRILLING (ON PITCH CIRCLE)



# SHAPING

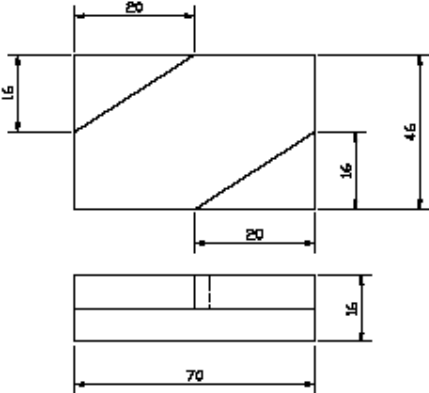
## 3.0 SHAPING

EX.NO.1 MACHINING FLAT SURFACE USING A SHAPER



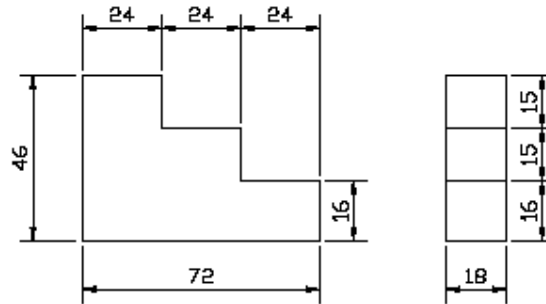
MATERIAL:C.I. OF SIZE 50X50X50mm.

EX.NO.2 CROSS CUT MACHINING USING SHAPER



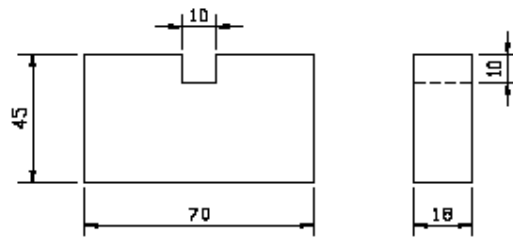
MATERIAL:C.I. OF SIZE 75X50X20mm.

EX.NO.3 MACHINIG A STEPPED BLOCK



MATERIAL: C.I. OF SIZE 75X50X20mm.

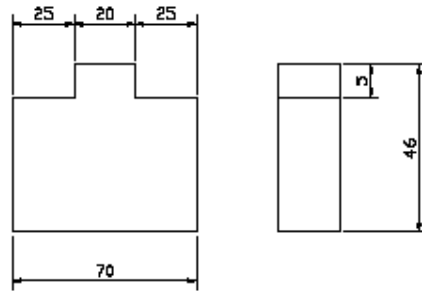
EX.NO.4 SLOTTING USING A SHAPER



MATERIAL: C.I. OF SIZE 75X50X20mm.

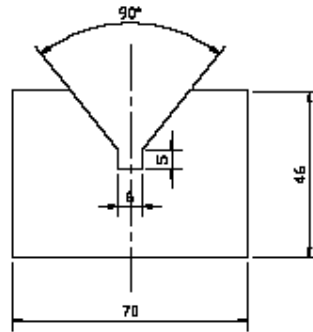


EX.NO.5 SHAPING INVERTED 'T' BLOCK



MATERIAL:C.I. OF SIZE 75X50X20mm.

EX.NO.6 SHAPING A 'V' BLOCK



MATERIAL:C.I. OF SIZE 75X50X20mm.

**SEMESTER : V**  
**Subject Code : AE 501**  
**Subject Title : Automobile Transmission**

**Structure of the Course Content**

**BLOCK 1 Steering system**

- Unit 1: Principle of steering
- Unit 2: power steering
- Unit 3: shock absorbers
- Unit 4: Trouble shooting in suspension & steering systems

**BLOCK 2 Brake Mechanisms**

- Unit 1: mechanical brake system
- Unit 2: Hydraulic brake system
- Unit 3: Air brake system
- Unit 4: Brake drum and brake shoes

**BLOCK 3 Tyre Mechanisms**

- Unit 1: Types of tyres
- Unit 2: Types of tubes
- Unit 3: Cross ply and radial ply
- Unit 4: Tubeless tyres

**BLOCK 4 Garage equipments**

- Unit 1: Power and machine tools
- Unit 2: Compressor
- Unit 3: Gauges
- Unit 4: Wheel balancer

**BLOCK 5 Servicing and Maintenance of Automobiles**

- Unit 1: Preventive maintenance
- Unit 2: Brake drum servicing
- Unit 3: Steering adjustment
- Unit 4: Emission control

**Books:**

1. Automobile Transmission and Power Systems, by William.H.Grouse.
2. Automobile Engineering by Narang. G.B.S., Khanna Publishers, New Delhi.
3. Automobile Electrical Equipments by William.H.Grouse
4. Automotive Engineering by Kirpal Singh, Standard Publishers, New Delhi
5. Automobile Engineering by Banga and Singh, Khanna Publishers, New Delhi
6. Motor vehicle technology and practical work by Dolan.J.A, ELBS
7. Automobile Mechanics by Dr.Giri.N.K, Khanna Publishers, New Delhi
8. Automotive Mechanics, Edn. 6 by Srinivasan, McGraw Hill Co., New York
9. Automotive Electrical Equipment by Kohli,TMC, New Delhi
10. Automotive Mechanics by Crouse, McGraw Hill Co

**SEMESTER : V**  
**Subject Code : AE 502**  
**Subject Title : Vehicle Body Technology**

**Structure of the Course Content**

**BLOCK 1 Car Body details**

- Unit 1: Types of car bodies
- Unit 2: Estate van, racing car and sports car
- Unit 3: Methods of improving visibility and space in cars
- Unit 4: Safety equipments for car body construction

**BLOCK 2 Bus Body Details**

- Unit 1: Types of bus bodies
- Unit 2: Bus body lay out
- Unit 3: Conventional and integral type construction
- Unit 4: Modular construction

**BLOCK 3 Vehicle Aerodynamics**

- Unit 1: Vehicle drag and types
- Unit 2: Various types of forces and moments
- Unit 3: Various body optimization techniques
- Unit 4: Flow visualization techniques

**BLOCK 4 Commercial Vehicle details**

- Unit 1: Different types of commercial vehicles
- Unit 2: Constructional details of flat platform body
- Unit 3: Tipper body and Tanker body
- Unit 4: Drivers cab design

**BLOCK 5 Body materials maintenance and surface finish**

- Unit 1: Steel sheet, Aluminium, timber, plastics
- Unit 2: corrosion and Anti corrosion
- Unit 3: Surface finish
- Unit 4: Painting Process and Electroplating of component

**Books:**

1. Powloski J, Vehicle Body Engg, Business Books Ltd, 1989
2. John Fenton Vehicle Body Layout and analysis Mechanical Engg Publication Ltd
3. Body Construction & design Illiffe Books by Giles G.J., Butter worth & co
4. Automobile Transmission and Power Systems, by William.H.Grouse.
5. Automobile Engineering by Narang. G.B.S., Khanna Publishers, New Delhi.
6. Automobile Electrical Equipments by William.H.Grouse
7. Automotive Engineering by Kirpal Singh, Standard Publishers, New Delhi
8. Automobile Engineering by Banga and Singh, Khanna Publishers, New Delhi
9. Motor vehicle technology and practical work by Dolan.J.A, ELBS
10. Automobile Mechanics by Dr.Giri.N.K, Khanna Publishers, New Delhi

**SEMESTER : V**  
**Subject Code : AE 503**  
**Subject Title : Two & Three Wheelers Technology**

**Structure of the Course Content**

**BLOCK 1 Power plant**

- Unit 1: Two stroke and four stroke SI engine
- Unit 2: Lubrication system
- Unit 3: Magneto coil and battery coil spark ignitions systems
- Unit 4: Electronic ignition systems

**BLOCK 2 Chassis and Sub system**

- Unit 1: Chassis and shaft drive
- Unit 2: Single multiple plates and centrifugal clutches
- Unit 3: Front and rear suspension systems
- Unit 4: Shock absorbers

**BLOCK 3 Brake and wheels**

- Unit 1: Drum brakes and Disc brakes
- Unit 2: Front and Rear brakes links layouts
- Unit 3: Spoked wheel and cast wheel
- Unit 4: Disc Types and Tyres and Tubes

**BLOCK 4 Two wheelers**

- Unit 1: Case study of Two Wheelers
- Unit 2: Motor Cycles
- Unit 3: Scooter and Moped
- Unit 4: Servicing and maintenance

**BLOCK 5 Three wheelers**

- Unit 1: Case study of Auto rickshaws
- Unit 2: Pick up vans
- Unit 3: Delivery Van and Trailer
- Unit 4: Servicing and Maintenance

**Books :**

1. Irving P.E Motor Cycle Engineering. Temple Press Book London
2. Maintenance Manuals of Leading Two & Three Wheelers Manufacturers in India
3. The Cycle Motor manual Temple Press Ltd London
4. Motor vehicle technology and practical work by Dolan.J.A, ELBS
5. Automobile Mechanics by Dr.Giri.N.K, Khanna Publishers, New Delhi

**SEMESTER : V**  
**Subject Code : AE 504**  
**Subject Title : Tractor & Farm Equipment Technology**

**Structure of the Course Content**

**BLOCK 1 General Design of Tractors and Accessories**

- Unit 1: Classification of Tractors
- Unit 2: Main components of Tractor
- Unit 3: Belt pulley
- Unit 4: Power Tiller

**BLOCK 2 Ploughing Implements**

- Unit 1: Primary and Secondary Tillage equipments
- Unit 2: Tiller and Harrows
- Unit 3: Mould Board Plough
- Unit 4: Cage Wheel and its uses

**BLOCK 3 Harvesting and Threshing Equipments**

- Unit 1: Harvesting
- Unit 2: conventional and Modern Harvesters
- Unit 3: Threshing
- Unit 4: Principle of Paddy Threshers construction

**BLOCK 4 Sprayers and Dusters**

- Unit 1: Classification of sprayers and dusters
- Unit 2: Manual and Power sprayers
- Unit 3: Sprayers and dusters
- Unit 4: Different pumps, nozzles, used in sprayers

**BLOCK 5 Maintenance of Tractors**

- Unit 1: Daily Maintenance of Tractors
- Unit 2: Maintenance of Tractors on hour basis
- Unit 3: Trouble shooting of Tractor engines
- Unit 4: Major overhaul of engines

**Books :**

1. Elements of Agricultural Engineering by Jagdishwar Sahay
2. Farm Tractor – Maintenance and Repair by S.C.Jain, C.T.Raj, TATA MC Graw Hill
3. Farm Machinery and Equipment by Smith & Wilkey, Tata MC Graw Hill.
4. Farm Machinery by C.Culpin

**SEMESTER : V**

**Subject Code : AE 505**

**Subject Title : Automobile Chassis & Transmission Lab**

**Part A**

1. Removing and replacing of pressure plate and clutch plate, fingers adjustment and clutch plate relining.
2. Dismantling, inspecting and assembling of sliding mesh gear box and finding out the gear ratios.
3. Dismantling, inspecting and assembling of constant mesh gear box and finding out the gear ratios.
4. Dismantling, inspecting and assembling of synchromesh gear box and finding out the gear ratios.
5. Dismantling, inspecting and assembling of Epicyclic gear train gear box and finding out the gear ratios.
6. Dismantling and assembling of constant velocity universal joints. Rzeppa and Bendix Weiss joints.
7. Dismantling and assembling of rear axle. Wheel bearing adjustments.
8. Dismantling, assembling and adjusting of steering gearbox. Finding gear ratio.
9. Dismantling, assembling and adjusting of power steering.
10. Wheel alignment; checking, measuring and adjustment of castor, camber, king – pin inclination, toe – in and toe – out.

**Part B**

11. Removing and refitting of shock absorber.
12. Study of air suspension and its components.
13. Dismantling and assembling of leaf and coil spring.
14. Dynamic and static balancing of wheels.
15. Vulcanizing of tubes and reconditioning of tyres.
16. Dismantling and assembling Dismantling, inspecting and assembling of final drive and differential units. Adjusting of backlash, tooth contact, pre-loading of bearing.
17. Overhauling, adjusting and bleeding of Hydraulic system.
18. Overhauling and adjusting of air brake system.
19. Clutch and brake pedal free play adjustments.
20. Adjust four-wheel drive mechanism for alignment.

**SEMESTER : V**

**Subject Code : AE 506**

**Subject Title : Automobile Workshop**

**Part A**

1. Milling different types of key-ways.
2. Milling splines on the shaft.
3. Milling Bevel gear.
4. Milling T-slots.
5. Valve guide removal and replacement.
6. Refacing and lapping of valves.
7. Valve seat grinding, cutting valve seat with angle cutter and lapping.
8. Reconditioning of cylinder head – checking of cracks, welding and cylinder head surface grinding.
9. Checking alignment of crankshaft – main bearing and connecting rod journals.

**Part B**

10. Line boring of main bearings.
11. Fitting of cylinder liners.
12. Truing brake drum on a brakedrum lathe.
13. Relining and grinding of brake shoes.
14. Reboring and homing of cylinders.
15. Static and dynamic balancing of wheels.
16. Grinding of flywheel.
17. Fitting the ring gear on the flywheel.
18. Identification and application of special tools and special equipment used in Automobile workshop.

**SEMESTER : VI**  
**Subject Code : AE 601**  
**Subject Title : Industrial Engineering and Road Transport Organization**

**Structure of the Course Content**

**BLOCK 1 Principles of Management and personnel Management**

- Unit 1: Theories of management
- Unit 2: Leadership and Motivation
- Unit 3: Total Quality Management and Management Information Systems
- Unit 4: Personnel Management

**BLOCK 2 Financial management**

- Unit 1: Fixed and working capital
- Unit 2: Depreciation
- Unit 3: Objectives of a good stock control system
- Unit 4: Purchasing procedure

**BLOCK 3 Goods Transport Operation**

- Unit 1: Simple layout of garages and depot for goods transport vehicle
- Unit 2: Materials Handling equipments in the goods vehicle depot
- Unit 3: Settlement of claims
- Unit 4: Transshipment and sub contracting

**BLOCK 4 Passenger Transport Operation**

- Unit 1: Passenger Transport
- Unit 2: Classification of vehicles
- Unit 3: Fare table calculation
- Unit 4: Operating cost

**BLOCK 5 Motor vehicles Act, Road signals and Marketing Management**

- Unit 1: Motor vehicles Act and road signals
- Unit 2: Inspection of accidents and recording
- Unit 3: Total cost and fixed cost and variable cost and running cost
- Unit 4: Control of costs

**Books :**

1. Goods vehicle Operation by Dunbar.
2. Bus Operation by Dunbar.
3. Tamilnadu Motor Vehicle Act 1989.
4. Industrial Management by Lundy.
5. Industrial Management by Davar.
6. Industrial Management by Bayar.
7. Industrial Management by K.K.Ahiya.
8. Industrial Management by S. Vedhapurt.
9. Industrial Engg. & Management Science by Bayar.
10. Industrial Management by Dr. B. Kumar.
11. Industrial Engg. & Production Control by R.K.Kuroma.



**SEMESTER : VI**  
**Subject Code : AE 602**  
**Subject Title : CAD/CAM**

**Structure of the Course Content**

**BLOCK 1 Computer Aided Design**

Unit 1: CAD Definition  
Unit 2: I/O Devices  
Unit 3: Memory  
Unit 4: Types of CAD systems

**BLOCK 2 Computer Aided Manufacturing**

Unit 1: CAM Definition  
Unit 2: Integrated CAD/CAM Organisation  
Unit 3: Master Production schedule  
Unit 4: Product Development cycle

**BLOCK 3 CNC Machines**

Unit 1: Numerical Control  
Unit 2: NC, CNC and adaptive control systems  
Unit 3: Types of CNC Machines  
Unit 4: CNC EDA Machines

**BLOCK 4 CNC components and Part programming**

Unit 1: Drives  
Unit 2: Actuating systems  
Unit 3: CNC programming procedures  
Unit 4: CAD Models

**BLOCK 5 GT – FMS – CIM –AGV and Robotic**

Unit 1: FMS  
Unit 2: CIM  
Unit 3: AGV  
Unit 4: Robotic

**Books :**

1. CAD/CAM/CIM, R.Radhakrishnan, S.Subramanian, V.Raju, 2nd, 2003, New Age International Pvt Ltd..
2. CAD/CAM, Mikell P.Groover, Emory Zimmers Jr. Indian Reprint Oct 1993, Prentice Hall of India
3. NC Programming, I Edition, 2001 by S.K.Sinha, Galgotia Publications Pvt. Ltd
4. CAD/CAM Principles and Applications, 2002 by Dr.P.N.Rao, Tata Mc Graw Hill Publishing Company, New Delhi
5. Mastering CAD/CAM, Special Indian Edition 2007 by Ibrahim Zeid, Tata Mc Graw Hill Publishing Company, New Delhi
6. Automation, Production Systems, and Computer-Integrated Manufacturing by Mikell P. Groover, Pearson Education Asia
7. Computer control of manufacturing systems, International Edition by Yoram Koren, Tata Mc Graw Hill Publishing Company, New Delhi
8. Computer Aided Manufacturing by C.Elanchzian, T.Sunder Selwyn, G.Shanmuga Sundar, Laxmi Narayan, S.Chand & Co, New Delhi
9. CAD/CAM: Principles and Applications by Rao, Tata Mc Graw Hill Publishing
10. CAD/CAM: Theory and Practice by Zeid, Tata Mc Graw Hill Publishing Company, New Delhi

**Subject Code : AE 603**

**Subject Title : Automobile Maintenance and Pollution Control**

**Structure of the Course Content**

**BLOCK 1 Maintenance Records & Schedule and Overhauling of Engine**

Unit 1: Daily maintenance

Unit 2: Inspection forms Log books

Unit 3: Cleaning methods

Unit 4: Reconditioning methods

**BLOCK 2 Maintenance, repair & Overhauling of Chassis driveline**

Unit 1: Clutch, Mechanical automatic types

Unit 2: Front and rear axle

Unit 3: Steering systems manual and power

Unit 4: Tyre maintenance

**BLOCK 3 Maintenance, Repair and Servicing of Electrical system**

Unit 1: Battery

Unit 2: Starter motor

Unit 3: Dc Generator, Ac Alternator, Regulator

Unit 4: Electric hom, Wiper, Flasher Electric fuel pump, gauges

**BLOCK 4 Emissions from Automobiles**

Unit 1: Various emissions from Automobiles

Unit 2: Ploy nuclear aromatic hydrocarbon emissions

Unit 3: Emission from C.I Engine

Unit 4: White, Blue and Black smokes

**BLOCK 5 Emission control Methods**

Unit 1: Controlling of pollutants from engine

Unit 2: catalytic converters

Unit 3: Fumigation EGR

Unit 4: Air injection

**Books :**

1. I.C. Engine by V. Ganesan
2. I.C. Engine by K.K. Ramalingam
3. Pollution Control Board Guide Lines

**SEMESTER : VI**  
**Subject Code : AE 604**  
**Subject Title : CAD/CAM lab**

### **PART-1 CAD Practical**

#### **3D CAD Drawing – Solid Modeling & Lisp Programming**

1. Predefined 3D objects – converting 2D plan into a 3D model – 3Dmesh – 3Dface - 3Dpoly -creating surfaces – Rulsurf – Revsurf – Tabsurf – Edgesurf – isolines -3DView – viewports –Vpoint – hide – dview – modelspace - paper space.
2. 3D solid primitives - creating region – pedit – extrude – revolve - combining object – union –subtract – intersect – Align – Fillet – chamfer - Advanced 3D editing techniques – align - 3D array–Mirror 3D - Rotate3D.
3. Working with UCS – 3D coordinate system – DDUCS – Plan – UCS icon
4. Solid Rendering – material attaching and detaching – shade with color – slice and sectioning –script – 3D orbit – calculating mass properties
5. Developing LISP program – constructing a list – input/output functions – control structures -arithmetic operations – trigonometric functions – special functions.

#### **3D solid modeling and LISP programming practice**

- i) Geneva Mechanism
- ii) Cast Iron Block
- iii) Bearing Block
- iv) Bushed Bearing
- v) Gib and Cotter joint
- vi) Screw Jack
- vii) Universal Coupling

### **Part-2 CAM Practical**

#### **Exercise practice**

##### **CNC Lathe**

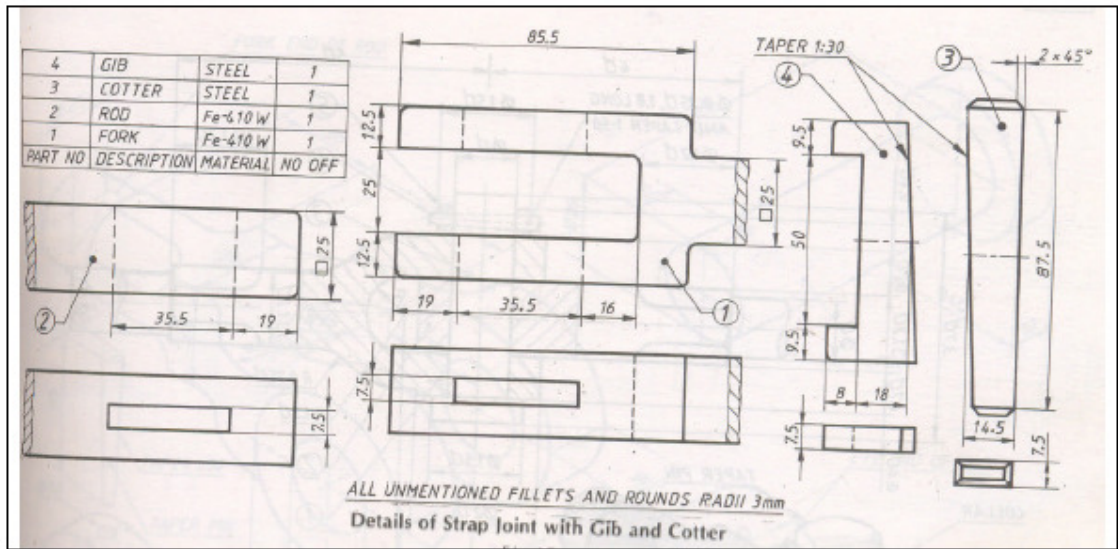
1. Develop a part program for step turning and simulate
2. Develop a part program for taper turning and simulate
3. Develop a part program for circular interpolation and simulate
4. Develop a part program for multiple turning operation and simulate
5. Develop a part program for thread cutting, grooving and simulate
6. Develop a part program for internal drills, boring and simulate

##### **CNC Milling**

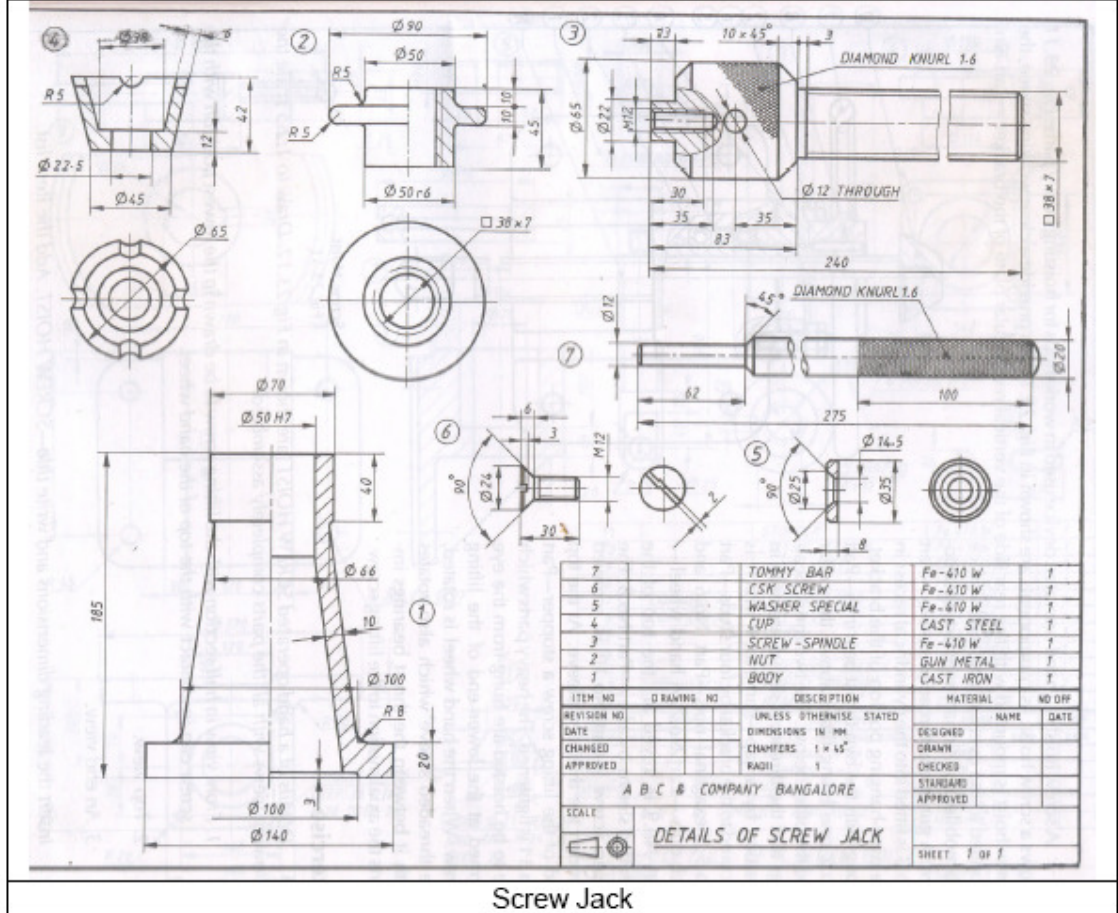
- 7 Develop a part program for grooving and simulate
8. Develop a part program for drilling (canned cycle) and simulate
9. Develop a part program for mirroring with subroutines and simulate
10. Develop a part program for rectangular and circular pocketing and simulate



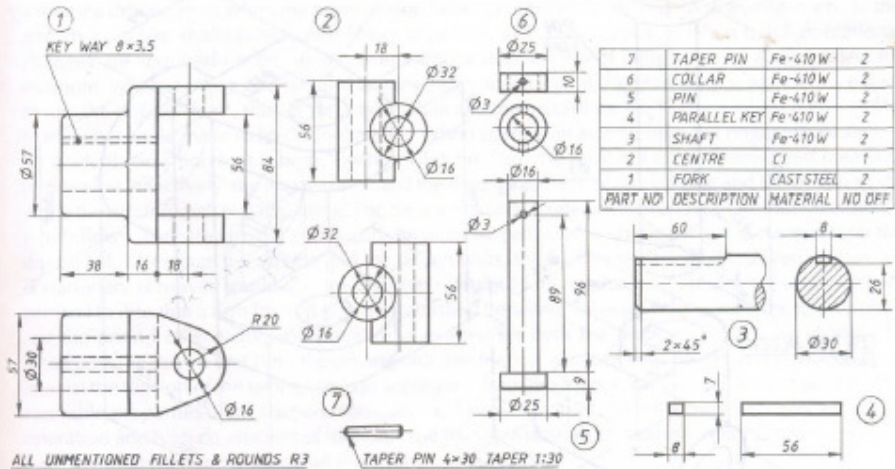




Gib and Cotter Joint



Screw Jack

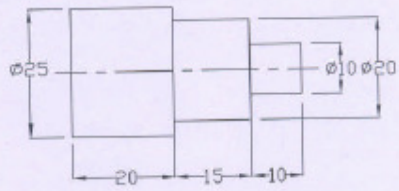


Details of Universal Coupling

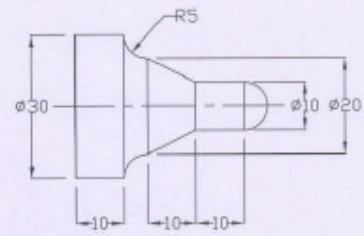
### Universal Coupling

## CAM Practicals – Lathe

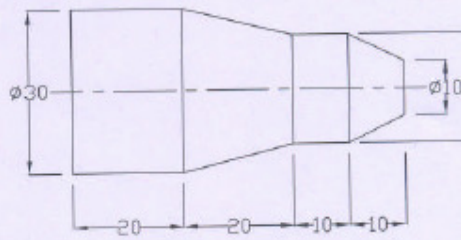
### STEP TURNING



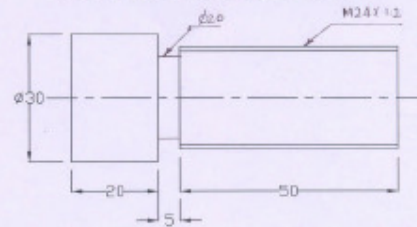
### MULTIPLE TURNING CYCLE



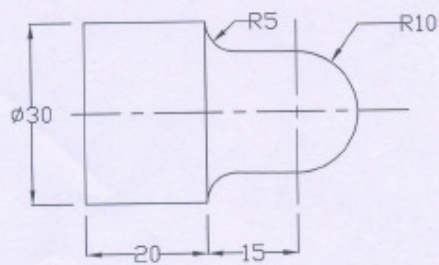
### TAPER TURNING



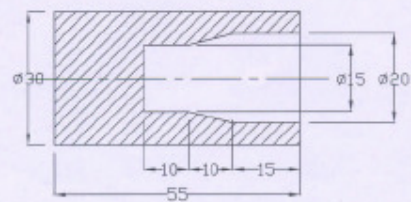
### THREADCUTTING & GROOVING



### CIRCULAR INTERPOLATION



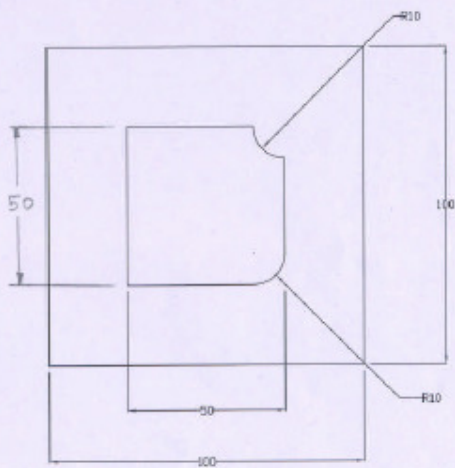
### INTERNAL DRILLS & BORES



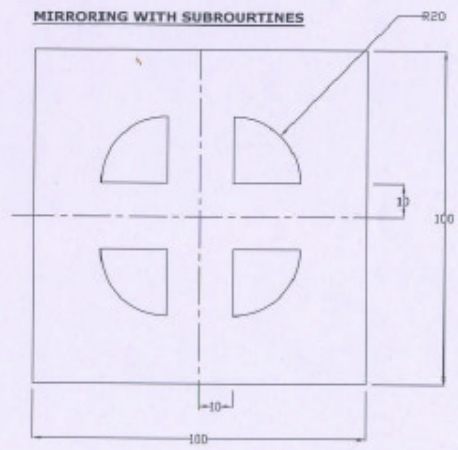


# CAM Practical - Milling

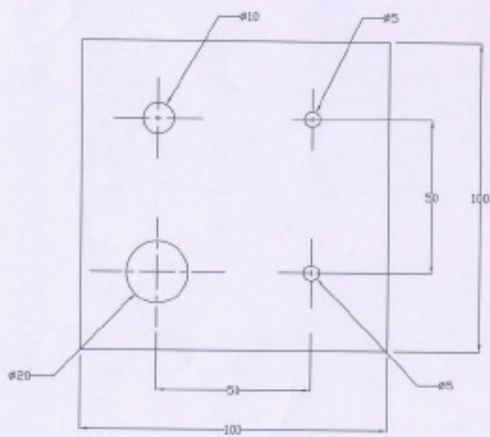
## GROOVING



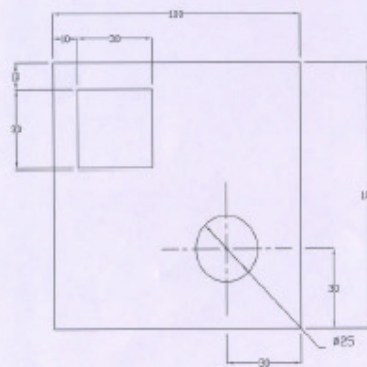
## MIRRORING WITH SUBROUTINES



## DRILLING



## RECTANGULAR POCKETING & CIRCULAR POCKETING-POCKET DEPTH 5mm



**SEMESTER : VI**

**Subject Code : AE 605**

**Subject Title : Project**