SCHEME OF INSTRUCTION & EXAMINATION
AICTE Model Curriculum
B. E. III – Semester (MECHANICAL ENGINEERING)
(Proposed for the Academic year 2020-2021)

S. No.	Course Code	Course Title	Scheme of Instructions				Scheme of Examination			Credits
			L	T	P/D	Contact Hours/Week	CIE	SEE	Duration in Hours	
Theory Course										
1	HS102EG	Effective Technical Communication in English	2	-	-	2	30	70	3	2
2	HS103CM	Finance and Accounting	3	-	-	3	30	70	3	3
3	BS205MT	Mathematics-III	3	-	-	3	30	70	3	3
4	ES303ME	Engineering Mechanic-I	3	-	-	3	30	70	3	3
5	ES304EC	Basic Electronics	3	-	-	3	30	70	3	3
6	PC401ME	Metallurgy and Material Science	3	-	-	3	30	70	3	3
7	PC402ME	Thermodynamics	3	-	-	3	30	70	3	3
Practical / Laboratory Course										
8	PC451ME	Metallurgy and Material Testing Lab	-	-	2	2	25	50	3	1
9	PC452ME	Machine Drawing and Modeling Lab	-	-	2	2	25	50	3	1
Total										**22**

MC: Mandatory Course **BS**: Basic Science **ES:** Engineering Science
L: Lecture **T**: Tutorial **P**: Practical **D**: Drawing
CIE: Continuous Internal Evaluation **SEE:** Semester End Examination (Univ. Exam)

Note:

1. Each contact hour is a clock hour
2. The duration of the practical class is two hours, however it can be extended wherever necessary, to enable the student to complete the experiment.

For the academic years 2020-2024

EFFECTIVE TECHNICAL COMMUNICATION IN ENGLISH

HS102EG

Instruction: 2 periods per week *Duration of SEE: 3 hours*
CIE: 30 marks *SEE: 70 marks*
Credits : 2

Objectives:

To expose the students to:
1. Features of technical communication
2. Types of professional correspondence
3. Techniques of report writing
4. Basics of manual writing
5. Aspects of data transfer and presentations.

Outcomes:

On successful completion of the course, the students would be able to:
1. Handle technical communication effectively
2. Use different types of professional correspondence
3. Use various techniques of report writing
4. Acquire adequate skills of manual writing
5. Enhance their skills of information transfer and presentations

Unit-I
Definition and Features of Technical communication: Definition and features of technical communication (precision, relevance, format, style, use of visual aids), Differences between general writing and technical writing, Types of technical communication (oral and written)
Unit-II:
Technical Writing-I (Official correspondence): Emails, IOM, Business letters, Business proposals.
Unit-III
Technical writing-II (Reports): Project report, Feasibility report, Progress report, Evaluation report.
Unit-IV
Technical writing- III (Manuals): Types of manuals, User manual, Product manual, Operations manual.
Unit-V
***Information Transfer and Presentations*:** Non-verbal (bar diagram, flow chart, pie chart, tree diagram) to verbal (writing), Verbal (written) to non-verbal, Important aspects of oral and visual presentations.

Suggested Reading:

1. Raman, Meenakshi& Sharma, Sangeeta. (2015). –*Technical Communication: Principles and Practice*(3rd ed.)‖. New Delhi.
2. Rizvi,Ashraf, M. (2017). –*Effective Technical Communication"*(2nd ed.). New Delhi, Tata McGraw Hill Education.
3. Sharma, R. C., & Mohan, Krishna. (2017). –*Business Correspondence and Report*

Writing: A Practical Approach to Business & Technical Communication" (4th ed.). New Delhi, Tata McGraw Hill Education.
4. Tyagi, Kavita & Misra, Padma. (2011). *–Advanced Technical Communication"*. New Delhi, PHI Learning.
5. Jungk, Dale. (2004). *–Applied Writing for Technicians".* New York, McGraw-Hill Higher Education.

FINANACE AND ACCOUNTING

HS103CM

Instruction: 3 periods per week *Duration of SEE: 3 hours*
CIE: 30 marks *SEE: 70 marks*
Credits : 3

Objectives:

The course will introduce the students
1. To provide basic understanding of Financial and Accounting aspects of a business Unit.
2. To provide understanding of the accounting aspects of business.
3. To provide understanding of financial statements.
4. To provide the understanding of financial system.
5. To provide inputs necessary to evaluate the viability of projects.
6. To provide the skills necessary to analyse the financial statements.

Outcomes:

After successful completion of the course the students will be able to
1. Evaluate the financial performance of the business unit.
2. Take decisions on selection of projects.
3. Take decisions on procurement of finances.
4. Analyze the liquidity, solvency and profitability of the business unit.
5. Evaluate the overall financial functioning of an enterprise.

Unit-I
Basics of Accounting: Financial Accounting–Definition- Accounting Cycle – Journal - Ledger and Trial Balance-Cash Book-Bank Reconciliation Statement (including Problems)
Unit-II
Final Accounts*:* Trading Account-Concept of Gross Profit- Profit and Loss Account-Concept of Net Profit- Balance Sheet (including problems with minor adjustments)
Unit-III
Financial System and Markets: Financial System-Components-Role-Considerations of the investors and issuers- Role of Financial Intermediaries. Financial Markets-Players-Regulators and instruments - Money Markets Credit Market- Capital Market (Basics only)
Unit-IV
Basics of Capital Budgeting techniques: Time Value of money- Compounding-Discounting- Future Value of single and multiple flows- Present Value of single and multiple Flows- Present Value of annuities- Financial Appraisal of Projects– Payback Period, ARR- NPV, Benefit Cost Ratio, IRR (simple ratios).
Unit-V
Financial statement Analysis**:** Financial Statement Analysis- Importance-Users-Ratio Analysis-liquidity, solvency, turnover and profitability ratios.

Suggested Reading:

1. Satyanarayana. S.V. and Satish. D., *–Finance and Accounting for Engineering"*, Pearson Education
2. Rajasekharan, *–Financial Accounting",* Pearson Education

3. Sharma.S.K. and Rachan Sareen, –*Financial Management"*, Sultan Chand
4. Jonathan Berk, –*Fundamentals of Corporate Finance*,‖ Pearson Education
5. Sharan, –*Fundamentals of Financial Management"*, Pearson Education

MATHEMATICS-III

BS205MT

Instruction: 3 periods per week *Duration of SEE: 3 hours*
CIE: 30 marks *SEE: 70 marks*
Credits : 3

Objectives:

1. To introduce the solution methodologies for second order Partial Differential Equations with applications in engineering
2. To provide an overview of probability and statistics to engineers

Outcomes:

After completing this course, the student will be able to:
1. Solve field problems in engineering involving PDEs.
2. They can also formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.

Unit-I
Formation of Partial Differential Equations, First order partial differential equations, solutions of first order linear Partial Differentiation Equations, Lagranges's equation, Non-linear First Order equations, Charpit's method.
Unit-II:
Second-order linear equations and their classification, Method of separation of variables, vibration of stretched string wave equation, one dimensional heat equation, two dimensional heat equation, solution of Laplace's equation.
Unit-III
Probability distributions: Poisson, Uniform and Normal distributions, Mean, variance, moment generating function and evaluation of statistical parameters for these distributions, Moments, Skewness and Kurtosis.
Unit-IV
Curve fitting by the method of least squares: Fitting of straight lines, second degree parabolas and more general curves, Correlation, regression and Rank correlation. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.
Unit-V
Test for single mean, difference of means and correlation coefficients, test for ratio of variances , Chi-square test for goodness of fit and independence of attributes

Suggested Reading:

1. R.K.Jain & Iyengar, –*Advanced Engineering Mathematics",* Narosa Publications.
2. B.S. Grewal, –*Higher Engineering Mathematics*‖, Khanna Publishers, 2000.
3. P.Sivaramakrishna Das & C.Vijaya Kumar, –*Engineering Mathematics"* , PearsonIndia Education Services Pvt. Ltd.
4. N.P. Bali & M. Goyal, –*A Text Book of Engineering Mathematics",* LaxmiPublications, 2010.
5. S.C.Gupta & V.K.Kapoor, –*Fundamentals of Mathematical Statistics"* , S.Chand Pub.
6. P. G. Hoel, S. C. Port & C. J. Stone, –*Introduction to Probability Theory",* Universal Book Stall, 2003.

7. W. Feller, ‑*An Introduction to Probability Theory and its Applications*‖, Vol. 1, Wiley, 1968.

For the academic years 2020-2024

ENGINEERING MECHANICS-I

ES303ME

Instruction: 2+1 periods per week *Duration of SEE: 3 hours*
CIE: 30 marks *SEE: 70 marks*
Credits : 3

Objectives:

The objectives of this course is to impart knowledge of
1. The resolution of forces, equilibrium and compatibility conditions of static loads
2. Centroid, moment of inertia and mass moment of inertia for various regular and composite bodies
3. Friction, laws of friction and its applications in different fields
4. Trusses, finding the forces in the members and analyze the trusses with various methods
5. Principle of virtual work, potential energy and stability

Outcomes:

After completing this course, the student will be able to:
1. Analyze the effect of a coplanar and non- coplanar system of forceson a body and equilibrium conditions for staticloads
2. Determine the Centroid, Area Moment of Inertia & Mass moment of Inertia of different areas
3. Determine the effect of friction and its governing laws on simple and connected systems
4. Analyse forces in members of a truss using method of joints and method of sections
5. Extracting information regarding hidden or unknown variables in a system using Principle of Virtual work and potential energy

Unit-I
Introduction to engineering mechanics: Basic concepts. ***System of forces:*** concurrent forces, components in space - resultant of coplanar and special systems moment of force and couple varignon's theorem. ***Equilibrium of systems of forces***: free body diagrams equations of equilibrium and applications to coplanar systems special system of forces moment and couple.
Unit-II:
Centroid: centroid of simple areas (from basic principles), centroid of composite area theorem of pappus. ***Area moment of inertia:*** definition moment of inertia of simple areas polar moment of inertia transfer formula moment of inertia of composite area. ***Centre of gravity and mass moment of inertia:*** Centre of gravity and mass moment of inertia of simple bodies (from basic principles)
Unit-III
Fiction: theory of friction, laws of friction, friction connected to single and connected bodies ***Applications of friction:*** wedge, screws, flexible belts, rolling resistance.
Unit-IV
Truss members: plain trusses, truss connections and supports, force representation and free body diagrams. ***Methods:*** method of joints method of sections statically determinant and indeterminate space trusses
Unit-V

Virtual work: work of a force, couple dimensions of work, equilibrium of a particle, rigid body, principle of virtual work. ***Potential energy and stability:*** elastic potential energy, gravitational potential energy, energy equation, principle of virtual work.

Suggested Reading:

1. Ferdinand L. Singer, –*Engineering Mechanics"*, Collins, Singapore, 1975.
2. Reddy Vijay Kumar K. and K. Suresh Kumar, –*Singer"s Engineering Mechanics*‖, 2010.
3. S.S Bhavakatti, –*Engineering Mechanics"*, New age International publishers.
4. Rajeshakharam, S. and Sankarasubrahmanyam, –*G.,Mechanics",* Vikas Publications, 2002.
5. Junarkar, S.B. and H.J. Shah., –*Applied Mechanics"*, Publishers, 2001.

BASIC ELECTRONICS

ES304EC

Instruction: 3 periods per week *Duration of SEE: 3 hours*
CIE: 30 marks *SEE: 70 marks*
Credits : 3

Objectives:

The objectives of this course is to impart knowledge of
1.To understand the characteristics of diodes and transistor configurations
2.To understand the design concepts of biasing of BJT and FET
3.To understand the design concepts of feedback amplifiers and oscillators
4.To study the design concepts of OP Amp and data converters

Outcomes:

After completing this course, the student will be able to:
1. Study and analyze the rectifiers and regulator circuits.
2. Study and analyze the performance of BJTs, FETs on the basis of their operation and working.
3. Ability to analyze & design oscillator circuits.
4. Ability to analyze different logic gates & multi-vibrator circuits.
5. Ability to analyze different data acquisition systems

Unit-I
PN Junction Diode: Characteristics, Half wave rectifier, Full wave rectifier, filters, ripple, regulation, TIF and efficiency, Zener diode and Zener diode regulators. CRT construction and CRO applications
Unit-II:
Transistors: BJT construction and working, modes of operation, configurations of BJT (CB, CE, CC), small signal h-parameter model of CE, CE amplifier analysis. Construction and working of JFET, V-I characteristics of JFET.
Unit-III
Feedback concepts: Types of negative feedback – modification of gain, bandwidth, input and output impedances, applications. ***Oscillators:*** RC Phase shift, Wein bridge, LC and crystal Oscillators (Qualitative treatment only).
Unit-IV
Operational Amplifier: OP-AMP Block diagram, Ideal OP-AMP, DC and AC Characteristics, Inverting and Non-Inverting Amplifiers, Adder/Subtractor, Integrator, Differentiator. ***Logic gate circuits*** - Introduction to Digital systems- AND, NAND, NOR, XOR gates, Binary half adder, full adder.
Unit-V
Data Acquisition Systems: Construction and Operation of transducers- Strain gauge LVDT, Thermocouple, Instrumentation systems. ***Data Converters:*** R-2R Ladder DAC, Successive approximation and Flash ADC.

Suggested Reading:

1. Robert Boylestad L. and Louis Nashelsky, –*Electronic Devices and Circuit Theory"*, PHI, 2007
2. Helfrick D and David Cooper, –*Modern Electronic Instrumentation and Measurements Techniques",*1st edition, Prentice Hall of India, 2006.
3. Salivahanan, Suresh Kumar and Vallavaraj, –*Electronic Devices and Circuits",* 2nd edition, Tata McGraw-Hill, 2010.

For the academic years 2020-2024

METALLURGY AND MATERIAL SCIENCE

PC401ME

Instruction: 3 periods per week *Duration of SEE: 3 hours*
CIE: 30 marks *SEE: 70 marks*
Credits : 3

Objectives:

1. Enable to understand structure property relations, analyse the failures of metals and their prevention.
2. To broad understanding of phase diagrams.
3. Acquire basic knowledge in various heat treatment operations, their purpose and applications.
4. Expose to various methods of extractive metallurgy techniques.
5. Understand various modes of failure and suggest mechanisms for preventions of failures.
6. Understand applications of conventional metals and alloys.

Outcomes:

1. Know the fundamental science and engineering principles relevant to material.
2. Suggest appropriate physical metallurgical methods (phase diagrams).
3. The type of heat treatment operation to be given to any metal in order to improve desired Mechanical properties.
4. Basic ability to plan an extraction process for given ore.
5. Suggest the appropriate methods for prevention of failures.
6. Analyse the applications of conventional metals and alloys

Unit-I
Introduction to Materials engineering, Space lattice, unit cell, crystal structure, crystal directions and planes, crystal imperfections- point defects, line defects, surface defects, volume defects.Effect of slip and twinning on the plastic deformation, Jogs and its effect on yield phenomenon, Hall-Petch equation, Orange peel effect, cold and hot working, strain hardening and Bauchinger effect. Recovery, Recrystallisation, Grain growth and its effect on mechanical properties of metals. Mechanical properties of materials- Tensile properties, stress-strain diagrams, elasticity, plasticity, ductility, toughness, modulus of elasticity, resolved shear stress, tensile and compression test, hardness and its measurement
Unit-II:
Fracture: Ductile and Brittle fracture, modes of fracture, ductile to brittle transition, crack initiation and propagation. ***Fatigue:*** S-N curve, Structure of fatigue fracture specimen, Fatigue crack propagation, Effect of metallurgical variables on fatigue of metal, Experimental determination of fatigue strength (RR-Moore Test). ***Creep:*** Creep strength, Creep curve, Creep deformation mechanisms, Creep Test, Differences between creep curve and stress rupture curve.
Unit-III
Structure of Alloys: Types of solid solution, Substitutional and Hume Rothary‘s rules for solid solution, Construction and interpretation of Binary equilibrium diagram, Isomorphous,

Eutectic and Peritectic diagrams, Intermediate phases and phase rule, Iron-Iron Carbide equilibrium diagram, construction and interpretation. Types of Plain Carbon Steels, Cast Iron and their properties and Characteristics.
Unit-IV
Alloy Steels: Effects of alloying elements like Nickel, Chromium, Manganese, Silicon and Tungsten. Titanium. Study about Stainless steels, HSS, Maraging steels, Brass,their composition and Properties. ***Heat Treatment:*** Annealing, Normalising, Hardening, Tempering, Construction and interpretation of T.T.T Curve. Austempering and Martempering. Case Hardening: Carburising, Nitriding, Carbo-nitriding, Flame Hardening, Induction Hardening. Brief introduction of Age Hardening.
Unit-V
Non-ferrous metals and alloys: Properties and applications of –Cu and its alloys, Al and its alloys, Age hardening, Ti and its alloys, Ni- based alloys. Bronze, Muntz Metal, Invar, Duralumin and Ti Alloy (Ti-6Al-4V)-their composition properties. Ceramics, Polymers and Composites: Ceramics, crystalline ceramics, glasses, properties and applications of ceramics, polymers-polymerization, thermoplastics and thermosetting plastics, properties and applications of polymers. Composites: concept of composites, matrix and reinforcement, rule of mixtures, classification of composites, applications of composites.

Suggested Reading:

1. V.Raghavan, *Material Science and Engineering*, Prentice Hall of India Ltd., 4th Edition, 1994.
2. S.H. Avner, *Introduction to Physical Metallurgy*, Tata McGraw Hill, 2nd Edn.1997.
3. S.P. Nayak, *Engineering Metallurgy and Material Science*, Charotar Publishing House, 6th Edition, 1995.
4. E. Dieter, Mechanical Metallurgy, Metric Editions, Tata McGraw Hill, 3rd Edn,1997.
5. Robert M Jones, Mechanics of Composite Materials, Taylor and Francis.

THERMODYNAMICS

PC402ME

Instruction: 3 periods per week *Duration of SEE: 3 hours*
CIE: 30 marks *SEE: 70 marks*
Credits : 3

Objectives:

1. Basic definitions of thermodynamics and significance of Zeroth law of thermodynamics.
2. The importance and application of first law of thermodynamics.
3. The various laws associated with second law of thermodynamics.
4. Properties of pure substances and use of Mollier diagram.
5. Various air standard cycles, their importance and their comparison.
6. Calculation procedures of the air-fuel ratio.

Outcomes:

1. Correlate the study of thermodynamics with the fundamental conceptual terminologies and Distinguish the different forms of energy
2. Analyse the Laws of Thermodynamics and correlate them for real life problem solving.
3. Read data from the chart of Mollier diagram and its applications.
4. Assess the importance of entropy and recognize the various curves of phase transformation
5. Identify the various air standard cycles, gas cycles and gas laws toward solving practical applications.

Unit-I
Introduction: Definition and Concept of Thermodynamics, Microscopic and Macroscopic approach of thermodynamics, system, surroundings and property, intensive and extensive properties, Measurement of temperature, Zeroth law of thermodynamics, Temperature Scales, ideal gas and ideal gas thermometer, Reversibility and irreversibility quasi– static process, Specific heats for ideal gases, Thermodynamic Equilibrium.
Unit-II:
First law of Thermodynamics: Statement of First Law, Heat and work interactions, Thermodynamics work and Internal energy, Energy as property of system, First Law applicable to Closed system, Thermodynamic processes and calculation of work, Heat transfer, and internal energy, Heat as Path Function, first law analysis of flow processes and limitation, Calculation of work done during flow processes
Unit-III
Second Law of Thermodynamics: Physical description of second law, Kelvin– Planck and Clausius statement of Second Law of thermodynamics, Equivalence of Kelvin– Planck and Clausius statement, Reversible and irreversible processes, Carnot Theorem, Clausius Inequality, Calculation of entropy change during various thermodynamic processes, principle of Entropy increase, T– S diagram, Available and Unavailable energies in steady flow, Second Law Analysis of Control Volume, Helmholtz and Gibb‘s functions, Available function for flow and non– flow processes and applications.
Unit-IV

Thermodynamic properties of Fluids: Properties of pure substances, Concept of phase change, Graphical representation of pressure, Volume and Temperature, (PVT)– T and H diagrams, Properties of steam, Use of steam Tables and Mollier diagram, Thermodynamic relations involving entropy, Enthalpy, Internal Energy, Maxwell relations and Clapeyron equation
Unit-V
Analysis of Thermodynamic Cycles**:** Air standard cycles: Otto, Diesel, Dual Combustion Cycle, Joule/ Brayton cycle. Vapour Power cycles: Rankine cycle. Refrigeration cycles: Reversed Carnot cycle, Bell Coleman cycle, Vapour compression refrigeration cycle.

Suggested Reading:

1. P.K. Nag, *Basic & Applied Thermodynamics*, Tata McGraw Hill, 2nd Edn., 2008.
2. Yunus A Cengel & Michael A Boles, *Thermodynamics- An Engineering Approach*, Tata McGraw- Hill, 7th Edition in SI Units (Special Indian Edition),2011
3. Y.V.C.Rao, *An Introduction to Thermodynamics*, Universities Press, 2nd Edn., 2010.
4. P.L Ballaney, *Thermal Engineering*, Khanna Publishers 2004.
5. E. Rathakrishnan, *Fundamentals of Engineering Thermodynamics*, PHI Learning Pvt. Ltd, 2005

METALLURGY AND MATERIAL TESTING LAB

PC451ME

Instruction: 2 periods per week *Duration of SEE: 3 hours*
CIE: 25 marks *SEE: 50 marks*
Credits : 1

Objectives:

1. Acquire basic knowledge by understanding iron-carbide diagram and its application in engineering.
2. Expose to Metallographic study and analysis of various metals.
3. Acquire knowledge in determining the hardness of metals before and after various Heat treatment operations.
4. Understand differences between different heat treatment methods.
5. Expose to T-T-T curve and its application in engineering metallurgy.
6. Understand the relation between micro structure and properties.

Outcomes:

After completing this course, the student will be able to:
1. Prepare specimen for metallographic observation
2. Analyse and identify low, medium and high carbon steels, different types of cast irons, non-ferrous alloys, from the study of their microstructure
3. Underlines the importance of grain size in evaluating the desired mechanical properties.
4. Correlate the heat treatment methods and the mechanical properties obtained.
5. Analyse and identify microstructures after annealing, normalizing, hardening and temperingRelate the properties of the materials using image analyser

List of Experiments:
A: Metallurgy Experiments:
1. Study of: Metallurgical Microscope, Iron-Iron Carbide diagram, Procedure for specimen preparation
2. Metallographic Study of Pure Iron& Low carbon steel
3. Metallographic Study of Medium carbon steel, Eutectoid steel& Hyper Eutectoid steel
4. Metallographic Study of, White cast-iron, Malleable cast iron, Nodular cast iron &Grey cast-iron
5. Metallographic Study of Aluminium, Brass & Bronze
6. Metallographic study of Muntz metal and Babbit Material
7. Jominy Quench test or Study of microstructure after heat treatment
B: Materials testing Lab
1. Uni-axial tension test, to draw stress- strain diagram, and estimate modulus of elasticity, % of elongation and toughness.
2. Compression test on bricks and Impact test
3. Hardness test: Brinell & Vickers
4. Shear force & bending moments tests.
5. Bending test on fixed beam, simply supported beam

6. Spring test and torsion test
7. Heat treatment of Metals, Annealing, Normalizing and Quenching

Note: At least ten experiments should be conducted

MACHINE DRAWING AND MODELLING LAB

PC452ME

Instruction: 2 periods per week *Duration of SEE: 3 hours*
CIE: 25 marks *SEE: 50 marks*
Credits : 1

Objectives:

1. To understand format of drawing sheet, angle of projections, isometric projections and practice on simple machine elements
2. To practice free hand sketching of machine elements
3. To understand Modelling of assembly drawings of typical machine parts.

Outcomes:

At the end of the course, the student
1. Will be able to draw isometric and orthogonal projections and sectional views of various mechanical components.
2. Will be able to draw free hand sketches of various mechanical components
3. Will be able to understand the shape and structure of different types of joints, screws, keys and Couplings
4. Will be sufficiently knowledgeable to use both the software and drafter to produce assembly views of various mechanical components from part drawings.

List of Experiments:
I. Machine Drawing (AutoCAD):
1. Format of drawing sheet & title block,
2. Conventions of drawing lines and dimensions,
3. Convention for sectional views.
4. Simple machine elements.
5. Riveted and screwed fastenings.
6. Joints and coupling.
II. Assembly drawing (SOLIDWORKS/ CATIA/ PRO-E):
8. Connecting rod.
9. Eccentric.
10. Cross head.
11. Stuffing box.
12. Lathe Tool Post.
13. Revolving centre.
14. Pedestal bearing (Plummer block).
15. Screw Jack.

Note: The test is for the ability of the student to read and interpret drawing. The drawing should include part list in standard format.

Suggested Reading:

1. N.D. Bhatt, *Machine Drawing*, Charotar Publishing house, Anand, New Delhi, 28th edition, 1994.
2. K.L. Narayana, P. Kannaiah, K. Venkat Reddy, *Machine Drawing*, New Age International (P) Ltd., 2nd edition 1999.
3. N. Siddeshwar, *Machine Drawing*, Tata McGraw Hill Publishing Co. Ltd., 5th edition, 1994
4. K. C. John, *Text book of Machine Drawing*, PHI Learning,