

TEXT BOOK

1. Meenakshi Raman and Sangeeta Sharma, 'Technical Communication: English Skills for Engineers', New Delhi: Oxford University Press, 2008.

REFERENCES

1. Department of Humanities & Social Sciences, Anna University, 'English for Engineers and Technologists' Combined Edition (Volumes 1 & 2), Chennai: Orient Longman Pvt. Ltd., 2006. Themes 1 – 4 (Resources, Energy, Computer, Transport)
2. Andrea, J. Rutherford, 'Basic Communication Skills for Technology', Second Edition, Pearson Education, 2007.

MA1101 - MATHEMATICS I

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UNIT I MATRICES 9+3

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values – Problem solving using Cayley-Hamilton theorem – Similarity transformation – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form – Orthogonal reduction to its canonical form.

UNIT II THREE DIMENSIONAL GEOMETRY 9+3

Angle between two lines – Coplanar lines – Shortest distance between skew lines – Equation of a sphere – Plane section of a sphere – Tangent plane – Orthogonal Spheres - Equation of a cone – Right circular cone – Equation of a cylinder – Right circular cylinder.

UNIT III DIFFERENTIAL CALCULUS 9+3

Curvature – Cartesian and Parametric Co-ordinates – Centre and Radius of curvature – Circle of curvature – Envelopes – Evolutes.

UNIT IV FUNCTIONS OF SEVERAL VARIABLES 9+3

Partial derivatives – Euler’s theorem for homogeneous functions – Total derivative – Differentiation of implicit functions – Jacobians – Maxima / Minima for functions of two variables – Method of Lagrange’s multipliers – Taylor’s expansion.

UNIT V ORDINARY DIFFERENTIAL EQUATIONS (ODE) 9+3

Solution of second and higher order linear ODE with constant coefficients – Simultaneous first order linear equations with constant coefficients – Linear equations of second order with variable coefficients – Cauchy’s and Legendre’s linear equations – Method of variation of parameter.

L: 45 T: 15 Total: 60

TEXT BOOK

1. Grewal, B.S, “Higher Engineering Mathematics”, Thirty eighth Edition, Khanna Publishers, New Delhi, 2005.
2. Venkataraman. M. K., “Engineering Mathematics”, Volume I and II Revised enlarged Fourth Edition, The National Publishing Company, Chennai, 2004.

REFERENCES

1. Glyn James., “Advanced Modern Engineering Mathematics”, Third Edition, Pearson Education Ltd, New Delhi, 2004.
2. Veerarajan. T., “Engineering Mathematics (for first year)”, Fourth Edition, Tata McGraw – Hill Publishing Company Limited, New Delhi, 2005.
3. Bali N. P and Manish Goyal, “Text book of Engineering Mathematics”, Third edition, Laxmi Publications (P) Ltd., 2008.

TEXT BOOKS

1. R. K. Gaur and S.C. Gupta, 'Engineering Physics' Dhanpat Rai Publications, 2003.
2. M.N. Avadhanulu and PG Kshirsagar, 'A Text book of Engineering Physics', S.Chand and Company, Ltd., New Delhi, 2005.

REFERENCES

1. Chitra Shadrach and Sivakumar Vadivelu, 'Engineering Physics', Pearson Education, 2007.
2. Serway and Jewett, 'Physics for Scientists and Engineers with Modern Physics', 6th Edition, Thomson Brooks/Cole, Indian reprint 2007.
3. Arumugam, M, 'Engineering Physics', Anuradha Publishers, Kumabakonam 2005.
4. Palanisamy, P.K., 'Engineering Physics' Scitech publications, 2007.
5. Rajendran, V and Marikani A, 'Engineering Physics' Tata Mc Graw Hill Publications Ltd, III Edition, 2004.

HS1103 - ENGINEERING CHEMISTRY I

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UNIT I WATER TREATMENT PROCESS 9

Alkalinity -Types of alkalinity and determination -- Hardness - Types - CaCO_3 equivalents - Estimation by EDTA method (problem) -- Boiler feed water - requirements - Troubles of using hard water in boilers --Internal conditioning (phosphate, calgon and carbonate) - External conditioning - Zeolite process --Domestic water treatment - Disinfection methods (Chlorination, UV treatment and ozonation) -- Desalination - Reverse osmosis.

UNIT II SURFACE CHEMISTRY 9

Adsorption - Types -- Adsorption of gases on solids -- Adsorption isotherms - Freundlich and Langmuir isotherms -- Adsorption of solutes from solutions -- Role of adsorbents in catalysis -- Ion-exchange adsorption and Pollution abatement.

UNIT III ELECTROCHEMISTRY 9

Electrochemical cells - Reversible and irreversible cells -- EMF - measurement of emf - Electrode potential - Nernst equation (problem) -- Reference electrodes - Standard hydrogen electrode - Calomel electrode - Glass electrode - Quinhydrone electrode and measurement of pH -- Electrochemical series - significance -- Conductometric titrations (HCl - NaOH titration) -- Potentiometric titrations (redox - Fe^{2+} vs dichromate and precipitation - Ag^+ vs Cl^- titrations).

UNIT IV ENERGY SOURCES AND STORAGE DEVICES 9

Nuclear energy - Nuclear fission and fusion process -- Nuclear reactor - Light water nuclear power plant (block diagram only) - Breeder reactor -- Batteries - Alkaline battery - Lead acid storage battery - Nickel-Cadmium battery - Lithium batteries - Fuel cells - hydrogen-oxygen fuel cell --Solar energy conversion - Solar cells - Wind energy.

UNIT V ANALYTICAL TECHNIQUES 9

Beer-Lambert's law (problem) -- UV-Visible and IR spectroscopy - Principle and Instrumentation (problem) (block diagram only) -- Estimation of iron by colorimetric analysis -- Flame photometry - Principle and Instrumentation (block diagram only) - Estimation of sodium by flame photometry -- Atomic absorption spectroscopy - Principle and Instrumentation (block diagram only) - Estimation of Nickel by atomic absorption spectroscopy.

L: 45 Total: 45

TEXTBOOKS

1. P.C. Jain and Monika Jain, "Engineering Chemistry", 15th Edition, Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2007.
2. S. Bahl, G.D. Tuli and Arun Bahl, "Essentials of Physical Chemistry", S. Chand and Company Ltd., New Delhi, 2004.

REFERENCES

1. J.C. Kuriakose and J. Rajaram, "Chemistry in Engineering and Technology", Vol.1 & 2, Tata Mcgraw Hill Publishing Company (P) Ltd., New Delhi, 1996.
2. B.K. Sharma, "Engineering Chemistry", Krishna Prakasam Media (P) Ltd., Meerut, 2001.
3. B. Sivasankar "Engineering Chemistry" Tate McGraw-Hill Pub.Co.Ltd, New Delhi (2008).

ME1101 - ENGINEERING GRAPHICS

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Concepts and conventions (Not for Examination) 1

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT I PLANE CURVES AND FREE HAND SKETCHING 15

Curves used in engineering practices:

Conics – Construction of ellipse, Parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

Free hand sketching:

Representation of Three Dimensional objects – General principles of orthographic projection – Need for importance of multiple views and their placement – First angle projection – layout views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES 14

Projection of points and straight lines located in the first quadrant – Determination of true lengths and true inclinations – Projection of polygonal surface and circular lamina inclined to both reference planes.

UNIT III PROJECTION OF SOLIDS 15

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT IV SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES 15

Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – Obtaining true shape of section.

Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 15

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones.

Perspective projection of prisms, pyramids and cylinders by visual ray method.

L: 30 T: 45 Total: 75

TEXT BOOKS

1. K. V. Natrajan, "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai (2006).
2. M.B. Shah and B.C. Rana, "Engineering Drawing", Pearson Education (2005).

REFERENCES

1. N.D. Bhatt, "Engineering Drawing" Charotar Publishing House, 46th Edition, (2003).
2. Luzadder and Duff, 'Fundamentals of Engineering Drawing', Prentice Hall of India Pvt. Ltd. 11th Edition, 2001
3. Dhananjay A.Jolhe, "Engineering Drawing with an introduction to AutoCAD" Tata McGraw Hill Publishing Company Limited (2008).

Publication of Bureau of Indian Standards:

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

Special points applicable to University Examinations on Engineering Graphics:

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. Whenever the total number of candidates in a college exceeds 150, the University Examination in that college will be conducted in two sessions (FN and AN on the same day) for 50 percent of students (approx) at a time.

CS1101 - FUNDAMENTALS OF COMPUTING AND PROGRAMMING

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UNIT I DIGITAL CONCEPTS

9+3

Digital Computer Fundamentals – Block diagram of a computer – Components of a computer system – Digital and Analog quantities – Binary digits – Logic Levels – Digital Waveforms – Basic Logic operations – Digital Integrated Circuits.

UNIT II NUMBER SYSTEMS

9+3

Number Representation – Decimal, Binary, Octal, Hexadecimal and BCD numbers – Binary Arithmetic – Binary addition – Unsigned and Signed numbers – one's and two's complements of Binary numbers – Arithmetic operations with signed numbers - Number system conversions – Digital codes.

UNIT III HARDWARE AND SOFTWARE

9+3

Processing Devices – Memory Devices – Input and Output Devices – Optical Input Devices – Audiovisual Input Devices – Monitors – Printing Devices - Storage Devices – Magnetic and Optical Storage Devices - System Software – Application Software – Graphics and Multimedia.

UNIT IV NETWORKING FUNDAMENTALS

9+3

Overview of Data Communication with Standard Telephone Lines and Modems, Digital Data Connections, Broadband Connections, DSL Technologies and Cable Modem Connections – Computer Networking Basics – Common Types of Networks – Structuring of Networks – Network Media and Hardware.

UNIT V PROBLEM SOLVING AND C PROGRAMMING

9+3

Planning the Computer Program – Purpose – Algorithm – Flow Charts – Pseudocode – Programming fundamentals – Variables and Data Types – Constants – Preprocessor – Operators and Expressions – Managing Input and Output operators – Decision Making – Branching and Looping – User-defined Functions – Declarations – Call by reference – Call by value – Arrays – Pointers – Handling of Character Strings – Structures and Unions.

L: 45 T: 15 Total: 60

TEXT BOOKS

1. Thomas L.Floyd and R.P.Jain, "Digital Fundamentals", 8th Edition, Pearson Education, 2007.
2. Peter Norton "Introduction to Computers", 6th Edition, Tata Mc Graw Hill, New Delhi, 2006.
3. Ashok.N.Kamthane, "Computer Programming", Pearson Education (India), 2008.

REFERENCES

1. Behrouz A. Forouzan and Richard.F.Gilberg, "A Structured Programming Approach Using C", II Edition, Brooks-Cole Thomson Learning Publications, 2007.
2. Morris Mano, "Digital Design", 3rd Edition, Pearson Education, 2006.
3. Albert Paul Malvino, Donald P. Leech, "Digital Principles and Applications", 6th Edition, Mc Graw Hill Publishers, 2007.

LIST OF EXERCISES

Concepts

Suggested Exercises

UNIT I

Introduction to Application Packages

Practical Exercises may be given in the application packages to acquire skills in word processing ,Spread sheet and Power Point.

Word

1. Document creation, Text manipulation with Scientific notations.
2. To create an advertisement in word.
3. To illustrate the concept of mail merging, importing images, tables in word.
4. Drawing - flow Chart

Spreadsheet

5. Chart - Line, XY, Bar and Pie.
6. Formula - formula editor.
7. Spread sheet - inclusion of object, Picture and graphics, protecting the document and sheet
8. To create a spread sheet to analyze the marks of the students of a class and also to create appropriate charts.
9. Sorting and Import / Export features.

Power Point

10. To create the presentation for the department with Power Point using animation, Design Templates and Effective presentation.

UNIT II

C Programming Basics*

The following exercises may be suggested

Data types, Expression Evaluation, Condition Statements, Operators & Expressions

11. To write a simple menu driven calculator program using switch statement,
12. To Find Age in terms of years, months and days.

IO Formatting

13. To print multiplication table for the given number.

Decision Making

14. To check and print if the given number is a palindrome or not, and the given number is a prime number or not

Looping

15. To print Fibonacci and Trigonometric series.

UNIT III

Exercises may be given to understand function prototype and invocation procedures, to understand call by value, call by address and implement recursion.

Arrays

16. To find the largest and smallest number using array
17. To Sort numbers in an array in ascending / Descending order.
18. To implement bubble sorting.
19. To reverse the elements given in an array.
20. Write a program for matrix addition and multiplication

String Manipulations

21. To implement string manipulation functions without using library functions.

Functions

22. To arrange the names in alphabetic order.

Recursions

23. To perform sequential search using functions.

24. To find the factorial of a number using recursion.

UNIT IV

Structures and Unions

25. To print the marksheet of 'n' students using structures.

Pointers

26. To print the elements of an array using pointers and String manipulation.

Files

27. To print the marksheet of 'n' students using file handling operations.

UNIT V

Command line arguments

28. To merge two files using command line arguments.

Total:45

* For programming exercises Flow chart and Pseudo code are essential

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS

Hardware

- LAN System with 33 nodes (OR) Standalone PCs – 33 Nos.
- Printers – 3 Nos.

Software

- OS – Windows / UNIX Clone
- Application Package – Office suite
- Compiler – C

GE1101 - ENGINEERING PRACTICES LABORATORY

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GROUP A (CIVIL & MECHANICAL)

I CIVIL ENGINEERING PRACTICE

9

Buildings:

- (a) Study of plumbing and carpentry components of residential and industrial buildings. Safety aspects.

Plumbing Works:

- (a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.
- (b) Study of pipe connections requirements for pumps and turbines.
- (c) Preparation of plumbing line sketches for water supply and sewage works.
- (d) Hands-on-exercise:
Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.
- (e) Demonstration of plumbing requirements of high-rise buildings.

Carpentry using Power Tools only:

- (a) Study of the joints in roofs, doors, windows and furniture.
- (b) Hands-on-exercise:
Wood work, joints by sawing, planing and cutting.

II MECHANICAL ENGINEERING PRACTICE

13

Welding:

- (a) Preparation of arc welding of butt joints, lap joints and tee joints.
- (b) Gas welding practice.

Basic Machining:

- (a) Simple turning and Taper turning.
- (b) Drilling practice.

Sheet Metal Work:

- (a) Forming & Bending:
- (b) Model making – Trays, Funnels, etc.
- (c) Different type of joints.

Machine assembly practice:

- (a) Study of centrifugal pump.
- (b) Study of air conditioner.

Demonstration on:

- (a) Smithy operations, upsetting, swaging, setting down and bending. Example – Exercise – Production of hexagonal headed bolt.
- (b) Foundry operations like mould preparation for gear and step cone pulley.
- (c) Fitting – Exercises – Preparation of square fitting and vee – fitting models.

GROUP B (ELECTRICAL & ELECTRONICS)

III ELECTRICAL ENGINEERING PRACTICE

10

- 1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
- 2. Fluorescent lamp wiring.
- 3. Stair-case wiring.
- 4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
- 5. Measurement of energy using single phase energy meter.
- 6. Measurement of resistance to earth of an electrical equipment.

IV ELECTRONICS ENGINEERING PRACTICE

13

- 1. Study of Electronic components and equipments – Resistor, colour coding measurement of AC signal parameter (peak-peak, rms period, frequency) using CR.
- 2. Study of logic gates AND, OR, EOR and NOT.
- 3. Generation of Clock Signal.
- 4. Soldering practice – Components Devices and Circuits – Using general purpose PCB.
- 5. Measurement of ripple factor of HWR and FWR.

P : 22+23 Total : 45

REFERENCES

- 1. K.Jeyachandran, S.Natarajan & S, Balasubramanian, “A Primer on Engineering Practices Laboratory”, Anuradha Publications, 2007.
- 2. T.Jeyapoovan, M.Saravanapandian & S.Pranitha, “Engineering Practices Lab Manual”, Vikas Publishing House Pvt.Ltd, 2006
- 3. H.S. Bawa, “Workshop Practice”, Tata McGraw – Hill Publishing Company Limited, 2007.
- 4. A. Rajendra Prasad & P.M.M.S. Sarma, “Workshop Practice”, Sree Sai Publication, 2002.
- 5. P.Kannaiah & K.L.Narayana, “Manual on Workshop Practice”, Scitech Publications, 1999.

SEMESTER EXAMINATION PATTERN

The Laboratory examination is to be conducted for Group A & Group B, allotting 90 minutes for each group, with a break of 15 minutes. Both the examinations are to be taken together in sequence, either in the FN session or in the AN session. The maximum marks for Group A and Group B lab examinations will be 50 each, totaling 100 for the Lab course. The candidates shall answer either I or II under Group A and either III or IV under Group B, based on lots.

Engineering Practices Laboratory- List of equipment and components (For a Batch of 30 Students)

CIVIL

1. Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings. 15 Sets.
2. Carpentry vice (fitted to work bench) 15 Nos.
3. Standard woodworking tools 15 Sets.
4. Models of industrial trusses, door joints, furniture joints 5 each.
5. Power Tools: (a) Rotary Hammer 2 Nos.
(b) Demolition Hammer 2 Nos.
(c) Circular Saw 2 Nos.
(d) Planer 2 Nos.
(e) Hand Drilling Machine 2 Nos.
(f) Jigsaw 2 Nos.

MECHANICAL

1. Arc welding transformer with cables and holders 5 Nos.
2. Welding booth with exhaust facility 5 Nos.
3. Welding accessories like welding shield, chipping hammer, wire brush, etc. 5 Sets.
4. Oxygen and acetylene gas cylinders, blow pipe and other welding outfit. 2 Nos.
5. Centre lathe 2 Nos.
6. Hearth furnace, anvil and smithy tools 2 Sets.
7. Moulding table, foundry tools 2 Sets.
8. Power Tool: Angle Grinder 2 Nos.
9. Study-purpose items: centrifugal pump, air-conditioner 1 each.

ELECTRICAL

1. Assorted electrical components for house wiring 15 Sets.
2. Electrical measuring instruments 10 Sets.
3. Study purpose items: Iron box, fan and regulator, emergency lamp 1 each.
4. Megger (250V/500V) 1 No.
5. Power Tools: (a) Range Finder 2 Nos.
(b) Digital Live-wire detector 2 Nos.

ELECTRONICS

1. Soldering guns 10 Nos.
2. Assorted electronic components for making circuits 50 Nos.
3. Small PCBs 10 Nos.
4. Multimeters 10 Nos.
5. Study purpose items: Telephone, FM radio, low-voltage power supply

HS1104 - PHYSICS CHEMISTRY LABORATORY I

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PHYSICS LABORATORY I

LIST OF EXPERIMENTS

1. (a) Particle size determination using Diode Laser.
(b) Determination of Laser parameters – Wavelength, and Angle of divergence.
(c) Determination of Acceptance angle in an Optical Fiber.
2. Determination of thickness of a thin wire – Air wedge method.
3. Determination of velocity of sound and compressibility of liquid – Ultrasonic Interferometer.
4. Determination of wavelength of Mercury spectrum – Spectrometer grating.
5. Determination of thermal conductivity of a bad conductor – Lee's Disc method.
6. Determination of Hysteresis loss in a Ferromagnetic material.

CHEMISTRY LABORATORY I

LIST OF EXPERIMENTS

1. Estimation of Hardness of Water by EDTA method.
2. Estimation of Copper in brass by EDTA method.
3. Determination of DO in water by Winkler's method.
4. Estimation of Chloride in Water sample by Argentometric method.
5. Estimation of alkalinity of Water sample.
6. Determination of molecular weight and degree of polymerization using Viscometry.

- **A minimum of FIVE experiments shall be offered.**
- **Laboratory classes on alternate weeks for Physics and Chemistry.**
- **The lab examinations will be held only in the second semester.**