

SYLLABUS IN CIVIL ENGINEERING



**Department of Civil Engineering
Andhra University College of
Engineering(Autonomous)
Visakhapatnam-530 003
Andhra Pradesh, India**

ANDHRA UNIVERSITY
VISAKHAPATNAM

COMMON SCHEME OF INSTRUCTION & EXAMINATION

I/IV B.E/B.TECH (FOUR YEAR COURSE) - SEMESTER SYSTEM

(With effect from **2006-2007** admitted batch onwards)

I & II SEMESTERS

CODE NO.	COURSE	Credits	Periods L/T/Lab	Exam Hours	Sessional Marks	Exam Marks	Total Marks
ENG 1001	English	2	2+1	3	30	70	100
ENG 1002	Mathematics – I	4	3	3	30	70	100
ENG 1003	Mathematics – II	4	3	3	30	70	100
ENG 1004	Physics Theory	4	3	3	30	70	100
ENG 1005	Chemistry Theory	4	3	3	30	70	100
ENG 1006	History of Science And Technology	2	3	3	30	70	100
ENG 1007	Comp. Prog. And Num. Met4	4	3	3	30	70	100
ENG 1008	Engineering Graphics	5	2+4	3	30	70	100
ENG 1009	Physics Laboratory	2	3	3	50	50	100
ENG 1010	Chemistry Laboratory	2	3	3	50	50	100
ENG 1011	Workshop	2	3	3	50	50	100
ENG 1012	Programming Laboratory	2	3	3	50	50	100
Total		37	39		440	760	1200

ENG 1001 English

The emphasis on English Language is enormously increasing as an effective medium of communication in all sectors the World over. As a consequence of this, the acquisition of effective communication skills in English has become most important to the students to flourish in their careers. In this connection there is a need to train the students to equip themselves with the necessary skills required for effective communication in English thereby enabling them to get a good placement immediately after the completion of their undergraduate courses. To meet the objectives of developing proficiency in English communication skills and developing Listening, Speaking, Reading and Writing (LSRW) skills. The following curriculum is designed for favorable consideration.

CURRICULUM : THEORY AND PRACTICE (LANGUAGE LAB)

1. A TEXT WITH FOCUS ON SKILLS APPROACH

Intended to develop the language skills of Listening, Speaking, Reading and Writing.

2. VOCABULARY :

- a) One – Word Substitutes.
- b) Words often Confused – Pairs of Words.
- c) Synonyms and Antonyms.
- d) Foreign Phrases.
- e) Phrasal verbs derived from the following dynamic verbs_Go, Get, Run, Take, Look, Hold, Put, Stand Etc.
- f) Idioms and phrases.

3. GRAMMAR :

- a) Error Analysis
 - Correction of Errors in a given sentence – errors in the use of words – errors of indianisms – use of slang – errors in punctuation
- b) Concord
- c) Articles, Prepositions and words followed by prepositions.
- d) Tenses.

4. Writing skills :

1. Précis writing
2. Note Making
3. Letter writing.
4. Technical Report Writing.
5. Preparation of C.V and Resume writing.
6. Reading Comprehension.
7. Memo.
8. Notices/Circulars Agenda and Minutes of a Meeting.
9. E-Mail etiquette
10. Essay writing.

Text Book Prescribed :

In order to improve the proficiency of the student in the acquisition of the above mention skills, the following texts and course content is prescribed.

- **LEARNING ENGLISH : A Communicative Approach**, Hyderabad: Orient Long man.
(selected lessons)

The following lessons are prescribed from the above Text:

- i) Astronomy (1)
- ii) Travel and Transport (3)
- iii) Humour (4)
- iv) Environment (6)
- v) Inspiration (7)
- vi) Human Interest (8)

Reference Books Prescribed :

1. Sharma, G.V.L.N., **English for Engineering Students**.
2. Margaret M Maison, **Examine your English**, Orient Longman
3. Krishnaswami,N and Sriraman, T., **Current English for Colleges**, Macmillan.
4. Krishnaswami, N. and Sriraman, T., **Creative English for Communication**, Macmillan.
5. Rizvi, M Ashraf. **Effective Technical Communication**. McGraw – Hill.
6. English for Technical Communication K.R Lakshminarayana, SCITECH.

ENG 1002 Mathematics-I

Lectures/week = 3
Exam=3 Hrs,

Sessional Marks =30
Exam. Marks = 70

Partial Differentiation and its applications:

Functions of Two or More Variables, Partial Derivatives, Homogeneous Functions- Euler's Theorem, Total Derivative. Differentiation of Implicit Functions, Geometrical Interpretation- Tangent Plane and Normal to a surface. Change of Variables, Jacobians, Taylor's Theorem for functions of two variables. Jacobians, Taylor's Theorem for functions of two variables. Errors and approximations. Total Differential, Maxima and Minima of functions two variables. Lagrange's method of undetermined multiples, Differentiation under the integral sign – Leibnitz Rule. Involutes and evolutes.

Multiple integrals and their applications:

Double integrals. Change of order of integration. Double integrals in Polar Co-ordinates, Areas enclosed by plane curves. Triple integrals. Volume of solids. Change of variables. Area of a curve of a curved surface. Calculation of Mass, Center of gravity, Center of pressure, Moment of inertia. Product of inertia. Principle Axes. Beta function, Gamma function. Relation between Beta and Gamma functions. Error function or Probability integral.

Solid geometry (Vector Treatment):

Equation of a plane. Equations of Straight line. Condition for a line to lie in a plane. Coplanar lines. Shortest distance between two lines. Intersection of three planes. Equation of Sphere, Tangent plane to a sphere. Cone, cylinder, Quadric surfaces.

Infinite series:

Definitions. Convergence, Divergence and oscillation of a series, General properties, series of Positive terms, comparison tests, Integral test. D'Alembert's ratio test. Raabe's test. Logarithmic test. Cauchy's Root test. Alternating series- Leibnitz's rule, Series of positive or negative terms. Power series. Convergence of exponential. Logarithmic and Binomial series. Uniform convergence. Weierstrass M-test. Properties of uniformly convergent series.

Fourier series:

Euler's formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Odd and even functions – Expansions of odd or even periodic function. Half range series. Parseval formula, Practical Harmonic analysis.

Text Books:

1. Higher Engineering Mathematics by B.S.Grewal
2. Mathematics for Engineering by Chandrica Prasad.

Reference Books:

1. Higher Engineering Mathematics by M.K.Venkatraman.
2. Advanced Engineering Mathematics by Erwin Kreyszig.

ENG 1003 Mathematics-II

Lectures/week = 3
Exam=3 Hrs,

Sessional Marks =30
Exam. Marks = 70

Linear Algebra:

Rank of a Matrix. Eigen values Eigen vectors of a Matrix. Cayley Hamilton Theorem. Consistency of equations. Matrix Inversion, Gaussian Elimination Scheme. Cholesky factorization. Jacobi and Gauss-Seidal Iterative Methods for solving simultaneous equations. Eigen Value solution using forward iteration. Inverse iteration. Hermitian and skew Hermitian forms. Unitary Matrix, Functions of a Matrix. Quadratic forms and Conical forms.

Differential Equations Of First Order And Its Applications:

Formation of differential equation. Solution of a differential equation. Geometrical meaning. Equations the first order and first degree. Variables separable, Homogeneous equations. Linear equations. Bernoulli's equation. Exact equations. Equation reducible to exact equations. Equations of the first order and higher degree. Clairaut's equation. Geometric applications. Orthogonal trajectories, Physical applications. Simple Electric circuits. Heat flow, Chemical applications. Newton's law of cooling.

Linear Differential Equations:

Higher order linear differential equations with constant Coefficients. Deflection of beams. Simple harmonic motion. Oscillatory Electric circuits.

Series solutions of differential equations:

Frobenius method, Special function as solution from series. Bessel equation, Bessel functions of first and second kind. Equation reducible to Bessel's equations. Legendre's equations, Legendre Polynomial, Rodrigues formula, Generating functions. Recurrence relation. Orthogonality relation for Bessel functions and Legendre Polynomial.

Laplace transforms:

Transforms of elementary functions. Properties of Laplace Transforms, Existence conditions, Inverse transforms, Transform of derivatives, Transform of Integrals. Multiplication's by 't' - division by 't'. Convolution theorem. Application to ordinary differential equations and simultaneous linear equations with constant coefficients. Unit step function, Impulse functions and periodic functions.

Text Books:

1. Theory of Matrices by Shantinarayanan.
2. Higher Engineering Mathematics by B.S. Grewal
3. Adv. Math for Engg students, vol. 2 by Narayana, Manieavachgon Pillay, Ramanaiah

Reference Books:

1. Higher Engineering Mathematics by M.K.Venkataraman.
2. Advanced Engineering Mathematics by Erwin Kreyszig.
3. Engineering Mathematics by P.P. Gupta.
4. A text book on Engg Mathematics by N.P.Bali.

ENG. 1004 Physics

Lectures/week = 3
Exam=3 Hrs,

Sessional Marks =30
Exam. Marks = 70

Thermodynamics

Heat and Work, First law of thermodynamics and applications, Reversible and Irreversible process, Carnot cycle and Efficiency, Entropy, Second law of thermodynamics, Entropy and disorder, Entropy and Probability, Third law of thermodynamics. Thermography and its Applications.

Electromagnetism

Concept of electric field – Point charge in electric field, dipole in an electric field. Gauss law, some applications, electric potential and field strength, potential due to a point charge and dipole.

Magnetic field – magnetic force on current, torque on current loop, Hall effect, Ampere's law, B near a long wire, B for a solenoid and Toroid. The Biot-Savart,s Law. B for a circular Current loop.

Faraday's law of induction. Lenz's law, Calculation of Inductance. L-R Circuit. Energy stored in Magnetic field. Induced magnetic fields, Displacement current. Energy density in Electric and Magnetic fields, Poynting Vector S .

Maxwells equations and Electromagnetic waves (Both differential and Integral forms). Magnetic properties of materials. Paramagnetism, Diamagnetism, Ferromagnetism, Ferrites and its applications.

Optics

Interference – Principles of superposition – Young's Experiment – Coherence – Interference of thin films, Wedge shaped film, Newtons Rings, Michelson Interferometer and its applications.

Diffraction – Single slit (Qualitative and quantitative treatment).

Polarisation – Polarisation by reflection, refraction and double refraction in uniaxial crystals, Nicol prism, Quarter and Half wave plate, circular and elliptical polarization and detection.

Lasers and Fibre Optics

Spontaneous and stimulated emissions, population inversions, Ruby laser, Gas laser, Semiconductor laser, Applications of lasers.

Fibre Optics, Optical Fibre and Total Internal Reflection, Acceptance Angle and cone of a fibre, Fibre optics in communications, Optical parts in Fibre. Fibre Optic Sensors.

Ultrasonics

Production of Ultrasonics by Magnetostriction and Piezoelectric effects – Ultrasonics and diffraction pattern, Applications of Ultrasonics.

Modern Physics

The quantization of energy, Photoelectric effect, De Broglie concept of matter waves, uncertainty principle, Schrodinger wave equation, application to a particle in a box.

Elementary concepts of Maxwell-Boltzmann, Bose-Einstein's and Fermi Dirac Statistics. Fermi Dirac Distribution function (no derivations).

Free electron theory of metals, Band theory of solids, Kronig Penny Model, Metals, Insulators and Semiconductors. Ferroelectrics and their applications

Super conductivity, Meissner Effect, Types of Superconductors and Applications of Superconductors.

Nanophase materials – Synthesis, characterization of nanostructured materials, properties and applications.

Renewable energies – Solar, wind and tidal – Applications

Books Recommended

1. Engineering Physics by R.K. Gaur and S.D. Gupta
2. Physics by David Halliday and Robert Resnick – Part I and Part II
3. Modern Engineering Physics by A.S. Vadudeva
4. University Physics by Young and Freedman
5. Materials Science by V. Rajendra and A. Marikani
6. Nonconventional Energy by Ashoke V. Desai

ENG 1005 Chemistry

Lectures/week = 3
Exam=3 Hrs,

Sessional Marks =30
Exam. Marks = 70

1. Water Chemistry and pollution:

Water Chemistry: Sources of water - impurities – Hardness and its determination – W.H.O. limits. Boiler troubles and their removal. Water softening methods – Lime Soda, Zeolite and Ion exchange. Municipal water treatment – Break point chlorination. Desalination of Sea Water - Electrodialysis and Reverse osmosis methods.

Water pollution: Source – BOD – COD – Sewage treatment - preliminary, primary, secondary and tertiary.

Air Pollution: Source – Air pollutants – CO , SO_x , NO_x , Hydrocarbons and particulates. Acid rain – Green House effect – control of Air pollution (General).

2. Solid State Chemistry:

Classification of Solids – Types of Crystals – Properties - imperfections in crystals. Band theory of solids. Chemistry of Semiconductors - Intrinsic, extrinsic, compound and defect. Organic semiconductors and superconductivity. Purification of solids by zone refining - Single crystal growth – epitaxial growth. Elementary ideas on liquid crystals.

3. Energy Sources:

Thermal Energy: Coal- Ranking of coal - analysis (proximate and ultimate) Calorific value and determination (Bomb calorimeter method) – COKE – Manufacture – Otto Hoffmann's process – Applications.

Chemical Energy: Electrode potential – Calomel electrode – Galvanic cells – primary secondary – Acid and alkaline cells – fuel cells.

Nuclear Energy : Fission and fusion – power reactors – Atomic pile applications .

Solar Energy : Methods of utilization – thermal conversion – Liquid Flat – Plate collector – Photovoltaic conversion - solar cell - Applications.

4. Corrosion Chemistry :

Origin and theories of corrosion – Types of corrosion - Factors affecting corrosion – corrosion control methods . Protective coatings –Metallic coatings – Chemical conversion coatings - phosphate , chromate , Anodized . Organic Coating – paints – special paints – Varnishes and lacquers.

5. Fuels and Lubricants:

Petroleum – refining - Motor fuels – Petrol and Diesel Oil - Knocking – Octane number - Cetane number. Synthetic petrol – Fisher - Tropsch and Bergius methods. LPG and CNG - Applications. Rocket fuels -Propellants - Classification.

Lubricants: Classification - mechanism - properties of lubricating oils - Selection of lubricants for Engineering applications.

6. Polymers and Plastics:

Definition – Types of polymerization – Mechanism of addition polymerization. Effect of polymer structure on properties. Plastics – Thermoplastic resins and Thermosetting resins - Compounding of plastics – Fabrication of plastics. Preparation and properties of cellulose derivatives - Vinyl resins-Nylon(6,6)- bakelites – polycarbonates - epoxy resins. Reinforced plastics. Conducting polymers. Engineering applications of polymers.

7. Building Materials:

Portland Cement: Manufacture - Dry and Wet process. Setting and hardening of cement - Cement concrete - RCC - Decay of concrete - special cements.

Refractories: Classifications - properties - Engineering applications.

Ceramics: Classification - Properties - uses.

Prescribed Text Books

1. Engineering Chemistry, P.C. Jain and M. Jain - Dhanapathi Rai & Sons, Delhi
2. A text book of Engineering Chemistry, S.S. Dara - S. Chand & Co. New Delhi
3. Engineering Chemistry, B.K. Sharma - Krishna Prakashan, Meerut
4. A text book of Engineering Chemistry, - Allied Publishers Balasubramanian et.al.,
5. Material Science and Engineering V. Raghavan - Prentice-Hall India Ltd.,

ENG 1006 History of Science and Technology

Lectures/week = 3

Exam=3 Hrs,

Sessional Marks =30

Exam. Marks = 70

1. Historical Perspective :

The Nature of Science and Technology , Roots of Science and Technology in India , Science and Society , Scientists and Society , Science and Faith and The Rise of Applied Sciences.

2. Policies and Plans After Independence :

Nehru's vision of Science for Independent India, Science and Technology Developments in the New Era Science and Technology Developments during the Five Year Plan Periods and Science and Technology Policy Resolutions.

3. Research and Development (R&D) in India :

Expenditure in R&D, Science and Technology Education, Research Activities and Promotion of Technology Development, Technology Mission, Programms Aimed at Technological self Reliance, Activities of Council of Scientific and Industrial Research (CSIR).

4. Science and Technological Developments in Major Areas :

Space – Objectives of Space Programms, Geostationary Satellite Services – INSAT System and INSAT Services Remote Sensing Applications, Launch Vehicle Technology

Ocean Development – Objectives of Ocean Development, Biological and Mineral Resources, Marine Research and Capacity Building;

Defense Research --- Spin –off Technologies for Civilian Use;

Biotechnology--Applications of Biotechnology in – Medicine, Biocatalysts, Agriculture, Food, Fuel and Fodder, Development of Biosensors and Animal Husbandry;

Energy – Research and Development in Conservation of Energy , India's Nuclear Energy Programme –Technology Spin –offs.

5. Nexus Between Technology Transfer and Development :

Transfer of Technology—Types, Methods, Mechanisms, Process, Channels and Techniques: Appropriate Technology, Technology Assessment, Technological Forecasting, Technological Innovations and Barriers of Technological Change.

Test Books :

1. Kalpana Rajaram , **Science and Technology in India**, Published and Distributed by Spectrum Books (P) Ltd., New Delhi-58.
2. Srinivasan, M., **Management of Science and Technology (Problems & Prospects)**, East – West Press (P) Ltd., New Delhi.

Reference Books :

1. Ramasamy , K. A. and Seshagiri Rao, K.,(Eds.) **Science, Technology and Education for Development**, K., Nayudamma Memorial Science Foundation, Chennai-8.
2. Kohili, G. R., **The Role and impact of Science and Technology in The development of India**, Surjeet Publications.
3. Government of India, **Five Year Plans**, Planning Commission, New Delhi. Sharma, K. D. and Quresh M. A., **Science, Technology and Development**, Sterling Publications (p) Ltd. New Delhi.

ENG 1007 Computer Programming and Numerical Methods

Lectures/week = 3
Exam=3 Hrs,

Sessional Marks =30
Exam. Marks = 70

Objectives:

To make the student familiar with programming in C and enable the student to implement the numerical methods described in this course using C as Programming Language

Section A

Computer Programming in C

Basics: Variables – Constants – Expressions – Operators and their precedence and associativity. Basic input and output statements. Control structures. Simple programs in C using all the operators and control structure.

Functions: Concept of a function – Parameters and how they are passed – Automatic Variables – Recursion – Scope and extent of variables. Writing programs using recursive and non-recursive functions.

Arrays and Strings: Single and multidimensional arrays-Character array as a string- Functions on strings. Writing C Programmes using arrays and for string manipulation.

Structures: Declaring and using structures-Operations on structures – Arrays of structures- User defined data types-Pointers to using files.

Files: Introduction –file structure- File handing functions- file types- Files- Error handing- C Programming examples for using files.

Section B

Computer Oriented Numerical Methods

1. Basic Concepts: Preliminary Concepts of Algorithms-Flow Charts and their execution traces- A Simplified Model of a Computer.
2. Representation for Characters and Numbers: Representation for integer and real numbers. Effect of finite representation on arithmetic operations for example overflow, underflow, associativity and normalization. Some elementary methods for overcoming these limitations.
3. Numerical Methods: Notation of round-off and truncation errors, numerical methods of finding roots of an algebraic equation of one variable. Successive bisection method, False position method, Newton Raphson method and Secant method.
4. Solutions of simultaneous Algebraic Equations; Gauss elimination method and Gauss Seidal methods.
5. Interpolation: Lagrange's Interpolation and difference table methods.
6. Numerical integration: Simpson's rule, Gaussian Quadrature Formula.
7. Numerical Solution of Differential Equation: Euler's method, Taylor's seriesmethod and Runge-Kutta method.

Books:

1. Section A: Programming with C by K.R.Venugopal& Sudeep R Prasad
2. Section B: Introduction to Numerical Methods by S.S Sastry
3. Elementary Numerical Methods by S.D.Conte

Reference:

1. C Programming Language by Kerningham & Ritchie

ENG 1008 Engineering Graphics

Lectures/week = 2+4
Exam=3 Hrs,

Sessional Marks =30
Exam. Marks = 70

Introduction:

Drawing Instruments and uses. Lettering scales in common use.

Curves:

Curves used in Engineering Practice, conic sections, construction of conics by different methods, rectangular-hyperbola, cycloidal curves, trochoids, epi and hypo-cycloids. involutes and Archimedean spiral.

Orthographic Projections:

Projection of points, projection of straight lines, traces of a line, projection of planes and projection on auxiliary planes.

Solids and Developments:

Projection of solids in simple positions, projection of solids with axis inclined to one of the reference planes and parallel to the other, projection of solids with axis inclined to both the reference planes. Projection of spheres. Development of surfaces of solids. Development of transition piece connecting a square and circular pipe. Helices and screw threads.

Sections and Intersections:

Sections of different solids and true shape of sections. Intersection of surfaces-simple problems with cylinders, prisms and cones.

Isometric and Perspective Projections:

Isometric projection and conversion of orthographic projection into isometric projection. Perspective projection. Theory of visual ray method and vanishing point method. Simple problems involving regular geometrical solids.

Textbook:

1. Elements of Engineering Drawing by N.D. Bhatt

Reference:

1. Engineering Graphics by K.L. Narayana and P. Kannaiah

ENG 1009 Physics Laboratory

Practicals/week = 3
Exam=3 Hrs,

Sessional Marks =50
Exam. Marks = 50

12 of the following experiments must be completed:

1. Lee's method- determination of coefficient of thermal conductivity of a bad conductor
2. Melde's experiment-determination of the frequency of an electrically maintained tuning fork.
3. Newton's rings – determination of radius of curvature of a convex lens.
4. Diffraction grating-determination of wavelengths in mercury line spectrum-using spectrometer
5. Determination of Cauchy's constants using Spectrometer and mercury light.
6. Wedge method-det. of thickness of a paper by forming parallel interference fringes.
7. Michelson's interferometer- a) det. of wavelength of light b) Resolution of spectral lines.
8. Det. of μ using calcite crystal.
9. Optical Bench – a) Young's double slit b) Lloyd's mirror c) biprism d) diffraction at an edge e) Thickness of wire
10. Ultrasonic Diffraction – Velocity of ultrasonic waves in liquids.
11. Variation of magnetic field along the axis of current carrying circular coil – Stewart and Gee's apparatus
12. Calibration of voltmeter using potentiometer
13. Carey Foster's bridge a) laws of resistance b) temperature coefficient of resistance
14. B-H curves – determination of hysteresis loss
15. Calendar and Barnes method – determination of specific heat of water
16. Hall effect – a) Determination of hall coefficient B) determination of charge density
17. Photoelectric effect – a) characteristics of photoelectric cell b) det. of Planck's const.
18. Determination of Rydberg constant using hydrogen discharge tube
19. Determination of e/m of an electron – Thomson's method
20. Determination of band gap of semi conductor.

ENG 1010 Chemistry Laboratory

Practicals/week = 3
Exam=3 Hrs,

Sessional Marks =50
Exam. Marks = 50

List of Experiments:

01. Determination of Sodium Carbonate.
02. Determination of Sulfuric acid using a strong base.
03. Estimation of Iron (II) using Potassium Permanganate.
04. Estimation of Oxalic Acid using Potassium Permanganate.
05. Determination of volume strength of Hydrogen Peroxide.
06. Estimation of Calcium in a sample of Portland cement.
07. Estimation of Chromium (VI) using Ferrous Ammonium Sulphate.
08. Estimation of Copper (II) using Sodium thiosulphate.
09. Analysis of Bleaching powder for Chlorine content.
10. Estimation of Zinc by EDTA method.
11. Determination of hardness of a water sample (EDTA Method).
12. Determination of alkalinity of a water sample.

Demonstration Experiments:

13. Determination of Viscosity of a Lubricating oil.
14. Preparation of Copper pigment.
15. Preparation of Phenol-Formaldehyde resin.
16. Digital pH meter.
17. Digital potentiometer.
18. D.O. Analyser.

ENG 1011 Workshop

Practicals/week = 3
Exam=3 Hrs,

Sessional Marks =50
Exam. Marks = 50

1. Carpentry:

Bench work, tools used in carpentry.

Jobs for class work – half lap joint, mortise and tenon joint, half –lap dovetail joint, corner dovetail joint, bridle joint.

2. Sheet Metal:

Tools used in sheet metal work. Laying developments of sheet metal jobs, soldering.

Jobs for class work – square tray, taper side tray, funnel, elbow pipe.

3. Fitting:

Tools used in fitting work. Different files, chisels, hammers and bench vice.

Jobs for class work – hexagon, rectangular, circular and triangular fits. External and internal threads with dies and taps.

Reference

1. Elements of Workshop technology, Vol.1 by S.K. and H.K. Hajra Choudary

ENG 1012 Programming Laboratory

Practicals/week = 3

Exam=3 Hrs,

Sessional Marks =50

Exam. Marks = 50

1. Write a program to read x,y coordinates of 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What will be the output from your program if the three given points are in a straight line?
2. Write a program, which generates 100 random integers in the range of 1 to 100. Store them in an array and then print the arrays. Write 3 versions of the program using different loop constructs. (e.g. for, while, and do while)
3. Write a set of string manipulation functions e.g. for getting a sub-string from a given position, Copying one string to another, Reversing a string, adding one string to another.
4. Write a program which determines the largest and the smallest number that can be stored in different data types like short, int., long, float and double. What happens when you add 1 to the largest possible integer number that can be stored?
5. Write a program, which generates 100 random real numbers in the range of 10.0 to 20.0, and sort them in descending order.
6. Write a function for transposing a square matrix in place (in place means that you are not allowed to have full temporary matrix).
7. First use an editor to create a file with some integer numbers. Now write a program, which reads these numbers and determines their mean and standard deviation.
8. Given two points on the surface of the sphere, Write a program to determine the smallest arc length between them.
9. Implement bisection method to find the square root of a given number to a given accuracy.
10. Implement Newton Raphson method to det. a root of polynomial equation.
11. Given a table of x and corresponding f(x) values, write a program which will determine f(x) value at an intermediate x value using Lagrange's interpolation.
12. Write a function which will invert a matrix.
13. Implement Simpson's rule for numerical integration.
14. Implement Gaussian quadrature for numerical integration.
15. Write a program to solve a set of linear algebraic equations.