MATS UNIVERSITY

Raipur (C.G.)

Syllabus Scheme

(3rd Semester)

For

Bachelor of Engineering

In

MECHANICAL

MATS School of Engineering & Technology

ARANG , RAIPUR (C.G.)

MATS UNIVERSITY

ARANG, RAIPUR

Subject Code For MATS School of Engineering & Tech.

3rd Semester (MECHANICAL)

S.No.	Subject Code	Subject Name
1	BE310	Engineering Mathematics-III
2	BE311	Metrology & Instrumentation
3	BE312	Fluid Mechanics
4	BE313	Mechanics of Solid-I
5	BE314	Kinematics of Machines
6	BE315	Computer Programming
7	BE316	Metrology & Instrumentation Lab
8	BE317	Fluid Mechanics Lab
9	BE318	Material Testing Lab
10	BE319	Computer Programming Lab

MATS UNIVERSITY

ARANG, RAIPUR

Scheme of Teaching & Examination
B.E. III SEMESTER MECHANICAL ENGINEERING

S.N.	code	Subject	Periods per week			Scheme of marks		Total Marks
			L	T	P	ESE	IM	
1.	BE310	Engg. Mathematics - III	4	1	-	70	30	100
2.	BE311	Metrology & Instrumentation	4	1	-	70	30	100
3.	BE312	Fluid Mechanics	4	1	-	70	30	100
4.	BE313	Mechanics of Solid -I	4	1	-	70	30	100
5.	BE314	Kinematics of Machines	4	1	-	70	30	100
6.	BE315	Computer Programming	4	1	-	70	30	100
7.	BE316	Metrology & Instrumentation Lab	-		3	20	30	50
8.	BE317	Fluid Mechanics Lab	-		3	20	30	50
9.	BE318	Material Testing Lab	-		3	20	30	50
10.	BE319	Computer Programming Lab	-		3	20	30	50
		Total	**24**	**6**	**12**	**500**	**300**	**800**

L – Lecture, T – Tutorial, ESE – End Semester Examination,

P – Practical, IM – Internal Marks (Include Class Test & Teacher's Assessments)

MATS UNIVERSITY
SEMESTER –III
BRANCH – MECHANICAL
SUBJECT- ENGINEERING MATHEMATICS - III
CODE-BE310

Unit-I

Fourier Series

Periodic functions, Euler's formula. Even and odd functions, half range expansions, Fourier series of different wave forms.

Unit-II

Laplace Transforms

Laplace transforms of various standard functions, properties of Laplace transforms, inverse Laplace transforms, transform of derivatives and integrals, Laplace transform of unit step function, impulse function, periodic functions, applications to solution of ordinary linear differential equations with constant coefficients, and simultaneous differential equations.

Unit-III

Special Functions

Power series solution of differential equations, Frobenius method, Legendre's equation, Legendre polynomial, Bessel's equation, Bessel functions of the first and second kind. Recurrence relations, equations reducible to Bessel's equation, Error function and its properties.

Unit-IV

Partial Differential Equations

Formation of partial differential equations, Linear partial differential equations, homogeneous partial differential equations with constant coefficients Applications: Wave equation and Heat conduction equation in one dimension. Two dimensional Laplace equation, solution by the method of separation of variables. Laplacian in polar coordinates.

Unit-V

Functions of Complex Variable

Limits, continuity, derivative of complex functions, analytic function, Cauchy-Riemann equation, conjugate functions, harmonic functions; Conformal Mapping: Mapping of a complex function, conformal mapping, standard transforms, mapping of standard elementary transformations, complex potential, applications to fluid flow problems; Complex Integration : Line integrals in the complex plane, Cauchy's theorem, Cauchy's integral formula and derivatives of analytic function. Taylor's and Laurent's expansions, singular points, poles, residue, complex integration using the method of residues, evaluation of real integrals by contour integration.

Text Books

1. Advanced Engineering Mathematics by Kreyszing Erwin ; Wiley Eastern, New Delhi
2. Higher Engineering Mathematics by BS Grewal : Khanna Publishers, New Delhi.
3. Numerical Solutions of Differential Equations by NK Jain ; Prentice Hall, Delhi.
4. Differential Equations by Sharma and Gupta ; Krishna Prakashan Media (P) Ltd.,Meerut.

5. Peter V. O'Neil, Advance Engineering Mathematics Thomson (Cengage) Learning, 2007.
6. Jain, Iyenger & Jain, Numerical Methods for Scientific and Engineering Computation, New Age International, New Delhi , 2003.
7. J.N. Kapur, Mathematical Statistics, S. Chand & company Ltd.,2000

Reference Books :-

1. R.K. Jain & S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publication House, 2002.
2. Chandrika Prasad, Advanced Mathematics for Engineers, Prasad Mudralaya, 1996.
3. E. Kreysig, Advanced Engineering Mathematics, John Wiley & Sons, 2005.
4. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 2005.
5. Devi Prasad, An introduction to Numerical Analysis, Narosa Publication house, New Delhi 2006.
6. T. Veerajan & T. Ramchandrandran, Theory & Problems in Numerical Methods, TMH, New Delhi, 2004.
7. S.P.Gupta, Statistical Methods, Sultan and Sons, New Delhi, 2004.
8. Devore, Probability and Statistics, Thomson(Cengage) Learning, 2007.
9. Walpole, Myers, Myers & Ye, Probability and Statistics for Engineers & Scientists, Pearson Education, 2003.
10.Advanced Engg.Mathematics by R.K. Jain and S.R.K. Iyengar – Narosa Publishing House.
11. Applied Mathematics by P.N.Wartikar & J.N. Wartikar. Vol- II– Pune Vidyarthi Griha Prakashan,Pune.
12. Applied Mathematics for Engineers & Physicists by Louis A. Pipes- TMH.

MATS UNIVERSITY
SEMESTER –III
BRANCH – MECHANICAL
SUBJECT- METROLOGY & INSTRUMENTATION
CODE-BE311

UNIT - I
Generalized Measurement System
Introduction - Introduction to measurement and measuring instruments, Generalized measuring system and functional elements, units of measurement, static and dynamic performance characteristics of measurement devices, calibration, concept of error, sources of error, statistical analysis of errors sensors and Transducers – Types of sensors, type of transducers and their characteristics.

UNIT - II
Measurement
Measurement of displacement and angular velocity. Measurement of pressure: Gravitational direct acting, elastic and indirect type pressure transducers. Measurement of very low pressure –Mcleod gauge and Pirani gauge.
Measurement of Strain
Type of strain gauges and their working, strain gauge circuits, Mcleod guage, Pirani guage, temperature compensation. Strain rosettes. Measurement of force and torque. Measurement of temperature by thermometers, bimetallic, thermocouples, thermistors and pyrometers-total radiation and optical pyrometry.

UNIT- III
Measurement of flow
Obstruction meters, variable head meters, hot wire and magnetic meters, ultrasonic flow meters. Vibration and noise measurement .

UNIT- IV
Metrology
Standards of measurement. Linear and angular measurement devices and systems limit gauges, gauge blocks. Measurement of geometric forms like straightness, flatness, roundness and circularity, principles and application of optical projectors, tool makers, microscope, Autocollimators etc.

UNIT- V
Metrology & INTERFEROMETRY
Principle and use of interferometry. Comparators, Measurement of screw threads and gears. Surface texture measurement.

TEXT BOOKS
1. Mechanical Measurements and Control – D.S. Kumar – S.K. Kataria & Sons
2. Mechanical Measurements – G. Beckwith Thomas G. – Pearson Education

REFERENCES BOOKS
1. Measurement Systems, Application Design – E.O. Deoblein - McGraw Hill
2. Engineering Metrology – K.J. Hume - MacDonald and Company
3. Engineering Metrology – I.C. Gupta - Dhanpat Rai & Sons
4. Mechanical & Industrial Measurements – R.K. Jain – Khanna Publishers

MATS UNIVERSITY
SEMESTER –III
BRANCH – MECHANICAL
SUBJECT-FLUID MECHANICS
CODE-BE312

UNIT I

Properties of fluid
Fluid, ideal and real fluid, properties of fluid : mass density, weight density, specific volume, specific
gravity, viscosity, surface tension, capillarity, vapour pressure, compressibility and bulk modulus.
Newtonian and non-Newtonian fluids
Fluid Statics
Pressure, Pascal's law, Hydrostatic law, Pressure measurement, Hydrostatic force on submerged plane
and curved surface, Buoyancy and Flotation, Liquid in relative equilibrium.

UNIT – II

Fluid Kinematics
Description of fluid motion, Langragian and Eulerian approach, Type of fluid flow, Type of flow lines-path
line, streak line, stream line, stream tube.Continuity equation, acceleration of a fluid particle, motion of
fluid particle along curved path, Normal and tangential acceleration, Rotational flow, Rotation and
Vorticity, circulation, stream and potential function, flow net ,its characteristics and utilities.
UNIT – III

Fluid Dynamics
Bernoulli's equation and its practical application, Venturimeter, Orifice meter, Nozzle , Pitot tube. Impulse momentum equation, Momentum of Momentum equation, Kinetic energy and Momentum correction factor, Vortex motion, Radial flow.

UNIT – IV

Laminar Flow
Reynold's experiment, shear stress and pressure gradient relationship, flow of viscous fluids in circular pipe and between two parallel plates, coutte flow.
Turbulent flow
Effect of turbulence, friction loss in pipe flow, shear stress, velocity distribution.
Flow through pipe
Loss of energy in pipes, Hydraulic gradient and total energy line, pipe in series and parallel, equivalent pipe power transmission through pipe, water hammer in pipes.

UNIT – V
Dimensional Analysis
Methods of dimensional analysis, Rayleigh's method, Buckingham's theorem, Limitations.
Model analysis, Dimensionless number and their significance, model laws, Reynolod's model law, Fraude's model law,
Euler's model law, Weber's model law, Mach's Model law, Type of models, scale effect in model,
limitation of hydraulic similitude.

References :

1. S Narasimhan : First Course in Fluid Mechanics , University Press
2. Som, S.K. & Biswas G. : Introduction of fluid mechanics & Fluid Machines, TMH, 2000,2nd edition.
3. M M Das : Fluid Mechanics & Turbomachines , Oxford University Press
4. S.K.Agarwal : Fluid Mechanics & Machinery, TMH
5. Garde, R.J., " Fluid Mechanics through Problems", New Age International Pvt. Ltd, New Delhi, 2nd Edition.
6. Hunter Rouse, "Elementary Mechanics of Fluids", John Wiley & Sons. Omc. 1946
7. I.H.Shames, "Mechanics of Fluids", McGraw Hill, Int. Student, Education, 1988.
8. Fluid Mechanics by Jagdish Lal
9. Vijay Gupta and S.K.Gupta, " Fluid Mechanics and its Applications", Wiley Eastern Ltd,1984.
10. Modi, P.N., and Seth, S.H., "Hydrualics and Fluid Machines", Standard Book House,1989.
11. Fluid Mechanics – A.K. Mohanty – Prentice Hall Pub.
12. Introduction to Fluid Mechanics and Fluid Machines – S.K. Som and G. Biswas- TMH
13. Mechanics of Fluid – B.S. Massey – English Language Book Society (U.K.)

Books

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar : S.K. Kataria and Sons Publishers
2. Mechanics of Fluids by Massey BS; Van Nostrand Reinhold Co
3. Fluid Mechanics by Douglas JF, Gasiorek JM, Swaffield JP; Poitman
4. Fluid Mechanics by Streetes VL and Wylie EB; Mcgraw Hill Book Co
5. Fluid Mechanics and Fluid Power Engineering – D.S. Kumar– Kataria & Sons – New Delhi
6. A text of Fluid Mechanics – R. K. Rajput – S. Chand & Company Ltd., Delhi

MATS UNIVERSITY
SEMESTER –III
BRANCH – MECHANICAL
SUBJECT - MECHANICS OF SOLID-I
CODE-BE313

UNIT – I
Introduction
Basic of Stress & Strain, elastic constants, stress – strain diagram, Hooke's law, stresses in the components subjected to multi-axial forces, temperature stresses, statically indeterminate systems.

UNIT – II
Bending of Beams
Bending of Beams with symmetric section, boundary conditions, pure bending, bending equations, Transverse shear stress distribution in circular / hollow circular / I & T section.

UNIT – III
Deflection of Beams
Relation between slope deflection & radius of curvature, solution of beam deflection, problems by Macaulay's Method, Direct integration method, Moment Area method, Method of Super position.

UNIT - IV
Torsion
Deformation in circular shaft due to torsion, basic assumptions, torsion equations, stresses in elastic range, angular deflection, hollow & stepped circular shaft.
Springs
Closed & Open Coil Helical Springs subjected to Axial Load, Springs in parallel & series.

UNIT – V
Principal Stress & Strain
Transformation of plane stress, principal stresses, maximum shear stress, Mohr's Circle for Plane Stress,
Plane Strain and its Mohr's circle representation, Principal Strains, Maximum Shear Strain.
Combined Loading
Components subjected to bending, torsion & axial load.

TEXT BOOKS

1. Strength of Material – Dr. Sadhu Singh – Khanna Publishers

2. Elements of Strength of Material – Timo Shenko & Young – EWP Press

3. Strength of Material – R.K. Rajput – Dhanpat Rai & Sons

REFERENCE BOOKS

1. Strength of Material – Rider – ELBS
2. Mechanics of Material – F.P. Bear & E.E. Johnston – McGraw Hill
3. Mechanics of Material – J.M. Gera & Time Shenko – CBS Publishers
4. Introduction to Solid Mechanics – I. H. Shames – PHI
5. Engineering Mechanics of Solids – E.P. Popov – PHI
6. Strength of Material – Shaums Outline Series – McGraw Hill

MATS UNIVERSITY
SEMESTER –III
BRANCH – MECHANICAL
SUBJECT-KINEMATICS OF MACHINES
CODE-BE314

UNIT- I

Relative Velocity
Elements, pairs, mechanisms, four bar chain and its inversions, velocity diagrams, Relative velocity method, instantaneous center method.

UNIT- II
Relative Acceleration
Synthesis of Mechanism, pantograph, lower pair mechanisms, relative acceleration diagram, Klien's construction, Coroilis Component of acceleration.

UNIT - III
Cams:
Classification of cams and followers, nomenclature of a radial cam, description of follower movement, displacement diagrams, uniform and modified uniform motion, simple harmonic motion, uniform acceleration motion and its modifications, cycloidal motion, synthesis of cam profile by graphical approach, considerations of pressure angle, cams with specified contours: circular arc cam & tangent cam.

UNIT- IV
Gear and gear trains
Gear terminology, law of gearing, gear tooth forms, standard involute and cycloid tooth profile,interference and undercutting of involute teeth, minimum number of teeth on pinion to avoidinterference, types of gears
Gear trains
Simple, compound, reverted, and epicyclical gear trains, tabular/analytical/graphical/vector method for computation of velocity ratio in gear trains

UNIT-V
Friction
Friction in turning pairs, application of friction circles in slider crank and four bar mechanisms; pivot and collar friction, thrust bearings.
Brakes and Dynamometers
Simple block and shoe brake, band brake, band and block brake, and internal expanding shoe brake; absorption dynamometers, transmission dynamometers.

TEXT BOOKS

1. Theory of Machine- S.S.Rattan - TMH.
2. Theory of Machine – P.L. Ballaney – Khanna Publishers
3. Theory of Machines – J. E. Shigley – McGraw Hill

REFERENCE BOOKS

1. Theory of Mechanisms and Machines- A. Ghosh, A. K. Mallik – EWP Press
2. The Theory of Machines - Thomas Bevan, - CBS Publishers
3. Mechanisms and Machine Theory - J. S. Rao, R. V. Dukkipati - Wiley Eastern Limited

MATS UNIVERSITY
SEMESTER –III
BRANCH – MECHANICAL
SUBJECT- COMPUTER PROGRAMMING
CODE-BE315

UNIT - I
Algorithm / pseudo code, flowchart, program development steps, structure of C program, A Simple C program, identifiers, basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation.

UNIT – II
Input-output statements, statements and blocks, if and switch statements, loops- while, do-while and for statements, break, continue, goto and labels, programming examples.

UNIT – III
Designing structured programs, Functions, basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C preprocessor, example c programs.

UNIT – IV
Arrays- concepts, declaration, definition, accessing elements, storing elements, arrays and functions, two-dimensional and multi-dimensional arrays, applications of arrays. pointers-concepts, initialization of pointer variables, pointers and function arguments, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions, command line arguments, c program examples.

UNIT – V
Derived types- structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bitfields, C program examples.
Input and output – concept of a file, text files and binary files, streams, standard I/o, Formatted I/o, file I/o operations, error handling, C program examples.

TEXT BOOKS :

1. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.
2. DataStructures Using C – A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson education.

REFERENCES :

1. C& Data structures – P. Padmanabham, B.S. Publications.
2. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education
3. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
4. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
5. Data Structures and Program Design in C, R.Kruse, C.L. Tondo, BP Leung, Shashi M, Second Edition, Pearson Education

MATS UNIVERSITY
SEMESTER –III
BRANCH – MECHANICAL
SUBJECT-METROLOGY & INSTRUMENTATION LAB
CODE-BE316

Experiments to be performed

1. Measurements of lengths, heights, diameter by Vernier Calipers, Vernier Height Gauge, Micrometers.
2. Measurement of various angles using Bevel Protractor, Sine Bar & Combination Set.
3. Determining the accuracy of Electrical and Optical Comparator.
4. Determine the Surface Flatness and Contour using Interferometer.
5. Determine the
6. Measurement of Gear Elements using Profile Projector and image analyzer.
7. Measurement of Tool Angles Effective Diameter of screw threads by using Two wire & Three wire methods of a Single Point Cutting Tool by using Tool Makers Microscope.
8. Calibration of Vernier Caliper, Micrometer, Height Gauge, Depth Micrometer using Slip Gauges.
9. To Measure Temperature Using Thermister.
10. To Measure Flow Rate Using Rotameter.
11. To Measure Pressure Using Pressure Transducer.
12. To Measure Strain Using Strain Cantilever Beam.

LIST OF EQUIPMENTS/MACHINES REQUIRED

APPARATUS SET UP	EQUIPMENTS / TOOLS
1. Pressure Measurement Tutor Using Pressure Transducer 2. Strain Measurement Tutor Using Strain Cantilever Beam 3. Temperature Measurement Tutor Using RTD Sensor 4. Temperature Measurement Tutor Using Thermocouple 5. Temperature Measurement Tutor Using Thermister 6. Angular Measurement Tutor Using Angular Sensor	1. Vernier Calipers 2. Vernier Height Gauge 4. Set of Slip Gauges 6. Tool Makers Microscope 7. Profile Projector 8. Bevel Protector 9. Sine Bar 10. Combination Set 11. Optical & Electrical Comparator 12. Optical Flats 13. Surface Plates 14. Dial Indicators 15. Snap and Ring Gauges (GO and NO-GO type)

MATS UNIVERSITY
SEMESTER –III
BRANCH – MECHANICAL
SUBJECT - FLUID MECHANICS LAB
CODE-BE317

EXPERIMENTS TO BE PERFORMED

1. To determine the meta-centric height of a ship model.
2. To verify Bernoulli's Theorem.
3. To verify Impulse Momentum Principle.
4. To calibrate a Venturimeter and study the variation of coefficient of discharge.
5. To calibrate an orifice-meter.
6. Experimental determination of critical velocity in pipe.
7. To determine of head loss in various pipe fittings.
8. Flow measurement using Pitot tube.
9. To study the transition from laminar to turbulent flow and to determine the lower critical Reynold's number.
10. To determine the hydraulic coefficients (Cc, Cd and Cv) of an orifice.
11. To determine the coefficient of discharge of a mouth piece.
12. To obtain the surface profile and the total head distribution of a forced vortex.
13. To study the velocity distribution in pipe and to compute the discharge by integrating velocity profile.
14. To study the variation of friction factor for pipe flow.
15. To determine the roughness coefficient of an open channel.

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. Apparatus for determination of metacentric height
2. Bernoulli's apparatus
3. Impact of jet apparatus
4. Venturimeter
5. Orificemeter
6. Pipe friction apparatus
7. Orifice apparatus
8. Mouth Piece apparatus with the provision for determination of hydraulic coefficient Cc, Cd & Cv
9. Vortex flow apparatus
10. Apparatus of head loss in various pipe fittings.
11. Reynold's apparatus
12. Complete setup for flow measurement using Pitot tube
13. Complete set for open channel apparatus

MATS UNIVERSITY
SEMESTER –III
BRANCH – MECHANICAL
SUBJECT - MATERIAL TESTING LAB
CODE-BE318

EXPERIMENTS TO BE PERFORMED

1. To study the Universal Testing Machine.
2. To perform the Tensile Test of Mild Steel on U.T.M and To Draw Stress–Strain Curve.
3. To determine strength of wood on U.T.M (i) Along the Grain (ii) Across the Grain.
4. To determine shear strength of Mild Steel on U.T.M.
5. To observe Flexural Behavior of Timber specimen and to determine it's strength under transverse loading on U.T.M.
6. To study the Impact Testing Machine and test specimen of Izod and Charpy.
7. To determine Izod and Charpy Value of the given mild steel specimen.
8. To study the Fatigue Testing Machine and to discuss the procedure to find out endurance limit of given material.
9. To study the Spring Testing Machine.
10. To determine modulus of rigidity for the material of open and closed Coiled Helical Spring Subjected to Axial Load by spring testing machine.
11. To study the Torsion Testing Machine
12. To determine ultimate shear stress and modulus of rigidity under Torsion.
13. To study the Cupping Test Machine and to determine Erichsen value of Mild Steel sheet.
14. To study the Rockwell Hardness Testing Machine and to determine the Rockwell Hardness of the given material.
15. To study the Brinell Hardness Machine and to determine the Brinell hardness of the given material.
16. To study the Vickers Hardness Machine and to conduct a test on the machine.
17. Buckling of column

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. Universal Testing Machine
2. Impact Testing Machine
3. Fatigue Testing Machine
4. Spring Testing Machine
5. Torsion Testing Machine
6. Cupping Testing Machine
7. Rockwell Hardness Testing Machine
8. Brinell Hardness Machine
9. Vickers Hardness Machine
10. Column Testing Machine

MATS UNIVERSITY
SEMESTER –III
BRANCH – MECHANICAL
SUBJECT- COMPUTER PROGRAMMING LAB
CODE -BE319

EXPERIMENTS TO BE PERFORMED

1. Write a program to calculate the area & perimeter of the rectangle and the area & circumference of the circle. The length and breadth of a rectangle and radius of a circle are input through keyboard.
2. Write a program to determine whether the character entered through a keyboard is a capital letter, a small case letter, a digit or a special symbol.
3. Write a program to add first seven terms of the following series using looping statements series is

$$s = \frac{1}{1!} + \frac{2}{2!} + \frac{3}{3!} + \cdots$$

4. Write a program which has the following options:
   a. Factorial of a number
   b. Prime or not
   c. Odd or even
5. Write a program to implement Bubble sort on a set of 10 numbers.
6. Write a program to store every character typed at the keyboard into a file. The procedure should come to an end as soon as the 'Esc' key is pressed.
7. Write a program to find the roots of an equation using Newton Raphson Method.
8. Write a program to practice one of the Numerical Integration Method.
9. Write a program to find the solution of Differential Equation by Modified Euler's Equation.
10. Write a program to find the solution of Differential Equation by Runge Kutta Equation.

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. P-IV, 2.6 G. Hz., 128/256 MB SDRAM, 40 GB HDD, 1.44 MB FDD, 14" Colour Monitor,
   52 X CD RW, Laser Scroll Mouse
2. Software Required – C & C++