

MATS School of Engineering & Technology

MATS University

Raipur



Syllabus Scheme
(3rd Semester)
For
Bachelor of Engineering
In
CIVIL Engineering

Subject Code For MATS School of Engineering & Tech. Deptt.

3rd Semester (Civil)

S.No.	Subject Code	Subject Name
1	BE340	Mathematics-III
2	BE341	Fluid Mechanics I
3	BE342	Computer Programming
4	BE343	Mechanics of Solids
5	BE344	Surveying-I
6	BE345	Building Materials
7	BE346	Fluid Mechanics I-Lab
8	BE347	Mechanics of Solids Lab
9	BE348	Surveying-I LAB
10	BE349	Computer Programming Lab



MATS School of Engineering & Technology
MATS University, Raipur
Scheme of Teaching & Examination
IIIrd Semester
Civil Engineering



S. No.	Course code	SUBJECT	Periods per week		Evaluation Scheme		Total Marks
			L	P	IM	ESE	
THEORY							
1	BE340	Mathematics-III	5	0	30	70	100
2	BE341	Fluid Mechanics I	5	0	30	70	100
3	BE342	Computer Programming	5	0	30	70	100
4	BE343	Mechanics of Solids	5	0	30	70	100
5	BE344	Surveying-I	5	0	30	70	100
6	BE345	Building Materials	5	0	30	70	100
PRACTICAL							
7	BE346	Fluid Mechanics I-Lab	0	3	20	30	50
8	BE347	Mechanics of Solids Lab	0	3	20	30	50
9	BE348	Surveying-I Lab	0	3	20	30	50
10	BE349	Computer Programming Lab	0	3	20	30	50

L-Lecturer, P-Practical, ESE- End Semester Examination, IM-Internal Marks

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GULLU, ARANG, RAIPUR

Semester: B.E.III Sem.

Subject:-MATHEMATICS--III

Total Theory Periods: - **40**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Branch:- Civil Engineering

Code :- BE340

Total Tutorial Periods: **15**

UNIT-1

Fourier Series

Periodic functions, Euler's formula, Dirichlet conditions, change of interval, Even and odd functions, Half range fourier series, Parseval's identity, Practical harmonic analysis.

(No. Of Pds 8+2)

UNIT-2

Partial Differential Equation

Formation, Solution by direct integration method, Linear equation of first order, Homogeneous linear equation with constant coefficients, Non-homogeneous linear equations, method of separation of variables.

(No. Of Periods 8+2)

UNIT-3

Complex Variables

Limit and derivative, Analytic functions, Cauchy-Riemann equations, Harmonic functions, Flow problems, Complex integration, Cauchy's theorem, Cauchy integral formula, Taylor & Laurent series, singularity, residues, Cauchy's residue theorem, Evaluation of real definite integrals.

(No. Of Periods 8+2)

UNIT-4

Numerical Solution Of Ordinary And Partial Differential Equations

Numerical Solution of ODE's Taylor's series method, Picard method, Euler's method, Euler's modified method, Runge-Kutta methods, Predictor-Corrector methods, Milne method, Adams-Bashforth method.

Numerical solution of PDE's, Classifications of second order PDE, Elliptic equations, solution of Laplace equations, solution of Poisson's equation, solution of elliptic equation by relaxation method, Parabolic equation, solution of one dimensional and 2-D heat equations, hyperbolic equation, Wave equation.

UNIT-5

Numerical Solution of Algebraic, Transcendental and Simultaneous equations Differential

Numerical solution of algebraic and transcendental equations: Newton-Raphson method, Secant method, Birage - Vieta method, Bairstow method.

Numerical solution of simultaneous linear equation: Direct method-Gauss elimination, Gauss-jordan and Crout's, Triangularisation method.

Iterative methods - Jacobi's, Gauss-Seidel and Successive over relaxation method.

(No. Of Periods 8+2)

TEXT BOOKS:-

- 1.Higher Engg. Mathematics by dr.B.S.Grewal-Khanna publishers.
- 2.Advanced engg.Mathematics by Erwin kreyszig-John wiley & sons.

REFERENCE BOOKS:-

1. Advanced Engg.Mathematics by R.K. jain and S.R.K.iyengar-narosa publishing House.
2. Applied Mthematics by P.N.Wartikar & J.N.Wartikar.Vol-II Pune vidyarthi Griha Prakashan Pune.
3. Applied Mathematics for Engineers & Physicists by Louis A.Pipes-TMH.

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GULLU, ARANG, RAIPUR

Semester: B.E.III Sem.

Subject:-Fluid mechanics-I

Total Theory Periods: - **40**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Branch:-Civil Engineering

Code:-BE341

Total Tutorial Periods: **10**

UNIT-1

Introduction

Fluid and continuum, physical properties of fluids ideal and real fluid, Newtonian and Non-Newtonian fluid.

Fluid Statics

Pressure density-height relationship, pressure measurement by manometers, Pressure on plane and curved surfaces, center of pressure, buoyancy, stability of immersed and floating bodies, metacentric height, fluid mass subjected to uniform accelerations.

(No. Of Periods 8+2)

UNIT-2

Kinematics of fluid flow

Steady and unsteady flow, uniform and non uniform flow, laminar and turbulent flow. one two and three dimensional flow, streamlines, streak lines and path lines, circulation and vorticity, rotational and irrotational flow, velocity potential and stream function, graphical and experimental methods of drawing flow nets, continuity equation.

(No. Of Periods 8+2)

UNIT-3

Dynamics of fluid flow

Euler's equation of motion along a streamline and its integration, Bernoulli's equation and its application – Pitot tube, Venturimeter, Orificemeter. nozzles momentum equation and its application to stationary and moving plates/vanes, pipe bends, problems related to combined application of energy and momentum equations.

(No. Of Periods 8+2)

UNIT-4

Flow in Pipes

Reynold's experiment, experimental determination of critical velocity, transition from laminar to turbulent flow, laminar flow through circular tubes, flow between parallel plates, minor losses in pipe lines, loss due to sudden contraction, expansion, etc; hot wire anemometer and LDA.

Flow in open Channel

Comparison between open channel and pipe flow, definition of uniform and non-uniform flow, uniform flow formula, Chezy's and Manning's formula, Hydraulically efficient channel section of rectangular, trapezoidal and circular type. **(No. Of Periods 8+2)**

UNIT-5

Flow through mouthpieces and orifices

Hydraulic coefficients of orifice, bell method orifice, mouthpieces, Borda's mouthpieces, running free and submerged.

Notches and Weirs

Rectangular, triangular and trapezoidal notches and weir, cippoletti and crested weir, aeration of nappe, cavitations submerged weir.

(No. Of Periods 8+2)

Name of Text Books:-

A text book of fluid mechanics by R. K. Bansal (Luxmi publication)

A text book of fluid mechanics and Hydraulic mechanics in SI Units by R. K. Rajput (S. Chand and company)

Reference Books:-

Fluid Mechanics by Frank M. White (TMH)

A text book of Fluid Mechanics and Hydraulic mechanics with introduction of fluids by Domkundwar and Domkundwar (Dhanpatrai and company)

Hydraulic and Fluid Mechanics by P. N. Modi and S. M. Seth (Rajhans publication Pvt. Ltd.)

Introduction to Fluid Mechanics by Som Biswas (TMH)

Hydraulic Machines by Jagdish lal (Metropolitan book company Pvt. Ltd.)

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GULLU, ARANG, RAIPUR

Semester: B.E. III Sem.

Branch: Civil Engineering

Subject: Computer Programming

Code: BE342

Total Theory Periods: **40**

Total Tutorial Periods: **10**

Total marks in end semester Exam: **100**

Minimum Number of class test to be conducted: **02**

UNIT I:

CHAPTER 1: History of C, Importance of C, BASIC Structure of C Programs, Programming Style, Executing a C Program, C Tokens, Keywords & Identifiers in C, Constants & Variables in C

UNIT II:

CHAPTER 2: Data Types, Operators : Arithmetic operator, Relational operators, Logical Operator, Assignment Operator, Increment & Decrement operator, Conditional operator, Bitwise Operator Expressions, Precedence of Arithmetic Operator, Input & Output operations

UNIT III:

CHAPTER 3 : Decision Making& looping: Simple If Statement, If-Else Statement, Nested If Else Statement, Switch Statement, Go To Statement. Loop: While, Do while, For Loop

Arrays: Introduction, One-Dimensional Array, Two Dimensional Array, Multi Dimensional Array, Declaration & Initializing of array

UNIT IV:

CHAPTER 4: String: Declaration & Initializing of string variables, Putting String Together, Comparison Of String.

Pointers: Introduction, Declaration & Initializing of pointer variable, Accessing variable through pointer, Pointer expression.

UNIT V:

CHAPTER V: Functions: Introduction, Need for user define function, Definition of function, Function calls, Argument with return value, Argument without return value, Recursion, Structure & Union.

Name of Text Books:

1. Programming in C By E. Balagurusamy (TMH)
2. Programming in C "Amiya Kumar Rath,Alok Kumar Jagadev,Santosh Ku.Swain

Reference Books :-

1. The C programming Language by Dennis M Ritchie and Kernighan (PHI)
2. Let us C by Yashwant Kanetkar (BPB Publication)
3. C for all by S. Thamarai Selvin & R. Murugesan (Anuradha Agencies)
4. Programming in C by Ghosh (PHI)
5. Computer Programming in C by V. Rajaraman (PHI)

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GULLU, ARANG, RAIPUR

Semester: B.E.III Sem.

Subject:-Mechanics of Solids

Total Theory Periods: - **40**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Branch:-Civil Engineering

Code:- BE343

Total Tutorial Periods: **10**

Unit 1

Stress Strain Relations

Types of stresses and strains, Mechanicals properties and testing of steel, Hooke's law, Uniaxial tensile test, stress – strain curve, hardness, impact, Poisson's ratio, Modulus of rigidity, Bulk modulus, Relation between the elastic constants, Thermal effects, Elongation of bars of constant and varying sections. Statically indeterminate problems in tension and compression. Thin cylindrical and spherical vessels.

Unit 2

Analysis of Stresses and Strains

Body forces, Surface forces, Internal Force, Stress at a point. Components of stress in rectangular coordinates, Principal stresses, Transformation equations, Stress invariants. Plane stresses. Mohr's circle for plane stress, Differential equations of equilibrium. Deformable bodies, Concepts of normal strain and shear strain, Strain components at a point. Transformation equations. Principal strains. Mohr's circle for strains. Compatibility conditions. Displacement equation of equilibrium, Plane strain.

Unit 3

Bending of Beams

Theory of simple bending - limitations - bending stresses in beams of different cross sections, beams of uniform strength, beams of two materials, shear stresses in symmetrical elastic beams transmitting both shear and bending moment. Shear force and bending moment diagrams for simply supported overhanging and cantilever beams and statically determinate plane frames

Unit 4

Columns and Combined stresses

Stable and unstable equilibrium, Short columns, Euler's formula for long columns, Rankin's formula. Beams subjected to bending and shear, Eccentrically loaded short column, Kern of rectangular sections, Middle third rule, stability of gravity dams & retaining walls.

Unit 5

Unsymmetrical Bending and Torsion

Unsymmetrical bending – Location of neutral axis, Shear flow - shear centre - determination of shear centre for simple sections. Torsion of circular solid and hollow circular shafts - power transmission. Closed coiled and open coiled helical springs.

Name of Text Books:

Strength of Materials – R.K. Rajput (S. Chand & Co.)

Mechanics of Materials – B.C. Punmia (Laxmi Publication)

Name of Reference Books:

Mechanics of Structures (Vol. – I) – Junarkar (Charotar Publications)

Strength of Materials – Timoshenko, S. & Gere (CBS Publishers)

Introductions to Solid Mechanics –Shames & Pitarresi (Prentice Hall of India)

Engineering Mechanics of Solid – Popov (Pearson Publication)

Strength of Materials – S. Ramamurtham (Dhanpat Rai Publications)

Strength of Materials (Part-I) – Timoshenko (CBS Publishers)

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GULLU, ARANG, RAIPUR

Semester: B.E.III Sem.

Subject:-Surveying-I

Total Theory Periods: - **40**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Branch:- Civil Engineering

Code:- BE344

Total Tutorial Periods: **10**

UNIT – I

SURVEYING

Chain Survey: Instruments used. Selection of survey-stations. Chain-lines, Off-sets, Oblique-offsets, Tie-lines, Check-lines. Ranging. Field-Book, Plotting, Survey of India Topo-sheets. Their scales and conventional symbols.

Compass Survey: The prismatic compass. Definition and types of meridian. Dip and Declination. Whole circle bearing, Fore bearing and Back bearing. Local attraction. Calculation of included angles for closed and open traverses.

[No. of Pds: 8+2]

UNIT – II

LEVELLING

Levelling: Various parts of a Dumpy level, Temporary adjustments, Interrelationship of Bubble Tube Axis, Line of Collimation and Vertical Axis, Leveling staff, technical terms used in Levelling. Fly leveling. Profile leveling. Level field book. Arthmetical checks and problems on leveling.

Contours: Definition, Contour value. Identification of ridge, valley and other geographical features on a contoured plan. **[No. of Pds: 8+2]**

UNIT – III

Trilateration and Triangulation

Principle of Trilateration, EDM instrument and their uses, Reduction of observation, Principle and classification of Triangulation System, Triangulation chains, Strength of Figures, Station marks and Signals, Satellite station, intersected and Resected points, field work- Reconnaissance, Intervisibility of station, Angular measurement, Base line measurement and its extension, Adjustment of Field observation and computation of co-ordinates.

UNIT – IV

Adjustment Computations

Weighting of observations. Treatment of random errors, probability equation, Normal law of error, Most Probable Value 7 measures of precision, Propagation of errors and variances. Most probable value, Principle of Least square, Observations and correlative Normal Equations. Adjustment triangulation figures and level nets.

UNIT – V

Plane Table Survey

Principles, advantage and disadvantage , plane table equipment , Use of telescopic alidade and Indian pattern tangent clinometers , Different methods of plane table surveying , resection –Two and Three point problems. Field work in plane Table Surveying and Contouring.

Minor Instrument

Hand level , Abney level , Clinometer , Ceylon ghat tracer , Pentagraph , Planimeter , Ideograph. **[No. of Pds: 8+2]**

BOOKS RECOMMENDED

1. Surveying Vol. I by B.C. Punmia & Ashok Jain
2. Suverying Vol. II by B.C.Punmia & Ashok Jain
3. Surveying Vol. I by S.K.Duggal
4. Surveying Vol II by S.K.Duggal

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Semester: B.E.III Sem.

Subject:-Building of Materials

Total Theory Periods: - **40**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Branch:-Civil Engineering

Code :- BE345

Total Tutorial Periods: **10**

Unit 1. Building Material & Construction

Bricks : Classification , Dimension, Characteristics , moulding , Various Test on bricks. Fly ash bricks.

Mortar: Definition, properties and usages.

Stone: Geological, physical and chemical classification of stone, important stones, uses of stone.

Steel: Different between Cast-iron, wrought iron and steel, mild steel and Tor-steel.

Building Plans: Reading and comprehending a building plan and section. Conventional symbols for representing doors, electrical and sanitary fittings etc.

[No. of Pds: 8+2]

Unit 2. Cement & Aggregates

Raw materials, manufacturing process, Setting times , Vicat apparatus, Grades of cement, Pozzolana cement & its classification, usages, Fly ash.

Types of Cement, Hydration of cement, tests on properties of cement, ferro cement.

Aggregate: Classification of Aggregates and their properties, grading curve and fineness modules. **(No. of Pds: 8+2)**

Unit 3. Concrete

Properties of concrete in fresh and hardened state, water cement ratio, Modulus of elasticity, factors affecting strength of concrete and durability, mixing, transporting, placing, compacting and curing concrete, variables in proportioning concrete mixes, admixtures in concrete, tests on concrete.

Special concrete – Polymer concrete, fibre reinforced concrete, light weight concrete, high strength concrete, heavy weight concrete , ready mixed concrete, shotcrete, smart concrete. **(No. of Pds : 8 + 2)**

Unit 4. Timber and Plywood

Characteristics of good timber, seasoning and preservation, names of timber producing trees and their relative market value.

Types and uses of plywood, veneers and hardboards Low cost materials for construction. System concepts, cost effective materials, industrial wastes, agricultural wastes. **(No. of Pds : 8 + 2)**

Unit 5. Paints, Glass etc.

Commercially available varieties of ceramics, glass and their uses, types of tiles, method of manufacturing and tests for suitability. Uses of Plastics and PVC. Composition and use of paints, varnishes and distempers. Composite materials, types and uses. **(No. of Pds : 8 + 2)**

Name of Text Books:

Building Materials – S.K. Duggal (New Age Publication)

Building Materials – S. C. Rangwala (Charotar Publication)

Name of Reference Books:

Concrete Technology – A.M. Neville & J.J. Brooks (Pearson Education)

Concrete Technology – M.S. Shetty (S. Chand & Co.)

Engineering Materials – Surendra Singh (Laxmi Publication)

Construction Engineering and Management – S. Seetharaman
(UmeshPublication)

Building Materials – Gurucharan Singh (Standard Publishers, Delhi)

Department of Civil Engineering List of Experiment

Subject: Surveying I lab.
Code: BE-348

EXPERIMENTS

01. Determination of location of a point with the help of Two point problem.
02. Determination of location of a point with the help of Three point problem.
- 03.To plot a transverse of area by chain survey.
- 04.To plot a transverse of area by prismatic compass (open)
- 05.To plot a transverse of area by prismatic compass (close)
- 06.To workout relative elevation of various points on area by performing profile leveling.
- 07.To determine the elevation of a point with respect to reference by fly leveling.
08. Study of minor instruments.

Department of Civil Engineering
List of Experiment

LAB FOR "C"

Subject : **Computer Programming Lab**
Code : **BE 349**

- (1) Write a program to add 2 numbers?
- (2) Write a program to print digit in reverse order?
- (3) Write a program to find if a number is even or odd?
- (4) Write a program to find greatest number using if statement?
- (5) Write a program to find greatest number using nested if else?
- (6) Write a program to find if number is perfect number or not?
- (7) Write a program to find prime number?
- (8) Write a program for Lucas series?
- (9) Write a program for Fabonary series?
- (10) Write a program to print Armstrong number?

Department of Civil Engineering
List of Experiment

Subject: Fluid Mechanics

Semester: IIIrd

Code: BE 346

1. To determine the meta-centric height of a ship model.
2. To calibrate an orifice-meter.
3. To determine the head loss in various pipe fittings.
4. To determine the coefficient of discharge of a mouthpiece.
5. To study the variation of friction factor for pipe flow.
6. To verify the Bernoulli's theorem.
7. To verify impulse momentum principle.
8. To calibrate a Venturimeter and study the variation of coefficient of discharge.
9. Experimental determination of critical velocity of pipe.
10. Flow measurement using pitot tube.
11. To study the transition from laminar to turbulent flow and to determine the lower critical Reynolds's number.
12. To determine the hydraulic coefficients (C_c , C_d and C_v) of an orifice.
13. To obtain the surface profile and the total head distribution of a forced vortex.
14. To determine the roughness coefficient of an open channel.

Department of Civil Engineering
List of Experiment

Subject: Material Testing lab
Semester: IIIrd
Code: BE 347

- 1.** Determination of compressive strength of cement cube.
- 2.** Determination of tensile strength of cement cube.
- 3.** Determination of fineness of cement by sieving method.
- 4.** Determination of fineness of cement by Blain Apparatus.
- 5.** To determine Uniaxial tensile test of mild steel.
- 6.** To determine Izod Charpy Value of given mild steel.
- 7.** To determine the Rockwell Hardness of given material.
- 8.** To determine Compressive strength of wood: (a.) Along the fiber and (b.) Across the fiber.
- 9.** To study the cupping test machine and determination of Erichser value of mild steel sheet.
- 10.** To determine the modulus of rigidity of material of given shaft.