MAHATMA GANDHI UNIVERSITY

B.TECH. DEGREE COURSE

4TH SEMESTER

SCHEME
&
SYLLABUS

2002

CIVIL ENGINEERING BRANCH

CIVIL ENGINEEING

SCHEME

4TH SEMESTER

Course Code	Subject Code	Subject	Duration of Uty. Exam (hrs.)	No. of periods per week (hrs)			Marks			
				Lect.	Tut.	Prac.	Sessional	Theory	Practical	Total
A	CMELRPTA401	Engineering Mathematics -III	3	3	1	-	50	100		150
B	C402	Fluid Mechanics – II	3	2	2	-	50	100		150
C	C403	Structural Analysis - I	3	2	2	-	50	100		150
D	C404	Engg. Economics and Construction Management	3	2	2	-	50	100		150
E	C405	Surveying – II	3	3	2	-	50	100		150
F	C406	Civil Engineering Drawing –II	3	-	-	3	50	100		150
G	C407	Hydraulics Laboratory	3	-	-	3	50		100	150
H	C408	Surveying Practical -II	3	-	-	3	50		100	150
Total			24	12	9	9	400	600	200	1200

SYLLABUS

ENGINEERING MATHEMATICS - III

CMELRPTA401 **3+1+0**

Module 1

Ordinary Differential Equations: Linear Differential equations with constant coefficents - Finding P.I. by the method of variation of parameters – Cauchys equations - Linear Simultaneous eqns- simple applications in engineering problems.

Module 2

Partial Differential Equations: Formation by eliminating arbitrary constants and arbitrary Functions - solution of Lagrange Linear Equations – Charpits Method – solution of homogeneous linear partial differential equation with constant coefficients – solution of one dimensional wave equation and heat equation using method of separation of variables – Fourier solution of one dimensional wave equation.

Module 3

Fourier Transforms: Statement of Fourier Integral Theorems – Fourier Transforms – Fourier Sine & Cosine transforms - inverse transforms - transforms of derivatives – Convolution Theorem (no proof) – Parsevals Identity - simple problems.

Module 4

Probability and statistics: Binomial law of probability - The binomial distribution, its mean and variance - Poisson distribution as a limiting case of binomial distribution - its mean and variance - fitting of binomial & Poisson distributions - normal distribution - properties of normal curve - standard normal curve - simple problems in binomial, Poisson and normal distributions.

Module 5

Population & Samples: Sampling distribution of mean (σ known) –Sampling distribution of variance, F and Chi square test – Level of significance - Type 1 and Type 2 errors – Test of hypothesis – Test of significance for large samples – Test of significance for single proportion, difference of proportions, single mean and difference of mean (proof of theorems not expected).

References

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
2. M.K. Venkataraman, Engineering Mathematics Vol. II -3rd year Part A & B, National Publishing Company.
3. Ian N.Sneddon, Elements of Partial Differential Equations,Mc Graw Hill International Edn.

4. Richard A Johnson, Miller and Fread's Probability and statistics for engineers, Pearson Education Asia / PHI.
5. Bali and Iyengar, A text book of Engineering Mathematics (Volume II), Laxmi Publications Ltd.
6. Erwin Kreyszig, Advanced Engg. Mathematics, Wiley Eastern Ltd.
7. Hogg and Tanis, Probability and statistical inferences, Pearson Education Asia.

FLUID MECHANICS - II

C402 **2+2**

Module 1

Flow in open Channel – Uniform and non uniform flow, equations for uniform flow – Chezy's and Manning's formula, Most economical cross sections – Velocity distribution in open channels, Conveyance of a canal section, Normal depth, computation of uniform flow, Energy in open channel flow, specific energy, specific force diagrams, critical velocity, critical states of flow, Froude number, measurement of discharge in channels.

Module 2

Gradually varied flow – Dynamic Equation for gradually varied flow, Different forms of the dynamic equation, Characteristics of surface profiles in prismatic channels, backwater computation by direct step method.

Module 3

Rapidly varied flow, hydraulic jump – initial and sequent depths, non-dimensional equation, Practical application of hydraulic jump, Types of jump in horizontal floor, Basic characteristics of the jump, Energy loss, efficiency, height of jump, jump as energy dissipater, stilling basins, Location of hydraulic jump.

Module 4

Hydraulic Machines – Impact of jet, Force of jet on stationary and moving plates – turbines – Classification, velocity triangle for Pelton, Francis, Kaplan turbines, Specific speed, selection of turbines, draft tube – types, Penstock, surge tank – types, tail race.

Module 5

Centrifugal Pumps – Types, Velocity triangle for pumps, Head of pump, Losses and efficiency, Minimum starting speed, Specific speed, Multistage pump, Pumps in parallel. Positive displacement pumps – working principle, types of reciprocating pumps, work done, effect of acceleration and frictional resistance, slip and coefficient of discharge. Indicator diagram, separation in suction and delivery pipes. Air vessel – rate of flow into and from air vessel.

References

1. Ven Te Chow, Open Channel Hydraulics, Mc Graw Hill Ltd.
2. K. Subrahmanya, Flow in open channel vol.1, Tata McGraw Hill, New Delhi

3. Dr. P. N. Modi & Dr. S. M. Seth, Hydraulics & Fluid Mechanics, Standard Book House, Delhi.
4. Jagadheesh Lal, Hydraulic Machines, Metropolitian Book Co., New Delhi.

STRUCTURAL ANALYSIS - I

C403 **2+2**

Module 1

Deflection of determinate beams: Differential equation of the elastic curve-slope and deflection of beams by method of successive integration-Macaulay's method- moment area method-conjugate beam method-deflection due to shear.

Module 2

Energy Theorems: Strain energy due to axial load-bending-shear and torsion-principle of super position-principle of virtual work-Castigliano's first theorem-Betti's theorem-Maxwell's law of reciprocal deflection-unit load method and strain energy method for determination of deflection of statically determinate beams-pin jointed frames-effect of temperature-lack of fit.

Module 3

Moving loads and influence lines: effect of moving loads-influence lines for reaction, shear force and bending moment for determinate beams-load position-absolute maximum bending moment.

Module 4

Arches: Theoretical arch-Eddy's theorem-analysis of three hinged arches – moving loads on arches-settlement and temperature effect.

Module 5

Cables and suspension bridges: General cable theorem-analysis of cables under concentrated and uniformly distributed loads-shape and stresses due to self weight-anchor cables-temperature effect-suspension bridges with three hinged and two hinged stiffening girders-influence lines for bending moment and shear force-temperature stresses in stiffening girder.

References

1. Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Co.1996.
2. Smith J.C. Structural Analysis, Macmillian Pub.Co.1985.
3. Rajesekharan &Sankarasubramanian,G., Computational Structural Mechanics,

Prentice Hall of India, 2001.
4. Wang C.K.& Solomon C.G., Introductory Structural Analysis, McGraw Hill.1968.
5. Sadhu Sindh, Strength of Materials, Khanna Publishers, 1988.
6. Seeli F.B.& Smith J.P., Advanced Mechanics of Materials, John Wiley &Sons, 1993.
7. Norris & Wilbur, Elementary Structural Analysis, McGraw Hill.
8. Junarker S.R., Mechanics of Structures, Vol. II, Charorbar Book Stall.
9. Timoshenko S.P, Young D.H., Theory of structures, McGraw Hill
10. Thadani B.N, Desai J.P, Structural mechanics, Weinall Book Corporation.
11. Punmia B.C., Strength of materials and theory of structures, Vol.II, Laxmi publications.

ENGG. ECONOMICS AND CONSTRUCTION MANAGEMENT

C 404 **2+2**

Part A
Engineering Economics

Module 1

Indian Industries: Industrial pattern-Industrial growth-Inadequacies of the program of industrialisation-Role of the public sector-problems and prospects of privatization-multinational corporations and their impacts on the Indian economy-inflation-demand pull and cost push-effects of price increases.

Module 2

Accountancy: Objectives of accounting – management accounting and financial accounting – journal – ledger – the trial balance – balance sheet – profit and loss account.

Module 3

Financial management: The Indian financial system – types of banks and their functions – long term financing – the stock market – functions and problems faced by the stock market – Industrial finance – loans and return of loans – cost benefit analysis – methods of appraising profitability – pay back method – average rate of return – internal rate of return – net present value.

Part B
Construction Management

Module 4

Introduction to job planning and Management: Bar charts and mile stone charts - work breakdown structure - C P M and PERT networks - Network and time estimates - Earliest expected time - Forward pass and backward pass - Time estimates - related problems.

Module 5

Project costs analysis: Cost Vs Time curve - optimum duration- related problems - updating, resource allocation - resource smoothing – resource leveling - Network compression - Compression limited by crashing - float- parallel critical paths - crashed critical paths – most economical solution.

Module 6

Industrial Relations: Payment of wages Act - Minimum wages Act - Employees State Insurance Act –Workers participation in management – labour welfare and social security – Industrial safety and welfare provision – role of state in labour welfare – role of labour welfare officers social security principles and practice.

References

1. A.N.Agarwal, Indian economy, Wishwa prakashan.
2. Prasanna Chandra, Fundamentals of financial management, Tata McGraw Hill.
3. Ruddar Datt, K.P.M. Sundaram, Indian economy, S.Chand &Co.
4. James.D.Steevens, Techniques for Construction Network Sheduling, McGraw Hill.
5. S.C.Sharma, Management of Systems, Khanna Publishers.
6. T.R.Banga, S.C.Sharma, Industrial Organisation and Engineering Economics, Khanna Publishers.
7. L. S. Srinath, PERT and CPM Principles and Applications, East – West Press.

SURVEYING - II

C405 **3+2**

Module 1

Triangulation: triangulation figures – classification of triangulation systems – selection of triangulation stations – intervisibility and heights of stations – station marks – signals and towers – base line – choice – instrument and accessories – measurement of base lines – corrections – satellite stations – need, reduction to centre – extension of base.

Module 2

Theory of errors and triangulation Adjustments: Kinds of error – laws of weights – principles of least squares – determination of most probable value of quantities – probable error – distribution of error to the field measurements – normal equation – Method of corrections – Adjustment of simple triangulation figures.

Module 3

Hydrographic surveying – Equipment – Methods of locating soundings – reduction and plotting of soundings – use of sextants and station pointer. Geodesy

– shape of earth – effects of curvature – spherical excess – convergence of meridians.

Module 4

Terrestrial photogrammetry – General principles – photo theodolite – horizontal position of a point from photogrammetric measurements – elevation of a point – determination of focal length of lens. Aerial photogrammentry – aerial camera – scale of vertical photograph – relief displacement on a vertical photograph – principle of parallax – stereoscopic pairs – flight planning – radial line method – flying height and overlaps – remote sensing – concepts of remote sensing – ideal remote sensing system.

Module 5

Field Astronomy: - Definitions – celestial sphere – co-ordinate systems – astronomical triangle – sidereal, apparent and mean solar time – corrections to astronomical observations – determination of azimuth, latitude and longitude – different methods.

References

1. T. P. Kanetkar and Kulkarni, Surveying and leveling Vol. II, A.V.G. Publications, Pune.
2. B. C. Punmia, Surveying and leveling Vol. II, Laxmi Publications (P) LTD, New Delhi.
3. Thoms M.Lillerand, Remote sensing and image interpretation, John Wiley & Sons, Inc. New York.
4. Dr. K.R. Arora, Surveying Vol. II, Standard Book House, New Delhi.

CIVIL ENGINEERING DRAWING - II

C406 **0+3**

Preparation of design, sketches and working drawings as per area and functional requirements.
Working drawings for

1. Residential buildings: Flat and pitched roof – cottages, bungalows and flats (single storied and double storied) (4 sheets)
2. Public buildings – schools, offices, libraries, restaurants, commercial complexes (3sheets)
3. Preparation of site plan and plan as per building rules. (2 sheets)
4. Plumbing: water supply and sanitary drawings for residential buildings. (1 sheet)

The student is expected to know local building rules and national building code provisions. The student is expected to prepare sketch design for clients and submission drawings for approval

References

1. Balagopal & T. S. Prabhu, Building drawing & detailing, Spades Publishers and distributors, Calicut.
2. Shah & Kale, Building Drawing, Tata Mc Graw Hill, New Delhi.
3. B.P.Varma, Civil Engineering drawing and House Planning, Khanna Publishers, Delhi.
4. Gurucharan Singh, Subhash Chander Sharma, Civil Engineering drawing, Standard Publishers distributors, Delhi.
5. National Building code, Kerala building byelaws.

HYDRAULICS LABORATORY

C407 **0+3**

PART A -FLOW

1. Study of taps, valves, pipe fittings, gauges, pitot tubes, watermeters and current meters.
2. Determination of metacentric height and radius of gyration of floating bodies.
3. Hydraulic coefficients of orifices and mouth pieces under constant head method and time of emptying method.
4. Calibration of venturimeter, orifice meter and water meter.
5. Calibration of rectangular and triangular notches.
6. Determination of Darcy's and Chezy's constant for pipe flow.
7. Determination of Chezy's constant and Mannings number for open channel flow.
8. Determination of discharge coefficient for Plug-Sluices.

PART B - MACHINERY

1. Study of centrifugal, self priming and reciprocating pumps; impulse and reaction turbines
2. Performance characteristics of centrifugal pump.
3. Performance characteristics of reciprocating pump.
4. Performance characteristics of self priming pump.
5. Performance characteristics of Pelton wheel .
6. Performance characteristics of Francis turbine.
7. Performance characteristics of Kaplan turbine.

SURVEYING PRACTICAL - II

C408 **0+3**

1. Measurement of vertical angles using theodolite.
2. Solution to problems on heights distances by observations using a theodolite.

3. Traversing using a theodolite – distribution of errors using gale's traverse table.
4. Determination of constants of the transit theodolite.
5. Heights and distances – using the stadia Tacheometer Principles.
6. Heights and distances – using tangential tachometry.
7. Setting out a simple circular curve by offsets from long chord.
8. Setting out a circular curve by Rankine's method.
9. Setting out a building – Foundation marking.
10. Study of total station.