Academic Scheme

for

B.Tech. Civil Engineering

Four Years Programme

Syllabus

As per

(Choice Based Credit System)

(I – IV Semesters- for Batch 2015 & onwards)

Department of Civil Engineering IUST, Awantipora, Pulwama -192122

OVERVIEW FOR B.TECH COURSE CIVIL ENGINEERING-2015 & ONWARDS

Semester-I

Course Code	Course Title	L – P	Credit (L+P)	Subject Type
PHY-111T	Physics-I	4– 0	4	C
CHM-111T	Chemistry-I	4 – 0	4	C
MTH-111T	Mathematics-I	4 – 0	4	C
ELE-101T	Basic Electrical Engineering	3 – 0	3	CF
BIO-101T	Environmental Science	4 – 0	4	CF
CIV-101T/P	Engineering Drawing	2 – 3	4	CF
MEC-101P	Engineering Workshop	0- 3	2	CF
PHY-112P	Physics-I Lab	0 – 2	1	C
CHM-112P	Chemistry –I Lab	0 – 2	1	C
	Total Credits	21-10	27	

Semester-II

Course Code	Course Title	L – P	Credit (L+P)	Subject Type
PHY-211T	Physics-II	4 – 0	4	C
CHM-211T	Chemistry II	4 – 0	4	C
MTH-211T	Mathematics-II	4 – 0	4	C
CSE-201T	C Programming	4 – 0	4	CF
CIV-201T	Elements of Civil Engineering	3 - 0	3	CF
ECE-201T	Basic Electronics and communication Engineering	3– 0	3	CF
PHY-212P	Physics-II Lab	0 – 2	1	C
CHM-212P	Chemistry II Lab	0 – 2	1	C
CSE-202P	C Programming Lab	0– 2	1	CF
	Total Credits	22-6	25	

OVERVIEW FOR B.TECH COURSE CIVIL ENGINEERING-2015 & ONWARDS

Semester-III

Course Code	Course Title	L – P	Credit (L+P)	Subject Type
CIV-311T	Structural Analysis I	4 – 0	4	C
CIV-312T	Surveying I	4 – 0	4	C
CIV-313T	Fluid Mechanics I	4 – 0	4	C
CIV-314T	Building materials	4 – 0	4	C
MTH-312T	Probability & Statistics	3 – 0	3	C
CIV-315P	SOM Lab	0– 2	1	C
CIV-316P	Surveying Lab-I	0 – 2	1	C
CIV-317P	Fluid Mechanics Lab I	0 – 2	1	C
XXX-xxxTP	Elective I (Generic)	x – x’	X	GE
	Total Credits	19+x – 6+x’	22+X	

Semester -IV

Course Code	Course Title	L – P	Credit	Subject Type
CIV-411T	Structural Analysis-II	4 – 0	4	C
CIV-412T	Surveying-II	4 – 0	4	C
CIV-413T	Fluid Mechanics-II	4 – 0	4	C
CIV-414T	Concrete Technology	3 – 0	3	C
CIV-415TP	Construction Techniques & Building Drawing	2 – 2	3	C
MTH-412T	Numerical Methods	4 – 0	4	C
CIV-416P	Fluid Mechanics Lab II	0– 2	1	C
CIV-417P	Structure Lab II	0 – 2	1	C
CIV-418P	Surveying Lab II	0 – 2	1	C
CIV-418(SC)P	Surveying Camp	0 - 3	2	C
	Total Credits	21 - 11	27	

OVERVIEW FOR B.TECH COURSE CIVIL ENGINEERING-2015 & ONWARDS

Semester-V

Course Code	Course Title	L – P	Credit	Subject Type
CIV-511T	Design Of Concrete Structures I	4 – 0	4	C
CIV-512T	Geotechnical Engineering-I	4 – 0	4	C
CIV-513T	Water supply Engineering	4 – 0	4	C
CIV-514T	Quantity Survey & Cost Estimation	4– 0	4	C
CIV-515T	Advanced Structural Analysis	4 – 0	4	C
XXX-xxxT	Elective II (Open)	x – x’	X	OE
CIV-516P	Geotechnical Lab I	0– 2	1	C
CIV-517P	Water Quality Lab	0 – 2	1	C
CIV-518P	Concrete Technology Lab	0 - 2	1	C
	Total Credits	20 +x -6+x’	23 +X	

Semester-VI

Course Code	Course Title	L – P	Credit	Subject Type
CIV-611T	Design Of Steel Structures	4 – 0	4	C
CIV-612T	Geotechnical Engineering-II	4 – 0	4	C
CIV-613T	Transportation Engineering-I(Highway & Pavement Management System)	4 – 0	4	C
CIV-614T	Water Resources Engineering	4 – 0	4	C
XXX-xxxT	Elective III (Open)	x – x’	X	OE
YYY-yyyT	Elective IV (Open)	y – y’	Y	OE
CIV-615P	Geotechnical Lab II	0– 2	1	C
CIV-616P	Transportation Lab	0– 2	1	C
CIV-617P	Geophysical Lab	0 – 2	1	C
	Total Credits	16 +(x+y) - 4+(x’+y’)	18 +(x+Y)	

OVERVIEW FOR B.TECH COURSE CIVIL ENGINEERING-2015 & ONWARDS

Semester-VII

Course Code	Course Title	L - P	Credit	Subject Type
CIV-711T	Design Of Concrete Structure-II	4 - 0	4	C
CIV-712T	Irrigation & Flood Structures	4 - 0	4	C
CIV-713T	Structural Dynamics	4 - 0	4	C
CIV-714T	Environmental Engineering	3- 0	3	C
XXX-xxxT	Elective V (Open)	x – x’	X	OE
YYY-yyyT	Elective VI (Open)	y – y’	Y	OE
CIV-715P	Pre Project Work	0 - 4	2	C
CIV-716P	Seminar	0 - 4	2	C
CIV-717P	Tour & Training	0-4	2	C
CIV-718P	Dynamics & earthquake Lab	0 - 2	1	C
	Total Credits	15+(x+y) - 14+(x’+y’)	22+(x+y)	

SEMESTER-VIII

Course Code	Course Title	L - P	Credit	Subject Type
CIV-811T	Design of Bridge Structures	4 - 0	4	C
CIV-812T	Earthquake Resistant Design	4 - 0	4	C
CIV-813TP	Project	5 - 10	10	C
CIV-814P	Professional viva-voce	0-3	2	C
XXX-xxxT	Elective VII (Open)	x – x’	X	OE
YYY-yyyT	Elective VIII (Open)	y – y’	Y	OE
	TOTAL CREDITS	13+(x+y) -13+(x’+y’)	20+(x+y)	

ELECTIVES

LIST OF OPEN ELECTIVES

Course Code	Subject	L - P	Credits	Preferred semester	Prerequisite
CIV-E01T	**Traffic Engineering & Transportation Facilities**	**3 - 0**	**3**	**V**	Civil Engineering Background
CIV-E02T	**Disaster Management**	**3 – 0**	**3**	**V**	Engineering Science Background
ECE-E24T	**Applied Electronic Instrumentation**	**3 – 0**	**3**	**V**	Basic Electronics Engineering
CIV-E03T	**Construction Technology**	**3 – 0**	**3**	**VI**	Structural Analysis I &II
CIV-E04T	**Advanced Measurement Techniques (Remote Sensing / GPS)**	**3 - 0**	**3**	**VI**	Computer Science/Physics/Math/ Engineering discipline/Geology/ Geo-informatics
CIV-E05T	**Computer Applications in Civil Engineering**	**3 – 0**	**3**	**VI**	Concrete Technology & Design
CIV-E06T	**Engineering Geology & Seismology**	**3 - 0**	**3**	**VI**	Civil Engineering background
CIV-E07T	**Civil Engineering Management**	**3 - 0**	**3**	**VII**	Civil Engineering Background
CIV-E08T	**Green Architecture & Town Planning**	**3 - 0**	**3**	**VII**	Engineering Background
CIV-E09T	**Computer Graphics& Design**	**3 - 0**	**3**	**VII**	Engineering Background
CIV-E10T	**Advanced Geo-Tech Engineering**	**3 - 0**	**3**	**VII**	Geotechnical Engineering I & II
CIV-E11T	**Hydropower Engineering**	**3 - 0**	**3**	**VIII**	Water Resource Engineering
MTH-E01T	**Operation Research & optimization**	**3 - 0**	**3**	**VIII**	Transportation Engg I/ Advanced Structural Analysis/Geotechnical Engg I & II
CIV-E12T	**Transportation Planning & Economics**	**3 - 0**	**3**	**VIII**	Transportation Engineering I)
CIV-E13T	**Rock Mechanics & Tunneling Technology**	**3 - 0**	**3**	**VIII**	Civil Engineering Background

LIST OF GENERIC ELECTIVES

Course Code	Subject	L - P	Credits	Preferred semester	Prerequisite
MEC-G01TP	Machine Drawing	3 – 0	3	III	Engineering Background
CIV-G01T	Professional Communication& Engineering Ethics	3 – 0	3	III	Engineering Background
CSE-G03TP	MATLAB For Engineers	1 – 3	3	III	Math as Science Subject

LIST OF OPEN ELECTIVES OFFERED TO SISTER BRANCHES

Course Code	Subject	L - P	Credits	Preferred semester	Prerequisite
CIV-E02T	Disaster Management	3 – 0	3	V	Engineering Science Background
CIV-E04T	Advanced Measurement Techniques (Remote Sensing / GPS)	3 - 0	3	VI	Computer Science/ Physics/ Maths/ Engg. discipline/ Geology/ Geoinformatics
CIV-E08T	Green Architecture & Town Planning	3 - 0	3	VII	Engineering Background
CIV-E09TP	Computer Graphics & Design	2 - 1	3	VII	Engineering Background

OVERVIEW FOR B.TECH COURSE CIVIL ENGINEERING

Semester-I

Course Code	Course Title	L – P	Credit (L+P)	Subject Type
PHY-111T	Physics-I	4– 0	4	C
CHM-111T	Chemistry-I	4 – 0	4	C
MTH-111T	Mathematics-I	4 – 0	4	C
ELE-101T	Basic Electrical Engineering	3 – 0	3	CF
BIO-101T	Environmental Science	4 – 0	4	CF
CIV-101T/P	Engineering Drawing	2 – 3	4	CF
MEC-101P	Engineering Workshop	0- 3	2	CF
PHY-112P	Physics-I Lab	0 – 2	1	C
CHM-112P	Chemistry –I Lab	0 – 2	1	C
	Total Credits	21-10	27	

PHY-111T - Physics-I

L – P **Credit: 4**

4 – 0

Unit-I

Vector Analysis, Rotation of coordinate axis and Transformation of vectors, Gradient of scalar field, divergence and curl of vector field in Cartesians, Spherical polar and Cylindrical Coordinate systems, line , surface & volume integrals, Gauss's divergence theorem, Stokes's theorem.

Unit-II

Collision of particles, Conservative and non-conservative forces, elastics and inelastic scattering, frames of references, laboratory and center of mass system, kinematics of elastics scattering in laboratory system, application of conservation theorem in solving collision and scattering problems. Rutherford's scattering.

Unit-III

Vibration and Acoustics, Differential equation of simple harmonic motion, Energy of simple harmonic oscillator, Damped harmonic motion, Energy dissipation, Forced oscillations, amplitude and velocity resonance, sharpness of resonance, Energy consideration in forced oscillations.

Unit-IV

Electromagnetic Theory: Coulombs law and Gauss's theorem, Calculation of electric field and potential, Charged Lines and Cylinders, Charged Plates, Charged Spheres.

Biot-Savart's law, Ampere's law, Applications of the Magnetic Force, Helical and Circular Motion of charged particle in Uniform B Cycloidal Motion of a charged particle in Crossed E and B fields, ModifedAmpers Law, Displacement current, Faraday's.

Unit-V

Maxwell's Equations, Electromagnetic wave equation in free space, its solution in one dimension, Pointing Vector and Discussion of Energy intensity, pressure and Momentum in Electromagnetic wave.Introduction to plasma: Debye shielding, plasma parameter, plasma frequency, Tutorial problems.

Text Books

1. Introduction to classical Mechanics by R.G.Takwale and P.S Puranik (Tata McGraw Hill Publishing Co.)

2. Classical Mechanics by N.C. Rana and P.S. Jog (Tata McGraw Hills)

ReferenceBooks

1. Introduction to Electrodynamics by David Griffiths (Pearson Education)

2. Introduction to Plasma theory by Dwight R. Nicholson (John Wiley)

3. Vibrations and Waves by A.P French, 1996

4. Electromagnetism by Gerald L. Pollack and Daniel R. Stump Pearson Education Asia limited and Higher Education press 2005.

CHM-111T-Chemistry-I

L P

4 0 **Credit: 4**

Unit-I CHEMICAL THERMODYNAMICS

Introduction and Importance, First Law of Thermodynamics, Work done in Isothermal and Adiabatic Conditions. Heat capacities, Relation between Cp and Cv relations, Second Law of Thermodynamics, Concept of Entropy, Carnot engine, Gibbs free energy. Free Energy Changes as Criteria of Reversible and Irreversible process, Gibbs-Helmholtz's equation, Clausius- Clapeyron equation.

Unit-II ELECTRO-CHEMISTRY

Introduction, Conductivity of Electrolytes, Kohlrausch's Law of Independent Migration of Ions and its Application, Debye Huckel Theory of Strong Electrolytes. Electrochemical cells, Electrode-Potential, Standard Electrode Potential, Types of Electrodes (Metal-Metal Ion electrode, Gas Electrodes, Metal Insoluble Metal Salt Electrode), Fuel Cells, pH: Measurement and Control.

Unit-III ENVIRONMENTAL CHEMISTRY

Introduction to Environmental Chemistry, Concept and Scope of Environmental Chemistry, Chemistry of the Atmosphere, Global Warming, Greenhouse effect, Acid Rain: Mechanism of Formation and Effects and Depletion of Ozone Layer,

Chemistry of Water and Waste Water, Measurement of acidity, Alkalinity, Hardness, BOD, COD, and Treatment of Water for Domestic and Industrial Purpose.

Toxic Chemicals in the Environment, Biochemical Effects of Arsenic, Lead, Mercury and, Pesticides.

Unit-IV ALLOYS

Introduction to Alloys, Advantages of Alloys over other Metallic Materials, Manufacturing of Alloys (Fusion Method, Powder Metallurgy, Electrodeposition and Reduction method), Classification of Alloys (Ferrous and non-Ferrous metal Alloys), Carbon steels (Carbon Steels Classification, Composition and Uses), Alloy Steels (Low, Medium and High alloys steels), Effect of Different Alloying Elements on Properties of Alloy steels, Engineering Application of Copper, Nickel and Aluminum Alloys.

Unit V INSTRUMENTAL TECHNIQUES I

Introduction, Advantages and Disadvantages of Instrumental and Non-Instrumental Methods, Electromagnetic Radiation, Electromagnetic Spectrum, Light Absorption (Beers-Lambert Law) UV-Vis spectroscopy (Types of Transition, Chromophors, Auxo-chromes and Applications) Infrared Spectroscopy (Modes of vibration, IR bands corresponding to different functional groups and Applications).

Books Recommended:

1. J.C. Kuriacose and J. Rejaraman: Chemistry in Engineering and Technology Volumes I & II (Tata McGraw Hill publishing company Limited, New Delhi)
2. P.C. Jain. Engineering Chemistry, (DhanpatRai& Sons, NaiSarak; New Delhi).
3. Physical Chemistry – Puri Sharma and Patharua.
4. Inorganic Chemistry (J.D. Lee).
5. Physical Chemistry by Peter Atkins,Juliodepaula
6. Electrochemistry and Corrosion Science by N.Perez
7. A Textbook of Organic Chemistry, V. K. Ahluwalia and MadhuriGoyal
8. Organic Chemistry: Stereochemistry, I. L. Finar, Pearson Education
9. Environmental chemistry by A. K. De, New Age International

Reference Books:

1. C.V. Agarwal - Chemistry of Engineering Materials (Tata publishing Works, Varanasi)
2. L.A.Munro – Chemistry in Engineering (Prentice Hall, New York)
3. Chemistry of Engineering Materials, C.P. Murthy, C.V. Agarwal and A. Naidu BS
4. O.P.Vermani and A.K. Narula – Applied Chemistry Theroy and Practive, (Wiley Eastern Limited, New Delhi).
5. R. M. E. Diamand: Applied Chemistry for Engineers, (Pitman)
6. Laboratory Manual on Engineering Chemistry by S.K. Bhasin and Sudha Rani, DhanpatRai Publishing Company, New Delhi (2004).

MTH-111T -Mathematics-I

L – P **Credit: 4**

4 – 0

Unit-I

Introduction to differential calculus, Leibnitz's Theorem for n^{th} derivative, Taylor's theorem, Tangent and Normal, Partial Differentiation, Euler's theorem, Double points, asymptotes, curvature and tracing of curves.

Unit-II

Limit, continuity and differentiability of functions of several variables, Chain rule, Jacobi theorem. Taylor's theorem of one and two variables, extrema of functions, two or more variables using method of Lagrange's multipliers.

Unit-III

Ordinary differential equations: Exact ordinary differential Equations and Ordinary differential equations reducible to exact differential equations. Linear differential equations and equations reducible to linear form.Linear Differential equations of second and higher order with constant and variable coefficients.

Unit-IV

Non-linear differential equation of first order, Simultaneous differential equation, Simultaneous differential equation of the form $dx/P = dy/Q = dz/R$, Applications of ordinary differential equations.

Unit-V

Algebraic Equation, Elements of the theory of polynomial equations.
Fundamental theorem of Algebra, Relation between the roots and the coefficients of an equation, Solution of cubic & bi-quadratic equations.

BOOKS RECOMMENDED

1. Differential calculus, Shanti Narayan, S.Chand
2. A text Book on Engineering Mathematics by Bali, N.P, Luxmi Publications
3. Ordinary and Partial Differential equation, M.D.Raisinghania, S.Chand and Co

Reference Books

1. Advanced Engineering Mathematics by Jain, R.K. and Iyengar SRK, Narosa, 2001
2. Advanced Engineering Mathematics, Kreyszig, J.Wiley
3. Linear Algebra, Hoffmann &Kunze, Prentice-Hall
4. Differential equations and its applications, H.T.Piaggio, Prentice-Hall
5. Engineering mathematics Vol I-II, Sastry, Prentice Hall of India

ELE-101T – Basic Electrical Engineering

L – P **Credit:3**

3 – 0

UNIT I

Introduction to DC circuits, Active and passive two terminal elements,Types of Voltage and Current Sources, Ohms law, Voltage-Current relations for resistor, inductor, capacitor , Kirchhoff'slaws, Mesh analysis, Nodal analysis, currentdivision, voltage division.Conventions for describing networks: Reference directions for currents and voltages.

UNIT II

Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem, Application of network theorems in solving various circuits, Star-Delta Transformation.

UNIT III

Sinusoids, Generation of AC, Average and RMS values, Form and peak factors,concept of phasor representation, J operator.Analysis of R-L, R-C, R-L-Ccircuits. Introduction to three phase systems - types of connections, relationshipbetween line and phase values.

UNIT IV

Working principle, construction and applications of DC machines and ACmachines (1 - phase transformers, single phase induction motors, introduction to alternator: Principle of operation and working.

UNIT V

Safety measures in electrical system- types of wiring- wiring accessories staircase,fluorescent lamps & corridor wiring- Basic principles of earthing –Typesof earthing.

Books Recommended

1. "Engineering Circuit Analysis", by William H Hayt, J E Kemmerly and Steven M Durbin, Seventh Edition, McGraw Hill, 2007
2. Electrical Engineering fundamentals by Deltoro, Prentice Hall India (PHI)
3. Kothari.D.P and Nagrath.I.J, "Basic Electrical Engineering", Second edition,Tata McGraw - Hill, 2009.
4. "Basic Electrical and Electronics Engineering", by S.K. Bhattacharya, Firstedition, Pearson Education, 2011.
5. Circuit Theory (Analysis & Synthesis) by A. Chakrabarti, DhanpatRai& Co.

BIO – 101 T –Environmental Science

L - P
4 - 0 **Credit:4**

Unit 1: Multidisciplinary nature of environmental studies **(2 lectures)**
Definition, scope and importance
Need for public awareness.

Unit 2 : Natural Resources : **(8 lectures)**
Renewable and non-renewable resources :
Natural resources and associated problems.

a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
e) Energy resources: Growing energy needs, renewable and non renewableenergy sources, use of alternate energy sources. Case studies.
f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources.
Equitable use of resources for sustainable lifestyles.

Unit 3: Ecosystems **(6 lectures)**

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structure and function of the following ecosystem:-

a) Forest ecosystem
b) Grassland ecosystem
c) Desert ecosystem
d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 4: Biodiversity and its conservation (8 lectures)

- Introduction – Definition: genetic, species and ecosystem diversity.
- Bio-geographical classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation
- Hot-sports of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit 5: Environmental Pollution (8 lectures)

Definition

- Cause, effects and control measures of :-

a) Air pollution
b) Water pollution
c) Soil pollution
d) Marine pollution
e) Noise pollution
f) Thermal pollution
g) Nuclear hazards

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disastermanagement: floods, earthquake, cyclone and landslides.

Unit 6: Social Issues and the Environment (7 lectures)

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case Studies
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents andholocaust. Case Studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act

- Issues involved in enforcement of environmental legislation.
- Public awareness.

Unit 7: Human Population and the Environment (6 lectures)

- Population growth, variation among nations.
- Population explosion – Family Welfare Programme.
- Environment and human health.
- Human Rights.
- Value Education.
- HIV/AIDS.
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies.

Unit 8: Field work (Field work equal to 5 lecture hours)

- Visit to a local area to document environmental assets river/ forest/grassland/hill/mountain
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc.

Exam Pattern: In case of awarding the marks, the question paper should carry 100 marks. The structure of the question paper being :

Part-A, Short answer pattern - 25 marks
Part-B, Essay type with inbuilt choice - 50 marks
Part-C, Field Work - 25 marks

REFERENCE

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
9. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)

10. Heywood, V.H &Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
11. Jadhav, H &Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
12. Mckinney, M.L. & School, R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition. 639p.
13. Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
15. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
16. Rao M N. &Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
17. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
18. Survey of the Environment, The Hindu (M)
19. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
20. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Stadards,Vol I and II, Enviro Media (R)
21. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
22. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

(M) Magazine
(R) Reference
(TB) Textbook

CIV-101T/P- Engineering Drawing

L – P **Credit: 4**

2- 3

UNIT- I:
Basic Concepts of drawing quadrants, drawing instruments, types of lines etc.
Dimensioning: General rules of dimensioning. Types: Aligned, unidirectional, chain, parallel, combined, title, block & margins.
Orthographic projections: Concept of horizontal and vertical planes, first and third angle projections, orthographic projections of simple blocks, missing lines and missing views.
Projection of points, lines and planes: Projection of points in different quadrants, projection of lines and planes positioned in different orientations with respect to the principle planes.

UNIT II:
Projection of solids: Projection of simple geometrical solids placed in simple positions and with single rotations of the face, edge or axis of the solid with respect to one of the principal planes of projection.

UNIT III:
Section of solids: Principal of sectioning, Section of simple geometrical solids, types of the section planes and their trace representation and location, true shape sections, sectioning by auxiliary planes.

UNIT IV:
Development of surfaces: Development of surfaces of simple sectional solids and intersecting solids, transition pieces, cones & cylinders.

UNIT V:
Isometric projections: Classification of pictorial projections, Isometric projection of plane figures, prisms, pyramids, cylinders and for the given orthographic projections. Introduction to Auto CADD.Basic commands of CADD.

Books Recommended :

1. Gill, P.S Engineering Drawing, S.K. Kataria and sons,
2. Bhatt, N.D Engineering Drawing, Charotar Book Stall, TulsiSadan, Anand
3. James, D Bethune Engineering Graphics with Auto CADD, 2006.
4. Narayana, Kannaiya Engineering Drawing, Scitech Publications, Chennai

Reference Books:
1. Sham Tickoo, Auto CADD 2006
2. B.C.RanaM.B.Shah Engineering Drawing, Pearson Education

MEC-101P- Engineering Workshop

L P` Credit:2

0 3

1. MACHINE SHOP

Operation and function of various machine tools like Lathe, for turning, facing, chamfering, grooving, knurling, boring & thread cutting. Shaper machine, for preparation of horizontal surfaces, slots and V-grooves.Milling machine, for side, end and face milling & making of spur gear.Drilling machines, for drilling and reaming operations. Grinding machines, for various grinding operations and CNC machine, for simple, step and taper turning operations.

2. FITTING SHOP

Exercise on marking, cutting, chipping, filing, drilling, taping, reaming, pipe threading and making nut & bolt and single ended spanner. Exercise on V, L, dove-tail & radius fittings.

3. SHEET METAL SHOP

Exercise on development of sheet metal surfaces like cylinder, funnel, rectangular duct and 900 bend. Soldering & brazing of various joints, making single/double riveted lap-joint & single cover plate riveted but-joint.

4. WELDING SHOP

Operation and function of various welding machines like Electric arc welding machine, for various joints like lap, butt & T and preparation of small cot-frame from conduit pipe.Gas welding machine, for cutting & joining operations and square pyramid from conduit pipe.TIG& MIG welding machines, for basic operations and Spot & Seam welding machines, for simple joints.

5. CARPENTRY AND PATTERN MAKING SHOP

Various types of timber, defects in timber, exercise on various operations and making joints like half lap (T, dove-tail, cross), mitre& lengthening and mortise &tenon. Simple exercise on wooden Lathe including pattern making and railing.

6. FOUNDRY SHOP

Exercise to prepare the green moulding sand, to prepare core and mould (single/double piece pattern). Casting of ferrous & non-ferrous metals after mould preparation for simple castings.

7. SMITHY SHOP

Smith's tools & their use, exercise for forging operations for making L-hook, chisel, square & hexagonal head bolts.

BOOKS RECOMMENDED

1. Raghuvanshi, B.S, A course in workshop technology, Vol. I - II. DhanpatRai and Sons.
2. HajiraChowdry, Vol. I - II. Workshop Practice.

PHY-112P - Physics-I Lab

L – P **Credit:1**

0 – 2

List of Experiments

1. To determine the value of e/m of electron
2. To study the bar pendulum
3. To study the Kater's reversible pendulum
4. To study the bending of beam apparatus
5. To study the Newton's ring apparatus
6. To determine the wavelength of light using a spectrometer
7. To study a Polarizer and analyzer
8. Stephens constant using incandescent lamps
9. Energy band of a semi-conductor diode

Recommended Books:

1. Practical Physics by SL Gupta,
2. Advanced Practical Physics, SP Singh, PragatiPrakashan

CHM-112P-Chemistry Lab-I

L P **Credit:1**

0 2

List of Experiments

Basic Introduction on Solution Preparation, Concentration terms, Handling of Glass wares Chemicals and Instruments, Precautions

1. Determination of strength of NaOH solution by standardization of sodium hydroxide using Oxalic acid
2. To determine the acid value of a given mineral oil or vegetable oil.
3. To determine the moisture content of a given sample of coal.
4. To determine the Degree of dissociation of a weak acid by Conductometry
5. Determination of the strength and pK_a value of the weak acid by titration with a alkali.
6. Estimation of calcium in Lime stone
7. To determine the Aniline point of the given sample of a Lubricating oil
8. To test the validity of Beer-Lambert law using spectrophotometer and determine the unknown concentration of solution.

Demonstration Experiments

1. Determination of pH of different concentration of acid and bases by pH meter
2. Determination of calorific value of solid fuels using Bomb Calorimetery

OVERVIEW FOR B.TECH COURSE CIVIL ENGINEERING

Semester-II

Course Code	Course Title	L – P	Credit (L+P)	Subject Type
PHY-211T	Physics-II	4 – 0	4	C
CHM-211T	Chemistry II	4 – 0	4	C
MTH-211T	Mathematics-II	4 – 0	4	C
CSE-201T	C Programming	4 – 0	4	CF
CIV-201T	Elements of Civil Engineering	3 - 0	3	CF
ECE-201T	Basic Electronics and communication Engineering	3– 0	3	CF
PHY-212P	Physics-II Lab	0 – 2	1	C
CHM-212P	Chemistry II Lab	0 – 2	1	C
CSE-202P	C Programming Lab	0– 2	1	CF
	Total Credits	22-6	25	

PHY-211T – Physics – II

L –P
4 – 0 **Credit: 4**

Unit-I

Quantum Mechanics: Why Quantum Physics,De-Broglie Hypothesis, Davison Germer experiment, Young's Double slit experiment,Uncertainty principle and Wave Packet ,Wave function and its properties, Expectation value,Operators, Normalisation,Schrodinger wave Equation; Time Dependent and Time Independent, Continuity equation in QM. Schrodinger Equation for free Particle, Particle in a Box, Step potential Tunnelling effect and its example (Tunnel diode or alpha decay).

Unit-II

Elementary Solid State Physics: Crystal lattice, Crystal structure, Unit cells, Miller Indices, Bravais lattice, Photographic crystal X-ray diffraction techniques, Laue's method.

Classification of solids, formation of energy bands in metals, semiconductors and insulators, intrinsic and extrinsic semiconductors, Fermi energy.

Unit-III

Diffraction: Optical diffraction techniques- Fresnel diffraction, Fresnel Diffraction from a Slit. Fraunhoffer Diffraction.Fraunhoffer Diffraction from a circular aperture. Fraunhoffer Diffraction from a rectangular aperture. Polarization of light, Plane, Circular,Elliptical Polarization.

Unit-IV

Special theory of Relativity*:* Frames of reference, Michelson-Morley experiment, Absolute Space and Absolute Time, Need for Relativity ,Basic postulates of special theory of relativity, Length contraction, Time dilatation, Relativistic Momentum, Mass-energy relation.
Super conductivity: Meisner Effect, Type I and Type II Superconductors, BCS theory (Qualitative only), applications of superconductors

Unit-V

Lasers*:* Introduction, Principle of laser, Stimulated and spontaneous emission, Population inversion, Einstein coefficients, optical pumping, **Resonant Cavity and its modes**, He-Ne Laser, Ruby Laser, Semiconductor Lasers, Applications of Lasers.

Text Books :

1. Ghatak, "Optics"
2. N. Subrahmanyam and BrijLal, "Optics"

Reference Books :

1. Jenkins and White, "Fundamentals of Optics"
2. Rajnikant, "Applied Solid State Physics"

CHM-211T- Chemistry-II

L – P

4 – 0 **Credit: 4**

Unit-I NANO-TECHNOLGY

Nanoscale and Its Significance, Properties at Nanoscale: Optical, Electrical, thermal, mechanical and Magnetic. General Methods of Preparation of Nanomaterialsviz Top Down (Ball Milling, Nanolithography) and Bottom up Methods (Sol-Gel, Solution Based Method), Carbon Nanotubes (Properties and Applications)

Unit-II CORROSION

Introduction, Effects of Corrosion, Factors Effecting the Rate of Corrosion (Nature of the Metal and Nature of the Environment), Electrochemical Theory of Corrosion, Dry Corrosion and Wet Corrosion, Types of Corrosion (Pitting Corrosion, Crevice Corrosion, Galvanic Corrosion and Stress corrosion), Testing and Measurement of Corrosion, Corrosion Protection and Inhibition, Cathodic Protection, Anodic Protection, Protective Coatings.

Unit-III POLYMERS

Advantages of Polymers over other Engineering Materials, Functionality, Degree of Polymerization, Concept of Molecular Weight, Polymerization (Addition, Condensation and Copolymerization), Polymerization Techniques (Bulk, Solution, Suspension and Emulsion polymerizations), Preparation, Properties and Engineering application of some Important Polymers, Polythene (LDPE and HDPE), Polyvinyl Chloride, Polystyrene, Teflon, Phenol Formaldehyde, urea-formaldehyde resin. Introduction to polymeric composites.

Unit-IV LUBRICANTS

Introduction, Function of Lubricants, Mechanism of Lubrication, Classification of Lubricants (Liquid ,Semisolid , Solid), Properties of Lubricants (Flash Point and Fire Point, Viscosity , Aniline Point Acid value) .

Unit-V INSTRUMENTAL TECHNIQUES II

Nuclear Magnetic Resonance: Principle, shielding mechanism, chemical shift, number ofSignals, application of nuclear magnetic resonance to simple organic molecules.
Introduction to Thermal Analysis: Principle, Working and Application (TGA ,DTA).
X-ray Spectroscopy: Principle and Applications.

Books Recommended:

1. S.S Dara A Text Book of Engineering S Chand & Co limited New Delhi
2. Advanced Practical Physical Chemistry by Yadav, Goyal publication
3. Spectroscopic methods : Williams and Fleming
4. Applied Chemistry : Theory And Practice By O. P. Vermani
5. A Text book of Engineering Chemistry by S.S. Dara, S.Chand& Co, New Delhi
6. Laboratory Manual on Engineering Chemistry by S.K. Bhasin and Sudha Rani, DhanpatRai Publishing Company, New Delhi (2004).
7. Applied chemistry,Balsaraf V. M. Et. Al., I. K. International Publishing House Pvt. Ltd (2010
8. Electrochemistry and Corrosion Science by N.Perez
9. Analytical chemistry: An Introduction ByDouglas A. Skoog, Donald M. West, F. James Holler 6^{th} edition
10. Polymer Science (Wiley Easter Limited New Delhi)V.R.Goowriker, N.V Viswanathan and jayadevSreedhar,
11. Nanotechnology Fundamentals And Applications,ManasiKarkare, RajniBahuguna
12. Nanotechnology Importance And Application, Fulekar
13. Physical Chemistry – Puri Sharma and Patharua.
14. Solid State Chemistry and its Applications, Anthony R. West, Wiley Publisher

MTH 211T– Mathematics-II

L – P

4– 0 **Credit: 4**

Unit-I:

Differential Equation**:** Partial differential equations of first order, langrage linear equation Standard form, Charpit`s Method to solve non- linear partial differential equation.

Unit-II:

Partial differential equations of second and higher, Homogeneous Partial Differential equations with constant coefficients, vibration of stretched flexible string, heat flow equation. Wave equation, solutions by the method of separation of variables. Series solutions of ordinary differential equations

Unit-III:

Fourier Series **:**Fourier Series, Integral Calculus**:** Differential under the sign of integration. Double and triple integrals, change of variables, Beta and Gamma functions

Unit-IV:

Matrices**:** Review of algebra of matrices, partitioning of Matrices,Hermitian and skew-Hermitian Matrices. Orthogonal and unitary matrices, Triangular matrices, Rank of a matrix. Equivalent matrices, elementary transformations, Normal form

Unit-V:

Inverse of matrix (Different Methods) and solution of simultaneous equation by elementary operation.Normal form, Eigen values, and Eigen vectors of a matrix.Caley-Hamilton theorem, Quadratic Form.

Books Recommended:

1. Advanced Engineering Mathematics by E.Kreyszig
2. Differential equations and its applications, H.T.Piaggio, Prentice-Hall
3. Applied Mathematics for Engineers byP.N.Wartikar
4. Advanced Engineering Mathematics,2/e by Greenberg, Pearson education, 2004
5. Ordinary and partial Differential equation, M.D.Raisingania, S.Chand and Co
6. Linear Algebra,Hoffmann&Kunze, Prentice-Hall
7. Mathematical Analysis by S.C.Malik&SavitaArora New Age international Limited
8. Integral Calculus by Shanty Narayan.

CSE 201T - C Programming

L –P **Credit: 4**

4– 0

Unit I

Computer components, characteristics & classification of computers, hardware & software, peripheral devices, system software, application software, utility program, compiler, interpreter, Assemblers,Evolution of programming languages, Algorithms, Dataflow Diagram,introduction to compiler/ Assembler/Interpreter.

Unit II:

Structure of C program, Identifiers, Keywords, Data Types, Constant and Variables, Operators: Precedence and Associativity, Expressions, Statements, Input and Output functions, storage classes, type casting, Macros.

Unit III

Control structures: Branching & looping, One Dimensional Array, Multidimensional Array and their applications, string manipulation.

Unit IV

Library and User defined functions, Formal and Actual parameters, function prototypes, Parameter passing (Call-by-value,), Recursion, Structures, unions.

Unit V

Pointer variable , Pointer Arithmetic, passing parameters by reference, pointer to pointer, pointers to functions, dynamic memory allocation. pointer to structure & pointer to union,Pointers to Multidimensional Arrays.Declaration of file pointer, opening and closing files, Working with text files.

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Books Recommended:

1. Programming in ANSI C – E. Balaguruswami, Sixth Edition, TMH
2. Programming in C – Byron Gottfried,Third Edition, 2010, TMH
3. Computer fundamentals and programming in C – PradipDey&ManasGhosh, Second Edition, 2013, OXFORD University Press
4. The ‘C’ programming language , Ritchi, Kernighan, Second Edition, 2012 D.M.Ritchie, PHI
5. C The Complete Reference - H.Sohildt, Fourth edition,2000 TMH
6. Let us C - Y. Kanetkar, Twelfth Edition, 2012, BPB Publications
7. Computer Science - A Structured Programming Approach using C – B.A. Forouzan& R.F. Gillberg, Third Edition, 2007, Cengage Learning

CIV-201T- Elements of Civil Engineering

L - P
3 - 0 **Credit:3**

UNIT I

Introduction to Civil Engineering: Overview of Civil Engineering; Civil Engineering land marks; Impact (social,economic, environmental) of Civil Engineering on society; introduction to various branches of civil Engineering Future directions: Job opportunities in Civil Engineering.

UNIT II

Stresss&Strain: Forces & stresses, Body Forces, surface forces, Internal forces, components of stress in rectangular coordinatesUni-axial tensile test, Elasticity, An-elasticity , Work-hardening, anisotropy, homogeneity and continuity, generalized Hooke's law, Lame's constants, Modulus of rigidity, Bulk modulus, relation between the elastic constants, Principle of superposition, Uniqueness theorem, Thermal effects.Center of Gravity (symmetrical & un-symmetrical sections), moment of inertia of symmetrical & unsymmetrical sections, parallel axis theorem, perpendicular axis theorem, radius of gyration.

UNIT III

Bending moment & Shearing Force: Notation & sign convention for flexural loads, shear force & bending moment diagrams of determinate structures, (Cantilever, simply supported beams & varying load beams) supported to point loads, UDL and VDL; computing of reactions using equation of equilibrium.

UNIT IV

Trusses: Planner Truss structures, idealization of planar structures, sign convention & member force representation, analysis of trusses by methods of Joints, graphical and sections.

UNIT V

Torsion of shafts: Geometry of deformation of a twisted circular shaft, Stress and deformation in twisted circular solid and hollow shafts, Strain energy due to torsion , Power transmitted by circular shafts.

BOOKS RECOMMENDED:

1. Shames I.H., Engineering Mechanics, Prentice Hall, New Delhi.
2. Beer, F.P. and Johnston, Vector Mechanics for Engineers, McGraw Hill – Eighth Edition.
3. D.S. Kumar, Engineering Mechanics, S.K. Kataria& Sons, New Delhi.
4. J. L. Meriam and L. G. Kraige, Engineering Mechanics, Vol I – Statics, 6th Ed, John Wiley.
5. Khurmi, Strength of Materials.
6. Ramamurtha, Strength of Materials

ECE-201T – Basic Electronics and Communication Engineering

L – P **Credit:3**

3 – 0

UNIT-I

Electronic Components: Active and Passive (Resistors, Capacitors and Inductors) components

Introduction to Semiconductors: P and N type Semiconductors, Transport Mechanism of Charge Carriers, Charge Densities in a Semiconductor, Electric properties, Hall Effect, Generation, Recombination, Diffusion, Continuity Equation, Injected Minority Carrier Charge.

UNIT-II

PN Junction: Open Circuited PN Junction, Current Components in PN junction Diode, Basic Principle, Operation and Volt-Ampere Characteristics of PN Junction Diode, Temperature Dependence of V/I Characteristics, Piecewise linear Diode Characteristics, Diode Resistance, Diode Capacitances in detail, Charge Control Description of a Diode, Junction Diode Switching Times.BJT and its types.

UNIT-III:

Digital Electronics: Introduction to digital Electronics, Gates (Basic & universal)Boolean algebra,laws & theorems-simplification of Boolean expression, Basics of Microprocessor 8085 and its pin diagram.

UNIT-IV

Communication Systems: Introduction to Communication System, elements of Communication System, Benefits of Communication, Communication Media, Modulation and Demodulation (brief idea).

UNIT-V

Transducers: Classification of Transducers, Basic Requirements of Transducers, Passive Transducers: Strain Gauge, Thermistor, LVDT, Active Transducers: Piezoelectric and Thermocouple.

TEXT BOOKS:

1. Electronic Devices & Circuits by J.B.Gupta
2. Integrated Electronics by Millman&Halkias.
3. Communication system; Analog and Digital, Sanjay Sharma

REFERENCE BOOKS:

1. Electronic Communication system; G. Kennedy
2. Electronic Communication Systems (Fundamentals through advanced), W.Tomassi, Pearson Education.
3. Electronic Devices and Circuit Theory by Boylestead and Nashelsky.

PHY-212P – Physics - II Lab

L – P

0 – 2 **Credit:1**

1. Determination of refractive index of prism by spectrometer.
2. Determination the wavelength of sodium light by diffraction grating.
3. Determination of Wavelength of sodium light by Newton's ring.
4. Study of Zener diode voltage regulating characteristics.
5. To study double slit interference by He-Ne laser.
6. To plot the graph for the transistor characteristics.
7. To plot the graph for the semi-conductor diode.
8. To find the dead time of a G. M. Counter

CHM - 212P Chemistry-II Lab

L - P
0 - 2 **Credit:1**

List of Experiments

1) Synthesis of the phenol formaldehyde resin
2) To titrate Fe(II) with $KMnO_4$spectrophotometrically.
3) To determine the dissociation constant of methyl red by spectrophotometric method
4) To determine the temporary and permanent hardness of the a sample of water by complexometeric titration
5) To determine the Alkalinity of the given sample of water.
6) Determination of the ion exchange capacity of cation exchange resin.
7) Separation of a mixture of inorganic ions by paper chromatography.

Demonstration of experiments

Determination of specific rotation of the sucrose by polraimetery

Spectrophotometer (concentration determination, wavelength maximum)

CSE 202P - C Programming Lab

L – P
0 –2 **Credit:1**

1. Programs to understand the basic data types.
2. Program for looping and decision statements.
3. Programs to generate odd, even, fibnoccii, lucas and other common series using loops.
4. Programs using built-in math functions.
5. Programs on arrays.
6. Program to implement linear search.
7. Programson two dimension array.
8. Program to add and multiply two Matrices.
9. Program to find transpose of a Matrix
10. Program to read and display array using functions
11. Programs on string manipulations.
12. Write functions for finding sum, difference, product and remainder between two numbers and return the result
13. Programs on functions.
14. Write a function to find factorial using recursion
15. Programs on structures and unions.
16. Programs on pointers
17. Write a function to swap two numbers using call by reference?
18. Write a function to find minimum of an array using pointers.?
19. Write a function to reverse a string using pointers?
20. Programs on basic file operations

OVERVIEW FOR B.TECH COURSE CIVIL ENGINEERING

Semester-III

Course Code	Course Title	L – P	Credit (L+P)	Subject Type
CIV-311T	Structural Analysis I	4 – 0	4	C
CIV-312T	Surveying I	4 – 0	4	C
CIV-313T	Fluid Mechanics I	4 – 0	4	C
CIV-314T	Building materials	4 – 0	4	C
MTH-312T	Probability & Statistics	3 – 0	3	C
CIV-315P	SOM Lab	0– 2	1	C
CIV-316P	Surveying Lab-I	0 – 2	1	C
CIV-317P	Fluid Mechanics Lab I	0 – 2	1	C
XXX-xxxTP	Elective I (Generic)	x – x’	X	GE
	Total Credits	19+x – 6+x’	22+X	

CIV-311T-Structural Analysis-I

L- P

4 – 0 **Credit: 4**

UNIT I: Introduction to Structural Analysis & Basic Concepts of Structural Analysis:

Structure; Structural Engineering; History of Structural Engineering; Structural Analysis; Structural form; simplification for purpose of analysis; Types of loads (uniformly, triangular, point, trapezoid)

Specification of a force; free body diagrams; Equations of equilibrium; Condition Equations; Displacements; Compatibility; Boundary Conditions; Principle of Superposition; Stiffness and Flexibility.

UNIT II: Determinate Structures:

Introduction to Determinate Structures; bending moment and Shear force in determinate beams; 3-Hinged Arches; Determinate beams with overhang, with various loading patterns and a propped cantilever with a moment hinge.

UNIT III: Bending and Shear Stress in Beams:

Flexural Formula; Bending Stress and Shear Stress Diagrams for Homogenous Beam Sections of various shapes; Composite sections; Applications to simpler problems.

UNIT IV: Slopes, Deflections&Compound stresses:

Slope and Deflection of determinate beams by Double Integration Method; Moment Area; conjugate Beam and energy methods; Compound stresses (including Mohrscicle method) .

UNIT V: Analysis of Columns:

Stresses in Columns; short and long columns; buckling phenomenon; Euler's and Rankine's theory of Crippling loads; stresses in eccentrically loaded columns.

BOOKS RECOMMENDED:

1. Introduction to Structural Engineering John M.Biggs
2. Determinate Structures: R.L.Jindal
3. Theory of Structures: Ramamurtham
4. Analysis of Structures: Thandavamoorthy
5. Strength of Materials: Singer and Pytel

CIV-312T-Surveying-I

L- P

4 – 0 **Credit: 4**

UNIT I: FUNDAMENTALS AND CHAIN SURVEYING

Definition- Classifications - Basic principles-Equipment and accessories for ranging and chaining – Methods of ranging - well conditioned triangles – Errors in linear measurement and their corrections - Obstacles - Traversing – Plotting – applications- enlarging the reducing the figures – Areas enclosed by straight line irregular figures- digital planimetre.

UNIT II:PRISMATIC COMPASS AND PLANE TABLE SURVEYING

Compass – Basic principles - Types - Bearing - Systems and conversions- Sources of errors - Local attraction - Magnetic declination-Dip-Traversing - Plotting - Adjustment of closing error – applications - Plane table and its accessories - Merits and demerits - Radiation - Intersection - Resection – Traversing- sources of errors – applications.Temporary adjustments of a prismatic compass

UNIT III: LEVELLING

Level line - Horizontal line - Datum - Bench marks -Levels and staves - temporary and permanent adjustments – Methods of levelling - Fly levelling - Check levelling - Procedure in levelling - Booking -Reduction - Curvature and refraction - Reciprocal levelling – Sources of Errors in levelling- Precise levelling - Types of instruments - Adjustments - Field procedure

UNIT IV: LEVELLING APPLICATIONS

Longitudinal and Cross-section-Plotting - Contouring - Methods - Characteristics and uses of contours – Plotting – Methods of interpolating contours – Computations of cross sectional areas and volumes - Earthwork calculations - Capacity of reservoirs - Mass haul diagrams.

UNIT V: THEODOLITE SURVEYING

Theodolite - Types - Description - Horizontal and vertical angles - Temporary and permanent adjustments – Heights and distances– Tangential and Stadia Tacheometry – Subtense method - Stadia constants - Anallactic lens

BOOKS RECOMMENDED:

1.Surveying volume I by Dr. K.R.Arora

2. Surveying Vol.II by Dr. K. R. Arora

3. Surveying Vol.II by S.K Duggal, Tata McGraw Hill, N.Delhi.

4.Basak “Surveying and levelling”

5.Surveying Volume I by Duggal S.K.

6.Surveying and leveling by P.B. Shahni

CIV-313T-Fluid Mechanics-I

L- P

4 – 0 **Credit: 4**

UNIT I: Introduction:

Physical properties of Fluids that is mass density, viscosity, compressibility, vapour pressure, surface tension, capillarity, etc. Ideal Fluids and Real Fluids; Newtonian and non-Newtonian fluids.

UNIT II: Kinematics of Fluid Flow:

Steady and unsteady; Uniform and non-uniform; laminar and turbulent flows; one, two and three dimensional flows; streak lines and path lines; continuity equation; rotation and circulation; Elementary explanation of stream function and velocity potential; Graphical and experimental methods of drawing flow nets.

UNIT III: Fluid Statics

Pressure Intensity, Pascal's law; Pressure density-height relationships; manometers; pressure on plane and curved surfaces; center of pressure; Buoyancy; stability of immersed and floating bodies.

UNIT IV: Dynamics of Fluid Flow:

Euler's equation of motion along a streamline and its integration to yield Bernoulli's equation; flow measurement; flow through orifice-meter; Venturimeter; orifices, mouth-pieces, Pitot and Prandtl tubes, sluice gates under free and submerged conditions, various types of notches and weirs under free and submerged conditions, aeration of Nappe; momentum equation and its application to stationary and moving vanes, pipe bends.

UNIT V: Dimensional Analysis and Hydraulic Similitude:

Dimensional analysis, Buckingham's theorem; Important Dimensionless numbers and their significance, geometric, kinematic and dynamic similarity; Model Analysis.

Boundary Layer Analysis-Boundary layer thickness, boundary layer over a flat plate, laminar boundary layer, Application of momentum equation, turbulent boundary layer, Laminar sub-layer, smooth and rough boundaries, local and average friction coefficients, separation.

Books Recommended:

1. Bansal, R.K. "Fluid Mechanics and Hydraulic machines"
2. Kumar, D.S. "Engg. Fluid Mechanics"
3. Engg; Fluid Mechanics by R.J.Garde

CIV-314T-Building Materials

L- P
4 – 0 **Credit: 4**

UNIT I:Brick & Timber:

Bricks: Classification, Characteristics of good bricks, Ingredients of good brick earth, Different forms of bricks, testing of bricks as per BIS. Defects of bricks.Timber : Seasoning of timber; Methods, Defects in Timber, Decay of Timber, Preservation of Timber, Testing of Timber, Veneers , Plywood.

UNIT II:Cement& Lime:

Cement: OPC,Manufacture of OPC, Composition, Types of cement.
Lime: Classification, Slaking and hydration, Hardening, Testing, Storage, Handling

UNIT III:Concrete& Advanced Materials

Concrete: Ingredients of concrete, W/C ratio, Workability, Different grades in cement concrete,Concrete Blocks.Mortars: Classification, Uses, Characteristics of good mortar, Ingredients. Cement mortar, Lime mortar, Lime cement mortar, special mortars.Composite Materials, Fibre Reinforced concrete, Geo Materials.

UNIT IV: Floors and Roofs:

Floors: Essential requirements of a floor, factors affecting selection of flooring material, various types of floorings (brick, tiled cement concrete, terrazzo, marble, timber, flooring reinforced concrete floor, pre cast concrete floor.)
Roofs and roof coverings: Requirements of good roof , classification, types of roof coverings for pitched roof. A.C. sheet roofs – fixing of A.C. sheets, laying of big six sheets, G.I. Sheets roofs, slates, flat roof.

UNIT IV: Wall Finishes & Temporary Works:

Wall Finishes: Plastering, pointing and painting

Special Treatments: Fire resistant, water resistant, thermal insulation, acoustical construction and anti-termite treatment.

Books Recommended:

1. Building Construction by Sharma and Koul
2. Building materials and construction by Gurcharan Singh
3. Properties of concrete by A.M.Neville
4. Concrete Technology by M S Shetty

MTH-312T- Probability &Statistics

L- P

3 – 0 **Credit:3**

Unit-I:

Statistics: Measures of central tendency and Measures of variations (Dispersions), Moments, Measures of Skewness and Kurtosis. Moment generating functions, problems.

Unit-II:

Probability: Random experiment, sample space, events, classical, statistical and axiomatic definitions of probability. Statements and proof of theorems on addition and multiplication of probabilities, problems.

Unit-III:

Conditional Probability: Bayes theorem on conditional probability. Random variables, Derivation of formulae for mean, variance and moments of random variables for discrete and continuous cases. Laws of expectation problems.Problems.

Unit-IV:

Standard Distributions: Binomial, Poisson and Normal Distributions, Beta and Gamma Distribution, t Distribution, F-Distribution, Chi-square Distribution and their applications.

Unit-V:

Method of Least Squares & Correlation: Methods of least squares, fitting of straight line and parabola of degree 'p'. Regression and Correlation.Multiple and Partial Correlation. Problems

Books Recommended:

1. Fundamentals of Mathematical Statistic by S.C.Gupta and V.K. Kapoor, Sulltan Chand & Sons New Delhi, Latest edition.
2. Statistical Theory and Methodology in Science & Engineering by Brownlee, John Wiley & Sons.
3. Introduction to Mathematical Statistics by R.E.Walpole 3rd edition New York Macmillan publication.
4. Data Analysis for Scientists & Engineers by Meyer, John Wiley & Sons.

CIV-315P-SOM Lab

L- P

0 – 2 **Credit: 1**

List of Experiments:

1. **Tensile Test of Steel**- To determine yield strength ultimate tensile percentage elongation and modulus of elasticity (Plot, stress strain curve).

2. **Tensile & Compressive strength of Timber-** a. Parallel to grains, b. Perpendicular to grains

3. **Bending test of Steel/Timber-** To measure deflection ultimate flexural strength and determine stiffness factor (Plot load-deflection curve)

4. **Shear test of steel/Timber**- To measure ultimate shear strength, shear modulus and Plot shear stress-strain curve.

5. **Torsion test of steel-** To measure angle of twist, Ultimate torsional strength stress-strain curve.

6. **Impact test of Steel-** To determine the impact strength of notched mild steel test piece using Charpy Test and Izode Test.

7. **Buckling load of columns various end conditions-** To determine crippling load of columns with different end conditions and compare theoretical values.

8.Testing of Bricks and Stones as per IS specifications.

9.. Specifications and Common tests as per ISS for Roofing Tiles.

10. Specifications and Common tests as per ISS for Flooring Tiles Mosaic, Marble and Ceramic tiles

11. Mechanical Testing of Composite materials with ceramic composite hybrid structure applications.

a) To determine the strength of the tiles by plotting graph between load and strain (static flexure testing).

b)To compare shear strength of different materials based on overlaid failure envelope (Punching Shear Test).

CIV-316P-Surveying Lab-I

L- P

0 – 2 **Credit:1**

LIST OF EXPERIMENTS:

9. Study of chains and its accessories

10. Aligning, Ranging and Chaining

11. Chain Traversing

12. Compass Traversing

13. Plane table surveying: Radiation

14. Plane table surveying: Intersection

15. Plane table surveying: Traversing

16. Plane table surveying: Resection – Three point problem

17. Plane table surveying: Resection – Two point problem

18. Study of levels and leveling staff

19. Fly leveling using Dumpy level

20. Fly leveling using tilting level

21. Check leveling

22. LS and CS

23. Contouring

24. Study of Theodolite.

CIV-317P-Fluid Mechanics Lab-I

L- P

0 – 2 **Credit:1**

LIST OF EXPERIMENTS:

1. To determines experimentally the metacentric height of a ship model.
2. To verify the Bernoulli's equation experimentally.
3. To determine the coefficient of discharge, coefficient of velocity and coefficient ofcontraction of an orifice or a mouthpiece of a given shape.
4. To calibrate an orifice meter and to study the variation of coefficient of discharge withReynold's number.
5. To calibrate a venturimeter and to study the variation of coefficient of discharge withReynold's Number.
6. To calibrate sharp crested rectangular and triangular weir.
7. To verify momentum equation experimentally.

OVERVIEW FOR B.TECH COURSE CIVIL ENGINEERING

Semester –IV

Course Code	Course Title	L – P	Credit	Subject Type
CIV-411T	Structural Analysis-II	4 – 0	4	C
CIV-412T	Surveying-II	4 – 0	4	C
CIV-413T	Fluid Mechanics-II	4 – 0	4	C
CIV-414T	Concrete Technology	3 – 0	3	C
CIV-415TP	Construction Techniques & Building Drawing	2 – 2	3	C
MTH-412T	Numerical Methods	4 – 0	4	C
CIV-416P	Fluid Mechanics Lab II	0– 2	1	C
CIV-417P	Structure Lab II	0 – 2	1	C
CIV-418P	Surveying Lab II	0 – 2	1	C
CIV-418(SC)P	Surveying Camp	0 - 3	2	C
	Total Credits	21 - 11	27	

CIV-411T-Structural Analysis-II

L – P

4 – 0 **Credit:4**

UNIT I: Introduction to indeterminate structures:

Introduction to Indeterminate structures, Types of structural supports (hinged, roller and Fixed), Degrees of Freedom, Kinematic and Static indeterminacy of structures (Statically indeterminate structures, Redundant Frames, Order of redundancy).

UNIT II: Energy Methods of Analysis of structures:

Strain Energy Method of analysis of Indeterminate Structures; Strain Energy stored due to axial loading, bending, torsion; Castigliano'sIst& 2nd theorem of minimum energy and its application to analysis of internally and Externally Indeterminate Beams, Frames, and Trusses.

UNIT III: Force methods of Analysis of structures:

Method of consistent deformation for analysis of indeterminate beams; continuous beams; Deflection of truss joints, First theorem of Castigliano's and its application; Analysis of two hinged arches, 3 Moment Equation.

UNIT IV: Displacement methods of Analysis of structures:

Analysis of Indeterminate Beams & Frames (with & without Sway) by Classical Displacement Methods viz; Slope Deflection Method & Moment Distribution Method.

UNIT V: Analysis of Influence lines and Cables:

Influence lines for beams for point loading, udl loading, for wheel loads; Analyze the beam for shear and moments and for their maximum value; analysis of a cable for moments and shear.

BOOKS RECOMMENDED:

1. Indeterminate Structural Analysis by C.K.Wang
2. Indeterminate Structural Analysis by R.L.Jindal.
3. Structural mechanics by Norris and Wilbur.
4. Theory of Structures by S.RamamruthamR.Narayan
5. Analysis of Structures: Thandavamoorthy
6. RC Hibbler- Analysis of Structures

CIV-412T-Surveying-II

L- P

4 – 0 **Credit: 4**

UNIT I: CONTROL SURVEYING

Horizontal and vertical control, Methods, specifications, triangulation, baseline , instruments and accessories – corrections – satellite stations – reduction to centre-trigonometricallevelling – single and reciprocal observations – traversing – Gale's table.

UNIT II:SURVEY ADJUSTMENT

Errors Sources- precautions and corrections – classification of errors – true and most probable values- weighed observations – method of equal shifts –principle of least squares -0 normal equation – correlates- level nets- adjustment of simple triangulation networks.

UNIT III:TOTAL STATION SURVEYING

Basic Principle – Classifications -Electro-optical system: Measuring principle, Working principle, Sources of Error, Infrared and Laser Total Station instruments. Microwave system: Measuring principle, working principle, Sources of Error, Microwave Total Station instruments. Comparison between Electro-optical and Microwave system.Care and maintenance of Total Station instruments.Modern positioning systems – Traversing and Trilateration.

UNIT IV:GPS SURVEYING

Basic Concepts - Different segments - space, control and user segments - satellite configuration - signal structure - Orbit determination and representation - Anti Spoofing and Selective Availability - Task of control segment – Hand Held and Geodetic receivers –data processing - Traversing and triangulation.

UNIT V:ADVANCED TOPICS IN SURVEYING

Route Surveying - Reconnaissance - Route surveys for highways, railways and waterways - Simple curves – Compound and reverse curves - Setting out Methods – Transition curves - Functions and requirements - Setting out by offsets and angles - Vertical curves - Sight distances- hydrographic surveying – Tides - MSL - Sounding methods - Three-point problem - Strength of fix - Sextants and station pointer- Astronomical Surveying – field observations and determination of Azimuth by altitude and hour angle methods – fundamentals of Photogrammetry and Remote Sensing.

BOOKS RECOMMENDED:

1)Surveying Vol.II by Dr. K. R. Arora
2) Surveying Vol.II by S.K Duggal, Tata McGraw Hill, N.Delhi.
3) Surveyingand Leveling by Basak, Tata Mcg raw Hill, N.Delhi
4) Surveying Vol.II by B.C Punima, Vol 2, Laxmi Publications Pvt. Ltd. N.Delhi
5) Surveying &Levelling by P.B. Shahni

CIV-413T-Fluid Mechanics - II

L – P

4 – 0 **Credit: 4**

Unit I: - FLOW IN OPEN CHANNELS:

Uniform flow, Critical depth, Normal depth, Specific energy, Resistance formulae, Gradually varied flow equations, Classification of water surface profiles, Computation of water surface profiles, step by step method and graphical integration method. Hydraulic Jump, Momentum Principle for open channels, Evaluation of the jump elements.Venturi flumes.

Unit II: - FLOW THROUGH PIPES:

Nature of turbulent flow in pipes, Hydraulic and energy grade lines. Equation for velocity distribution over smooth and rough pipes, Resistance coefficient and its variation, Nikuradse experiments, Moodydiagram, Flow in sudden expansion, Contraction, diffusers, Bends, Valves and Siphons;Concept of equivalent length,branchedpipes, pipes in series and parallels, Simple networks, Transmission of power.

Unit III: - FLUID FLOW PAST SUBMERGED BODIES:

Drag and lift, Drag on a sphere, cylinder and disc: Lift, Magnus effect and Circulation.

Unit IV: - WATER HAMMER AND SURGE TANKS:

Sequence of events after sudden value closure, pressure diagrams, Gradual closure or opening of the valve, Instantaneous closure of valve in a rigid pipe, Instantaneous closure of valve in an Elastic pipe and Compressible fluid, Methods of Analysis; Surge Tanks, Location of Surge Tanks, Types, Design of surge Tanks.

Unit V: - HYDRAULIC MACHINES:

Types of Turbines, Description and principles of Impulse and reaction Turbines, Unit quantities and specific speed, Runaway speed, Turbine characteristics , Selection of Turbines, Cavitation; Draft Tube, Draft Tube Dimensions, Types of draft tubes; Governing of TurbinesCentrifugalpumps, specific speed, power requirements, Reciprocating pumps.

BOOKS RECOMMENDED:

1. Engineering Fluid Mechanics by R.J.Garde.
2. Open Channel Flow by Subramanaya.
3. Fluid Mechanics and Hydropower Engg. ByDr D.S Kumar
4. Handbook of Hydroelectric Engg. by Nigam
5. Flow through Open Channels by RangaRaju, Tata McGraw Hill Publishing Company Ltd. N.Delhi.

CIV-414T- Concrete Technology

L- P

3 – 0 **Credit:3**

UNIT I:

Concrete as a Structural Material, Chemical Composition of Cement, Hydration of Cement, Heat of Hydration and Strength, Tests on Cement and Cement Paste – fineness, consistency, setting time, soundness, strength.

Quality of Water – Mixing Water, Curing Water, Harmful Contents

Types of Portland Cement – ordinary, Rapid hardening, low-heat, sulphate resisting, Portland slag, Portland pozzolana, super sulphated cement, white cement.

UNIT II:

Aggregates – Classification, Mechanical and Physical Properties, Deleterious Substances, Alkali- Aggregate Reaction, Sieve Analysis, Grading Curves, Fineness modules, Grading Requirements.

Testing of Aggregates – Flakiness, Elongation Tests, Aggregate Crushing Value, Ten Percent Fines Value, Impact Value, Abrasion Value

UNIT III:

Properties of Fresh Concrete – Workability, Factors Affecting Workability, Slump Test Compacting Factor Test, Flow Table Test, Segregation, Bleeding, Setting Time, Mixing and Vibration of Concrete, Mixers and Vibrators, Curing methods.

UNIT IV:

Strength of Concrete – Water/Cement ratio, Gel/Space ratio, Strength in Tension, Compression, Influence of temperature on the strength of concrete.Effect of Age on Strength, Relation between Compressive and Tensile Strength, Fatigue Strength, Stress Strain Relation and Modulus of Elasticity, Poisson's Ratio, Shrinkage and Creep, Compression Test on Cubes, Cylinders, Introduction to Non-Destructive Tests (Rebound hammer & Ultrasonic pulse velocity)

UNIT V:

Admixtures – different types, effects, uses, Retarders and Super plasticizers.

Mix Design by I.S. 20262 (2009).

Special concretes:-Light-weight, Polymer and Fibre-reinforced concrete

BOOKS RECOMMENDED:

1. Concrete Technology by M.S.Shetty; S.Chand& Company, N,Delhi.
2. Gambhir, M.L. "Concrete Technology", Tata McGraw Hill New Delhi.
3. Neville, A.M."Properties of Concrete "Pearson Publishers.
4. Construction Methods Plant and Equipment by R.L.Purifoy

CIV-415TP-Construction Techniques &Building Drawing

L – P

2 –2 **Credit:3**

UNIT I: Introduction

Standard Conventions in Drawing; Basic principles of planning and design in buildings. Drawing of plans, elevations and sections giving construction details of important building components including foundation, plinth. DPC, lintels, slabs and roofs; full specifications for each component.

UNIT II:

Drawing exercises on layouts of building services such as
electrical, water supply and plumbing, sanitation etc.; Drawing of doors, windows and ventilators. Location, size and different types including steel and aluminum: types f lintels an d their construction details.

UNIT III:

Drawing of RCC slabs (One and two way); beams (including cantilever); columns.Foundations: Principles of foundations, types and suitability of foundations includin g strip, pad, raft, pile and pier foundation, timbering for excavation of foundation

UNIT IV:

Stair And Staircase;Various types and materials; Drawing of various components of a Dog-legged stair case (section and Plan). Brief introduction of ramps, lifts and escalators.

UNIT V:

Roofs & Roof Coverings: Classification of roofs with special reference to pitched roofs;Draw ing of various timber trusses.

BOOKS RECOMMENDED:

1. Building Drawing by M.G.Shah
2. Civil Engineering Drawing by Chakorbarty
3. Civil Engineering Drawing by J.B.Mckay
4. Building Drawing by V.B.Sikka

MTH-412T-Numerical Methods

L – P

4 –0 **Credits: 4**

Unit-I:

Finite Difference: Difference Table and its usage. The difference operators Δ ,∇ and the operator E.Interpolation with equal intervals, Newton's advancing difference formula. Newtons's backward difference formula.Interpolation with unequal intervals.Newton's divided difference formula.Lagrange's interpolation formula.

Unit-II

Central Differencesand Inverse interpolation:: The central difference operator δ and the over raging operator μ. Relations between the operators.Gauss forward and backward interpolation formula, Sterlings, Bessel's, Laplace and Everetts formulae.
Inverse interpolation by (i) Langrange's (ii) Methods of successive e approximation & (iii) Methods of elimination of third differences

Unit-III:

Numerical solution of algebraic and Transcendental Equations andNumerical differentiation&Numerical Integration: Graphic Method, Regula-Fast method, Balzano's Process of bisection of intervals, Newton-Raphson Method and its geometrical significance.
Numerical differentiation of a function.Differential coefficient of a function in terms of its differences.Numerical Integration, General Quadrature Formula, Trapezoidal rule, Simpson's one-third and three-eight rules, Weddles' rule, Euler- Maclaurin expansion formula.

Unit-IV

Difference Equationsand Numerical Solution of ordinary differential equations: Linear-homogeneous and non-homogeneous difference equations of order n with constant coefficient, and their solution, methods of undetermined coefficient.
Numerical solution of ordinary differential equations, Picard's method.Taylors series method, Euler's method, Runge-Kutta Method.

Unit-V

Numerical solution of simultaneous equations and Eigen value problem: Gauss elimination method, Gauss Jordon method, Gauss- Jacobi and Gauss- Seidel iteration methods, power methods for solving Eigen value problems.

BOOKS RECOMMENDED:

1. Numerical Methods for Scientists and Engineering by M.K.Jain, S.R.Iyengar&R.K. Jain, Wiley Eastern Ltd.
2. Mathematical Numerical Analysis by S.C. Scarborough, Oxford and IBH publishing Company.
3. Introductory methods in Numerical Analysis by S.S.Sastry, Prentice Hall of India.
4. Numerical Solution of Differential equations by M.K.Jain.
5. Numerical Methods for Science & Engineering by R.G.Stanton.

CIV-416P-Fluid Mechanics Laboratory-II

L – P

0 –2 **Credits: 1**

LIST OF EXPERIMENTS:

1. To study the variation of friction factor "f" for turbulent flow in different commercial pipes.

2. To determine the loss coefficient for various pipe fittings.

3. To determine Manning's coefficient of roughness "n" for the bed of a given flume.

4. To calibrate a broad crested weir.

5. To study the formation of hydraulic jump.

6. To study the velocity distribution in a pipe and also to compute the discharge by integratingthe velocity profile.

7. To study the velocity distribution in an open channel and to determine the energy and momentum correction factors.

CIV-417P-Structural Laboratory-I

L – P

0 –2 **Credits 1**

LIST OF EXPERIMENTS:

1. Deflection of curved beams
2. Behavior of Portal Frame under different load combinations
3. Deflection of Truss
4. Behavior of a cantilever beam under symmetrical and un-symmetrical loading
5. Analysis of an elastically coupled beam
6. Analysis of a redundant joint
7. Analysis of two hinged arch
8. Study of Loading frame and Degrees of loading.
9. **Verification of Maxwell's Theorem-** To verify the Principle of Maxwell's Theorem
10. **Verification of Horizontal Thrust in a 3-Hinged Arch-** To evaluate experimentally horizontal thrust in a 3-Hinged arch and draw influence line diagram for the horizontal thrust.

CIV-418P-Surveying Lab-II

L- P

0 – 2 **Credit:1**

LIST OF EXPERIMENTS:

1. Study of theodolite
2. Measurement of horizontal angles by reiteration and repetition and vertical angles
3. Theodolite survey traverse
4. Heights and distances - Triangulation - Single plane method.
5. Tacheometry - Tangential system - Stadia system - Subtense system.
6. Setting out works - Foundation marking - Simple curve (right/left-handed) - Transition curve.
7. Field observation for and Calculation of azimuth
8. Field work using Total Station.

CIV-418(SC)P- Survey Camp

L – P

0 –3 **Credits: 2**

1.Triangulation:

(i) Ordinary Methods (ii) On the basis of Global Positioning System (GPS)

2. Shifting of Horizontal and Vertical Controls.

3. Setting out of works.

4. Setting out of Curves.

5. Contouring:(i) Contouring of a Dam Reservoir/Railway line

(ii) Preparing a contour plan byvarious methods.

(iii) Setting out of Contour lines of an appropriate sit

LIST OF OPEN ELECTIVES

Course Code	Subject	L - P	Credits	Preferred semester	Prerequisite
CIV-E01T	**Traffic Engineering & Transportation Facilities**	**3 - 0**	**3**	**V**	Civil Engineering Background
CIV-E02T	**Disaster Management**	**3 – 0**	**3**	**V**	Engineering Science Background
ECE-E24T	**Applied Electronic Instrumentation**	**3 – 0**	**3**	**V**	Basic Electronics Engineering
CIV-E03T	**Construction Technology**	**3 – 0**	**3**	**VI**	Structural Analysis I &II
CIV-E04T	**Advanced Measurement Techniques (Remote Sensing / GPS)**	**3 - 0**	**3**	**VI**	Computer Science/Physics/Math / Engineering discipline/Geology/ Geo-informatics
CIV-E05T	**Computer Applications in Civil Engineering**	**3 – 0**	**3**	**VI**	Concrete Technology & Design
CIV-E06T	**Engineering Geology & Seismology**	**3 - 0**	**3**	**VI**	Civil Engineering background
CIV-E07T	**Civil Engineering Management**	**3 - 0**	**3**	**VII**	Civil Engineering Background
CIV-E08T	**Green Architecture & Town Planning**	**3 - 0**	**3**	**VII**	Engineering Background
CIV-E09T	**Computer Graphics& Design**	**3 - 0**	**3**	**VII**	Engineering Background
CIV-E10T	**Advanced Geo-Tech Engineering**	**3 - 0**	**3**	**VII**	Geotechnical Engineering I & II
CIV-E11T	**Hydropower Engineering**	**3 - 0**	**3**	**VIII**	Water Resource Engineering
MTH-E01T	**Operation Research & optimization**	**3 - 0**	**3**	**VIII**	Transportation Engg I/ Advanced Structural Analysis/Geotechnical Engg I & II
CIV-E12T	**Transportation Planning & Economics**	**3 - 0**	**3**	**VIII**	Transportation Engineering I)
CIV-E13T	**Rock Mechanics & Tunneling Technology**	**3 - 0**	**3**	**VIII**	Civil Engineering Background

CIV-E01T -Traffic Engineering & Transportation Facilities

L – P

3 – 0 **Credits: 3**

UNIT I:

Components of traffic system- vehicle characteristics; human characteristics, road characteristics & traffic-control devices

UNIT II:

Intersections- signalized intersections, channelization and round-abouts, interchanges-requirement & design.

UNIT III:

Traffic signs- role and types, signalized intersections, signal timing design; signal coordination

UNIT IV:

Traffic flow theory-flow parameters; fundamental relation of traffic flow, road capacity and level of service concept

UNIT V:

Parking facilities- parking demand, on-street parking, off-street parking.

Traffic Safety: Accident Analysis, Traffic safety issues, countermeasures.

BOOKS RECOMMENDED

1. Transport New York; Toronto.Planning and Traffic Engineering by CA O'Flaherty, John Wiley & Sons, Inc.,
2. Traffic Engineering by McShane&Roess, Prentice-Hall of India Private Ltd, New Delhi-110001.
3. Principles and Practices of Highway Engineering by Kadiyali&Lal, Khanna Publishers, Delhi-6
4. Principles of Transportation Engineering by Chakarborty& Das, Prentice-Hall of India Private Ltd, New Delhi-110001
5. Traffic Engineering and Transport Planning by L. R. Kadiyali, Khanna Publishers, 2-B , NaiSarak, Delhi-110006

CIV-E02T- Disaster Management

L – P

3 –0 **Credits: 3**

UNIT 1

Earthquake, causes and classification, Estimation of size of earthquake, Magnitude and intensity, seismic waves, Isoseismal maps, Recurrence intervals, Fault slip rates, Response spectrum.

UNIT 2

Floods, causes of floods, Flood damages, Flood analysis and flood plain zooning, Drought and its impact.

UNIT 3

Cyclones and Tsunami, their causes characteristics and their impact, Prediction and control Measures,Avalanches – Mechanism, Classification, Control measures.

UNIT 4

Landslides - Mechanism, Causative factors, Landslides monitoring and prediction, Landslide hazard zonation.

UNIT 5

Vulnerability and Risk Management, Case studies for natural hazards, Various Retro-fitting Techniques.

BOOKS RECOMMENDED:

1. Reiter, L Earthquake Hazard Analysis, Issues and Insights, Columbia University Press.
2. Hyndman D. and Hyndman D, Natural Hazard and Disasters, Brooks/cole.
3. Mileti D.S., Disasters by Design: A Reassessment of Natural Hazards in United States.

ECE-E24T-Applied Electronic Instrumentation

L – P

3 –0 **Credits 3**

UNIT-I

Basic measurement concepts: Measurement System – Static and Dynamic characteristics, Units and standards of measurements, primary and secondary standards – error, accuracy and precision.

UNIT-II

Basic electronic measurements: Electronic multimeters, CRO – block schematic – applications, AC and DC measurement – DC voltmeter, ammeter, ohmmeter, Digital type voltmeter, ammeter, ohmmeter, AC measurement, ammeter, ohmmeter

UNIT-III

Transducer and sensor: Active and passive transducers, Types – resistive, inductive, capacitive, piezoelectric. Measurement of physical, physiological, chemical quantities (temperature, pH, luminescence, flow, torque, pressure, speed, acceleration, rotation, stress, strain). Denim gauge, Dial gauge, G – clamps, Load Cell, Electronic strain gauge, Accelerometers.

UNIT-IV

Signal generators and analyzers: Function generators, RF signal generator, Sweep generator, Frequency synthesizer, Waveanalyzers for audio and radio frequency wave.

UNIT-V

Data acquisition system and Testing: Components of data acquisition system, Interfacing of transducer, single and multichannel system, Multiplexing, interfacing with micro controllers. Testing an audio amplifier, radio receiver. Ultra sonic testing.

Text Books:

1. Electronic measurements by W. Cooper
2. Electrical and Electronic measurements by A.K. Sawhney

CIV-E03T- Construction Technology

L- P

3 - 0 **Credit:3**

UNIT I:

Construction Technology and various Construction methods.

Construction equipment: Selection ,cranes, hoists, mixers, conveyors, vibrators, bulldozer, dumpers, trenchers, excavators, hoe, graders, piling hammers, pumps, compressors, bitumen mix plant, rollers, clam shell, aggregate production techniques, crushers.

UNIT II:

Project scheduling:Network planning and scheduling, resource leveling and allocation with examples using various techniques namely Bar chart; CPM and PERT.

UNIT III:

Engineering economics of projects:Depreciation; Sinking Fund; compound interest factors, Selection of most economical alternative by variable cost method/Cost benefit ratio. Owning **and Operating cost.**

UNIT IV:

Works accounting. Cashbook, Imprest cash, contractors bills, store accounts. Materials at site account. Indent, invoice, Debit & Credit note, suspense head stock, Engineering Statements, Form of agreement.

UNIT V:

Form work, Scaffolding, shoring, Shuttering and underpinning; their types, characteristics, performance and application to building processes.

Books Recommended:

1. Construction Methods Plant and Equipment by R.L. Purifoy
2. Building Construction by S.P. Arora& S.P. Bindra
3. Project Management by B.M. Naik
4. The practice of Construction Management by Barry Fayer.

CIV- E04T- Advanced Measurement Techniques

(Remote sensing/ GPS)

L – P

3 –0 **Credits: 3**

UNIT I:

Basic concepts of Remote sensing, Airborne and space born sensors, Active and passive remote sensing, idea of remote sensing systems, Applications of remote sensing

UNIT II:

GPS, GPS-range and time measurements, errors, surveying methodologies and field procedures.

UNIT III:

Laser, Laser Scanning-physics of laser, laser interaction, different methods of range measurements with advantages and disadvantages, laser scanning types, components of LiDAR systems, INS-GPS integration, errors in laser scanning, laser scanning applications

UNIT IV:

Photogrammetry-camera types, geometry of photographs, distortions and rectifications, stereoscopy, parallax and use, interior and exterior orientation.

UNIT V:

Mathematical model relating image and object space, bundle block adjustment.

BOOKS RECOMMENDED:

1. Fundamentals of Remote sensing by George Dr. Joseph
2. Remote Sensing and GIS by BasudebBhatta
3. GPS Satellite Surveying, Alfred Leick, John Wiley
4. GPS for Land Surveyors, Sickle, J. V. Ann Arbor Press
5. Photogrammetry Surveying by R Agor and P.B. Shahani
6. Topographic Laser Ranging and scanning: Principles and Processing by Jie Shan, Charles K. Toth

7. Essentials of GPS by N.K.Agarwal

CIV-E05T-Computer Applications In Civil Engineering

L – P

3 –0 **Credits: 3**

UNIT I: Introduction to Topographic Survey and Assessment Using AUTOCAD™ CIVIL-3D®:

Introduction to Software, Terrain Points (Topo&Cogo), Formation of Point groups and Clouds, Surface and its formation using points, Surface formation using Google Earth™, Creation of Profile Views, Creation of Section Views, Importing Points and Mesh from Google Earth™ and GIS, Terrain Analysis using Contours, Slope Arrows, Water Shed, Importing and Plotting of Point Data from XML, CSV Point Data files

UNIT II: Introduction to Soil Analysis (Geotechnical Aspect) using TERRASOL™ PLAXIS 2D®:

Quick start Introduction to Software, Settlement of Circular Footing on Sand (Rigid & Flexible), Submerged Construction of an Excavation (input, mesh generation, calculations, results), Construction of Road Embankment (Input, Mesh Generation, Calculations, safety Analysis, Using Drains), Pile Driving (input, mesh generation, calculations, results)

UNIT III:Introduction to Structural Analysis using CSI™ SAP®:

Introduction to software, Creating a new model from the Model Wizard, Creating a new model from the Grid, Defining Materials, Load Patterns Load Cases, Load Combinations, Using of Special Joints in a Model, Assigning Joint properties, Frame Properties, Area Properties, Solid Properties, Assigning Joint Loads, Frame Loads, Area Loads, Analyzing the Model, Selecting Load Cases to run, Introduction to Model Alive® Features, Displaying of Results (Deformed Shape, M3, VMAX, Axial Force)

UNIT IV: Introduction to Structural Design Using CSI™ ETABS®:

Introduction to software, Creating a new model from the Model Wizard, Creating a new model from the Grid, Defining the Diaphragm from the Wizard, Defining Material Properties, Section Properties, Addition of new materials using Indian Codes IS-456 and IS-800-LSD, Drawing Joint Objects, Beam/Column/Brace Objects, Drawing Floor/Wall Objects, Drawing grid, Assigning Joints Properties and Loads, Frame Properties and Loads, Shell Properties and Loads, Link Properties, Analysing the Model, Automatic Meshing for Slabs & Walls, Display Deformed Shape, Force/Stress Diagrams, Designing of Concrete Members, Designing of Steel Members, Detailing of the Results, Exporting the Detailing's to .DWG, .DXF, .IGS, formats, Printing of Detailed Design Drawings

UNIT V: Introduction to Costing and Estimation using MICROSOFT™ EXCEL®:

Introduction to the Software, Assigning Formulas to Columns, Insertion of Charts, Creation of Comparative Statements, Creation of BOQ, Detailed Estimate of Sub-Structure, Detailed Estimate of Super-Structure.

CIV-E06T-Engineering Geology& Seismology

L – P

4 –0 **Credits: 3**

UNIT I:

Geology and its relevance to civil engineering, Structural Geology; Folds, Faults and Mechanism of Faulting, Joints, Unconformities.

UNIT II:

Engineering Geology; geological considerations in tunnels, dams, bridges, building sites; landslides.

UNIT III:

Earthquakes; types and causes, distribution in the world, basic definitions, seismic zones.

UNIT IV:

Engineering Seismology (Definitions), Introduction to Seismic Hazards and Earthquake Phenomenon. Geographical Distribution of Earthquakes and Seismo-techtonics.

UNIT V:

Earthquake recording instruments, Warning systems, Global network, Monitoring of Earthquakes.

BOOKS RECOMMENDED

1) Engineering Geology by Parbin Singh

2) Physical Geology by Arthur Holmes

3) Engineering Geology by F.G. Bell

4.Engineering Seismology by PN Aggarwal.

5.An introduction to Seismology, Earthquakes & Earth Structures by Sethstein& Michael Wysession

CIV-E07T-Civil Engineering Management

L – P

3 – 0 **Credits: 3**

UNIT I: BASIC CONCEPTS

Types of business operations, sole proprietorship partnership, company, public and private sector enterprises/ joint ventures, collaborations.Functions of management / principles of managements.Production management – planning, scheduling – procurement, inventory control. Management tools LP, PERT, CPM etc

UNIT II:INTRODUCTION TO MARKETING AND FINANCIAL MANAGEMENT

Marketing – marketing segmentation, positioning, marketing research, marketing planning, scope of financial management – cost accounting vs financial accounting. Appraisal of projects, investment decisions, concept of pay back.

UNIT III:MATERIALS AND EQUIPMENT MANAGEMENT

Planning – identification, procurement, schedule and cost control – systems approach in resource management.

Material: Time of purchase, quantity of material, sources, Transportation, Delivery and Distribution.ABC analysis, VED analysis, FSN analysis.

Equipment: Planning and selecting by optimistic choice with respect to cost, Time Source and handling

UNIT IV:HUMAN RESOURCE MANAGEMENT

Scope and objective of HRM – man power policy and planning - recruitment and selection.Training performance appraisal. Wage policy and compensation systems. Accidents, absenteeism and turn over – grievances/conflicts – identification and resolution

UNIT V: INTRODUCTION TO COMPUTER APPLICATION IN CONSTRUCTION MANAGEMENT

Planning, Scheduling and Resource analysis. Recording and operations project accounting, costing and finance usage of project management software.

BOOKS RECOMMENDED

1. Civil Engineering Management by O.N. Wakhloo
2. Works Management by Maheshverma.
3. Konni, Donnel C.O. and Weighrich H., Management, Eighth edition. McGraw Hill International Book Company,1997
4. Philip kotler, marketing management, Prentice Hall of India, Edition 1998

CIV-E08T-GreenArchitecture & Town Planning

L – P

3 – 0 **Credits 3**

UNIT I: ARCHITECTURE

Architecture & Civil Engineering, classical Architecture, contemporary Architecture, General aspects of Architectural projects.

Architectural planning and design-Introduction, factors affecting Architectural Design, principles of Architectural design, organization of space, space standards, modular co-ordination.

UNIT II: FUNCTIONAL ANALYSIS

Analytical study of Buildings in respect of functional efficiency, Architectural efficiency, Building Science, environmental controls-both exterior and interior, physical and economic constraints with respect to residential and Public buildings, DhajjiDewari and Takh System.

UNIT III: ARCHITECTURAL PLANS AND PROJECTS

Introduction to Architectural plans, preparation and reading of architectural plans, analytical study of various works/projects of some architects like LE Corbusier, Philip Jhonson, F.L.Wright, etc.

UNIT IV: TOWN PLANNING

Planning at various levels-national, regional, city, village.
Origin & growth of towns, Horizontal and Vertical development.
Brief historical review of some ancient towns, present day planning in India.

UNIT V: MASTER PLAN & ZONING

Importance of Master Plan for redevelopment of existing towns & planning of new towns, implementation, building Bye-Laws, concept of Red-hood Neighbourhood Pattern.

Zoning Regulation for various urban land uses including density and height zoning, multi-story buildings and their implications on urban planning.

BOOKS RECOMMENDED-

1. Architectural Design by KR Moudgil
2. Town Planning by Rangawala
3. Town Design by Fredrick Gibberd
4. New concepts in Architecture & design by Yoshikawa

CIV-E09TP- Computer Graphics and Design

L – P

2 – 1 **Credits: 3**

UNIT I: AUTOCADD 2012

Annotation scale overview; Working with annotative styles; Annotation scale and model space; Using Fields; Updating and Modifying Fields; Object Fields; Fields in Blocks; Fields in Attributes; Working with Tables; Dynamic Blocks-Working with Dynamic Blocks.

UNIT II: AUTOCADD 2012 PLOTTING

Attributes, Inserting Blocks with Attributes, What are Attributes?, How Attribute Values Are Entered, Editing Attribute Values, Defining Attributes, Redefining Blocks with Attributes, Updating Blocks with New Attributes, Output and Publishing, Output for Electronic Review, Plotting Electronic Files, Exporting DWF or PDF Files, Autodesk Design Review, Viewing Markups in AutoCAD, Publishing Drawing Sets.

UNIT III: STAAD Pro concepts

Generating the model geometry; Specifying member properties; Specifying material constants; Specifying member specifications; Specifying supports; Defining and Specifying Loads; Analysis types, Post analysis print

UNIT IV: STADD Pro design

Concrete Design Parameters; Concrete Design per IS:456; Steel Design Parameters; Steel Design per IS:800; Printing information to output files; Perform analysis, View output file, Graphical post processing, Diagrams, Results, Creating customized reports; Printing of reports; Interactive designs

UNIT V:

Brief Introduction to SAP 2000 v14; SAFE, STADD foundation; and ANSYS, CORAL DRAW; features and feasibility of usage

CIV-E10T- Advanced Geo-Technical Engineering

L – P **Credits 3**

3 –0

UNIT I: EARTH RETAINING STRUCTURES

Analysis and Design of Sheet piles and Gravity retaining structures by various methods

UNIT II: EARTH STABILISATION

Methods of Stabilization.Brief introduction to each of the methods of stabilization such as Shot-creting, geo-reinforcement, Ground improvements by Stone Column and preconsolidation.

UNIT III: ENVIRONMENTAL GEOTECHNIQUES

Landfills and its types, Clay-Liners, etc.

UNIT IV: SOIL DYNAMICS

Dynamic behavior of soils and its impact on Foundation design, Machine Foundations

UNIT-V: FOUNDATION DESIGN

Analysis and Design of raft footings, pile foundations, well foundations and Caissons

Books Recommended

1. Earth Retaining Structures by ShamsherPrakash.
2. Design Aids in Geotechnical Engineering by KaniRaj.
3. Foundation Engineering by Teng.
4. Foundation Engineering by Bowe

CIV-E11T-Hydropower Engineering

L – P

3 –0 **Credits: 3**

UNIT I: GENERAL INTRODUCTION

Development of water power, Estimation of Hydropower potential, Comparison of hydro, thermal & nuclear power.

Classification of hydro-power plants.

UNIT II: ANALYSIS OF STREAM FLOW & DEMAND

Flow duration curve, firm power, secondary power, load & Load duration curves, load factor etc.

UNIT III: WATER CONVEYANCE SYSTEM

Power canals, Alignment, Design of power canals, flumes, covered conduits & tunnels.

Penstocks- Alignment, types of penstocks, Economic diameter of penstocks, Anchor blocks.

UNIT IV: DAMS

Selection of site, preliminary investigations, Final investigations.

Rigid Dams: Basic principles of design & details of construction.

Embankment Dams: Earthen dams, rock-fill dams, design Considerations.

Spillways: Types of spillways, Spillway gates, Design of stilling basins.

UNIT V: POWER HOUSE DETAILS

Forebay, intakes, General layout of power house & arrangement of hydropower units; Underground power stations.

BOOKS RECOMMENDED:

1. Dandekar, M.M. “Water Power Engineering”.
2. Deshmukh, M.M. “Water Power engineering”, DanpatRai& Sons, New Delhi.

3. Arora, K.R. “Irrigation, Water Power & Water Resources Engineering”, Standard Publishers Distributors, Delhi.

MTH-E01 T Operation Research

L – P

3 –0 **Credits: 3**

Unit I: Introduction
Introduction to operation Research, Linear Programming problem â €.Formulation of LPP, Graphical solution of LPP, simplex method, artificial variables, big-M method.

Unit II:Transportation Problems
Formulation, solution of balanced transportation problem. Finding intial basic feasible solutions â €. North-west corner rule, least cost method and Vogoles approximation method.

Unit III: Assignment Model and Hungarian method
Assignment Model Formulation, Hungarian method for optimal solution; solving unbalanced problems; travelling salesman problem and assignment.

Unit IV:Sequencing Models
Solution of sequencing problem â €; processing n jobs through two machines, â € processing n jobs through three machines â €; Processing two jobs through m machines.

Unit V: Dynamic Programming
Introduction to Dynamic programming problems, Characteristics and applications of Dynamic Programming, Mathematical formulation and optimal Solution of Dynamic Programming problems.

BOOKS RECOMMENDED:

1. P. SankaraIyer, â € Operations Research, Tata McGraw Hill 2008
2. A.M. Natarajan, P.Balasubramani, A. Tamilarasi, â € Operations, Pearson Education, 2005.

CIV-E12T-Transportation Planning & Economics

L – P

3 –0 **Credits: 3**

UNIT I:

Introduction and scope of transportation planning and transportation economics, transportation planning issues.

UNIT II:

Public Transportation: public transport modes, desirable characteristics of public transport systems, transit system operations, route development, stopping policy, stop location, scheduling, capacity of transit systems, socially optimal pricing

UNIT III:

Transport analysis and forecasting: transport planning process, transportation and land use, transport planning strategies, transport planning models, travel demand analysis, operational transportation and land use models.

UNIT IV:

Transport economics and finance: pavement economics- construction cost; maintenance cost and vehicle operation cost, economic evaluation of highway projects- basic principles

UNIT V:

Time value of money; costs and benefits; net present value (NPV) method; benefit-cost (B/C) ratio method; internal rate of return (IRR) method; comparison of evaluation techniques, freight transport-trends and economic growth.

BOOKS RECOMMENDED:

1.Transport Planning and Traffic Engineering by CA O'Flaherty, John Wiley & Sons, Inc., New York; Toronto.

2.Transportation Engineering and Planning by Papacostas&Prevedouros, Prentice-Hall of India Private Ltd, New Delhi-110001

3. Principles of Transportation Engineering by Chakarborty& Das, Prentice-Hall of India Private Ltd, New Delhi-110001

4. Urban Transportation Planning by Meyer & Miller, McGraw Hill, New Delhi

CIV-E13T: Rock Mechanics & Tunneling Technology

L – P

3 - 0 **Credits: 3**

UNIT I: INTRODUCTION TO ROCK MECHANICS

Introduction, terminology, Rock classification systems, physical & mechanical properties of rocks, laboratory testing, stability of rock slopes, Rock bolting.

UNIT II: INTRODUCTION TO TUNNELS

Introduction, Classification of tunnels. Survey for a tunnel project

UNIT III: METHODS OF TUNNELING

Methods of Tunneling in soft & hard rock.Methods of rock blasting in tunnels.

UNIT IV: TUNNEL SERVICES

Tunnel services in rock tunnels; ventilation, drainage and lighting.

UNIT V: TUNNEL LINING & SUPPORTS

Lining of tunnels in soft grounds methods and types, tunnel supports for weak rocks including rock bolting.

BOOKS RECOMMENDED:

1. Brown, E.T. “Analytical & computational Methods in Engineering Rock Mechanic, CBS Publishers & Distributors, New Delhi.

2. Godman, P.E. “Introduction to Rock Mechanics”, John Wiley, 1989.

LIST OF GENERIC ELECTIVES

Course Code	Subject	L - P	Credits	Preferred semester	Prerequisite
MEC-G01TP	**Machine Drawing**	**3 – 0**	**3**	**III**	**Engineering Background**
CIV-G01T	**Professional Communication & Engineering Ethics**	**3 – 0**	**3**	**III**	**Engineering Background**
CSE-G03TP	**MATLAB for Engineers**	**1 – 3**	**3**	**III**	**Math as Science Subject**

MEC – G01 TP - Machine Drawing

L – P
2 – 2 **Credit:3**

UNIT I:

Principles of Sectioning, types of Sections, standard practices.

UNIT II:

Nut and Bolt, types and their assembly, threads and various types of screw threads, threaded fasteners, locking devices, foundation bolts.

Permanent fasteners: Rivet and riveted Joints, welding symbols and welding joints.

UNIT III:

Pin and cotter joints (temporary fasteners), Spigot and socket type cotter joint, sleeve type cotter joint, knuckle joint, Gib and cotter joint.

UNIT IV:

Keys and Shaft Couplings (temporary fasteners), Flanged (Protected and unprotected), Muff coupling (Pin type), friction coupling, clutches, Oldham coupling and universal coupling.

UNIT V:

Shaft bearing: Type of Bearings, journal bearings, pivot bearings, thrust bearings, ball bearings, bearing bracket, hangers and ball bearings.

Books Recommended:

1. P.S Gill Machine Drawing
2. N.D Bhatt Machine Drawing

CIV -G01T- Professional Communication& Engineering Ethics

L – P

3– 0 **Credit:3**

Unit I:
Communication: definition and description; types of communication; body language; barriers to Communication. Speech sounds: description and articulation of Phonemes, words, word stress, sentence stress and intonation in basic patterns; basics of connected speech and conversational patterns.

Unit II:
Written communication: nature, styles and types, Report writing; structure, drafting and types; business correspondence: purpose, types of business letters; resume; proposals and invitations; emails. Presentation: skills and deliverance; making and answering phone calls; debating and group discussions; facing interviews.

Unit III:

Engineering ethics, Nature and scope, Types of ethics: Common ethics, Personal ethics, Professional ethics, Origin of ethical theories, Rights and responsibilities of engineers, Case studies.

Unit IV:
Islamic perspective on ethics and education, concept of rights and duties in Islam, sociological perspective on education, social and value implications of technology, Environmental Obligations on Engineers.

Unit V:
Moral development, Different stages of moral development; pre-conventional, conventional and post-conventional, Moral and non-moral actions, Impediments to responsible action, Computer ethics, Computer Crimes, need of computer ethics, hacking, Bio-Ethics.

RECOMMENDED BOOKS:

1. Battacharaya, Inderjit. An Approach to communication Skills.
2. P.D. Chaturvedi and M. Chaturvedi, Business Communication, Delhi: Pearson Education, 2006.
3. Charles B. Fleddermann, Enginerring Ethics 2nd ed. Pearson education Inc.
4. FrankanaWalliam .K :Ethics

5. Sinha. J.N :Manual of Ethics

CSE-G03T/PMATLAB for Engineers

L – P
1 – 3 **Credit:3**

Unit-I
Introduction to MATLAB and why it is widely used in engineering and science,advantagesand limitations of the student edition of MATLAB, Start the MATLAB program and solve simple problems in the command window, Identify and use the various MATLAB windows, Define and use simple matrices, Name and use variables, difference between scalar, array, and matrix calculations, Express numbers in either floating-point or scientific notation, Adjust the format used to display numbers in the command window, Save the value of variables used in a MATLAB session, Save a series of commands.

Unit-II
Built in functions, elementary math functions (common math functions,rounding functions, discrete mathematics functions,trigonometric functions), data analysis functions (maximum and minimum, mean and median, sums and products), sorting functions, random numbers,complex numbers, Recognize and be able touse the special values andfunctions built into MATLAB.

Unit-III
Creating Function M-Files, Creating Your Own Toolbox of Functions, Anonymous Functions and Function Handles, Function Functions, Subfunctions. user defined input, output options, graphical input, Relational and logical operators, Find function, if/else, switch/case structure, for loops, while loops, midpoint break loops,

Unit-IV
Manipulate matrices, extract data from matrices, solve problems with two matrix variables of different sizes, special matrices, Matrix Operations and Functions, Solutions of Systems of Linear Equations.

Unit -V
Two-Dimensional Plots, Subplots, Other Types of Two-Dimensional Plots, Three Dimensional Plotting, Editing Plots from the Menu Bar, Creating Plots from the Workspace Window, Saving Your Plots,

LIST OF EXPERIMENTS
1. Practicing MATLAB environment with simple exercises to familiarizeCommandWindow, History, Workspace, Current Directory, Figure window,Edit window, Shortcuts, Help files.
2. Data types, Constants and Variables, Character constants, operators, Assignment statements.

3. Control Structures: For loops, While, If control structures, Switch, Break,Continue statements.
4. Input-Output functions, Reading and Storing Data.
5. Vectors and Matrices, commands to operate on vectors and matrices, matrix manipulations.
6. Arithmetic operations on Matrices, Relational operations on Matrices, Logicaloperations on Matrices.
7. Polynomial Evaluation, Roots of Polynomial, Arithmetic operations onPolynomials.
8. Graphics: 2D plots, Printing labels, Grid & Axes box, Text in plot, Bar and Piechart.

RECOMMENDED BOOKS:

1. Holly Moore, "MATLAB for Engineers", Pearson
2. Bansal R.K, Goel A.K., Sharma M.K., "*MATLAB and its Applications in Engineering*", Pearson Education, 2012.

REFERENCES

1. Amos Gilat, "*MATLAB-An Introduction with Applications*", Wiley India, 2009.
2. Stephen.J.Chapman, "*Programming in MATLAB for Engineers*", CengageLearning, 2011.