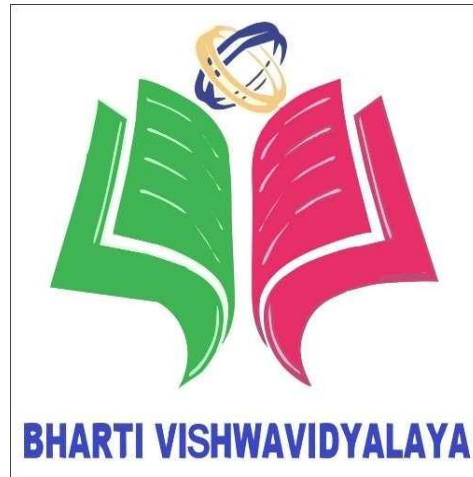


BHARTI VISHWAVIDYALAYA DURG (C.G.)

Website - www.bhartiuniversity.org, Email–bhartiuniversity.in@gmail.com



**SCHEME OF EXAMINATION
&
SYLLABUS OF
DIPLOMA
IN
CIVIL ENGINEERING
UNDER
FACULTY OF CIVIL ENGINEERING**

Session 2021-22

(Approved by Board of Studies)



BHARTI VISHWAVIDYALAYA, DURG

Scheme of Teaching and Examination

Diploma in Electrical Engineering/Civil Engineering (Group-I)

Semester – I

S. No.	Course Code	Course Titles	Scheme of Studies			
			L	P	T	Credit (L + T + P/2)
1	DE00101	Communication Skills – I	2	-	1	3
2	DE00102	Applied Maths – I	2	-	1	3
3	DE00103	Environmental Engineering & Sustainable Development	2	-	1	3
4	DE00104	Applied Physics	2	-	1	3
5	DE00105	Basic Non-Conventional Energy Sources	1	-	1	2
6	DE00106	Computer Fundamentals & Applications	2	-	-	2
7	DE00107	Applied Physics (Lab)	-	2	-	1
8	DE00108	Basic Non-Conventional Energy Sources (Lab)	-	2	-	1
9	DE00109	Computer Fundamentals & Applications (Lab)	-	4	-	2
10	DE0010	Seminar & Technical Presentation (Listening, Reading & Speaking) Skills	-	2	-	1
11	-	Library	-	2	-	-
12	-	Co-curricular & Academic Activity Societies	-	2	-	-
Total			11	14	05	21

L - Lecture

P – Practical

T - Tutorial



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Scheme of Teaching and Examination

Diploma in Electrical Engineering/ Civil Engineering (Group-I)

Semester-I, Session - 2021-22

S. No.	Course Code	Course Titles	Scheme of Examination					
			Theory			Practical		Total
			ESE	CT	TA	ESE	TA	Marks
1	DE00101	Communication Skills – I	70	10	20	-	-	100
2	DE00102	Applied Maths – I	70	10	20	-	-	100
3	DE00103	Environmental Engineering & Sustainable Development	70	10	20	-	-	100
4	DE00104	Applied Physics	70	10	20	-	-	100
5	DE00105	Basic Non-Conventional Energy Sources	-	-	50	-	-	50
6	DE00106	Computer Fundamentals & Applications	70	10	20	-	-	100
7	DE00107	Applied Physics (Lab)	-	-	-	35	15	50
8	DE00108	Basic Non-Conventional Energy Sources (Lab)	-	-	-	35	15	50
9	DE00109	Computer Fundamentals & Applications (Lab)	-	-	-	35	15	50
10	DE00110	Seminar & Technical Presentation (Listening, Reading & Speaking) Skills	-	-	-	-	50	50
Total			350	50	150	105	95	750

ESE: End of Semester Exam,

CT: Class Test,

TA: Teachers Assessment.



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Course Code :	DE00101
Course Title :	Communication Skills – I
Credit :	3
Max. ESE Marks : 70	Min. Marks : 28

Unit I

English Grammar Sentence–Parts types transformation (Affirmative, Negative and interrogative), Determiners, Tenses, Active and Passive Voice, Prepositions, Subject-Verb Agreement.

Unit II

Effective Communication objectives of communication. Elements of communication process, Seven Cs of Communication, Different Communication Skills, Listening Speaking Reading Writing, Effective use of listening, listening versus hearing, Process and Purpose of listening. Techniques of effective listening.

Unit III

Short Stories, Selfish Giant-Oscar Wilde A Letter to God-Gregario Lapex Y-Fuentes, An astrologer's Day –R.K. Narayan.

Unit IV

Suggestive passages for Comprehension, Language of Science, Non-conventional sources of Energy, Our Environment and Entrepreneurship.

Books:

1. English Grammar in Use Murphy Raymond Cambridge Publications 4th Edition.
2. Living English Structure Allen Cambridge Publications Fifth edition (2009).
3. Effective English with CD Kumar, E. Suresh; Sreehari, P.; Savithri, J. Pearson Education, Noida, New Delhi 2009 ISBN: 978-81-317-3100-0.
4. English Grammar at Glance Gnanamurali, M. S. Chand and Co. New Delhi, 2011
5. Communication Skill for Technical Students Somaiya Publication.
6. Elementary English Agarwal N. K. Goyal Brothers Latest Edition.



7. Grammar and Composition A Study Guide on Communication Skills for Technical Students Dr. Sumi Guha Dr. Shameena Bano Prakashan Vaibhav Prakashan 1st Edition, 2020 ISBN - 978-93-89989-25-0.

Open source software and website address:

1. <https://www.englishgrammar.org/>
2. <http://www.englishgrammarsecrets.com/>
3. <https://www.usingenglish.com/handouts/>
4. <http://learnenglish.britishcouncil.org/en/english-grammar>
5. <https://www.englishclub.com/grammar/>
6. <http://www.perfect-english-grammar.com/>
7. <http://www.englishteachermelanie.com/category/grammar/>
8. <https://www.grammarly.com/blog/category/handbook>
9. <https://www.britishcouncil.in/english/learn-online>
10. <http://learnenglish.britishcouncil.org/en/content>
11. <http://www.talkenglish.com/>
12. [language-labs.com](http://www.language-labs.com/)
13. www.wordsworthelt.com



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Course Code :	DE00102
Course Title :	Applied Maths – I
Credit :	3
Max. ESE Marks : 70	Min. Marks : 28

Unit I Algebra

Concept and principles of determinants. Properties of determinants Computation of Mean and R.M.S. Value General equation of second degree, Nature of roots, Quadratic Equation, Formation of Equation Class- I, II,III, IV.

Unit II Differential Calculus

Basic Trigonometry, Multiple and sub multiple angles, Functions and Limits, Independent and dependent variables, Different types of functions, Concept of Limit and its evaluation, Differentiation of elementary functions, Differentiation of Algebraic, Trigonometric, Exponential and Logarithmic functions, Differentiation of sum, product, quotient of two functions.

Unit III Applications of Differential Calculus

Second order derivatives–Second order derivatives (without examples), Equation of Tangent and Normal, Equation of Tangent and Normal for functions of one variable only Maxima and minima, Maxima and minima for functions of one variable only.

Unit IV Co-ordinate Geometry

Various forms of straight lines, Co-ordinate systems, slope point form, two point form, Distance between two points, division of a line segment, Two points intercepts form, general form, Perpendicular distance from a point on the line, perpendicular distance between two parallel lines, *Components of Vector*.

Conic sections: Definition, standard forms, General equation, Center and radius of a circle, Focus, axis, directrix, latusrectum and vertex of parabola and ellipse.

Unit V Fundamentals of Statistics

Frequency distribution and central tendency, Introduction, graphical representation of



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frequency distribution, Central tendency, mean, median, frequency distribution and mode, Dispersion and deviation, Measure of dispersion, Range, quartile deviation, Standard deviation, root mean square deviation, Variance and coefficient of variance, Variance and coefficient of variance.

Books:

1. Advanced Engineering Mathematics Krezig, Ervin Wiley Publ., New Delhi 2014, ISBN: 978-0-470-45836-5.
2. Advanced Engineering Mathematics H. K. Das S. Chand & Co, New Delhi ISBN: 9788121903455.
3. Higher Engineering Mathematics B. S. Grewal Khanna Publ., New Delhi 2015, ISBN: 8174091955
4. Engineering Mathematics, Volume 1 S. S. Sastry PHI Learning, New Delhi 2009, ISBN: 978-81-203-3616-2
5. Fundamentals of Mathematical Statistics S. C. Gupta S. Chand & Sons 2014

Open source software and website address:

1. www.scilab.org/ -SCI Lab
2. www.dplot.com/ -DPlot
3. www.allmathcad.com/ -MathCAD
4. www.wolfram.com/mathematica/ - MATHEMATICA
5. www.easycalculation.com



Course Code :	DE00103
Course Title :	Environmental Engineering and Sustainable Development
Credit :	3
Max. ESE Marks : 70	Min. Marks : 28

Unit – 1

Water pollution and Air pollution

Introduction to environment and environment pollution, Water pollution Introduction, sources of water pollution, *Hydrosphere, Natural water* classification of water pollutants and adverse effect of water pollution, control of water pollution, Physical and chemical standard of domestic water as per Indian standard. Air pollution Introduction, *Atmospheric composition, Energy balance* Sources of air Pollutants, classification of air Pollutants, Effect of air pollution on human, plant, and animal, Air monitoring system and air pollution control.

Unit – 2

Soil, Noise, Thermal and Nuclear pollution

Soil and soil profile, soil pollution introduction, *Lithosphere*, sources of soil pollution, adverse effect of soil pollution, control measures of soil pollution, Noise pollution introduction, measurement of noise and acceptable noise level, sources of noise pollution, effect of noise pollution, control of noise pollution. *Difference between sound and noise* Thermal pollution introduction, effects of thermal pollution causes and control. Radioactive pollution introduction, sources of radioactive pollution, adverse effects of radioactive pollution, control of radioactive pollution.

Unit – 3

Sustainable Development and Clean technologies

Sustainable Development: Concept of sustainable development, *Elements of sustainable development* Natural resources, a-biotic and biotic resources, Principles of conservation of energy and management, Need of Renewable energy, Growth of renewable energy in India. Clean Technologies Introduction: Clean technology, Types of Energy, Conventional Energy



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Sources, Non-conventional Sources of Energy, Recycling pollution control.

Solar Power: Features of solar thermal and PV systems, Types of solar cookers and solar water heaters, Hydel Energy and its advantages, Wind energy –advantages. Biomass energy, Types of Biomass Energy Sources, Energy content in biomass of different types of Biomass conversion processes.

Unit – 4

Environment Impact Assessment (EIA)

Public Participation in EIA, *Object of EIA*, *Component of EIA*, EIA documentation, Case studies on EIA, EIA scope & steps, EIA process, EIA report *and documentation*, EIA Gazette notification, EIA action plan, EIA implementation, EIA directives follow-ups.

Unit – 5

Social Issues and the Environment

Water conservation, *Objective of water conservation*, *Methods*, Rain water harvesting, Watershed management, Acid rain *Causes and sources* and its effect, Climate change, Greenhouse effect, Depletion of Ozon layer, and effect of Ozon layer depletion, Global warming and measures against global warming.

Solid waste management: causes, effects and control measures of urban and industrial waste, importance of 3R's in waste management. *Pyrolysis* Environment protection Act 1986: importance and objective

Books :

1. Environmental studies, Dr. Suresh K. Dhameja, S. K. Kataria and sons, 2012.
2. Energy, Environment Ecology & Society, Dr. Surinder Deswal, Dhanpat Rai & sons, 2014.
3. Environment & Ecology, Dr. Piyush Kant Pandey, Sun India Publication, 2009.
4. Energy and sustainable development, P. S. Ramakrishnan, National Book Trust, 2014.
5. Our Environment (Hindi Textbook), M. K. Goyal, Agrawal publications, Agra, 2013.

Open source software and website address:

1. www.nptel.ac.in



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2. <https://swayam.gov.in>



Course Code :	DE00104
Course Title :	Applied Physics
Credit :	3
Max. ESE Marks : 70	Min. Marks : 28

Unit – 1

Units, Measurement and Error analysis

Unit of physical quantity, Fundamental and derived unit, Unit system, CGS, MKS and SI, Advantages/ disadvantages of SI unit system, Seven basic and Supplementary units. Dimensional Analysis, Dimensional formula and equations. Applications of Dimensional equations. Numerical problems on Dimensional analysis. Measurement, Accuracy, Precision and Errors, Absolute, Relative and percentage Error. Significant figures and rounding off.

Unit – 2

Motion, Force and General Properties of matter

Motion, Newton's Law of Motion, Equation of Motion, Force, Types of Forces, Conservative and non-conservative forces, Frictional Forces, Limiting static and dynamic friction. Centripetal and centrifugal force and Their illustration. Gravitational Force 'G' and 'g' and their interrelation, Factors affecting 'g', Elasticity, Hooke's law, Elastic limit and elastic fatigue, Moduli of elasticity's, Young's modulus, Bulk Modulus, Shear modulus of rigidity, Surface Tension, Molecular force, Surface energy, effect of temperature, Cohesive and adhesive force Excess pressure and its illustration, rise of liquid in capillary tube, Viscosity Coefficient of viscosity, Newton's law of viscosity Streamline and turbulent flow, Reynolds number, Poiseuille's equation (no derivation of formula), Stoke's law and their applications.

Unit – 3

Optics, optical instruments and optical fibers

Reflection, Reflection of Light, Types of Reflection, Refraction Laws of, Refraction Lenses and combination of lenses, Absolute and relative, refractive index, Refraction



through prism, Angle of minimum deviation and its relation, Total internal reflection of light, Critical angle. Applications of TIR, Optical fiber, NA of Optical fiber, Optical instruments, Simple and Compound microscope, Spectrometer, Electromagnetic Spectrum, Pure and Impure spectrum, Visible Range.

Unit – 4

Electrostatics, Magnetism and Current Electricity

Electrostatics: - Electric Charge, Coulomb's Law, Electric Field, Potential, Potential Difference between Two Points, Equip- potential Surfaces, Types of dielectrics and dielectric Strength Capacity, Units, Principle of Capacitor, Factors Affecting Capacity, type of capacitors,

Magnetism: - Magnetic lines of force, lines of induction.

Current Electricity, Resistance, Specific resistance, Series and parallel combination of resistance, Internal resistance of a cell, Potential difference and emf of a cell, Combination of cells in series and in parallel. Simple applications of Wheatstone bridge, Meter Bridge and Potentiometer, Electrical power.

Unit – 5

Modern Physics

Photoelectric effect, Laws of photoelectric emission, Photoelectric equation and threshold frequency, Photo cell, X-rays Production of X rays, properties & uses, Laser, Spontaneous and stimulated emission, population inversion, pumping scheme and active system Ruby Laser and semiconductor laser, Ultra-sonics, Frequency range, Methods of production Magnetostriction & Piezo electric method, Properties of ultra- sonics, Applications of ultra- sonics.

Books:

1. Fundamentals of Physics Halliday, David; Resnik, Robert and Walker, Jearl John Wiley and sons Tenth edition 2013.
2. The Feynman Lectures on Physics Feynman P. Richar, B. Leighton Robert Sands Matthew Pearson Education India First edition 2012.



3. University physics Young Hugh, Freedman Roger Pearson Education India
Thirteenth Edition 2013

Open source software and website address:

1. Some relevant Experiments: <http://cdac.olabs.edu.in>
2. VernierCalipers:<http://www.tutorvista.com/physics/animations/vernier-callipers-animation>
3. Screw gauge: www.notesandsketches.co.uk/Measuring_Tools_Small.swf
4. <http://www.stefanelli.eng.br/en/virtual-vernier-caliper-simulator-05-millimeter>.
5. Photoelectric effect: <http://vlab.amrita.edu/?sub=1&brch=195&sim=840&cnt=1>.
6. Deflection magneto meter: http://emvau.vlabs.ac.in/Deflection_Magnetometer/.
7. Laser: <https://spaceplace.nasa.gov/laser/en/>



Course Code :	DE00105
Course Title :	Basic Non-Conventional Energy Sources
Credit :	2
Max. ESE Marks : 70	Min. Marks : 28

Unit-1

Energy sources

Conventional and non- Conventional energy sources. Energy consumption as a measure of Nation's development; strategy for meeting the future energy requirements Global and National scenarios. Non-conventional energy- Seasonal variations and availability. Renewable energy – sources and features. Hybrid energy systems, Distributed energy systems and dispersed generation (DG). Prospects and Achievements of renewable energy sources in India in general and Chhattisgarh state in particular. Issues related to power generation through renewable energy sources.

Unit-2

Solar energy

Solar radiation: Beam and diffuse radiation, Solar constant, earth sun angles, attenuation and measurement of Solar radiation, local Solar time, derived Solar angles. Flat plate collectors, concentrating collectors, elements, working and maintenance. Solar air heaters-types, Solar driers, elements, working and maintenance. Storage of Solar energy- thermal storage, Electrical storage, Chemical storage. Solar water heaters, Solar distillation, Solar still, Solar cooker, elements, working and maintenance. Photo voltaics - Solar cells & its applications, Solar panels, Solar PV pump, Solar Home lighting systems, Solar street lights, elements, working and maintenance.

Unit-3

Wind energy

Principle of Wind energy conversion; Basic components of Wind energy conversion systems. Wind mill components, various types and their constructional features.



Maintenance of Wind mills and turbines.

Unit-4

Energy from Biomass

Biomass conversion, technologies, Biogas generation plants, classification, advantages and disadvantages. Constructional details, site selection, filling a digester for starting, maintaining Biogas production, Fuel properties of Bio gas, and applications of Biogas. Maintenance of Biogas plants.

Unit-5

Geothermal, Micro Hydel, Ocean Thermal Energy Conversion and Tidal Energy

Geothermal plant. Micro Hydel plant. Ocean Thermal Electric Conversion (OTEC) systems like open cycle, closed cycle. Energy from tides, basic principle of tidal power, single basin and double basin tidal power plants, advantages, limitation.

Books:

1. Non-conventional Energy Sources G D RAI Khanna Publishers New Delhi
2. Non-conventional Sources of Energy (Hindi) S.S.L. PATEL Standard Publishers and Distributors
3. Non-conventional Energy Sources BH KHAN Tata McGraw Hill Publications
4. Renewable and Conventional energy S Rao Khanna Publishers New Delhi



Course Code :	DE00106
Course Title :	Computer Fundamentals and Applications
Credit :	2
Max. ESE Marks : 70	Min. Marks : 28

Unit – 1

Basics of Computer System

Basic building block of Computer. Central Processing Unit (CPU), Control Unit, Arithmetic logic Unit (ALU), Memory Unit, Input Output Units, Word, ASCII, BCD, EBCDIC, UNICODE Concept of Hardware and Software, System software & Application Software, Operating system Concepts, Purpose and its Functions Operations of Windows OS, Operations of Windows OS, *Operation on* file and folders, Copy file, Rename and Delete of files and folders, Search files and folders, Install Application, Create shortcut of application on the desktop Windows OS Utilities Windows accessories Utilities Control Panel, Taskbar.

Unit – 2

Word Processing

Overview of Word processor, Basics of Font, Casechanging options, working with Text, *Opening and closing documents*, Formatting Paragraphs Lists Setting, Line spacing Page settings, Margins Setting, Header and Footer Spelling and Grammatical checks, Table and its options, Merging and Splitting cells, Inserting Pictures from Files.

Unit – 3

Spread sheet/Data Analysis & Chart Presentation

Introduction to data, cell address, Excel, Data Types, Concept of hyperlink Introduction to Formatting Number, Text, Formatting Date & Time, Formatting Concept of Workbook, *Forward and functions*, Common Excel Functions, Math & Trig Functions such as Sum, Round, Sqrt, Powered. Statistical Function such as Average, Min, Max, etc. Date & Time. Logical Functions such as IN, AND, OR etc. Text Function such as Upper, Lower Types of Graphics, Word Art, Auto Shapes, Images, Introduction to charts,



Overview of different types of Charts. Printing in spreadsheet, Print Area, Header & Footer, Page Setup options.

Unit – 4

Multimedia Graphic Presentation

Introduction to Multimedia *and* Graphics. Starting a New Presentation Files, Saving work, Creating new Slides Work with textboxes, Adjusting line spacing, Formatting text boxes, Create new Slides, Introduction to Formatting, Change a slides Layout, Applying a theme, Changing the background, Formatting bulleted and numbered list, Styles Work with Fonts, Change the font, font size, font color, Creating and managing custom font theme & Color, Slides Master, Slide Sorter, Word Arts, Selecting, deleting, moving, copying, resizing and arranging objects, working with drawing tools, Find and replace text, Correcting your spelling, Use Tables Creating a new Table, Work with Video, Link to a video, Size a video, Use Animation, Sound & Effects, Creating hyperlinks, using action buttons.

Unit – 5

Basics of Internet & Cloud Computing

Types of Networks LAN, MAN, WAN Intranet, *Concept of Internet, application of Internet, www, Web browser software, VPN, Wi-Fi, Bluetooth, switches* Brief of Internet Connectivity Devices and Services Dial up, Leased line, DSL Broadband, Modem, Chat, Video conferencing, File Transfer Protocol, Web Browsers URL, Web Site, Search Engines Introduction to Virus& Antivirus Virus & its type, Antivirus Firewall Overview of Cloud Computing and *troubleshooting*.

Books:

1. Computer Fundamentals Goal, Anita, Pearson Education, New Delhi, 2014, ISBN-13: 978-8131733097.
2. Computer Course, Ravi Kant Taxali, Tata McGraw Hills. New Delhi. Year 2014 or latest.
3. Fundamentals of computers, V. Raja Raman, Neeharika Adabala, PHI 6th Edition



2014 or latest.

4. Computer Basics Absolute Beginner's Guide, Windows 10 Miller, Michael, QUE Publishing; 8th edition August 2015, ISBN: 978-0789754516 or latest.
5. The Internet Book, Douglas Comer Prentice Hall, Year 2007 or latest.
6. Microsoft Office 2010: On Demand Johnson, Steve Pearson Education, New Delhi India, -2010. ISBN: 9788131770641 or latest.
7. OpenOffice.org for Dummies Leets, Gurdy, Finkelstein Ellen, Mary Leets Wiley Publishing, New Delhi, 2003 ISBN: 9780764542220 or latest.

Open source software and website address:

1. Fundamentals of computers- V. Raja Raman, Neeharika Adabala https://books.google.co.in/books?id=rGjkBQAAQBAJ&dq=Fundamentals+of++computers&source=gbs_navlinks_s
2. Computer course, Ravi Kant Taxali- https://books.google.co.in/books/about/COMPUTER_COURSE.html?id=PfHftdSmNBkC&redir_esc=y
3. Computer Fundamentals Tutorials- https://www.arstecb.com/book_argument/com_fun.pdf
4. Computer fundamentals, P. K. Sinha <http://www.edutechlearners.com/computer-fundamentals-p-k-sinha-free-pdf/>
5. Microsoft office set by step Joan Lambert and Curtis Frye <https://ptgmedia.pearsoncmg.com/images/9780735699236/samplepages/9780735699236.pdf>
6. Open Office Suit- <http://www.openoffice.us.com/download-openoffice-free.php>
7. MS Office: <https://www.microsoft.com/en-in/learning/office-training.aspx>
8. Open Office Training: <http://www.tutorialsforopenoffice.org/>
9. Star Office- https://s3-ap-southeast-1.amazonaws.com/r4ltue295xy0d/Special_Edition_Using_StarOffice_6_0.pdf
10. Typing Master 10 in English for Windows: <http://www.typingmaster.com/typing-tutor/free-download.html>
11. Hindi Typing Tutor and Master <http://www.hinditypingtutor.com/>



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Course Code :	DE00107
Course Title :	Applied Physics Lab
Credit :	1
Max. ESE Marks : 35	Min. Marks : 14

List of Practical:-

1. Vernier calipers: Stainless steel body, Range: 0-150 mm, Resolution: 0.1 mm
2. Screw gauge: Stainless steel spindle and ratchet top brass body with satin chrome finish. Graduated to read up to 25 mm in 0.01 mm divisions with screw pitch of 0.5 mm, ratchet lock nut
3. Speedometer: Brass double disc superior quality, stainless steel legs and screw 1/100 mm pitch each.
4. Pendulum apparatus for determination of 'g': 200 mm diameter metal wheel mounted with fixed stand and a meter scale, stop watch to measure time. steel case fly back action least count 1/10th or 1/5th of second
5. Stoke's Law apparatus: Glass tube (~1-inch diameter and length ~ 1 m) with stand, timer, steel sphere, glass beads
6. Surface tension set up: Travelling microscope with horizontal and vertical movement (LC 0.001 cm), capillary tube, beaker, pin fixed on adjustable stand
7. Glass slab: Rectangular, all sides polished, made from slightly greenish glass free from bubbles, 75*50*18 mm
8. Glass Prism: Equilateral or right angled, from bubble free boro crown glass 38 x 38
9. Ohm's law apparatus: Box type with D.C meter to verify ohm's law with fitted ammeter & voltmeter
10. Post Office Box: Complete set in polished wooden box, Split brass contact blocks holding precision cut, interchangeable plug having molded black fluted tops. Coils of constantan wire with 4 pair of ratio
11. Arms.
12. Meter Bridge (Wheatstone Bridge): Sun mica top, two gap type having lock type terminals with pencil jockey.
13. Deflection magnetometer: Wooden base length~ 1 m, magnetic compass, meter scale



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and magnets

14. Bar magnet: Alnico size 3"- 4"
15. Potentiometer: 10K Ohm 500mW Linear Slide Potentiometer. About 10 m wire of Manganin and constantan with high resistivity and low temperature coefficient stretched on a wooden board attached with a meter scale and pencil jockey.
16. Photoelectric apparatus: Includes photo cell, light sources, voltmeter, ammeter
17. Diode laser: Power 5 mW, randomly polarized



Course Code :	DE00108
Course Title :	Basic Non-Conventional Energy Sources (Lab)
Credit :	1
Max. ESE Marks : 35	Min. Marks : 14

List of Practical:

1. Study of Solar Radiation by using Pyranometer
2. Study of Solar Distillation or Solar Still.
3. Study the photovoltaic cells available in the lab.
4. Demonstration/ study of solar water heater.
5. Demonstration/ study of solar cooker.
6. Study of solar water heating system of 120 liter/day capacity for the institute's hostel
7. Study of working of Solar pump and calculate its discharge.
8. Demonstration/ study of the working of a windmill.
9. Visit to biogas plants, domestic community/institution for study and demonstration of biogas plant .
10. Working principle of geothermal power plant.
11. Scope of Mini and Micro-hydro power plants in your state.



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Course Code :

DE00109

Course Title :

**Computer Fundamental and Application
(Lab)**

Credit :

2

Max. ESE Marks : 35

Min. Marks : 14

List of Practical:

1. Computer Network, LAN Cable, Router, Switch 30*2/Hub
2. Printer, Scanner, Plotter, Modem, Laser Printer, Scanner, Plotter, Modem
3. MS Back Office 2016 or latest, Office suit
4. Typing Master in English for Windows(Free download) Hindi Typing Tutor and Master(Free download), <http://www.typingmaster.com/typing-tutor/free-download.html> <http://www.hinditypingtutor.com/>
5. Open Office Suit Latest, Office suit
6. Internet Connectivity, Broad band/Leased Line
7. Anti-Virus Software & Firewall, Antivirus software And Firewall



Course Code :	DE00110
Course Title :	Seminar & Technical Presentation (Listening, Reading & Speaking) Skills
Credit :	1
Max. ESE Marks : 50	Min. Marks : 20

Unit – 1

Need of Learning to learn skills (Listening, Reading and Speaking), Methods of good study habits, Practice Loud reading, Practice Active Listening, Practice Speaking in Class(Group Discussion, Extempore, Debate, Role Play etc.

Unit – 2

Characteristics of good oral Presentation Ways of oral presentation Gestures Mannerism during oral Presentation Preparing Successful Presentations Making Effective Use of Visual Aids.

Books :

1. English Grammar in Use, Murphy Raymond, Cambridge Publications, 4th Edition
2. Living English Structure, Allen, Cambridge Publications, Fifth edition (2009).
3. Effective English with CD, Kumar, E. Suresh; Sreehari P.; Savithri J., Pearson Education, Noida, New Delhi, 2009 ISBN: 978-81-317-3100-0.
4. English Grammar at Glance, Gnanamurali, M., S. Chand and Co. New Delhi, 2011, ISBN: 9788121929042.
5. Elementary English Grammar and Composition Agarwal N. K., Goyal Brothers Prakashan, Latest Edition.

Open source software and website address:

1. <https://www.englishgrammar.org/>
2. <http://www.englishgrammarssecrets.com/>
3. <https://www.usingenglish.com/handouts/>
4. <http://learnenglish.britishcouncil.org/en/english-grammar>



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5. <https://www.englishclub.com/grammar/>
6. <http://www.perfect-english-grammar.com/>
7. <http://www.englishteacheramelanie.com/category/grammar/>
8. <https://www.grammarly.com/blog/category/handbook>
9. <https://www.britishcouncil.in/english/learn-online>
10. <http://learnenglish.britishcouncil.org/en/content>
11. <http://www.talkenglish.com/>
12. [language-labsystem.com](http://www.language-labsystem.com)
13. www.wordsworthelt.com



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Scheme of Teaching and Examination

Diploma in Electrical Engineering/Civil Engineering (Group – I)

Semester – II, Session – 2021-22

S. No.	Course Code	Course Titles	Scheme of Studies			
			L	P	T	Credit (L + T + P/2)
1	DE00201	Communication Skills-II	2	-	1	3
2	DE00202	Applied Maths-II	2	-	1	3
3	DE00203	Applied Mechanics	2	-	1	3
4	DE00204	Applied Chemistry	2	-	1	3
5	DE00205	Engineering Drawing	2	-	1	3
6	DE00206	Workshop Practice (Theory)	1	-	-	1
	DE00207	Applied Mechanics (Lab)	-	2	-	1
7	DE00208	Applied Chemistry (Lab)	-	2	-	1
	DE00209	Engineering Drawing (Practical)	-	2	-	1
8	DE00210	Work Shop Practice (Lab)	-	4	-	2
9	DE00211	Seminar & Technical Presentation (Personality Development & Leadership) Skills	-	2	-	1
10	-	Library	-	2	-	-
11	-	Co-curricular & Academic Activity Societies	-	2	-	-
Total			11	16	05	22

L - Lecture,

T - Tutorial,

P – Practical



BHARTI VISHWAVIDYALAYA, DURG

Scheme of Teaching and Examination

Diploma in Electrical Engineering/ Civil Engineering (Group – I)

Semester-II, Session – 2021-22

S. No.	Course Code	Course Titles	Scheme of Examination					
			Theory			Practical		Total Marks
			ESE	CT	TA	ESE	TA	
1	DE00201	Communication Skills-II	70	10	20	-	-	100
2	DE00202	Applied Maths -II	70	10	20	-	-	100
3	DE00203	Applied Mechanics	70	10	20	-	-	100
4	DE00204	Applied Chemistry	70	10	20	-	-	100
5	DE00205	Engineering Drawing	70	10	20	-	-	100
6	DE00206	Workshop Practice (Theory)	-	-	50	-	-	50
7	DE00207	Applied Mechanics (Lab)	-	-	-	35	15	50
8	DE00208	Applied Chemistry (Lab)	-	-	-	35	15	50
9	DE00209	Engineering Drawing (Practical)	-	-	-	35	15	50
10	DE00210	Work Shop Practice (Lab)	-	-	-	35	15	50
11	DE00211	Seminar & Technical Presentation (Personality Development & Leadership) Skills	-	-	-	-	50	50
Total			350	50	150	105	110	800

ESE: End of Semester Exam,

CT: Class Test,

TA: Teachers Assessment



Course Code :	DE00201
Course Title :	Communication Skills – II
Credit :	3
Max. ESE Marks : 70	Min. Marks : 28

Unit – 1

English Grammar, Auxiliary Verbs, Modifiers & Adverbial Phrases, Degree, Narration.

Unit – 2

Non-Verbal Communication Static features of Non Verbal Communication – Distance, Posture, Physical contact etc. Dynamic features of Non-Verbal Communication – Mannerism, Head & Hand movement, Eye to Eye contact, Facial expressions, Gestures.

Unit – 3

Paragraph & Letter Writing Paragraph writing. Letter writing Purposes of Letters Characteristics of a Letter Types of Business Letters -Applications for Job & Resume Writing-Letter of Enquiry-Letter for Order Placement-Letter of Complaints.

Unit – 4

Technical Report Writing: Report Writing, Characteristics of a Good Report, Types of Technical Report, General outline of Project Report, Progress Report of any assumed work, **Notice:** Purposes of Notices, Qualities of Notices, Format of Notice, Mail, Purposes of Mail and Format of Mail.

Books:

1. English Grammar in Use, Murphy Raymond, Cambridge Publications, 4th Edition
2. Living English Structure, Allen, Cambridge Publications, Fifth edition(2009)
3. Effective English with CD, Kumar, E. Suresh; Sreehari P.; Savithri, J., Pearson Education, Noida, New Delhi, 2009 ISBN: 978-81-317-3100-0
4. English Grammar at Glance, Gnanamurali M., S. Chand and Co. New Delhi, 2011 ISBN:9788121929042
5. A Course in Technical English, TTTI Bhopal



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6. Elementary English Grammar and Composition, Agarwal N. K., Goyal Brothers Prakashan Latest Edition.
7. A Study Guide on Communication Skills for Technical Students, Dr. Sumi Guha, Dr. Shameena Bano, Vaibhav Prakashan, 1st Edition, 2020 ISBN-978-93-89989- 25-0

Open source software and website address:

1. <https://www.englishgrammar.org/>
2. <http://www.englishgrammarsecrets.com/>
3. <https://www.usingenglish.com/handouts/>
4. <http://learnenglish.britishcouncil.org/en/english-grammar>
5. <https://www.englishclub.com/grammar/>
6. <http://www.perfect-english-grammar.com/>
7. <http://www.englishteachermelanie.com/category/grammar/>
8. <https://www.grammarly.com/blog/category/handbook>
9. <https://www.britishcouncil.in/english/learn-online>
10. <http://learnenglish.britishcouncil.org/en/content>
11. <http://www.talkenglish.com/>
12. [language-labs.com](http://www.language-labs.com/)
13. www.wordsworthelt.com



Course Code :	DE00202
Course Title :	Applied Maths – II
Credit :	3
Max. ESE Marks : 70	Min. Marks : 28

Unit – 1

Matrices

Introduction, Definition, Special Matrices, Addition and Subtraction of Matrices, Multiplication of Matrices, Transpose of a Matrix, Symmetric & Skew Symmetric Matrix, Ad-joint of a Square Matrix, Inverse of Matrix, Solution of simultaneous Linear equations, Rank of Matrix, Consistency of Linear System of Equations

Unit – 2

Integral Calculus

Simple Integration: Rules of integration and integration of standard functions, Methods of Integration: Integration by substitution, Integration by parts and Integration by partial fractions.

Unit – 3

Applications of Integral Calculus

Definite Integration, Simple examples, Properties of definite integral (without proof) and simple examples, Applications of integration: Area under the curve, Area between two curves.

Unit – 4

Differential equations

Differential equations of first order and first degree, Concept of differential equation, Order, degree and formation of differential equation, Solution of differential equation, Variable separable form, Homogeneous Differential Equations, Linear differential equation.



Unit – 5

Numerical Solutions of Equations

Introduction of algebraic and transcendental equations, Bisection method, Regular Falsie method, Newton Rapson's method, Introduction to Numerical integration, Trapezoidal rule, Simpson's one third rule, Simpson's three eighth rules.

Books :

1. Advanced Engineering Mathematics, Krezig, Ervin Wiley Publ., New Delhi, 2014, ISBN: 978-0-470-45836-5.
2. Advanced Engineering Mathematics, H. K. Das, S. Chand & Co, New Delhi, ISBN: 9788121903455.
3. Higher Engineering Mathematics, B. S. Grewal, Khanna Publ., New Delhi, 2015, ISBN: 8174091955.
4. Engineering Mathematics, Volume – 1, S. S. Sastry, PHI Learning, New Delhi, 2009, ISBN: 978-81-203-3616-2.
5. A text book of Engineering Mathematics, Dutta, D, New age International publications, New Delhi, 2006, ISBN: 978-81-24-1689-3.
6. GettingStarted with MATLAB-7, Pratap Rudra, Oxford University Press, New Delhi, 2009, ISBN: 0199731241.

Open source software and website address-

1. www.scilab.org/ -SCI Lab
2. www.dplot.com/ -DPlot
3. www.allmathcad.com/ -MathCAD
4. www.wolfram.com/mathematica/ - MATHEMATICA
5. www.easycalculation.com



Course Code :	DE00203
Course Title :	Applied Mechanics
Credit :	3
Max. ESE Marks : 70	Min. Marks : 28

Unit – 1

Fundamentals and Resolution of Forces

Definition of Mechanics, Statics, Dynamics- Kinetics, Kinematics. Concept of space, mass, particle, body, rigid body, scalar, vector, fundamental units, derived units. Force- concept, definition, unit, graphical representation. Concept of system of forces- non-coplanar, coplanar, concurrent, non-concurrent and parallel forces. Composition and Resolution of forces. Free body diagrams, law of parallelogram, Varignon's theorem. Equilibrium of Coplanar concurrent forces, parallel forces and non-concurrent forces, Lami's Theorem. Moment of a force and Couple, properties of couple, conditions of equilibrium, applications.

Unit – 2

Centroid and Moment of Inertia

Location of Centroid and Center of Gravity. Centroid of regular plane and compound areas. Center of Gravity of simple solids. Moment of Inertia of plane areas. Perpendicular and Parallel Axis theorems.

Unit – 3

Friction

Rough and Smooth surfaces, concept of friction. Types of friction, Coulomb's laws of friction Co-efficient of friction, angle of friction, angle of repose. Friction on horizontal and inclined plane, Method of reducing friction.

Unit – 4

Kinematics and Kinetics

Kinematics in Cartesian and polar coordinates. Concept of speed, velocity, acceleration,



radial and transverse velocity, Particle under uniform and non-uniform acceleration, tangential and normal acceleration. Angular displacement, Angular Velocity, Angular Acceleration. Motion under gravity. Kinetics of particle, motion under constant force, Newton's Laws of Motion. Momentum and energy principles, Impulses and angular momentum.

Unit – 5

Work, Power and Energy

Definition and unit of Work done, Power and Energy, Forms of Energy- Kinetic and Potential Energy, Principle of Conservation of power and energy, Power of engine and pumps, mean effective pressure, power measurement, Relation between Heat & Mechanical work, relation between Electrical & Mechanical energy.

Books:

1. Applied Mechanics Khurmi, R.S. S.Chand & Co. New Delhi 2014
ISBN:9788121916431
2. Applied Mechanics S.S.L Patel Dhanpat Rai & Company
3. Foundations and Applications of Applied Mechanics Ram, H. D.; Chauhan, A.
K. Cambridge University Press, Thomson Press India Ltd., New Delhi, 2015,
ISBN: 9781107499836
4. Engineering Mechanics- Statics, Vol. I Meriam, J. L.; Kraige, L.G. Wiley
Publication, New Delhi, ISBN: 978-81-265-4396
5. Engineering Mechanics Ramamrutham, S. S Chand & Co. New Delhi 2008
ISBN:9788187433514



Course Code :	DE00204
Course Title :	Applied Chemistry
Credit :	3
Max. ESE Marks: 70	Min. Marks : 28

Unit – 1

Atomic Structure and Chemical Bonding

Atomic Structure Electronic structure of atoms, Discovery of electrons, protons and neutrons. Rutherford model and Bohr's – Burry scheme of distributions of electrons. Heisenberg's uncertainty principle, Quantum numbers, subs energy level Distribution of electrons in sub- shells and concept of Electronic configuration of atoms, Auffbaus's rule, Pauli's exclusion principle. Hund's rule of maximum multiplicity. Chemical Bonding, *Types of Chemical Bonding, and it's Application*, Hydrogen bonding.

Unit – 2

Water Treatment

Hardness: Types of Hardness, Determination of hardness using EDTA method, Hard water Boiler Problems, Boiler corrosion, caustic embrittlement, priming and foaming, scales and sludge's. Water softening: lime soda process, Hot lime soda process, Cold lime soda process, Zeolite process, I-ion exchange process, Caution exchange An-ion exchange, *Advance Techniques of Softening*, Municipal Water, Treatment, Sedimentation Coagulation Filtration Sterilization BOD & COD. Polymer: Classification of polymer, Types of rubber, Natural and, synthetic, Processing of natural rubber. *Types of Synthetic rubber*, Properties and applications of Buna-N, Neoprene.

Unit – 3

Electrochemistry and Batteries

Conductance: Nature of solute, Nature of solvent, Temperature, Concentration or dilution, Electrical conductance in metals and electrolytes, specific conductance, equivalent conductance, cell constant. Electrodes: Hydrogen electrode, calomel electrode glass electrode.



Batteries: Type of batteries with examples Primary battery, Secondary battery, *Their Uses*, Electrical Insulator and thermocouple alloy, Electrical insulators: Classification and example Thermocouple alloy: Composition and characteristics platinum /rhodium *and its application*.

Unit – 4

Metallurgy

Metallurgy: Mineral, Ore, Gangue, Flux, Slag. *Metallurgical processor iron and Uses*.

Metal Alloys: Properties of metals, aluminum, tungsten, platinum nickel. *Uses of Metal Alloys*, Ferrous alloys: Low carbon Medium carbon High carbon steels. Non-ferrous alloy: Brass, Bronze, *Application of Steel*, Tin man Solder Woods metal.

Cement: Portland cement, Constituent Setting and Hardening, *Protection of Cement from Corrosion*.

Unit – 5

Fuels and Combustion

Fuel: Calorific value and ignition temperature, classification. Solid fuels: Coal, Classification and composition, proximate analysis, Ultimate analysis, Bomb Calorimeter. Carbonization of coke by Otto Hofmann's oven. Liquid fuels: Fractional distillation of crude petroleum, Boiling range, Composition and properties. Knocking, Cracking, Octane number and Cetane number. Gaseous fuels: Biogas, LPG, and CNG, *Application of Fuel*. Lubricants, Paints and Varnishes: Lubricant-Types, Liquid, Solid, Semisolid Theory of lubrication, Properties of a good lubricant Flash and Fire Point, Pour point and cloud point. *Application of Lubricant, Paints and Varnish*, Constituents, Properties and uses.

Books:

1. Engineering Chemistry, Agarwal, Shikha, Cambridge university press; New Delhi, 2015.
2. Engineering Chemistry Dara, S. S. and Dr. S. S. Umare S. Chand Publication, New Delhi, 2015.
3. Engineering Chemistry, Jain & Jain, Dhanpat Rai and sons; New Delhi, 2015.



4. Engineering Chemistry Dr. Vairam, S. Wiley, India Pvt. Ltd., New Delhi, 2013.
5. Chemistry for Engineers, Agnihotri Rajesh, Wiley India Pvt.Ltd. 2014.

Open source software and website address :

1. www.chemguide.co.uk/atommenu.html (Atomic structure and chemical bonding)
2. www.visionlearning.com (Atomic structure and chemical bonding)
3. www.chem1.com (Atomic structure and chemical bonding)
4. <https://www.wastewaterelearning.com/elearning/> (Water Treatment)
5. www.chem1.com/acad/webtext/elchem/ec6.html (Electrochemistry and batteries)
6. [www.em-ea.org/guide%20books/book 2/2.1%20fuels%20and%20combustion.pdf](http://www.em-ea.org/guide%20books/book%202/2.1%20fuels%20and%20combustion.pdf)
(Fuel and Combustion)
7. www.chemcollective.org (Metals, Alloys)
8. www.wqa.org(Water Treatment)



Course Code :	DE00205
Course Title :	Engineering Drawing
Credit :	3
Max. ESE Marks : 70	Min. Marks : 28

Unit – 1

Basics of Engineering Drawing

Introduction to Engineering Drawing, importance and uses, drawing equipments, instruments and their uses, Indian standard practices of laying out and folding of drawing

Lettering and numbering as per BIS 9609, Lines- Different types of lines Dimensioning systems as per BIS and Methods of dimensioning and their rules.

Scales - full scale, reduced scale and enlarged scale.

Unit – 2

Constructions of conic curves

Conic Sections- Definition of locus, focus, directrix, axis, Vertex and eccentricity. Definition: ellipse, parabola and hyperbola. Ellipse: Construction of ellipse by concentric circle method, Oblong method, Arc of circle method and Eccentricity method. Parabola: Construction of parabola by rectangle method, parallelogram method Tangent method and eccentricity method or General Method. Hyperbola: Construction of hyperbola by rectangular method and eccentricity method.

Unit – 3

Projections of points, lines and planes

Projection of points: Concept of quadrant, first angle and third angle projection. Projection of points – points on different quadrants and on the reference planes.

Projection of straight lines: Projection of straight lines – Line in the first quadrant and on the reference Planes, perpendicular to one plane and parallel to other plane, inclined to one plane and parallel to the other plane, parallel to both the planes and inclined to both the planes. **Projection of Planes:** Concept of planes, Projection of planes parallel to one of the reference plane. Projection of plane inclined to one



reference plane and perpendicular to another. Projection of plane inclined to both the reference planes.

Unit – 4

Orthographic projection and Section of solids

Introduction, First angle projection, Third angle projection, Symbols and comparison of first and third angle projections. **Projection of simple objects** – front view/ top view/ right/ left side view. Concept of sectioning planes, Auxiliary planes, types of sections and true shape of section. **Projections of Solids** -Types of solids, projections of solids in simple position, projections of solids with axes inclined to one of the reference planes and parallel to the other, projections of solids with axes inclined to both H.P. and the V.P. **Section of solids** - Practice problems for drawing projections and section of solids.

Unit – 5

Isometric Projection

Isometric axis, lines, and planes, isometric scale, isometric projection, isometric drawing. Isometric projection of objects containing rectangular, circular, cylindrical shapes and slots on sloping and plane Surfaces.

Books :

1. Engineering Drawing N.D. Bhatt Charotar Publisher
2. Engineering Drawing R.B. Gupta Satya Prakashan
3. Engineering Drawing Gujral & Shende Khanna Publisher
4. Engineering Drawing R.K.Dhawan S.Chand
5. Engineering Drawing P.J.Shah S.Chand
6. Engineering Drawing M.B.Shah, B.C.Rana Pearsons
7. Engineering Graphics with AutoCAD A.K.Sarkar, A.P.Rastogi, D.M. Kulkarni
PHI
8. Engineering Drawing and Graphics using AutoCAD T. Jeyapoovan Vikas



BHARTI VISHWAVIDYALAYA, DURG



Course Code :	DE00206
Course Title :	Workshop Practice (Theory)
Credit :	1
Max. ESE Marks : 70	Min. Marks : 28

Unit – 1

Measurement, Hand tools and workshop safety.

Engineering Measurement: definition, importance and Types of measurements. Measuring instruments: linear measurement and angular measurement instruments. Measuring devices: Linear measurement and angular measurement devices. Workshop hand tools: List the various hand tools used in workshops. Workshop Safety –Safety Practices, Causes of accidents, General safety rules, Safety signs and symbols. Firefighting equipment, fire extinguishers, and their types and First Aid

Unit – 2

Wood Working Shop

Types of woods and artificial woods and their applications. wood working tools – bench vice, hammers, chisel, files, hacksaw, wood saw, surface planer, punch, v block, try square , steel rule , twist drill, marking block, reamers, tap set, mallet and their specification. Wood working operations – Marking ,Cutting , reaming , filing, drilling, joining, Types of wood working joint – Butt joint , lap joint, Bridle joint, Dowel joint, Mitre joint , finger joint , dovetail joint , Dado joint, Groove joint, Cross lap, splice joint. Applications of various joints.

Unit – 3

Joining Methods :

Joining methods- Various types of Joining Methods and their field application and types of welding joint. Arc welding Arc welding process, equipment with necessary accessories, Welding electrode, tools and consumables Personal protective equipment like safety glasses, welding gloves etc and safe practices in welding shop. Gas welding Gas welding process, Equipment with necessary accessories, Types like Carburizing,



oxidizing and neutral flame. Soldering and brazing: specification, filler material, flux, heating methods, temperature range, advantages, and comparison.

Unit – 4

Fitting and Sheet metal Shop.

Fitting tools – Hand tools used in fitting shop, holding tools, Marking and measuring tools, cutting tools. Fitting Operation – Sawing, Chipping, Filing, Taping, Reaming and Drilling. Sheet metal tools-list of sheet metal tools used. Sheet metal operation- Shearing, Bending, Drawing, Squeezing, Snipping, riveting, Grooving.

Unit – 5

Lathe Machine

Concept, Working principle, constructional details and major components of lathe machine with their functions. Job and tool holding devices and lathe attachments – head stock, tail stock, tool post, Lathe tools, chucks (3 and 4 Jaw), name and advantages of lathe attachment. Lathe operations – Plain turning, Facing, taper turning, Knurling, Threading etc.



Course Code :	DE00207
Course Title :	Applied Mechanics (Lab)
Credit :	1
Max. ESE Marks : 35	Min. Marks : 14

List of practical:

1. Measure resultant force using law of Triangle of forces setup.
2. Measure resultant force using law of Parallelogram of forces setup.
3. Measure resultant force using law of Polygon of forces setup.
4. Measure resultant force using Lami's Theorem using Jib crane setup.
5. Use Funicular diagram to demonstrate Non-concurrent, Non-Parallel forces.
6. Measure resultant moment using Law of Moments setup.
7. Determine C.G. of a given lamina of any shape using any computer aided drafting software.
8. Determine M.I of a given lamina any shape using any computer aided drafting software.
9. Determine coefficient of friction for surfaces of different materials on a Horizontal Plane with given setup.
10. Determine coefficient of friction for surfaces of different materials with Inclined Plane apparatus.
11. Plot Velocity -Time diagrams for different combinations of Uniform and non-uniform velocities.
12. Use dynamometer to calculate power in any rotating shaft/drum/pulley/wheel.
13. Use tachometer to calculate speed of any rotating shaft/drum/pulley/wheel.



Course Code :	DE00208
Course Title :	Applied Chemistry Lab
Credit :	1
Max. ESE Marks : 35	Min. Marks : 14

List of practical:

1. Electronic balance, Scale range of 0.001g to 500g. pan size 100 mm; Response time 3-5 sec.; power requirement 90- 250 V, 10 watt.
2. Nephelometer, Auto-ranging from 20-200 NTU,+/- 2% of reading plus 0.1 NTU, power 220 Volts +/- 10% AC 50 Hz.
3. Conduct meter, Range 0-199.9ms; resolution 0.1ms/0.01ms/0.001ms/0.1μs/0.01μs; accuracy ±0.5% ±2 digits.
4. pH meter, Working range 0-14; resolution 0.1/0.01 pH; temperature compensation 0-1000 C.
5. Electric oven, inner size 18''x18''x18''; temperature range 100 to 2500 C. with the capacity of 40lt.
6. Muffle furnace, Temperature up to 9000C, digital temperature controller with an accuracy of +/- 30C.
7. Bomb calorimeter, Measurement unit J/kg, cal/gm, BTU/lb; temp. resolution 0.00010C or better; combustion bomb- halogen and acid resistant stabilized stainless steel; resolution 0.001kcal/gm; measurement range up to 40,000 J/gm.
8. Redwood viscometer-1, Suitable to operate at 220 volts AC mains with tap; stainless steel jet; cup cover; thermometer; electronic digital indicator ; controller etc.
9. Cleveland open cup, apparatus, Energy regulator-to regulate the rate of rise in, temperature; 220V; 50 Hz; single phase; AC supply.
10. Cloud and pore point apparatus, Energy regulator ,to regulate the rate of rise in, temperature,200V,50Hz, single phase, AC supply etc.
11. Fractional distillation assembly, Capacity 1.5 lt.



BHARTI VISHWAVIDYALAYA, DURG

Course Code :	DE00209
Course Title :	Engineering Drawing (Practical)
Credit :	1
Max. ESE Marks : 35	Min. Marks : 14

List of practical:

1. Draw Lettering, types of lines, methods of dimensioning and one problem from Plain scale & Diagonal scale each on a single drawing sheet.
2. Draw Parabola, Ellipse and Hyperbola by general and Special methods on a drawingsheet.
3. Draw the problems on projection of points and lines on a drawing sheet.
4. Draw the projection of given Planes on a drawing sheet.
5. Draw the Orthographic projections of a given object with and without section on a drawing sheet.
6. Draw the projections of a solids and section of given solids on a drawing sheet.
7. Draw isometric views of simple machine elements.
8. Draw minimum two drawings using AutoCAD software.



Course Code :	DE002010
Course Title :	Workshop Practice (Lab)
Credit :	1
Max. ESE Marks : 35	Min. Marks : 14

List of practical:

1. Measuring tools available in workshop.
2. Marking and hand tools in a given situation.
3. Mock drill session for extinguishing fire.
4. Preparation of simple wooden job.
5. Preparation of two wooden joints.
6. Operate gas welding apparatus.
7. Preparation of lap joint using gas welding.
8. Preparation of butt joint using arc welding.
9. Mounting of electronic components on PCB.
10. Joining of aluminum sheet by using brazing.
11. Preparation of simple fitting job.
12. Preparation of simple male –female type fitting job.
13. Preparation of sheet metal job.
14. Preparation of simple turning job.
15. Preparation of simple drilling/ knurling /threading using lathe.



Course Code :

DE00211

Seminar & Technical Presentation

Course Title :

(Personality Development & Leadership)

Skills

Credit :

1

Max. ESE Marks: 50

Min. Marks : 20

Unit – 1

Concept and meaning of personality, Characteristics/Qualities, Factors influencing personality, Need for desirable personality, Posture and Health, Good Health diet, Exercise, Personal Cleanliness, Sleep and Rest, Use of Cosmetics, Dress Code, Eye-Contact.

Unit – 2

Skills for a good Leader, Different Leadership Styles: Autocratic, Democratic, Ethical, Transformational, Team Leadership, Necessity of Team Work, Personally, Socially, Professionally and Educationally.

Unit – 3

Weighing Positives & Negatives in Group Discussion, Do's and Don'ts of Group Discussion, Initiating, continuing and concluding a Group Discussion, Principles of Time Management, Criteria governing Time Management, Prioritizing work.

Books :

1. How to achieve success and happiness, Beau Norton, Create Space Independent, Publishing Platform, Latest edition.
2. Living English Structure, Allen, Cambridge Publications, Fifth edition(2009).
3. The Quick and Easy Way to Effective Speaking, Dale Carnegie, Amazing Reads, 23 January 2018.
4. English Grammar at Glance, Gnanamurali, M., S. Chand and Co. New Delhi, 2011 ISBN: 9788121929042.
5. Elementary English Grammar and Composition, Agarwal N. K., Goyal Brothers



Prakashan, Latest Edition

6. Covey Sean, Seven Habits of Highly Effective Teens, Covey Sean, Fireside Publishers, 1998.
7. How to win Friends and Influence People, Carnegie Dale, Simon & Schuster, New York 1998.
8. Thomas A Harris, I am ok, You are ok, Thomas A Harris, New York-Harper and Row, 1972
9. Emotional Intelligence, Bantam Book, 2006, Daniel Coleman, Bantam Book, 2006
10. Chanakya's 7 Secrets of Leadership, Pillai Radhakrishnan, Jaico Publishing House, ISBN: 9788184954012, 8184954018

Open source software and website address:

1. <https://www.englishgrammar.org/>
2. <http://www.englishgrammarsecrets.com/>
3. <https://www.usingenglish.com/handouts/>
4. <http://learnenglish.britishcouncil.org/en/english-grammar>
5. <https://www.englishclub.com/grammar/>
6. <http://www.perfect-english-grammar.com/>
7. <http://www.englishteachermelanie.com/category/grammar/>
8. <https://www.grammarly.com/blog/category/handbook>
9. <https://www.britishcouncil.in/english/learn-online>
10. <http://learnenglish.britishcouncil.org/en/content>
11. <http://www.talkenglish.com/>
12. [language-labs.com](http://www.language-labs.com/)
13. www.wordsworthelt.com

Scheme of Teaching and Examination

Diploma in Civil Engineering

Semester – III

S. No	Code	Course Title	Hours per week			Total Contact hrs /week	Credits L+T+P/2
			L	T	P		
1	DE04301	Construction Material	2	0	0	2	2
2	DE04302	Surveying-I	2	0	0	2	2
3	DE04303	Building Drawing and CAD	2	2	0	4	4
4	DE04304	Building Construction	2	0	0	2	2
5	DE04305	Hydraulics	3	1	0	4	4
6	DE04306	Construction Material (Lab)	0	0	2	2	1
7	DE04307	Surveying-I (Lab)	0	0	4	4	2
8	DE04308	Building Construction (Lab)	0	0	2	2	1
9	DE04309	CAD (Lab)	0	0	4	4	2
10	DE04310	Hydraulics (Lab)	0	0	2	2	1
11	-	Health, Hygiene and Yoga	0	0	2	2	0
12	-	Library	0	0	2	2	0
Total			11	03	18	32	21



BHARTI VISHWAVIDYALAYA, DURG

Scheme of Teaching and Examination

Diploma in Civil Engineering

Semester – III

S. No	Code	Course Title	Maximum Marks			Total	Credits
			ESE	CT	TA		
1	DE04301	Construction Material	70	10	20	100	2
2	DE04302	Surveying I	70	10	20	100	2
3	DE04303	Building Drawing andCAD	70	10	20	100	4
4	DE04304	Building Construction	70	10	20	100	2
5	DE04305	Hydraulics	70	10	20	100	4
6	DE04306	Construction Material (Lab)	35	0	15	50	1
7	DE04307	Surveying-I (Lab)	35	0	15	50	2
8	DE04308	Building Construction (Lab)	35	0	15	50	1
9	DE04309	CAD (Lab)	35	0	15	50	2
10	DE04310	Hydraulics (Lab)	35	0	15	50	1
11	-	Health, Hygiene and Yoga	0	0	0	0	0
12	-	Library	0	0	0	0	0
Total			525	50	175	750	21



Course Code :	DE04301
Course Title :	Construction Material
Credit :	2
Max. ESE Marks: 70	Min. Marks : 28

OBJECTIVE:-

Civil Engineering diploma holders mostly supervise construction of various types of Civil Engineering works/projects involving use of various construction materials like stones, bricks and tiles, cement and cement based products, lime, timber and wood based products, paints and varnishes, metals and other miscellaneous materials. The students of civil engineering diploma program should have requisite knowledge and skills pertaining to the quality, properties and characteristics of specified and required engineering materials , use and availability of various building materials and skills in conducting tests to determine suitability of materials for various construction purposes. In addition to above , BIS specifications and recommendations of various materials should also be known for effective quality control.

Unit I Stone , Aggregate and Brick

Properties of construction materials:

Introduction and Importance of Building materials in civil engineering , Basic properties of construction materials (i) Physical properties - bulk density, durability, porosity, water absorption, void ratio , specific gravity, permeability, heat conductivity , frost resistance. Mechanical properties – Strength, Hardness, Elasticity, Plasticity

STONE AND AGGREGATE

Geological , Physical and Chemical Classification of rocks; Properties of good building stones; Methods of quarrying and dressing of stones; Common building stones of INDIA: characteristics and uses; Definition, types of aggregate coarse and fine aggregate; Grading of aggregates fineness modulus, Bulking of sand.

Introduction and definition of Clay Bricks , characteristics of good brick. Ingredients of good brick earth, harmful substances in brick earth; Properties of good building bricks; Classification and Defects of clay bricks; Testing of Bricks (as per BIS Code) and field test on bricks; Fly ash & Hollow bricks: properties, preparation and uses.

UNIT-II BINDING MATERIAL

Introduction of Cement, Chemical composition of Raw materials of cement, Constituent of cement clinker (Bogues compounds) , Hydration of cement and heat of hydration; Ingredients used for manufacturing of cement, Methods of manufacture of cement by (i) wet process, (ii) dry process(flow chart); Laboratory test of cement as per IS consistency, setting time, fineness, soundness, compressive strength, tensile strength; Field tests on cement; Types and grades of cement and suitability- Ordinary Portland cement, rapid hardening cement, low heat cement, high alumina cement, Portland slag cement, white and coloured cement, Portland pozzolana cement, super sulphate cement, quick setting cement; Pozzolanas Introduction, effects, use and classification of puzzolanas. Cement admixtures and their applications as per requirements; Mortars- classification of mortars, characteristics of a good mortar. Cement mortar, lime mortar, surkhi mortar, Selection of mortar.

Unit III Flooring Materials, Roofing Material , False Ceiling and Tiles :

Flooring Materials-

Flag stone floor, Cement concrete floor ,Mosaic flooring , Tile floors, Ceramic tile floor, vitrified tile floors , Granite Flooring, PVC tiles, Linoleum floor, Paver blocks, Wooden floor, Glass floor.

Roofing Materials-

Roof covering materials- bamboo mats, galvanized iron sheets, asbestos cement sheet, profiled steel and aluminum sheets, polycarbonate roofing material; Clay tiles- Allahabad



tiles, flat tiles, Mangalore tiles, half round tiles, local country tiles.;

Materials used for false ceiling-

Gypsum Board Ceiling, Plaster of Paris Ceiling, Fiber Ceiling, Wooden Ceiling, Synthetic Leather Ceiling, Glass Ceiling, Metal Ceiling

Cladding materials-

Introduction and properties of tiles , Clay Tiles Claddings, Stone Claddings, Timber Claddings, Fiber Cement Claddings, Steel Claddings, Aluminum Claddings, Aluminum Composite Panel (ACP) Claddings.

UNIT IV TIMBER, GLASS, STEEL, ALUMINIUM AND PLASTIC

Introduction of Timber, definition , Properties of timber, requirement of timber to be used for building; Seasoning of timber: Purpose, methods of seasoning and Preservation of timber and methods of treatment as per BIS; Defects in timber; Other wood based products, their uses: laminated board, block board, fiber board, hard board, sun mica, plywood, veneers, nu-wood., Moulded Door. *Characteristics of good timber* .

Glass:

Definition , ingredients, commercial forms of glasses, Characteristics and performance of glass, glass wool. *Uses of glass*.

Frame/truss Steel:

Introduction of steel , Properties and uses :Mild Steel, High Carbon Steel, High Tensile steel; Rolled steel sections, Steel sections-L,T, I , PIPE section

Aluminium:

Advantages of Aluminum in construction, available forms of aluminum, use of aluminum material glass.



Plastics:

Plastic, Thermoplastic and Thermosetting Plastic, Common plastics used as construction material, Properties of plastics, Application of Plastics. Rubber, use of rubber in building construction. Uses of plastic .

UNIT V MISCELLNEOUS BUILDING MATERIALS

Definition Paints ,Enamels and Varnishes -Composition of oil paint, Characteristics of ideal paints, *properties of paint and varnishes*, factors affecting selection of paint. Enamel paint and Varnish and its type. Distemper, primers Water proofing materials Fire proofing materials Acoustic materials; Heat insulating materials; Adhesive materials; Water proofing resins and chemicals, coating materials; Termite proofing materials; Bitumein, Tar, Asphalt-Forms of bitumen, properties and use of bitumen as water proofing material.

BOOKS:

1. Building Material by S K Duggal New Age International Publisher Fourth 2012
2. Building Material by S S Bhavikatti Vikas Publishing House 2014
3. Building Materials and Construction by Dr Anil Kumar Mishra S.Chand Publishing 2017
4. Material Technology (Samagri Proudhyogiki) by Shivanand Kamde University Book House Jaipur First 2017

Reference Books:

1. Concrete Technology – A.M. Neville & J.J. Brooks (Pearson Education)
2. Concrete Technology – M.S. Shetty (S. Chand & Co.)
3. Engineering Materials – Surendra Singh (Laxmi Publication)
4. Construction Engineering and Management – S. Seetharaman (Umesh Publication)



Course Code :

DE04302

Course Title :

Surveying I

Credit :

2

Max. ESE Marks: 70

Min. Marks : 28

OBJECT:

Field survey is carried out and various type of survey maps are prepared before planning and development process for any civil engineering or mining project. These maps and drawing are used for taking various decisions regarding the planning, designing, estimation, execution and construction process .The important functions of a diploma civil engineer includes the jobs of detailed surveying, plotting of survey data, preparation of survey maps and setting out works While framing the curriculum for the subject of surveying, stress has been given to the development of the skill in each type of survey like chain surveying, compass surveying leveling, that the Civil Engineering diploma holder will normally be called upon to perform chain survey, compass survey, levelling and plane table surveying, Field work is required to be done accurately to minimize the errors.

UNIT I Conduct chain survey in the field

Introduction to surveying, Plane and Geodetic surveying, Purpose of engineering surveys, Principles of surveying, *classification of surveying*.

Chain Survey:

Define chain survey, Types of chain and tapes, Metric Chain, Tapes, Arrow, ranging rod, offset, open cross staff, optical square, prism square Ranging: Direct/indirect/ reciprocal, offsets and recording in field book. Chaining on plane and sloping ground, Obstacles in chaining, Offsets:- Types Perpendicular/ Oblique Instruments used to take offsets, *limiting length of offset*.

Chain Triangulation:



Concept and principle of chain triangulation, Survey Stations, Survey lines Arrangement of survey lines, conditions to be fulfilled by survey lines or survey stations, Recording field book, chain traversing, Errors in chain surveying and their corrections. Symbols and signs to indicate ground features

Unit II Compass Survey

Compass surveying, units of angle measurement system, Traverse Survey –Traversing, Closed and Open Traverse, Name of instruments used for measurement of directions and angles. Bearings and Angles –Bearing, Meridian, latitude and departure in various quadrant, Types of meridian and bearing, Systems of bearing, Fore and Back Bearing, Calculation of angles from bearings and bearings from angles. adjustment of closing error, Magnetic Compass –Magnetic Compass, Prismatic Compass, Surveyor’s Compass, Temporary adjustment of prismatic compass and taking observation and Magnetic dip and declination. Local attraction -causes, detection, errors and corrections, problems on local attraction, magnetic declination and calculation of included angles in a compass traverse

Unit III Levelling

Definitions - Level surfaces, Level Line, Horizontal Plane, Horizontal Line, Vertical Line, Datum, Bench Marks, Reduced Level, Mean Sea Level, Levelling Instruments –Dumpy Level, Tilting Level, Auto Level, Leveling Staff, Temporary adjustment of Dumpy Level; Terms used in leveling - Line of collimation, Axis of Telescope, Axis of bubble tube, Station, *arithmetic check* -, Rise Fall method, Height of instruments, Back sight, Fore sight, intermediate sight, Change point; Classification of Levelling – Simple Levelling, Differential Levelling, Fly Levelling, Profile (SL) Levelling, Reciprocal Levelling; *curvature correction, refraction correction, combined correction*, Examples & methods of finding out the R. L. in Level Book by H.I. Methods and Rise & Fall Methods with necessary check; Correction for Curvature and refraction and related examples, Balancing of backsight and foresight; Errors in Levelling.



Unit IV Contouring

Contour; Contour interval, horizontal equivalent; Uses of contours; Characteristics of contours, *properties of contour line*, Methods of Contouring; Interpolation of contours; Preparation of contour map; Uses of Contour Map- Drawing of Sections, Determination of intervisibility between two points, Tracing of contour gradient and location of route, measurement of drainage *areas*, calculation of capacity of reservoirs & related examples, *some suitable value of contour map*, Use of Topo sheet

Unit V Plane Table Survey

Introduction and Principles of plane table surveying, Advantages and disadvantages of plane table survey; Plane table and its accessories; Setting of a plane table: (a) Centering (SL) (b) Levelling (c) Orientation

;Methods of plane table surveying:

- (a) Radiation,
- (b) Intersection
- (c) Traversing
- (d) Resection

Errors in plane table survey and precautions to control them; Minor instruments:- Construction and use of Hand Level, Abney; Level, Box Sextant, Pentagraph and Ceylon Ghat Tracer, Planimeter.

BOOKS:

1. Surveying I by Dr BC Punmia, Ashok Kumar Jain, Dr Arun Kumar Jain Laxmi publication 17th 2016
2. Surveying and Leveling by S K Duggal TMG publication
3. Surveying and Leveling by A K Arora Standard book house
4. Surveying and Leveling by R Agor Khanna publication



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Reference Books:

1. Engineering Surveying Technology – Kennie, T.J.M. and Petrie G. (Blackie & Sons Pvt. Ltd., London, 1990)
2. An Introduction to Remote Sensing and its Applications- Shivangi Somvanshi, Maya Kumari(S.K. Kataria and Sons, New Delhi.
3. Surveying (Vol. I & II) T.P. (Pune Vidyarthi)
4. Surveying (Vol. I & II) – C. Venkataramaih (Universities Press Hyderabad)



Course Code :	DE04303
Course Title :	Building Drawing and CAD
Credit :	4
Max. ESE Marks: 70	Min. Marks : 28

OBJECT:

Drawing is considered as language of core engineering. In case of Civil Engineering it very important medium of communication between Architect , Design Engineer and Diploma holder who is supposed to implement the construction works using basic plan, working drawings, design drawings etc. A Civil Engineering diploma holder must be capable of preparing drawings/ sketching detailed constructional drawing of various components of building using CAD software for the purpose of communication with the field workers. Planning of small buildings, developing a line plan, dimensioning, key plan, and drainage plan are the important skills to develop. The diploma engineer must be conversant with reading and interpretation of drawing for execution of work. In view of above this course curriculum of Building Drawing and CAD is developed.

UNIT I Introduction to building drawing

Size of Drawing, Layout of drawing, Title block, Scale, Dimensioning; Symbols for Doors & Windows, Drains and Pipes, Sanitary and Plumbing, *Electrical Fittings as per IS 962 Building Bye-laws*, Building Bye-laws for Residential Building; Building Byelaws for Commercial Building; Plot area, built up area, plinth area, carpet area and Floor Area Ratio (FAR)

Principles of Planning:

General principles of architecture : Function, Economy, Safety, Aesthetics, Economy; Basic elements of planning residential building: living area, sleeping area, service area, other areas. Principles of planning of residential building: Orientation, Privacy, Grouping, Circulation, Sanitation, Flexibility, Elegance, Landscaping Dimensions for different types of rooms,



height, Size of doors and windows.

Unit II Computer Aided Drawing (CAD)

AutoCAD Features Graphical input devices Drawing primitives, Text and editing (move, copy rotate, mirror) Scale, filters and round, Grouping of entities ,Layers ,Grid, Snap Ortho ,PEDIT, display and zoom, pan, fill redraw, region, Q Text, offset, Annotate ,Sectioning, hatching styles ,Block and its creation ,Extrude, Subtract and union ,Shading

Application of AutoCAD

Enquiry commands ,plotting of drawing ,Uses of plotters, Changing plot specification Application of Civil Engineering

Editing and Changing Properties of Objects

Filtering, Selecting, Accessing , Understand the property list ,Changing property list .

Unit III Layout plan, detailed plans of residential buildings/campus

Types of plan ,Site plan, location plan, Line plan, foundation plan, layout plan; Line plan of residential building; Development of plan from line plan of residential building; Area statement and other details; Submission drawing; Working drawing

Section, Elevation and other detailed drawings

Elevation of building; Sectional elevation of building; Steel truss, Lean to roof.

Unit IV Doors , Windows and Staircase

Doors and Windows



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Types of doors and Windows according to material. Detailed drawing of panel doors and windows. Detailed drawing of metal framed windows. Detailed drawing of aluminum framed windows, Detailed drawing of building elements.

Staircase

Types of staircase .Detailed drawing of straight staircase. Detailed drawing of dog-legged staircase. Detailed drawing of. open newel staircase

Unit V Perspective Drawing

Isometric projection

Drawing an isometric view

Perspective drawing

Terms used in perspective drawings: Station point, picture plane, axis of vision, vertical plane, horizontal plane, ground plane, eye level, line of vision, centre of vision vanishing points One point, two point and three point perspective Perspective drawing of single room Perspective drawing of two roomed building.

BOOKS:

1. Civil Engineering Drawing by V.B. Sikka S.K. Kataria and Sons 7th 2015
2. Civil Engineering Drawing by Gurucharan singh and Chander Standard Publishers and Distributers
3. Building Drawing by M G Shah ,C M kale AND S Y Patki Mcgraw Hill Publishing
4. Building Planning and Drawing by S S Bhavikatti and MV Chitawadgi Willey India Pvt Ltd

REFERENCE BOOK:

1. Building Planning and Drawing by Kumara Swamy and N Kameshwar Rao Charotar Publications



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2. Civil Engineering Drawing by Malik and Mayo Computech Publications
3. AutoCAD 2000 by Ajit Singh McGraw Hill Publishing
4. Engineering Drawing Using AutoCAD by T Jeyapovan Vikas Publications



Course Code :

DE04304

Course Title :

Building Construction

Credit :

2

Max. ESE Marks: 70

Min. Marks : 28

OBJECT:

The main job of a Diploma civil engineer is to supervise and monitor the construction work as per the design drawing and specifications. Supervisor must be able to understand proper construction procedure, selection of materials and equipments. Supervisor must be aware of maintenance work of building, treatment works and to take the safety measures during the construction. Diploma engineer should also have knowledge of National Building Code and relevant Indian Standard Codes. Keeping above requirement in mind this subject curriculum is designed for developing the ability in the student to prepare layout and supervise the construction and maintenance works as per working drawing and decision to select necessary equipment and machines.

Unit I Introduction

Introduction of buildings, Classification of building as per NBC ,Components of a building, Load bearing and framed structure ,comparison between Load bearing and framed structure

Foundation

Function of foundation, requirement of good foundation; Types of foundation: Shallow and deep foundation Shallow foundation: spread footing, combined footing, strap footing, mat foundation. Deep foundation : Pile foundation, cast in situ and pre cast concrete piles, under reamed pile foundation; Selection of suitable foundation Setting out of foundation; *Foundation in black cotton soil*, Excavation for foundation-Implements for foundation, Shoring, Excavation in ground with subsoil water.

Stone Masonry



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Glossary of terms, Classification of stone masonry: rubble masonry- random and coursed, Ashlar masonry; Dressing of stone, size and placing of joint and corner stones, filling joints, proper packing of internal cavities of rubble masonry wall, making of joints to receive finishes, supervision of stone masonry.

Brick masonry:

Definition of terms in brick masonry; Bonds, Rules for bonding, Stretcher, Header, Brick laying, supervision of brick work; Comparison between brick and stone masonry; Construction of walls of precast hollow concrete blocks, brick laying.

UNIT II Walls, Scaffolding, Arches, Lintels Doors, Windows and Ventilators

Walls

Introduction of walls, Classification of walls: load bearing, non-load bearing, dwarf wall and partition walls, cavity wall.

Scaffolding:

Introduction of Scaffolding Purpose of scaffolding Different types of scaffolding, Merits and demerits of different types of scaffolding.

Arches:

Introduction of Arches Classification of arches Meaning and use of arches Glossary of terms used in arches : Abutment, pier, arch ring, intrados, soffit, extrados, , springing line, crown, key stone, skew back, span, rise, depth of an arch, , spandrel, jambs, haunch, spandrel, jambs, Types of Arches - Semi circular, segmental elliptical and parabolic Construction of Concrete Arches.

Lintels:

Introduction of Lintels Purpose of lintel, Materials used for lintels, Cast-in-situ and pre-cast lintels, Lintel along with sun-shade or chhajja.



Doors, Windows and Ventilators:

Introduction and purpose of Doors, Windows and Ventilators Glossary of terms with neat sketches Classification based on materials i.e. wood, metal and plastic and their Suitability for different situations; Door and window frames: Materials and sections, door closures, hold-fasts. Different type of doors-Classification of doors, Battened and Ledged Doors, Battened, Ledged and Braced Doors, Panel Door, Flush Door, Glazed Door, Rolling Shutter, Steel Door, Sliding Door, Plastic And Aluminium Doors; Window – Fixed and Pivoted Window, Panel Window, Glazed Windows Ventilators, Sky Light Window, Louvers Shutters, Steel Windows, Aluminium Windows and Plastic Windows; Door and window frames: Materials and sections, door closures, hold-fasts.

Unit III Floors, Roofs and Stairs

Floors

Introduction of Floors Glossary of terms floor finish, topping, under layer, base course, rubble filling and their purpose; Types of floor- flag stone, kota stone, marble, granite flooring, glazed and vitrified tiles flooring, concrete Floors, timber floor, Other miscellaneous Floor. Construction Method of different types of floor

Roofs

Introduction of Roofs Construction of flat roof, shuttering for beam and slab floor. Steel roof truss. Slopes, overlaps of roofing materials, Procedure for laying AC and GI sheet; Procedure for laying false ceiling.

Stairs

Introduction and purpose of Stairs Glossary of terms: Staircase, landing, riser, tread, nosing, width of staircase, hand-rail, Types of Stairs - straight flight, dog legged, open well, quarter turn, half turn, geometrical stairs, spiral stair. Construction of RCC stair. Escalators and Elevators.



Unit IV Damp Proofing and Water Proofing, Painting, Distempering and White-Washing

Damp Proofing and Water Proofing

Introduction of Damp Proofing and Water Proofing Causes of dampness, its ill effects; Methods of Damp proofing, water proofing materials and their specifications, Rich concrete and mortar, bitumen, bitumen mastic, polymer coating, use of chemicals; Damp Proof Course treatments in buildings treatment to foundation against gravitational water, treatment to basements, treatment to floors, treatment to walls, treatment to roofs; Plastering – objects of plastering, requirements of good plaster, cement mortar mixes for plastering, number of coats of plaster, method of plastering with cement mortar, types of plaster finishes, special materials used in plastering, defects in plastering;

Painting, Distempering and White-Washing

Purpose of Painting, Distempering and White-Washing Painting method of painting on new and old wood work, iron and steel work, plastered surfaces, defects in painting; Method of distempering, white washing, colour washing.

Unit V Building Services and Equipment

Anti Termite Measures Introduction, preconstruction treatment, post construction treatment, chemicals used in anti-termite treatment; Fire Protection – Fire hazard, general fire safety requirements for buildings as per IS1641-1988, Fire resistant construction, fire alarm, fire extinguishing equipments; Ventilation and Air conditioning- natural ventilation, mechanical ventilation, air conditioning; Machinery & Equipment: List of machines and equipments required during building construction and their use; Building maintenance and safety measures: Causes and types of defects in buildings, Preparation of report on maintenance work, Remedial measures and execution procedure of any one type of building maintenance work, Safety precautions to be observed during the construction work.



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Text Books:

1. Civil engg drawing- shah ,kale & patki (tata mcgraw hill)
2. Building Construction – B.C. Punmia (Laxmi Publication Pvt. Ltd.)
3. Building Construction – Sushil Kumar (Standard Publication Distributors)
4. A course in civil engg drawing- V B SIKKA (katson technical publication)

Reference Books:

1. Building Construction – Gurucharan Singh (Standard Publication Distributors)
2. Building Construction – S. C. Rangwala (Charotar Publishing House, Anand, Gujarat)
3. Building Construction by S.S.Bhavikatti Vikas Publication House
4. Building Construction by S.K.Sharma S. Chand and Co



Course Code :	DE04305
Course Title :	Hydraulics
Credit :	4
Max. ESE Marks: 70	Min. Marks : 28

OBJECT:

Hydraulics is a branch of engineering science which deals with behaviour of fluid in static and dynamic condition. The basic knowledge about hydraulics is required in subjects of civil engineering like Irrigation, Water Resources Management and Public Health Engineering. In this course, basics of hydraulics and its application oriented content has been kept with a focus that students should be able to solve practical problems related to pipe flow, open channel flow and different type of pumps. Competencies developed by this course would therefore be useful for students while performing his/her job in the field of Water resources / Irrigation/PHE and Environment Engineering.

UNIT-1 Introduction

Definition of liquid, *Types of fluid*; Properties of liquid - Mass density, Specific weight, , *Specific Volume*, Specific Gravity, Compressibility, *Viscosity- Kinematic viscosity and Newton;s law of viscosity*, Surface Tension, Capillarity; Branches of hydraulics- Hydro Statics, Hydro Kinematics and Hydro Dynamics; Pressure and its measurement; Pressure, Pressure intensity, Variation of pressure with depth of liquid, Pressure head, Effect of shape and size of container on pressure, PASCAL's law; Atmospheric Pressure, Gauge Pressure, Absolute Pressure, Vacuum Pressure; Measurement of pressures by different Mehods peizometer Manometer Differential Manometer and Inverted Differential Manometer, Bourdons pressure gauge, Hydrostatics, Total pressure and centre of pressure and pressure distribution diagram; Computation of Total pressure and centre of pressure on plane horizontal surface, vertical surface and inclined surface.

Unit II Hydro kinematics



Introduction, method of describing fluid motion, Types of liquid flow Laminar, Turbulent, Uniform-Non uniform, Steady, Unsteady, and Compressible, Incompressible flow, *Rotational and irrotational flow*, 1,2, and 3 dimensional flow; *Rate of flow or discharge*, Law of conservation of mass, Continuity Equation; Stream line, Path line, Streak Line; Hydrodynamics; Various forms of energies present in liquid flow - potential energy, kinetic energy, pressure energy, total energy, potential head, kinetic head, pressure head, total head; Bernoulli's Equation and Limitations of Bernoulli's theorem; Simple Application of Equation of Continuity and Bernoulli's theorem; Pitot Tube

UNIT III Flow measurement

Venturimeter- Components of venturimeter, discharge through venturimeter; Orifice meter- *Classification of orifice*, Discharge through orifice meter; Flow through orifice; Definition and types of orifice; Vena Contracta, Various Hydraulic Coefficients C_c , C_v and C_d and relationship between them; Time required for emptying tank through orifice at the bottom of tank. (No Derivation); Flow through Notche; Definition and Description; Computation of discharge through notches – Rectangular Notch, V – Notch and Trapezoidal Notch; Flow through Weirs; Definition and Description; Computation of discharge through weirs - Discharge through narrow crested and broad Crested weir (No Derivation), Discharge through Cipolletti weir.

UNIT-IV Flow through Pipes

Characteristics of flow through pipes ;Major Energy (Head) losses in pipe Flow Expression for head loss in pipes due to friction and Computation of major head by Darcy Weisbach Equation; Minor Energy (Head) losses in pipe Flow loss of head at Sudden enlargement, contraction, entry, exit and at bend; Hydraulic Gradient Line (HGL) and Total Energy Line (TEL) in various cases; Flow of water from one tank to another by long pipe; Flow through pipes in series and parallel, *Power transmission through pipe, Equivalent pipe*



UNIT-V Flow through Open Channel

Classification of flow in channel, Open channel flow; Comparison of pipe flow and open channel flow; Wetted perimeter, Hydraulic mean depth, Hydraulic gradient, Froude number, uniform and non uniform flow; Use of Chezy's and Manning's formula. Most economical sections of channel Rectangular, Trapezoidal; *Non uniform flow through open channel*; *Specific Energy Diagram*, Critical Depth, Critical Velocity, Streaming Flow, Critical Flow, Shooting Flow, Hydraulic Jump; Pumps (No numerical and derivations); Definition, description of Centrifugal pump, Reciprocating pump and Submersible Pump; Components and working principles of centrifugal pump and Reciprocating pump; Priming, Selection criteria for pumps.

TEXT BOOKS:

1. Hydraulics, Fluid Mechanics and Hydraulic Machines by R K Bansal Laxmi Publication 9th Edition, 2017
2. Fluid Mechanics by A K Jain Khanna Publishers 2008
3. Hydraulic and Hydraulic Machine(Hindi) by B. L. Gupta, Amit Gupta Standard Publishers 6th Edition, 2012
4. Hydraulics, Fluid Mechanics and Hydraulic Machines by R S Khurmi S Chand 20th Edition, 2014



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Reference Books:

1. Mechanics of Fluid – Irving H. Shames (McGraw Hill)
2. Introduction to Fluid Mechanics – James A. Fay (Prentice Hall India)
3. Fluid Mechanics – R.J. Garde (New Age International Publication)
4. Fluid Mechanics – Streeter V.L. & Wylie E.B. (Tata McGraw Hills)



Course Code :	DE04306
Course Title :	Construction Material (Lab)
Credit :	1
Max. ESE Marks: 35	Min. Marks : 14

LIST OF PRACTICALS (Perform any 10):-

1. Determination of Compressive strength of cement.
2. Determination of Tensile strength of cement.
3. Determination of Fineness of cement by sieving method.
4. Determination of Fineness of cement by Blain Apparatus.
5. Determination of Soundness of cement.
6. Determination of Specific gravity of cement.
7. To determine Uniaxial Tensile Test of mild steel.
8. To determine IzodCharpy Value of given mild steel.
9. To determine Compressive Strength of Wood: (a) Along the fibre and (b) Across the fibre.
10. Determination of Specific gravity and water absorption of aggregate.
11. Abrasion Test on tiles.
12. Impact test on tiles.
13. Flexural Strength of Tiles.
14. To study the Cupping Test Machine and determine Erichseser value of mild steel sheet.
- 15 Measurement of Initial and final setting time of cement.



Course Code :

DE04307

Course Title :

Surveying-I (Lab)

Credit :

2

Max. ESE Marks: 35

Min. Marks : 14

LIST OF PRACTICALS (Perform any 10):-

1. Chain surveying:
 - a) Ranging a line
 - b) Chaining a line and recording in the field book
 - c) Taking offsets - perpendicular and oblique (with a tape only).
 - d) Setting out right angle with a tape
 - e) Chaining a line involving obstacles to ranging
2. To fix station point and to measure length of a line by direct ranging with the help of chain and tape and plot it.
3. To perform a chain survey of closed traverse fixing the angle between two chain lines by tie lines and to plot them and adjusting the closing error by graphical method.
4. To perform a chain survey of an area by chain triangulation and plot .
5. Study the parts of prismatic compass and to measure the bearings of lines joining different station point
6. To take the fore bearing and back bearing of sides of a regular polygon and to calculate included angle and check them.
7. To perform a chain and compass survey of an area by open traverse and prepare a map
8. To perform a chain and compass survey of an area by close traverse and prepare a map
9. To learn temporary adjustment of levelling instrument and to find the R.L. of the given point.
10. To find the difference of R.L. of two given point by shifting of instrument on change points and applying arithmetical checks.
11. To take the longitudinal and cross-section levels of an existing road



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12. To take the block leveling of undulated site and to draw the contours using method of interpolation.
13. Preparing a contour map of a small area by direct method of contouring.
14. To draw contour map of a small pond and to calculate its capacity.
15. To study a Topo sheet of certain area and to mark on it watershed line and find out catchments area of a stream at a place.



Course Code :	DE04308
Course Title :	Building Construction (Lab)
Credit :	1
Max. ESE Marks: 35	Min. Marks : 14

LIST OF PRACTICALS (Perform any 10):-

1. To prepare Layout of a building: single rooms building.
2. To prepare Layout of a building: two rooms building.
3. To prepare Layout of a building: two rooms building with front verandah.
4. To construct brick bonds (English bond only) in one, one and half and two brick thick walls.
5. To construct brick bonds (flemish bond only) in one, one and half and two brick thick walls.
6. To construct brick bonds (streach bond only)
7. To construct brick bonds (header bond only)
8. To construct brick bonds for L, T and cross junction.
9. Draw sketches of different types of doors and windows.
10. Draw sketches of different types of Arches and Lintels
11. Draw sketches of different types of Scaffolding.
12. Draw sketches of various types of floors.
13. Draw sketches of various flat types of roofs.
14. Draw sketches of various pitched types of roofs.
15. Draw sketches of various types of stairs



Course Code :

DE04309

Course Title :

CAD (Lab)

Credit :

2

Max. ESE Marks: 35

Min. Marks : 14

LIST OF PRACTICALS (Perform any 10):-

1. Draw line using different methods.
2. Draw circle using different methods.
3. Draw standard door using AutoCAD.
4. Draw Window Using AutoCAD.
5. Draw Rectangle Using Autocad
6. Draw Triangle Using Autocad
7. Draw Hexagon Using Autocad
8. Draw Octagon Using Autocad
9. Draw line plan of any building, showing all AutoCAD features(Dimensions, layers,
10. Draw line plan and section of any building, showing all AutoCAD features(Dimensions, layers, grouping of entities etc)., in the drawing
11. Draw some three D objects using Extrude, Subtract and Union.
12. Draw submission drawing, to the scale of 1:100, of a Residential Building (2BHK) with Flat Roof using CAD and enclose Print out showing:
 - a) Developed plan.
 - b) Site plan (1:200) and area statement
13. Draw submission Drawing of above Drafting in CAD showing:
 - a) Sectional Elevation of building.
14. Draw submission drawing, to the scale of 1:100 of Residential Building (2BHK) with Flat Roof and staircase showing:
 - a) Section passing through Staircase
 - b) Position of Doors and windows
15. Draw the different component of Building such as Doors Windows, staircase in CAD



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in three D.



Course Code :

DE04310

Course Title :

Hydraulics (Lab)

Credit :

1

Max. ESE Marks: 35

Min. Marks : 14

LIST OF PRACTICALS (Perform any 10):-

1. Measure the pressure of water in pipe using Piezometer.
2. Measure the pressure of water in pipe using simple manometer.
3. Measure the pressure of water in pipe using differential manometer.
4. Verification of Bernoulli's theorem.
5. Determination of Hydraulic coefficients C_c , C_v and C_d of orifice and verify the relation between them.
6. Determine discharge through venturimeter.
7. Determine discharge through orifice meter.
8. To determine coefficient of discharge of a rectangular notch/triangular notch.
9. Determine friction losses through pipes.
10. To determine loss of head in pipe flow due to
 - a) Sudden enlargement
 - b) Sudden contraction
 - c) Bend
11. Determine discharge through open channel using Notch.
12. Determine discharge through open channel using weir.
13. Study the working of Reciprocating pump
14. Study the working Centrifugal pump
15. Performance characteristics of Kaplan turbine.



Course Title :

Health, Hygiene & Yoga

No. Of Periods

2 Periods/Week

Max. ESE Marks: NIL

Min. Marks : NIL

UNIT I HEALTH & HYGIENE

Concept of health, Physical health and mental health and wellbeing and how to achieve these, longevity and how to achieve it, concept and common rules of hygiene, cleanliness and its relation with hygiene; Overeating and underrating, amount of food intake required, intermittent fasting; adequate physical labour, sleep; consumption of junk fast food vs nutritious food; fruits, vegetables cereals and qualities of each of these.

UNIT II INTRODUCTORY KNOWLEDGE OF COMMON STREAMS OF MEDICINAL CURE

History, development, basic concepts, modes of operation of Alopathy, Ayurved, Homoeopathy, Biochemic, Unani, Siddha, Accurpressure, Accupunture, Naturopathy, Yogic and Herbal system of medicines, Introduction of Anatomy and Physiology concerned.

UNIT- III YOGASANS

Meaning and concept of Yoga, Yogasans and its mode of operation, How to perform Yogasans, Common Yogasans with their benefits, such as, Padahastasan, Sarvangasan, Dhanurasan, Chakrasan, Bhujangasan, Paschimottasan, Gomukhasan, Mayurasan, Matsyasan, Matsyendrasan, Pawanmuktasan, Vajrasan, Shalabhasan, Sinhasan, Shashankasan, Surya Namaskar, Halasan, Janushirasan, Utshep Mudra.

UNIT-IV YOGASANS FOR COMMON DISEASES

From Yogic Materia Medica with symptoms, causes, asans and herbal treatment.



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- **Modern silent killers:** High blood pressure, diabetes and cancer, causes and cure; Common health problems due to stomach disorders, such as, indigestion, acidity,
- dycentry, piles and fissures, artheritis, its causes, prevention and cure.
- **Asans for relaxation:** Shavasan, Makarasan, Matsyakridasan, Shashankasan.
- **Asans to increase memory and blood supply to brain:** Shirsh padasan, Shashankasan.
- **Asans for eye sight:** Tratak, Neti Kriya .
- **Pranayam:** Definition and types: Nadi Shodhan, Bhastrik, Shitakari, Bhramari useful for students.

UNIT-V CONCENTRATION

Concentration Of Mind And How To Achieve It. Tratak (त्राटक),, Concentration On Breath, Japa (जप), Ajapajap (अजपाजप), Internal silence(vUrekSuØ, Visualization In Mental Sky (fpnkdk'k /kkj.kkØ, Concentration On Point Of Light(T;kfs r /;kuØ, Concentration On Feeling (Hkko /;kuØ, Concentration On Figure (ewikZ /;kuØ-

Text Books:

Health, Hygiene & Yoga, Dr P B Deshmukh, Gyan Book Pvt Ltd. New Delhi.

Reference Books:

- (1) Yogic Materia Medica
- (2) Asan, Pranayam and Bandh



BHARTI VISHWAVIDYALAYA, DURG

Scheme of Teaching and Examination

Diploma in Civil Engineering

Semester – IV

S. No	Code	Course Title	Hours per week			Total Contact hrs /week	Credits L+T+P/2
			L	T	P		
1	DE04401	Surveying-II	2	0	0	2	2
2	DE04402	Strength of Material	3	1	0	4	4
3	DE04403	Public Health Engineering	3	0	0	3	3
4	DE04404	Concrete Technology	2	0	0	2	2
5	DE04405	Transportation Engineering	3	0	0	3	3
6	DE04406	Surveying-II (Lab)	0	0	4	4	2
7	DE04407	Strength of Material (Lab)	0	0	2	2	1
8	DE04408	Public Health Engineering (Lab)	0	0	2	2	1
9	DE04409	Concrete Technology (Lab)	0	0	2	2	1
10	DE04410	Transportation Engineering (Lab)	0	0	2	2	1
11	-	Indian Constitution	2	0	0	2	0
12	-	Library	0	0	2	2	0
13	-	Physical and Mental Fitness	0	0	2	2	0
TOTAL			15	1	16	32	20



BHARTI VISHWAVIDYALAYA, DURG

Scheme of Teaching and Examination

Diploma in Civil Engineering

Semester – IV

S. No	Code	Course Title	Maximum Marks			Total	Credits
			ESE	CT	TA		
1	DE04401	Surveying-II	70	10	20	100	2
2	DE04402	Strength of Material	70	10	20	100	4
3	DE04403	Public Health Engineering	70	10	20	100	3
4	DE04404	Concrete Technology	70	10	20	100	2
5	DE04405	Transportation Engineering	70	10	20	100	3
6	DE04406	Surveying-II (Lab)	35	0	15	50	2
7	DE04407	Strength of Material (Lab)	35	0	15	50	1
8	DE04408	Public Health Engineering (Lab)	35	0	15	50	1
9	DE04409	Concrete Technology (Lab)	35	0	15	50	1
10	DE04410	Transportation Engineering (Lab)	35	0	15	50	1
11	-	Indian Constitution	0	0	0	0	0
12	-	Library	0	0	0	0	0
13	-	Physical and Mental Fitness	0	0	0	0	0
Total			525	50	175	750	20



Course Code :

DE04401

Course Title :

Surveying-II

Credit :

2

Max. ESE Marks: 70

Min. Marks : 28

Object

Basic knowledge of Field survey is required for preparation of any engineering maps or drawings. Field survey can be professionally carried out only when various steps involved in the survey work are known with skills of operating theodolite, tachometer, curves and modern surveying instruments and tools. At diploma level, students are expected to study about these aspects so as to develop their understanding, performance oriented abilities in order to apply their knowledge in construction industry.

Unit I Theodolite Survey

Introduction to theodolite, Uses of theodolite , Sketch the parts of Transit Vernier theodolite, Reading of main and vernier scale on horizontal and vertical plate. Temporary adjustment of a theodolite Fundamental axis of theodolite and their relationship, *Optical theodolite*, Definitions and various technical terms. Methods of measuring horizontal angles and vertical angles. *micrometer microscope*, Measuring direct and deflection angles, Errors in theodolite survey, Theodolite Traversing, Traverse computations, Closing errors, Balancing the traverse.

Unit II Tacheometry

Introduction Purpose and Principles of tacheometric surveying, Instruments used in Tacheometry, *internal focusing telescope*, Methods of Tacheometry (Stadia & Tangential) Principle of of Stadia Tacheometry Methods of determining constants of a Tacheometer, Anallatic Lens, advantages & disadvantages. Numerical examples on tacheometer constants, Method of Fixed Hair : -When line of sight is horizontal and staff held vertically, Advantages and disadvantages of Tangential method Stadia field work –General arrangement of field



work, *substance bar*, Triangulation, Traversing, Errors in Stadia Tacheometry, *use of tacheometer*.

UNIT III Curves

Introduction Types of circular curves, *general and element of all type of curve*, Definitions and notations, Designation of curve Relation between Radius and degree of curve, Elements of simple circular curve. Setting out simple circular curve- Linear Method and Angular, Method of location of tangent, tangent point, peg interval. Linear Methods – By ordinates from long chord, by successive bisection of arcs, by offsets from tangents, by offsets from chord produced. Angular Method – Rankine's method of tangential angle, Introduction to Transition curves, *length of transition curve*, Vertical curves and their purpose, *type of vertical curve, sight distance*.

Unit IV Modern Surveying Techniques

Introduction, Basics of Digital Theodolite, Introduction and Principles of E.D.M., Total station - Parts of Total station - uses of Total Station, Automatic Target Recognition ATR . Surveying using Total Station, *modern instrument and its purpose*, Fundamental Parameters of Total Station Precautions to be taken while using Total Station , Set up of Total Station Centering, Orientation. Field Procedure for Total Station , Initial Data Entry , , Survey Station entries , Sighted Point Entries, Occupied Point Entries , Procedure Electronic data recording Data loggers : Data recorders, field computer ,memory card, internal memory.

UNIT V GIS and GPS

Introduction, Definition of GIS, Objectives of GIS, Subsystems of GIS, Tools of representation of features Point Data, Line Data, Areal Data. Data Structure for GIS : Vector and Raster data structure. *basic radiation laws*, GIS SOFTWARE PACKAGES, Application areas of GIS, Remote sensing and GIS, *application of remote sensing, electromagnetic*



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energy, ArcGIS. GPS Overview : Introduction and principle, Components of GPS
Introduction to GPS surveying techniques: Static and Dynamic, Uses and application of GPS.

Text Books:

1. Surveying (Vol. I & II) – Punmia, B.C. (Laxmi Publications, New Delhi, 1996)
2. Surveying (Vol. II & III) – Agor, R. (Khanna publications, Delhi, 1995)
3. Surveying (Vol. I & II) – C. Venkataramaih (Universities Press Hyderabad)
4. Surveying (Vol. II) 4e – S.K. Duggal, McGraw Hill Publications

Reference Books:

1. Surveying (Vol. II & III) – Arora, K.R. (Standard Book House, Delhi)
2. Engineering Surveying Technology – Kennie, T.J.M. and Petrie G. (Blackie & Sons Pvt. Ltd., London, 1990)
3. An Introduction to Remote Sensing and its Applications- Shivangi Somvanshi, Maya Kumari(S.K. Kataria and Sons, New Delhi.
4. Surveying (Vol. I & II) T.P. (Pune Vidyarthi)



Course Code :

DE04402

Course Title :

Strength of Material

Credit :

4

Max. ESE Marks: 70

Min. Marks : 28

OBJECT:-

Strength of material is the computation of deformations, deflections and internal forces or stresses (*stress equivalents*) within structures, either for design or for performance evaluation of existing structures. This subject is to develop the concept of analysis of determinate structures under various types of transverse & direct loading. Analysis of structural members under the effect of principal stresses & strains is also incorporated to give an exposure of compound stresses to the students. At diploma level students are expected to study about these aspects of analysis and design of various structures so as to develop their understanding in order to apply their knowledge in construction industry.

Unit I Simple stresses and strains

Mechanical properties of material: strength, elasticity, plasticity, ductility, brittleness, malleability, toughness, hardness and rigidity & stiffness, *Introduction to stress, Types of stress, Direct Stress, Introduction to Strain, Types of strain, linear Strain, Hook's Law. Stress Strain curve of Mild Steel. Modulus of Elasticity. Yield stress, breaking stress, working stress & ultimate stress and factor of Safety Principle of superposition, Stresses in bars of different sections., Stresses in composite bars, Lateral Strain, Volumetric strain due to uni-axial, biaxial and triaxial force and change in volume Shear stress, Principle of shear stress, Shear Modulus, Bulk Modulus and Relationship among C, E and K, Strain energy, resilience, proof resilience, modulus of resilience for Gradual, Sudden and Impact Load.*

Unit II Shear force and bending moment

Load, Types of loads, Types of supports, Types of beams - cantilever, simply supported, fixed, overhanging, continuous beams;, reactions Concept of shear force and bending moment, sign



convention. Relation between bending moment, shear force and rate of loading, Shear force and bending moment diagrams for simply supported beams, simply supported beams with overhangs and cantilever subjected to point loads, UDL point of contraflexure. Load and bending moment diagram from Shear Force Diagram

Unit III Bending Stresses in Beams:

Introduction of bending Moment and shear stress, Concept of pure bending, theory of simple bending, assumptions in theory of bending, neutral axis. Bending Stresses and their nature, bending stress distribution diagram, Moment of resistance. Application of theory of bending to symmetrical and unsymmetrical sections.

Shear stresses in beams: Shear stress equation, shear stress distribution for rectangular, hollow rectangular, circular sections and hollow circular sections, I section, T section channel section, diamond section, triangular section. Relation between Max shear stress and average shear stress for rectangular section, circular section, triangular section

Unit IV Compound stresses

Introduction to Compound stress, Stresses on inclined plane with different stress conditions, Principal planes and principal stresses, Analytical method and Graphical method using Mohr's stress circle method. Slope and deflection and their interrelation, Macaulay's Method for determination slope and deflection, Maximum values slope and deflection for u.d.l. and point loads for Simply supported, cantilever and fixed beams

Unit V Fixed Beam And Column

Fixed beam –*What is fixed beam*, Concept, Advantages & drawbacks, Computation of fixed end moments for a fixed beam for following loading (i) Single point load central/eccentric (ii) two point loads (iii) u.d.l. over entire span. Drawing of B.M. diagrams indicating the maximum +ve and –ve value.

Column- Column & Strut, Short & Long Column End Condition of Column and effective



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Length of Column & Modes of Failure in column, Radius of Gyration, Slenderness Ratio
Euler's Crippling Load Formula. Rankine's Formula

Books

1. Strength of Material and Mechanics of Structures Strength of Material and Mechanics of Structures by Dr. B C Punamia Laxmi Publications (p) Ltd. New Delhi, 10/e, 2015, ISBN-13: 978-8131809259
2. Strength of Material Strength of Material by S Ramamurutham Dhanpat Rai Publishing Company Private Limited- New Delhi; Eighth edition, 2014, ISBN-13: 978-9384378264
3. Strength of Material Strength of Material Timoshenko and Gere CBS,2 edition, 2006, ISBN-13: 978- 8123908946

REFERENCE BOOK:

1. Theory of Structures Theory of Structures by R S Khurmi S. Chand Publishing, New Delhi, 2006 , ISBN-13: 978- 8121928229
2. Strength of Materials Strength of Materials by R.K. Rajput S. Chand Publishing (6th Edition) (2015) ISBN-13: 978- 9385401367
3. Strength of Materials Strength of Materials Rattan S.S. McGraw Hill Education; Third edition, 2016, ISBN-13: 978-9385965517



Course Code :

DE04303

Course Title :

Public Health Engineering

Credit :

3

Max. ESE Marks: 70

Min. Marks : 28

Object:

Water is one of the basic needs of human. The requirement of water for various utilities is essential to understand and accordingly engineers need to provide it in sufficient quantity with ensuring quality. A diploma engineer must be well aware and well educated and trained to meet the water and sanitary requirement of the public. For sustainable development and environment, proper collection, conveyance and disposal of wastewater and solid refuse are necessary. This again reinforces the necessity of study of water supply and sanitary engineering in the civil engineering. This course is aimed mainly at study of water supply and sanitary engineering which is primarily for urban and semi urban area but since lot of our people live in the villages a chapter on rural sanitation has also been included. The knowledge and application of such aspects is essential in developing a good technician who should be conversant with the collection, conveyance, treatment, maintenance and disposal of water and wastewater.

UNIT-I Quantity of Water and Sources of Water

Introduction- Natural and manmade hydrological cycles, Duties of Public Health Engineer
Quantity of Water- *Need to protect water supplies, flow diagram of water supply schem,*
Population forecast by arithmetical increase, geometrical increase and incremental increase methods, graphical extension method, graphical comparison Method, Criteria for method selection, Water demand – per capita demand, domestic use, institutional use, public or civic use, fire demand, industrial use, water system losses. *Factors influencing demand rate,* variations in demand, Demand rates for various uses. Design period, total water demand of a city.



Sources of Water- Surface or subsurface source of water– natural and artificial, intake, selection of site for intakes and types of intakes, river, intakes for reservoir, lake and canal. Ground water- aquifer, open well, tube well, types of tube well, methods for drilling tube well, selection of site for a tube well, section of a tube well, infiltration gallery, Yield of well- yield of an open well, constant level pumping test and recuperation test, yield of tube well- confined and unconfined aquifer.

Unit II -Quality of water and *purification of water*

Introduction- *Quality of water needed for analysis of water*, Requirement of water for domestic use, *Common impurities in water*, impurities in water from different sources, characteristics of water- Physical ,Chemical and Microbiological tests, standards of potable water as per I.S. & WHO, collection of water sample, Physical tests- colour, taste and odour, turbidity test, chemical tests for total solids, chlorides, hardness, pH value, dissolve oxygen, (DO),biochemical oxygen demand microbiological examination of water : E- coli index and MPN

Purification of water- Objectives of water treatment, Location & Layout of treatment plant, Basic principles of working of treatment plant. Sedimentation – plain sedimentation and sedimentation with coagulation, quiescent and continuous flow type sedimentation tanks, plain sedimentation tanks, sedimentation tanks for coagulation. Filtration- filtration, slow sand filters, rapid sand filter, comparison between slow and rapid sand filter, pressure filter. Water softening hardness of water, temporary and permanent hardness, removal of temporary hardness, removal of permanent hardness-lime soda process, zeolite process, Demineralization. Disinfection requirements of disinfectant, methods of disinfection ,chlorination, forms of application of chlorine, method of application of chlorine, *types of chlorination on the basis of its stage of application.bacteriological tests*



Unit III-*Conveyance and Distribution of water,pumping*

Introduction, Pumping –Necessity of pumping, types of water pumps, reciprocating pump, centrifugal pump, submersible and air lift pumps, Efficiency of pump, WHP and BHP.

Conveyance of water - Type of pipes used for conveyance if water, pipe joints, pipe laying, corrosion and its prevention in pipe, pipe appurtenances –, air valves, reflux valves, pressure relief valves, altitude valves, scour valves sluice valves or gate valves.

Distribution of Water- *Requirements of a good distribution system*, methods of distribution, pressure in distribution mains, systems of water supply, storage and distribution reservoir, layout of distribution system.service reservoirs.

Water Supply for Building – materials for service pipe, service connection, water meter, globe valve and gate valve.

Unit-1V Collection and Conveyance of Sewage, *domestic sewage and system of sewerages.*

Collection and Conveyance of Sewage -; *Seawge and sewerage, Difference between sewage and sewerage*, conservancy system, water carriage sewerage system, separate, combined and partially separate system, dry weather flow, storm water flow, types of sewer, materials of sewer, shapes of sewer, laying of sewer, cleaning and maintenance of sewer, , leaping weir, sewer appurtenances- inlets, clean outs, manholes, flushing tanks, grease and oil traps, ventilation of sewer, overflow weirs, siphon spillway.

House Drainage – principles of house drainage, pipes in house drainage, traps, classification of traps, sanitary fittings, and systems of plumbing.

Rural Sanitation- provision of safe and potable water for domestic purpose, collection and disposal of dry refuse collection and disposal of sullage, , different types of privies, excretal waste disposal through privies.



Solid Waste Disposal –*introduction* solid waste or refuse, quantity and composition of refuse, collection of refuse, transport of refuse, disposal of refuse-controlled tipping, land filling, trenching, dumping into the sea, pulverization, incineration, composting.

Unit-V Waste Water Characteristics and Sewage Treatment.

Introducrtion, Constituents of sewage, characteristics of waste water, micro-organisms found in waste water. aerobic and anaerobic decomposition, physical, chemical and biological characteristics of sewage,

Sewage Treatment

Introduction to treatments of sewage Objectives of sewage treatment, , primary treatment, secondary treatment, final treatment, Layout of treatment plant; Preliminary Treatment and Primary Treatment- screening, fixed bar type screen, disc type fine screen, grit chamber, detritus tanks, skimming tank, sedimentation and chemical clarification, classification of settling tanks, rectangular, circular and hopper bottom settling tanks; Secondary treatment – biological treatment process – aerobic and an aerobic processes, biological treatment techniques-attached growth, suspended growth and combined processes, trickling filters, construction of trickling filters, activated sludge process, flow diagram of activated sludge process, conventional activated sludge process, secondary settling tank for activated sludge process; Treatment and disposal of sludge- flow chart for sludge treatment and disposal, sludge thickening or concentration, anaerobic digestion, conventional digester, methods of final disposal of sludge *common complaints in the operation of septic tank and remedies.*

Text Books:

1. Water Supply Engineering – S.K. Garg (Khanna Publication).
2. Water Supply Engineering – B.C. Punmia (Laxmi Publication, New Delhi)
3. Elements of Public Health Engineering by K.N. Duggal S. Chand Publication Latest Revised Edition
4. Lok swasthya Abhiyantriki by A.K. Saxena Deepak prakashan Gwalior Latest



Reference Books:

1. Environmental Engineering – Peavy & Rowe (Tata McGraw Hill, New Delhi).
2. Water Supply and Sanitary Engineering – G.S. Birdi (Dhanpat Rai Publications).
3. Introduction to Environmental Science – Y. Anjaneyulu (B.S. Publications)
4. The committee on PHE manual and code of practice, the ministry of health, govt. of India, PHE manual and code of practice-sections I, II, III and IV.



Course Code :	DE04303
Course Title :	CONCRETE TECHNOLOGY
Credit :	3
Max. ESE Marks: 70	Min. Marks : 28

Object:

Cement mortar and concrete are the most widely used and versatile construction materials. It is the material of choice where strength, impermeability, durability, performance, fire resistance and abrasion resistance are required. Concrete is generally a site-made material unlike other materials of construction and as such can vary to a great extent in its quality, properties and performance owing to use of natural materials except cement. The knowledge of concrete and its properties in the plastic condition and in hardened condition are highly important in order to make Civil Engineering Structure safe and serviceable. This course focuses on students' acquisition of knowledge, skills & practices in concrete works. The knowledge and application of such aspects is essential in developing a good technician who should be conversant with the tests of various components of concrete and site practices to maintain quality of concrete works.

Unit-I Introduction to Concrete Introduction

Definition of Concrete and its ingredients and their functions, mix proportion of concrete and grade of concrete, Various types of concrete and their uses, Advantages and disadvantages of concrete. Properties of concrete

Water:

Requirements of quality of water in concrete as per IS:456-2000 and its function.

Cement:

Type of cement, Function of cement in concrete, Ingredients of ordinary Portland cement and their function, *composition of cement clinker and its functions*, test on cement: fineness, standard consistency, initial & final setting times, compressive strength & soundness; Different types and Grades of cement as per IS Codes, mineralogy.



Aggregates:

Defination of aggregate, Classification: According to size, shape, texture and source; Characteristics of aggregates: Particle size and shape, surface texture, specific gravity of aggregate; bulk density, water absorption, surface moisture, bulking of sand, deleterious materials soundness; Grading of aggregates: coarse aggregate, fine aggregate; All-in-aggregate; fineness modulus; interpretation of grading charts

Unit-II Fresh concrete

Introduction to Fresh concrete and its properties - water cement ratio, Workability, hardness, Segregation and bleeding; Factors affecting workability; Methods of measurement of workability Slump Test & Compaction Factor Test Vee Bee consistometer, flow table test; Recommended slumps for placement in various conditions as per IS:456- 2000/SP-23; Relation between workability and strength of concrete, bleeding and laitance in concrete, Batching of materials, Methods of mixing of concrete – Hand & Machine Mixing, mixing time , Transportation and Placing of concrete; Ready mixed concrete ,proportioning ready mixed concrete, production of ready mixed concrete; Methods of compaction of concrete and its suitability, Factors affecting compaction; Finishing of concrete; Curing and its importance , its methods and suitability ,Effect of curing on development of strength of concrete; Admixtures:- Types of Admixtures – Accelerator and Retarder Plasticizer and Super Plasticizer and Air entraining admixture , Utility of Admixtures

Unit-III Hardened Concrete

Introduction to Hardened Concrete Hardened Concrete and its Properties; Compressive Strength ,Tensile Strength, Bond Strength, Flexure Strength Durability, Permeability; Factors affecting Compressive Strength; IS Test Procedure to find Compressive & Tensile Strength of Concrete, Acceptance Criteria , Mean Strength & Standard Deviation; Durability of Concrete & factors affecting it; Economy of Concrete & factors affecting it; Methods of Non Destructive Test of Concrete Rebound Hammer Test, Ultrasonic Pulse Velocity Test



Introduction to Special concrete: Light weight concrete, Mass concrete, Fibre reinforced concrete, , Ferro cement, Polymer concrete, High density concrete, No fines concrete,

Unit-IV Concrete Mix design

Introduction to Concrete Mix design Factors causing variation in quality of concrete; Field Control , Advantages of Quality control; Statistical Quality control; Concrete Mix Design and its importance; Nominal Mix and Design Mix; Factors affecting concrete mix design; Different methods of Mix Design and its suitability; I.S. method to design a Concrete Mix As per IS 10262- 2009; Example of Mix design as per I.S. method; safety precautions observed

Unit-V Defects and Repair of concrete

Introduction to Defects Deterioration of concrete, Types of deteriorations and its effects, Prevention of concrete deterioration; Corrosion of reinforcement, Effect of corrosion of reinforcement in concrete and remedial measures; Types, causes and remedies of concrete cracks before hardening and after hardening; Evaluation of cracks, methods of evaluation of cracks; Prevention of cracks , *Repair* Materials for repair of cracks, Methods used for repair of cracked Concrete; Repair and strengthening of column, repair of concrete floor slab system, overlays and surface treatments, underwater repairs; Strengthening of damaged structures, section enlargement, Strengthening of beams and slabs.

Text Books:

1. Concrete Technology – M.L. Gambhir (Tata McGraw Hill)
2. Concrete Technology Theory and Practice - M. S. Shetty, (S.Chand and Company Ltd.Delhi)
3. Concrete Technology S. S. Bhavikatti I. K. International Publishing House 2015
4. Concrete Technology A.R.Santhakumar Oxphord University Press. Concrete Technology M. S. Shetty S. Chand



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Reference Books:

1. Concrete Technology – A. M. Neville, J. J. Brooks, (Pearson Education)
2. Light Weight Concrete Academic Kiado – Rudhani G. (Publishing Home of Hungarian Academy of Sciences)
3. Concrete Technology – R.S. Varshney (Oxford, IBH Publishers).



Course Code :

DE04305

Course Title :

Transportation Engineering

Credit :

3

Max. ESE Marks: 70

Min. Marks : 28

Object:

Transportation engineering has been identified as one of the most important subject for civil engineers. This subject covers Highway, Railway and Bridges. Highway engineering is one of the major areas Civil Engineering construction where employment for Diploma civil engineers for its construction and maintenance having very vast scope. In this scenario standards of highway engineering are continuously being improved with latest technology. Highway engineers must know highway geometrics, materials for highway construction and construction methods the knowledge of roads drainage system its maintenance is also needed for Civil Engineering diploma pass-outs. Railway and bridges are important elements of transportation engineering. Curriculum intends to give adequate knowledge about railway as well as bridge engineering. It is to cater the needs of the technician engaged in the survey, investigation, planning and construction of railway and bridges. This subject aims at basic knowledge about railway and bridges in respect of their various types, materials used, functions of component parts, methods of construction, aspects of supervision and maintenance. Site visits will be of immense value for attaining this goal.

UNIT-I Highway Alignment, Geometrics And Traffic Engineering Highway Alignment And Surveys

Road development in India, Classification of roads as per IRC, Highway alignment, requirements of highway alignment, factors controlling alignment, map study, reconnaissance survey, preliminary survey. Final location and detailed, surveys, drawings and reports; Highway Geometrics; Cross Section Elements – pavements characteristics, camber, *shoulder*, *Traffic separator*, *Right of way*, width of pavement, traffic separators, kerbs, road margins, formation width, right of way, *Skid and Slip*, typical cross section of roads as per IRC;



Sight Distance- Sight distance, total reaction time, *PIEV theory*, Stopping Distance, Stopping Sight Distance, Overtaking Sight Distance, overtaking zones, sight distance at intersections; Horizontal Alignment – Horizontal curves, super elevation, necessity of superelevation, radius and degree of curve, extra widening of pavements at horizontal curves, horizontal transition curves, object of providing transition curves; Vertical Alignment – gradient, classification of gradients, compensation in gradient at curves, vertical curves; Traffic Engineering; Traffic studies traffic volume studies, origin and destination study, traffic capacity study, passenger car unit and capacity of roads as per IRC; Traffic Operation Traffic regulations traffic control devices – traffic signs and signals, road marking; Channelization- Traffic islands, unchannelized and channelized intersections, Rotary intersection, advantages and limitations of traffic rotary.

Unit II Pavement Materials and Highway Construction Pavement materials:

Significance of subgrade soil, California Bearing Ratio (CBR), Stone Aggregates-Desirable properties of road aggregate, Tests for road aggregate; Bitumen, requirements of bitumen, tests on bitumen.

Highway Construction:

Earthwork- Excavation, excavation equipments, embankment, construction of embankment, compacting equipments. , Construction of earth roads, Gravel roads, WBM Roads, Construction of Bituminous Pavements – Types of Bituminous construction, construction procedure with equipments for surface dressing, penetration macadam, bituminous macadam, premixed bituminous carpet, bituminous concrete. Construction of Cement Concrete Pavements –Materials, plants and equipments, construction steps, joints in cement concrete pavements – expansion joint, contraction joint, construction joint, longitudinal joints.

Drainage of Roads:

Importance of Road drainage, Requirements of road drainage system Surface drainage system, cross drainage and subsurface drainage Drainage of Slopes and erosion control.

UNIT III Railway Track Geometrics:



Permanent way, Requirements of ideal permanent way, gauges, *types of gauge*, selection of gauges, uniformity of gauges, *types of rails*, *Detail of standard rail section used in Indian railway*, railway track cross sections, coning of wheels. Gradient, types of gradients, grade compensation. Degree of curve, superelevation or Cant, Object of providing superelevation, determination of superelevation, cant deficiency, limits of super-elevation and Cant deficiency, transition curves and its necessity, curve indicators, purpose necessity of providing check rails on curves, Extra widening on curves, Extra Clearance on curves.

Railway track Materials:

Ballast- functions, requirements of good ballast, types of ballast, ballast size and gradation, ballast section and profile, methods of packing ballasts

Sleepers- Functions, types of sleeper, requirements of sleeper, prestressed concrete sleeper, merits, demerits, limitations and service life of prestressed concrete sleepers,

Rails – Function of rail, requirement of rail section, Types of rails sections, Standard rail section, Length of rails, Wear of rails, Cause and methods to reduce wear of rails, rail joints, requirements of an ideal joint, types of rail joints, Welding of rail joints, Length of welded rails, Creep of rails, its indication, , effect, measurement, preventions.

Rail fixtures and fastening- Purpose, types of fastening, Fish plates, requirements of fish plates, section of fish plates, slide chair, bearing plates, keys, elastic fastenings, functions of elastic fastenings, elastic rail pad, elastic rail clip.

UNIT IV Points and Crossings and Track Junctions; Layout of Stations and Yards and Signaling and Control System

Points and Crossings and Track Junctions:

Introduction of Points and Crossings and Track Junctions Necessity of points and crossings, turnout, important terms used in pints and crossings, Points or Switches types of switches; Crossings, types of crossings. Three throw switch, double turnout, Diamond crossing, Cross over, Single and Double slip.



Stations and Yards :

Introduction of Stations and Yards; Requirements of a railway station, Classification, and description of railway stations, Passenger plat forms requirements, length and width, clearance , height ;Goods Platform requirements, Station Yards- Passenger Bogie Yards, Goods Yards, Marshalling Yards, Locomotive Yards. Necessity of equipments in station yards, Cranes, Weigh Bridges, Loading Gauges, End Loading Ramps, , Scotch Block, Engine Sheds, Triangle, Turn Table, Traverser. Derailing switch, Fouling Marks, Buffer Stops, Sand Hump.

Signaling , Control Systems and Interlocking :

Objects of signaling, classification of signals, Semaphore signal, warner signal, shunting signal, colour light signals, reception and departure signals, control of train movements, Necessity and functions of interlocking.

UNIT V Bridge Classification ,Site Investigation and Bridge Substructure

Classification- classification of bridge according to span, material, life, alignment, HFL, loading, level of bridge floor.

Site Selection & Investigation – factors affecting selection of site for bridge, bridge alignment-factors controlling alignment, bridge site investigation.

Bridge sub structure- components of bridge –pier, abutment, wing wall, foundation, bearings

Waterway-Waterway, Standard values of clearances and freeboard as per IRC, economic span, afflux, scouring, free board

Bridge Super Structure

Permanent Bridges-Types of RCC bridges- slab, slab and girder, prestressed concrete bridges, advantages of prestressed concrete bridges,

Construction-steps involved bridge construction, erection of steel girder and truss bridges, erection of RCC bridges.



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Books :

1. Highway Engg., annah K . K . S& C.E. Justo, Nem chand & Brothers, Latest Revised
2. Principles & Practice of Highway Engg., L.R. Kadiyali Khanna, Publications New Delhi, Latest Revised , Edition
3. Course in Highway Engg, S.P. Bindra Dhanpat, Rai Publication New Delhi , Latest Revised, Edition
4. Fundamental Principles of Road Engg., V.B. Priyant Charotar Publications, Anand (Gujrat), Latest Revised ,Edition

Reference Books:

1. Traffic Engineering (Hindi), Shivanand Kamde , Deepak prakashan Gwalior (M.P.), Latest Revised , Edition
2. IRC, Publications - Indian Roads Congress, Latest Revised, Edition
3. Textbook of Railway Engg, S.C. Saxena nad S.P. Arora , Dhanpatrai & sons, Delhi., Latest Revised ,Edition
4. Railway Bridge and Tunnel Engg. , A K Upadhyay, S K Katariya and sons , Latest Revised,Edition



Course Code :

DE04406

Course Title :

Surveying-II (LAB)

Credit :

2

Max. ESE Marks: 70

Min. Marks : 28

LIST OF PRACTICALS (Perform any 10):-

1. Study of parts of a theodolite and their uses.
2. Temporary adjustment of a theodolite.
3. Measurement of a horizontal angle by repetition method.
4. Measurement of a horizontal angle by reiteration method.
5. Measurement of a vertical angle
6. Determine the tacheometric constant
7. Determine the distance and R.L. of a point when line of sight is horizontal.
8. Determine the elements of simple circular curve.
9. Determine the data for setting out curve from offset of long Chord.
10. Determine the data for setting out curve By Rankine (one theodolite) method
11. Identify the parts of the Total Station
12. Set out the total station on a station
13. Set out station by setting up a back sight
14. Set out station by setting up a Azimuth Mark
15. Measure the horizontal Angle



Course Code :

DE04407

Course Title :

Strength of Material (Lab)

Credit :

1

Max. ESE Marks: 70

Min. Marks : 28

LIST OF PRACTICALS (Perform any 10):-

1. Perform Compression test on cast iron on Universal Testing Machine .
2. Plot Stress-Strain Curve for ductile materials like Mild Steel, Aluminium under tensile loading as per IS 1608.
3. Determine Young's Modulus of Elasticity of different materials' beam simply supported at ends.
4. Calculate Impact Value/toughness of Mild Steel using IZOD Impact Test Apparatus as per IS 1757.
5. Determine energy absorption capacity of Ductile and Brittle materials such as MS, Al, Br and Cu, by conducting Charpy Impact test as per IS 1598
6. Estimate Maximum Bending moment and shear force for simply supported and cantilever beam under point load and UDL using Combined Shear Force and Bending Moment apparatus.
7. Measure flexural rigidity (EI) for a given beam using 'Slope and Deflection' apparatus and compare it with theoretical value.
8. Measure principal stresses and strains in a beam made of aluminum and loaded as a cantilever, and compare them with theoretical values using 'Principal stress and strain. Apparatus.
9. Investigate the effect of beam length and width on deflection of beam and compare it with theoretical value using 'Slope and Deflection' apparatus.
10. Measure the buckling load of three different slenderness ratio long columns of same lengths using 'Behaviour of column and struts'



11. Calculate beam deflection using Maxwell Reciprocal theorem.
12. Perform spring test.
13. Perform hardness test.
14. Perform bending test on cantilever beam to evaluate the deflection of beam made of wood.
15. Perform bending test on cantilever beam to evaluate the deflection of beam made of steel.



Course Code :	DE04408
Course Title :	Public Health Engineering (Lab))
Credit :	1
Max. ESE Marks: 70	Min. Marks : 28

LIST OF PRACTICALS (Perform any 10):-

1. To determine acidity of water/wastewater sample.
2. To determine alkalinity of water/wastewater sample.
3. To determine hardness of water/wastewater sample.
4. To determine chloride content of water/wastewater sample.
5. To determine D.O. content of water/wastewater sample.
6. To estimate the quantity of BOD from water/wastewater sample.
7. To determine the availability of chlorine in bleaching powder for drinking water.
8. To determine the residual Cl₂ Content in drinking water.
9. To determine the quantity of Optimum Coagulant Dose and pH of water sample.
10. To determine the Total Solids in water/wastewater sample.
11. To determine the COD in Sewage / Industrial wastewater.
12. To determine the MPN in Sewage / Industrial wastewater.
13. To determine the Fluoride content in Sewage / Industrial wastewater.
14. To determine the Nitrates in Sewage / Industrial wastewater.
15. To determine the Phosphates in Sewage / Industrial wastewater.



Course Code :

DE04409

Course Title :

Concrete Technology (Lab)

Credit :

1

Max. ESE Marks: 70

Min. Marks : 28

LIST OF PRACTICALS (Perform any 10):-

1. Determines fine silt in aggregate by field method.
2. Determine flakiness index and elongation index of coarse aggregate (IS 2386-Part I)
3. Determine specific gravity and water absorption of aggregate (IS2386part III for aggregates of size 40 mm to 10 mm)
4. Determine the compressive strength of Portland cement (IS-269)
5. Perform Field test of cement
6. Determine of bulk density and voids of aggregates ((IS2386part III)
7. Determine particle size distribution of fine, coarse and all in aggregate by sieve analysis (grading of aggregate)
8. Determine Fineness modulus of fine and coarse aggregate by sieve analysis.
9. Determine particle size distribution of fine, coarse and all in aggregate by sieve analysis (grading of aggregate)
10. Test for workability (slump test): (a)To verify the effect of water, fine aggregate/coarse aggregate ratio and aggregate/Cement ratio on slump (b) To test cube strength of concrete with varying water cement ratio
11. Compaction factor test for workability (IS: 1199)
12. Conduct Split Cylinder Test
13. Determine the compressive strength of concrete cubes.
14. conduct Non destructive test on concrete (a) Rebound hammer test (b) Ultrasonic pulse velocity test
15. Determine flexural strength of concrete beam



Course Code :	DE04410
Course Title :	Transportation Engineering (Lab)
Credit :	1
Max. ESE Marks: 70	Min. Marks : 28

LIST OF PRACTICALS (Perform any 10):-

1. Determination of crushing value of aggregates.
2. To determine 10 percent finer value.
3. Determination of abrasion value by Los Angle's Machine.
4. Determination of abrasion value by Deval's Abrasion Machine.
5. Determination of Impact Value of aggregates.
6. Determination of Specific Gravity and Water Absorption of aggregate.
7. Determination of Softening Point of Bitumen.
8. Determination of Ductility Value of Bitumen.
9. Determination of Viscosity Value of Bitumen.
10. Determination of Elongation Index of Aggregate.
11. Determination of Flakiness Index of aggregate.
12. Determination of Penetration Value of Bitumen.
13. Flash and Fire Point Test.
14. Study of Marshal Stability Test.
15. Study of Benkelman Beam.



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Course Code :	: NIL
Course Title :	: Physical and Mental fitness
Credit :	2
Max. ESE Marks: 70	Min. Marks : 28

Institution need to accord special & significant priority to physical & mental fitness of students and faculty in the campus and nominate a Nodal Officer for Fitness Implementation & Monitoring, whose activities would be monitored by and Institutional Committee. The following indicative guidelines/steps may be taken in this regard;

1. Physical fitness period or session may be incorporated into the academic calendar of the an institution, covering the aspects of sports, yoga, meditation, right diet etc. The physical fitness sessions may be staggered throughout the day to enable all students to participate.
2. Fitness Leaders in each institution to be created. For guiding students into physical fitness, services of students volunteer from the institution, ex-servicemen and other volunteers may be obtained on a daily & voluntary basis. 10 committed persons well versed in physical activity may be involved in the exercise.
3. Proper the utilization of existing infrastructure, encouraging students to climb stairs, walk at least
4. 10,000 steps a day, use cycles within the campus by creating cycling zones etc.
 - (A) Every institution must organize intra institution game/sports competition/tournaments.
 - (B) Sports meet : -
5. Sports competition will be of four tier competition,
 - (1) Intra institution sports meet
 - (2) Inter institutional level sports meet at Regional level.
 - (3) State level University sports meet.
 - (4) National University sports meet.
6. The top leadership of the Institution and professors actively participate with staff and students in



7. fitness activities on a periodic basis to lead by example, eg: cycling, running, aerobics, marathon,
8. meditation activities etc.
9. Incorporating provisions of healthcare and wellness initiatives in the objectives of the institution.
10. Annual health check-ups by volunteer health doctors or voluntary organizations to monitor student health fitness and also maintain a record.
11. Providing guidance regarding a balanced nutritional diet, distribution of pamphlets and information material on the subject.
12. Redressing the emotional concerns of students in mental health. Awareness camps or sensitization workshops on depression, anxiety and stress management may be organized for faculty and students.
13. Inviting health icons and motivational speakers on health & fitness to address students in campus and regular conduct of outdoor sports events in campus.
14. Data pertaining to health & fitness activities of and institution should be placed on the website. Exemplary performers shall be selected subsequently for National level awards.

Scheme of Teaching and Examination

Diploma in Civil Engineering

Semester – V

Sn.	Code	Course Title	Hours per week			Total Contact hrs/week	Credits L+T+P/2
			L	T	P		
1	DE04501	Quantity Surveying & Costing-I	3	0	0	3	3
2	DE04502	Structural Design & Drafting-I	3	0	0	3	3
3	DE04503	Water Resources Engineering	3	0	0	3	3
4	DE04504	Geotech Engineering	2	1	0	3	3
5		Elective-I	3	0	0	3	3
		Advanced Construction Technology					
	DE04505(01)	Traffic Engineering					
	DE04505(02)	Pavement Design Construction & Maintenance					
DE04505(03)							
6	DE04506	Quantity Surveying & Costing-I (Lab)	0	0	2	2	1
7	DE04507	Structural Design & Drafting-I (Lab)	0	0	2	2	1
8	DE04508	Geotech Engineering (Lab)	0	0	2	2	1
9	DE04509	Summer Internship	0	0	0	0	3
10	-	Major Project	0	0	2	2	^
Total			14	1	8	23	21

Scheme of Teaching and Examination

Diploma in Civil Engineering

Semester – V

Sn.	Code	Course Title	Maximum Marks			Total Marks	Credits
			ESE	CT	TA		
1	DE04501	Quantity Surveying & Costing-I	70	10	20	100	3
2	DE04502	Structural Design & Drafting-I	70	10	20	100	3
3	DE04503	Water Resources Engineering	70	10	20	100	3
4	DE04504	Geotech Engineering	70	10	20	100	3
5		Elective-I	70	10	20	100	3
	DE04505(01)	Advanced Construction Technology					
	DE04505(02)	Traffic Engineering					
	DE04505(03)	Pavement Design Construction & Maintenance					
6	DE04506	Quantity Surveying & Costing-I (Lab)	35	0	15	50	1
7	DE04507	Structural Design & Drafting-I (Lab)	35	0	15	50	1
8	DE04508	Geotech Engineering (Lab)	35	0	15	50	1
9	DE04509	Summer Internship	0	0	100	100	3
10	-	Major Project	0	0	0	0	^
Total			395	50	305	750	21



Course Code :

DE04501

Course Title :

Quantity Surveying & Costing - I

Credit :

3

Max. ESE Marks: 70

Min. Marks : 28

OBJECTIVE:-Preparation of quantity and cost estimates of the various construction items/works is a major job function of a diploma pass out in the field of construction technology and management. The course therefore, aims in developing in the student competency in preparing estimates of all types of civil engineering structures. For achieving this student is made familiar with the procedures and principles of measuring various works, estimating its cost and computing quantities of material needed. After learning the principles and procedures student applies them to prepare the estimated cost of various types of buildings, earth work and road work. To ensure that the student has developed the desired competence in preparing estimates he may be given appropriate exercises on QSC.

UNIT I- Specification and Approximate Estimate

Introduction, Object of specification. use of specification , Main items of works, General Specification, Detailed Specification, General Specifications, Detailed Specification of different items of works; Introduction of Stage-I or Approximate Estimate, Purpose of estimate and its importance to the field situations, data for estimate, actual cost approximate method of Stage-I estimate, detailed estimate. Approximate estimate for building-Service unit method , Plinth area method , Cubic content method, Approximate quantity method. Approximate estimate of highways. Approximate methods for water supply, sanitary and electrical installations. Approximate estimate of different civil engineering structure like bridge, culvert, road, dams, over head tanks etc.

Unit II Taking Out Quantities and units measurements

Introduction, Meaning of term taking out quantities, Units and modes of measurements, different items of work required in estimating building works, Rules and methods of



measurement of work, , measurement of different work ,accuracy in measurement,. Standard conversion used in measurements; Taking out quantities from working drawing of buildings, Method of computing quantities.

Unit III - Detailed Estimate Of Buildings

Introduction of Detailed Estimate Of Buildings, Pre-requisite for stage II estimates or detailed estimate; Preparation of abstract from quantity sheets; Percentage provision to be made in stage II estimate for some items Classification of estimates

Preparation of detailed

estimate for:

- Small building
- Small building with pitched roof
- Shop cum residential multi-storied building

Unit IV Schedule of Rates and Analysis of Rates

Introduction, Schedule Of Rates Information available in schedule of rates with specialization of particular item such as *Analysis of Rates*; Purpose of rates analysis, Task artisan per day , Materials required for major items; Labour required for major items; Analysis of major items of Work.

UNIT V Earthwork and Road Estimate

Introduction, Earthwork Estimate; Calculation of area of cross section for given cross sections: Fully cutting section, Partly cutting and partly embankment section, Fully embankment section; Mid sectional area method and mean sectional area method ,Calculation of earth work by using Prismoidal formula And Trapezoidal formula, lead and lift, Estimate of earth work for a given length of road.



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Introduction of Road Estimate Items of work in flexible pavement, estimation of soling coat, inter coat and top coat in road work.

BOOKS:

1. Estimating and Costing by B.N.Dutta (B.N. Dutta, S.D. Dutta & Co) Tagore Path, Motilal Bose Road, Lucknow
2. Estimating, Costing, specification & Valuation in civil engineering M. CHAKRABORTI M. CHAKRABORTI 21 B Bhabananda road Kolkata- 700026 Latest Revised Edition
3. Estimating, Costing & Valuation Rangwala Charotar Publications, Station Road Latest Revised Edition
4. Estimating,& Costing Anand Birdi, J.C. Kapoor Dhanpet Rai & Sons, Delhi & Julandhar Latest Revised Edition

Reference Book:

1. Estimating & Costing Vol. I & II J.C. Malhotra, Khanna Publishers, 28, Nath Market, Nai Sarak, New Delhi Latest Revised Edition
2. Current Schedule of rates from PWD/PHE/Irrigation/CPWD Govt. publications Latest



Course Code :	DE04502
Course Title :	STRUCTURAL DESIGN AND DRAFTING-I
Credit :	3
Max. ESE Marks: 70	Min. Marks : 28

OBJECTIVE:-

Design of reinforced Concrete Structures will be taught as per IS 456 – 2000. Most of the residential buildings, Commercial and Public Buildings are designed using R. C. C. due to their long durability and flexibility in size and shape of structures and its members. So, Design of R.C.C. components like slab, beam, column and footing using Limit State Method is required to be understood. Also precise and correct detailing of reinforcement in structure drawing is also required in order to execute smooth construction of RCC structures. Hence this course will provide a detailed knowledge of reinforcement as per IS 456-2000. The latest good practice of design is based on Limit State Method. Hence, knowledge of this latest method is most important for civil engineers. The working stress method is also essential for knowledge purpose. LSM of design has been followed and introduction to WSM and Pre-stress Method has been included.

UNIT 1- Reinforced Cement Concrete, IS Code 456-2000 and Working Stress Method of Design

Reinforced Cement Concrete

Introduction of RCC ,structural components, meaning of R.C.C., purpose of reinforcement, Materials of reinforcement, Steel as a reinforcing material, Type of steel used for reinforcement mild steel, tor steel, *mix design* Different mixes of concrete to be used for R.C.C. work;

IS Code 456-2000-



Effective span, Control of deflection, Modification factor for Tensile and compressive steel, Cover to reinforcement Vertical and horizontal, Spacing of reinforcement, Curtailment and bending of bars, Max and min reinforcement, *shear and Development length*, Shear reinforcement, Min. positive and negative reinforcement at support, Min length of reinforcement inside support Live load and dead load;

Working Stress Method:

Introduction of WSM, Permissible stresses in steel and concrete, assumption for design in flexure, under reinforced, over reinforced and balanced section, design constants for balanced sections analysis of singly and doubly reinforced beams.

Unit -II Limit State Method of Design & Design of Rectangular Beams

Limit State Method of Design – *introduction of LSM, difference between lsm and wsm*
Concept of limit state method, limit state of collapse, limit state of serviceability, characteristic strength of materials, characteristic load and *load combination*, partial safety factors, *modular ratio*, design values, stress-strain curve for concrete and steel;

Design and drafting of rectangular beams

Limit state of collapse for flexure, assumptions, stress block parameters, neutral axis, analysis and design of singly and doubly reinforced section; Limit state of collapse for shear, nominal shear stress, design shear strength of concrete, design of shear reinforcement, Development length & anchorage length: concept and necessity of development length, design bond stress, overlap length, necessity of hook and bend; Design singly and doubly reinforced beam and check for deflection, cracking and anchorage length; Design of lintels.

Unit-III Design of flanged beams, slabs, continuous slab and flanged beams .



Introduction of Flanged beam; Properties of flanged beams, moment of resistance and design of singly reinforced Flanged beam; Design of slabs : Dead loads, imposed loads, thickness of slabs, modification factors, effective span, reinforcement in slab, design of one way slab and two way slabs, check for cracking, check for development length.

- a. Design and drafting of one way simply supported slab
- b. One way continuous slab – effective span, bending moment and shear force coefficient, design and drafting of three span continuous slab.
- c. Two way slab – design and drafting simply supported slab on four sides.

UNIT -IV Column & Column footing

Column

Introduction of Column Types of column- short and long column, axially loaded column, columns subjected to bending, effective length, slenderness limit, minimum eccentricity, IS code provisions for longitudinal and lateral reinforcement, ultimate load for axially loaded columns, columns with helical reinforcement, assumptions made for limit state design of column, axial ultimate on a column, design and drafting of axially loaded square, rectangular and circular columns;

Column Footing

Introduction of Column Footing Isolated footing, square and rectangular , sloped footing, design principles for column footing, thickness of footing, design for load transfer at column base, design of square, rectangular, circular pad and sloped footing design for one way shear, design for two way shear or punching shear, design for flexure.

UNIT-V Design of Stair Case and Prestressed Concrete

Design of Stair Case

Introduction of Design of Stair Case , Classification of Stair Case General introduction and types of stair, Components of stairs, IS code provisions for design of staircase ,geometrical



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classification of stair case, structural classification of star, effective span and loading for stairs, design and drafting straight , cantilever stair, doglegged stair case and open newel staircase.

Prestressed Concrete

Principles of pre-stressing, materials for prestressed concrete ,methods of prestressing, advantages and disadvantages of prestressing

BOOKS:

1. Reinforced Concrete Design by N.Krishnaraju R.N.Pranesh New Age International Publishers,New Delhi
2. Reinforced Cement Concrete Vol I H J Shah Charotar Publishing House Anand
3. Reinforced Cement Concrete Design N C Sinha and S K Roy Charotar Publications, Station Road
4. Design of Reinforced Concrete Structures Dr B C Punmia S Chand New Delhi

Reference Book:

1. Limit State Design of Reinforced Concrete P.C. Varghase Prentice Hall of India.
2. N. Krishna Raju Prestressed Concrete Mc Graw Hill India
3. IS: 456-2000, 875-1984, 432-Part-I 1786 BIS
4. Design SP:16 Hand Book BIS Latest Revised Edition



Course Code :

DE04503

Course Title :

Water Resource Engineering

Credit :

3

Max. ESE Marks: 70

Min. Marks : 28

OBJECTIVE :

In India water requirement is rapidly increasing due to vast industrial development and population growth. We are mostly dependent on rain as a predominant source of water. Looking to scarcity of water in our country, it is essential to store the water in appropriate manner for anticipated requirement. Irrigation engineering is the artificial process of applying water to the soil to help in growing agriculture crops or maintaining the landscapes when there is shortage of natural water by rain. It deals with the analysis and design of irrigation systems which include dams, weir, barrage, canals, drains and other supporting system etc. This course has been designed to develop theoretical and practical knowledge in order to implement the irrigation designs and operate irrigation systems.

Unit I Hydrology

Definition, *General aspect of hydrology*, *index of wetness*, Hydrologic cycle, the water budget equation, catchment area; Precipitation, forms of precipitation, measurement of rainfall, rain gauge and types, rain gauge density as per IS, computation of average rainfall over a basin, mean annual rainfall; Losses from precipitation, *Evaporation*, infiltration, *infiltration indices*, Runoff, factor, computation of runoff; Hydrograph, unit hydrograph, peak flow determination, *floods, flood routing and control*, stage discharge curve affecting run off.

Unit-II Water requirements of crops

IRRIGATION: Definition, necessity, advantages, disadvantages, types of irrigation, methods of irrigation – surface, sub surface, sprinkler and drip irrigation; Water requirements of crop: functions and quality of irrigation water, *classes and availability of soil water*, crop period base period, duty, delta. Importance of duty, factors on which duty depends, delta and duty



for certain crops measures for improving duty of water, relationship between duty and delta, and numerical problems, principal crops and crop seasons, important terms; Functions of irrigation water, *irrigation requirements of crops*, soil moisture constants, limiting soil moisture conditions, consumptive use of water, estimating depth and frequency of irrigation on the basis of soil moisture regime concept irrigation efficiencies, crop rotation, Water logging: cause and control.

Unit-III Reservoir Planning

Purposes of reservoir, classification of reservoir based on purpose, investigation for reservoir planning, Engineering surveys, area elevation curve, storage elevation curve, Geological investigation, Hydrological investigation, factors affecting selection of site for a reservoir; Zones of storages and various water levels, storage capacity and yield of reservoir; Dams: various types of dam, *force acting on gravity dams*, factors governing the selection of type of dam, factors for selection of site for a dam; Comparison of earthen and gravity dams with respect to foundation, seepage, construction and maintenance

UNIT-IV Dam and spillway

Define dams, function of dams, selection of dams, Earthen Dams – Types of earth dam, causes of failure of earthen dams, criteria for safe design of earth dam section of an earth dam components , *elementary profile of gravity dams*, seepage , control of seepage through embankment and foundation, construction of earth dam, equipments used in construction of earth dam; Gravity Dams –identification and definition of forces acting on a gravity dam, modes of failure and criteria for structural stability of gravity dam, elementary and practical profile, typical cross section, drainage gallery, joints in gravity dam, control of cracking in concrete dams, construction of gravity dam.

Spillways-Definition, function, location, *type of spillway, essential requirements of spillway, components, spillway capacity*, straight drop spillway, ogee spillway, side channel spillway, trough spillway, conduit spillway, shaft spillway, siphon spillway, spillway crest gates,



Unit V Diversion Headworks and Canal Irrigation System Diversion Headworks

Introduction Diversion headwork, *type of diversion work*, weir, barrage, component parts of a diversion headworks, *location and components*, *diversion weir* and its types, location of diversion headworks, causes of failure of weirs and its remedy, types of regulation at head regulator, *Lance's and khosla's theory*, silt control at headwork, *their remedies*.

Text Books:

1. Engineering Hydrology – K. Subramanya (Tata McGraw Hill)
2. A Text Book of Hydrology – Dr. P. Jaya Rami Reddy (Laxmi Publications)
3. Irrigation Engineering and Hydraulic Structures – S.K. Garg (Khanna Publications)
4. Irrigation Engineering – B.C. Punmia (Laxmi Publications)

Reference Books:

1. Applied Hydrology – VenTe Chow, David R. Maidment, Larry W. Mays (McGraw Hill)
2. Applied Hydrology – Linsely R.K. Kohler, M.A. and J.L.H. Paulhus (McGraw Hill)
3. Irrigation, Water Resources and Water Power Engineering – Dr. P.N. Modi (Standard Book House)
4. Theory and Design of Irrigation Structures (Volume – I & II) – Varshney (Nem Chand & Bros.)



Course Code :	DE04504
Course Title :	Geotech Engineering
Credit :	3
Max. ESE Marks: 70	Min. Marks : 28

OBJECTIVE:

Knowledge and understanding of soil and its engineering properties are very important for engineers working at site in order to make Civil Engineering Structures safe and serviceable. In INDIA, from region to region soil varies in properties and characteristics. Under different loading conditions soil is subjected to various stresses and problems like water logging, liquefaction of soil, seepage through soil and settlement. At diploma level students are expected to study about these aspects of soil so as to develop their understanding in order to apply their knowledge in construction industry

Unit-I Weight and Volume Relationships, Index Properties and Classification Of Soil

Weight and Volume Relationships

Definition of soil and soil mechanics or Geotechnical Engineering, field application of Geotechnical Engineering; *Soil formation cycle, various types of soil*. Soil as a three phase system, *various types of soil water*, water content, Void ratio, porosity and degree of saturation, water content, density and unit weights, specific gravity, density index and relative compaction and functional relationship among them . *Methods of determination of water content, specific gravity and bulk density*

Index Properties And Soil Classification

Particle size analysis, mechanical sieve analysis, sedimentation analysis, Stoke's law, pipette method and hydrometer method , particle size distribution curve and its interpretation; Consistency of soil, stages of consistency, Atterberg's limits of consistency, relationship between consistency limits, Determination of liquid limit, plastic limit and shrinkage limit; Particle size classification of soils & IS classification of soil.



Unit II Permeability, Well Hydraulics and Seepage

Permeability

Introduction of permeability, Darcy's law of permeability, coefficient of permeability, Factors affecting permeability; Constant head and falling head permeability tests.

Well Hydraulics

Aquifer, aquiclude, aquifuge, coefficient of transmissibility; Formulae for discharge through unconfined and confined aquifer for steady radial flow by Dupuit's Theory, field determination of coefficient of permeability and coefficient of transmissibility

Seepage

Seepage through earthen structures, head, gradient and potential, seepage velocity, seepage pressure, quick sand condition; Flow net, characteristics of flow net, application of flow net, phreatic line.

Unit III Shear Strength of Soil

Shear failure of soil, concept of shear strength of soil, components of shearing resistance of soil, cohesion, internal friction; Mohr-Coulomb failure theory, Strength envelope, strength equation; Effective stress principle-total pressure, effective pressure, neutral pressure, shear strength equation in terms of effective pressure, Mohr's stress circle. Determination of shear strength- types of shear test depending upon drainage condition, Direct shear test, Tri-axial test Unconfined compression test, Vane shear test.

Unit IV Compressibility, Compaction of Soil and Earth Pressure

Compaction of Soil



Introduction of Compressibility Concept of compaction, purpose of compaction field situations where compaction is required. Standard proctor test – test, procedure as per IS code compaction curve, optimum moisture content, maximum dry density, zero air voids line. *Standard proctor test*, Modified proctor test Factors affecting compaction Field methods of compaction – rolling, ramming & vibration and suitability of various compaction equipments, placement water content, field compaction control; Difference between compaction and consolidation

Earth Pressure

Definition of active earth pressure, Neutral pressure and passive earth pressure; Structures subjected to earth pressure in the field; Rankine's theory; Calculation of active and passive earth pressure(simple cases).

Unit V Bearing Capacity of Soils , Stabilization of soil and Site Investigation And Sub Soil Exploration

Bearing Capacity of Soils

Introduction of Bearing Capacity of Soils Concept of bearing capacity, ultimate bearing capacity, safe bearing capacity and allowable bearing pressure; Terzaghi's analysis and assumptions made. Effect of water table on bearing capacity; IS code method for computing bearing capacity; Field methods for determination of bearing capacity – Plate load test and standard penetration test. Test procedures as Per IS:1888 & IS:2131; Typical values of bearing capacity from building code IS:1904; Liquefaction(in brief)

Stabilization of soil

Concept of soil stabilization, necessity of soil stabilization; Different methods of soil stabilization – Mechanical soil stabilization, lime stabilization, cement stabilization, bitumen stabilization, fly-ash stabilization

Site Investigation And Sub Soil Exploration



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Necessity of site investigation & sub-soil exploration; Method of site exploration open excavation & boring; Criteria for deciding the location and number of test pits and bores
5.3.4 Methods of exploration, disturbed & undisturbed soil samples for lab testing.

TEXT BOOKS:

1. Soil Mechanics and by Foundations B.C. Punmia Laxmi Publication
2. Soil Mechanics and Foundation Engineering by K R Arora Standard Publishers Latest edition
3. Laboratory Manual on Soil Mechanics by Ravi Kumar Sharma I K International Publishin House
4. Soil Mechanics and Foundation Engineering by V N S Murthy UBS Publsher Latest Edition

REFERENCE BOOKS:

1. Modern Geo Technical Engineering by Dr Alam Singh Jodhpur University Latest Edition
2. Soil Sampling & Testing Manual by Dr A K Duggal NITTTR Chandigarh
3. Basic and applied soil mechanics by Gopal ranjan and A S Rao New Age international publishers



Course Code :	DE04505(01)
Course Title :	Advanced Construction Technology
Credit :	3
Max. ESE Marks: 70	Min. Marks : 28

OBJECTIVE:

The term 'advanced construction technology' covers a wide range of modern techniques and practices that encompass latest developments in materials technology, design procedures, quantity surveying, facilities management, services, structural analysis and design, and management studies. Incorporating advanced construction technology into practice can increase levels of quality, efficiency, safety, sustainability and value for money. However, there is often a conflict between traditional industry methods and innovative new practices, and this is often blamed for the relatively slow rate of technology transfer within the industry. The knowledge of different materials in advanced construction, different methods in concreting, and the relevance of advanced construction methods for particular site condition and requisite hoisting and conveying machinery for the given situation will be very important for a Diploma Engineer.

Unit I Advanced Construction Materials

Introduction to Fibres: Use and properties of steel, polypropylene, carbon and glass fibers; *Plastics:* Use and properties of PVC, RPVC, HDPE, FRP, GRP; *Miscellaneous Materials:* Properties and uses of acoustics materials, wall claddings, plaster boards, micro-silica, waterproofing materials, adhesives. Use of waste products and industrial by products in bricks, blocks, concrete and mortar.

Unit II Advanced Concreting Methods and Equipments

Introduction to Ready Mix Concrete: Necessity and use of ready mix concrete; Products and equipments for ready mix concrete plant. Conveying of ready mix concrete, transit mixers; *Vibrators for concrete consolidation:* Internal, needle, surface, platform and form vibrators; *Underwater Concreting:* Procedure and equipments required for tremie method, Drop bucket



method. Properties, workability and water cement ratio of the concrete; Special concrete: procedure and uses of special concretes: Roller compacted concrete, Foam concrete, shotcreting, Self-compacting concrete (SCC).

Unit III Advanced Technology in Constructions

Introduction to Advanced Technology in Constructions Construction of bridges and flyovers: Construction of solid foundation and pile foundation, launching of girder; Construction of multi-storied building: pumping of concrete, slip forms, climbing forms, table forms, tower cranes, plumb laser, platforms, chute and lifts, protection screen; Prefabricated construction: Methods of prefabrication, Plant fabrication and site fabrication, All prefabricated building elements such as wall panels, slab panels, beams, columns, door and window frames etc. Equipments and machineries used for placing and Jointing of prefabricated elements. Concept of reinforced soil, strengthening of embankments by soil reinforcing techniques using geosynthetics, types, function of geosynthetic material, components of reinforced soil, construction procedure, advantages.

Unit IV Equipments for construction of flyovers, Hoisting and Conveying Equipments

Equipments and machineries required for foundation and super structure of bridges and flyovers, *Classification of construction equipments*, Pile driving equipments, Pile hammers; Hoisting Equipments: Principles and working of Derrick-Pole, Gin Pole, Crane, Power driven scotch derrick crane, Hand operated crane, Locomotive crane, Tower crane, Lattice Girder, Winches, Elevators, ladders. Crawler cranes, Truck mounted cranes, Gantry cranes, Mast cranes; Conveying Equipments: Working of belt conveyers, types of belts and conveying mechanism, Capacity and use of dumpers, tractors and trucks.

Unit V Miscellaneous Machineries and Equipments



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Various types of Miscellaneous Machineries and Equipments, Excavation Equipments: Use, working and output of following machinery – bull dozers, scrapers, graders, Clam Shell, trenching equipment, Tunnel boring machine, Wheel mounted belt loaders, power shovels, JCB, and drag lines; Compacting Equipments: Output of different types of rollers such as plain rollers, ship footed rollers, vibratory, pneumatic rollers rammers; process of using explosives, Miscellaneous Equipments: Hot mix bitumen plant, bitumen paver, grouting equipment, guniting equipments; Selection of drilling pattern for blasting, bentonite/mud slurry in drilling, Explosives for blasting, Dynamite,.

TEXT BOOKS:

1. Construction Engineering and Management, by Sharma S C and Deodhar S V Khanna BookPublishing, New Delhi
2. Construction Engineering and Management, by Seetharaman S. Umesh Publication, New Delhi.
3. Construction Technology Vol. I to II, by Chudly, R. ELBS-Longman Group.
4. Construction Planning Equipment and Methods, by Peurifoy, R. L. McGraw Hill Co. Ltd. NewYork.

REFERENCE BOOKS:

1. Construction Management and Planning by Sengupta, B. and Guha
2. McGraw Hill Education, New Delhi.
3. Materials of Construction Smith, R. C., McGraw Hill Co. Ltd.
4. Construction Planning and Equipment by Satyanarayana, R Saxena Standard Publication, New Delhi.
5. Ghose, D. N. Materials of Construction by McGraw Hill Publishing Co, New Delhi.



Course Code :	DE04505(02)
Course Title :	Traffic Engineering
Credit :	3
Max. ESE Marks: 70	Min. Marks : 28

OBJECTIVE:-

Traffic Engineering deals with traffic planning and design of roads, of frontage development and of parking facilities and with the control of traffic to provide safe, convenient and economic movement of vehicles and pedestrians. Knowledge and understanding of the basic concept of Traffic Engineering is highly essential for the engineers designing and executing the road laying projects in order to make road transport system safe and workable. Students are expected to perform various traffic surveys, analyze data and interpret the results and design of traffic control device appropriately in order to apply their knowledge in designing efficient and safe road transport systems.

Unit I Road Traffic Characteristics

Traffic engineering- Definition, objects, scope; *PIEV Theory*, Relationship between speed, volume and density of traffic; Road user's characteristics physical, mental, emotional factors; Vehicular characteristics width, length, height, weight, speed, efficiency of breaks; Road characteristics - gradient, curve of a road, design speed, friction between road and tyre surface; *Slip and Skid*; Reaction time – factors affecting reaction time.

Unit II Traffic Studies

Traffic volume study – manual count, automatic count, intrusive methods, non intrusive methods, types of volume counts, representation and analysis of data; Necessity of Origin and Destination study and its methods; Speed studies – Spot speed studies, and its presentation ,time mean speed, space mean speed, journey speed and travel time survey, delay/queuing survey.

Unit III Road Signs ,Traffic Markings and Intersection Design

Traffic control devices –definition, necessity, types. Road signs - definition, *types*, objects of road signs; Classification as per IRC: 67- Mandatory or Regulatory, Cautionary or warning, informatory signs, location of cautionary or warning sign in urban and non-urban areas, Points to be considered while designing and erecting road signs, traffic markings definition, classification, carriage way, kerb, object marking and reflector markers; Intersection at grade, grade separated intersection, various forms of intersection, unchannelized and channelized intersection, rotary intersection, design factors of rotary, requirements of intersection at grade, sight distance at intersection; Grade separated intersections, advantages, grade separation structures, grade separated intersection with interchange facilities, types – flyovers partial and full Cloverleaf pattern, Diamond intersection, Trumpet type

Unit IV Intersection Control

Effective traffic control device and factors considered for traffic control devices, conflicts points at intersection, types of intersection control; Traffic signals- Definition, Types, Traffic control signals, pedestrian signals. Types of traffic control signals - Fixed time, manually operated, traffic actuated signals and location of signals. Factors to be considered of installation of traffic signals; Terms commonly used in design of traffic signal time, vehicle and pedestrian movement and phase numbering, signal timing policies and process, objective of signal time; Signal timing at isolated intersection– Yellow Change Interval, Cycle Length of Fixed Signals, Minimum Green Time for Pedestrian Movement.; Actuated Traffic Signals, Terms associated with actuated signals, Average Phase Duration for Actuated Traffic Signals, Coordinated signal System-basic terminologies and fundamentals. Types of Actuated Signals,

Unit V Highway Safety



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Highway Safety Plans, definition of terms in highway safety management; Steps in highway safety management, Network Screening Process, Diagnosis, Select Counter Measures, Economic Appraisal, Prioritize Project, Safety Effectiveness Evaluation, Effectiveness of safety design features, safety effectiveness of some commonly used highway design features; Traffic Calming-concept, traffic calming strategies to reduce traffic speed, traffic calming strategies to reduce volume, safety impact of Intelligent Transportation System (ITS), legislation and enforcement; Highway lighting – necessity, distribution of light from luminarie-glare problem, vertical and horizontal distribution of light, mounting height, spacing, types of, light, mounting height, spacing types of light, levels of illumination as per IS 194 -1970, luminarie arrangement, illumination of intersection, traffic rotaries, curves, bridges, high-mast lighting, *Road Accidents, causes of road accidents, Strategic*

TEXT BOOKS:

1. Highway Engineering by Khanna S.K., Justo, C E G and Veeraragavan, A Nem Chand and Brothers, Roorkee Latest publication
2. Transportation Engineering by Kadiyali L.R Khanna publishing house New Delhi Latest publication
3. Transportation Engineering Vol. I & II by, Khanna Publishers. Delhi. Vazirani, V N, Chaondola, S P, Khanna Publishers. Delhi. Latest publication
4. S Traffic planning and design, by Sxena S C Dhanpat Rai & Sons Delhi Latest publication

REFERENCE BOOKS:

1. Introduction to Traffic Engineering by Kumar R S University Press (India), Pvt. Ltd. Latest publication
2. Traffic Engineering by Mike Slinn Pal Mathews Peter Guest Elsevier India, New Delhi Latest publication
3. Highway Engineering by Martin Rogers Bernard Enright Wiley India, New Delhi Latest publication
4. Traffic and Highway Engineering by Nicholas J.Garber Lester A.Hoe K.ramchandra rao Cengage Learning India, New Delhi Latest publication



Course Code :	DE04505(03)
Course Title :	Pavement Design, Construction and Maintenance
Credit :	3
Max. ESE Marks: 70	Min. Marks : 28

OBJECTIVE:-

Knowledge and understanding of various factors affecting pavement design, pavement material and construction procedure is essential for diploma engineer. He should have knowledge of traditional techniques along with modern techniques. Knowledge of pavement evaluation and the related maintenance activities is also important. A road with irregular pavement, excess cracks or corrugations and patch affects the costs involved in the operations of vehicles. This underlines the importance of pavement maintenance.

Unit I Fundamentals of Pavement Design

Functions and characteristics of pavement. *Types of pavement; Comparison of Various pavements*, structural components of flexible and rigid pavements and their functions, Factors affecting selection of type of pavement.; Factors affecting pavement design Design wheel load-Contact pressure, Axle load, traffic volume, Vehicle damage factor, load safety factor, lane distribution factor, lateral distribution of wheel path in a lane, Wheel configuration, Equivalent single wheel load ESWL ; Strength Characteristics of pavement materials- California Bearing Ratio CBR , course and sub-base course material, modulus of sub grade, Drainage Situation, Climatic variations.

Unit II Design of Pavement

Type of pavement, difference between rigid and flexible pavement, Methods of Flexible Pavement Design; Mechanistic Empirical method of Design- Layered Elastic Model; IRC37 -2001 guidelines for design of flexible pavement - design criteria, Design procedure , Design Traffic, Pavement thickness design chart, Pavement composition, simple numerical example,



Critical load positions, Equivalent radius of resisting section, Wheel load stresses - Westergaard's stress equation, Temperature stresses, Warping stress, Frictional stresses, Combination of stresses; Design of joints -Expansion joints, Contraction joints, Dowel bars, Tie bars; IRC58- 1988 guidelines for design of concrete pavement .

Unit III Construction of Flexible Pavements

Characteristics for GSB, Stabilized Layers, WBM, WMM, Crusher Run Macadam , Construction of GSB, Stabilized layers, WBM, WMM, Crusher Run Macadam compaction standards ,Quality Control. Binders for Bituminous Construction- Bitumen, Cutback Bitumen and Modified Bitumen, Quality control tests of binders; Bituminous Mix Design, Marshall method of mix design, Design Criteria, Proportioning of Material; Construction of Bituminous Courses Construction of different types of bituminous layers such as BM, DBM,BC, SMA and Mastic Asphalt Mix, Paving of Mix, Compaction of bituminous surface, Quality Control.

Unit IV Construction of Rigid Pavements

Sub grade preparation, construction of base and sub base, dry lean concrete (DLC) as sub base; Production of Concrete for DLC, Transportation, laying, Compaction, Finishing, Curing of DLC ,Production of Concrete for Pavement Quality Concrete (PQC), Transportation of Concrete for PQC, Separation Membrane Slip Form Paving of PQC including Placing of Concrete, Laying by Slip form Paver, Insertion of Dowel and Tie Bar Compaction, Floating and Finishing of Concrete, Curing; Initial Saw Cutting of Joint, Material for Transverse Contractions, Expansions and Longitudinal Joints (Dowel Bar, Tie Bar, Sheathing, Expansion Cap, Sealant, Widening of Joints and Sealing Quality Control and Quality Assurance, Various tests.

Unit V Pavement Evaluation and Maintenance



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Definition and purpose of pavement evaluation, types of pavement maintenance - routine, periodic, and special. Need for inspection and maintenance schedule; Types and causes of damages cracks. Deformations - Rutting, fatigue, settlement and upheaval. Disintegration - loss of aggregate, stripping, pothole, Remedial measures - slurry seal, liquid seal, fog seal, and patching, ready mix patch. Strengthening and Rehabilitation of Flexible, Strengthening and Rehabilitation of rigid pavement. Evaluation of rigid pavement by Falling Weight Deflectometer, Methods of Pavement evaluation –Visual rating, Pavement serviceability index, Roughness measurements, Benkelman Beam deflection method ; Types of damages in rigid pavement - cracking, spalling, slab rocking, settlement, joint sealant failure; Methods of repair - repair of spalled joints, full depth reconstruction, and replacement of dowel bars.

TEXT BOOKS:

1. Highway Engineering, Kadiyali, L.R., Khanna Book Publishing House, New Delhi Latest revision
2. Principles of Transportation Engineering Chakroborty, Partha Das, Animesh Prentice-Hall of India Pvt.Ltd latest revision
3. Transportation Engineering Vol. I & II, Vazirani, V N, Chaondola, S P Khanna Publishers. Delhi Latest revision

REFERENCE BOOKS:

1. Principles of Pavement Design Yoder, E J Wiley India Pvt Ltd Latest revision Highway Engineering Martin Rogers Bernard Enright Wiley India, New Delhi Latest revision
2. Traffic and Highway Engineering Nicholas J.Garber Lester A.Hoe K.ramchndra rao Cengage Learning India,New Delhi Latest revision



Course Code :

DE04506

Course Title :

Quantity Surveying & Costing-I (Lab)

Credit :

3

Max. ESE Marks: 35

Min. Marks : 14

LIST OF PRACTICALS (Perform any 10):-

1. Prepare approximate estimate of a building by different methods on the basis prevailing market rate.
2. From a given detailed drawing and specification of a building take out the quantities of different items of works.
3. Workout the quantities of all items of work for a single storied residential building with flat roof
4. Workout the quantities of all items of work for a single storied residential building with pitched roof.
5. Workout the quantities of all items of work for a G+2 residential building
6. Workout the quantities of all items of work for a shop cum residential Single storied building
7. Workout the quantities of all items of work for a shop cum residential double storied building
8. Rate analysis for:
 - a. Brick masonry
9. Rate analysis for:
 - a. Excavation in foundation
10. Rate analysis for:
 - a. Cement concrete
11. Rate analysis for:
 - a. Cement mortar
12. Rate analysis for:
 - a. Flooring
13. Rate analysis for:



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a. Woodwork.

14. Estimate of earth work for different sections.

15. Estimate of road of 1 K.M. length for pavement surface. W.B.M. Bitumen



Course Code :

DE04507

Course Title :

Structural Design & Drafting-I (Lab)

Credit :

3

Max. ESE Marks: 35

Min. Marks : 14

LIST OF PRACTICALS (Perform any 10):-

1. Preparation of structural plan for framing of a building showing position of columns and beams.
2. Draw Longitudinal section of singly reinforced .
3. Draw Longitudinal section of singly reinforced beam with bar bending schedule.
4. Draw cross section of singly reinforced beam with bar bending schedule.
5. Draw Longitudinal section of doubly reinforced beam
6. Draw cross section of doubly reinforced beam
7. Draw R.C.C chajja with lintel.
8. Draw one way slab.
9. Draw two way slab.
10. Draw continuous slab and flanged beam.
11. Draw square column with pad footing.
12. Draw square column with sloped footing.
13. Draw doglegged stair case.
14. Draw spiral stair case.



Course Code :

DE04508

Course Title :

Geotech Engineering (Lab)

Credit :

3

Max. ESE Marks: 35

Min. Marks : 14

LIST OF PRACTICALS (Perform any 10):-

1. Determine water content by oven drying method as per IS code.
2. Determine Specific Gravity of soil by Pycnometer as per IS code.
3. Determine bulk unit weight and dry unit weight of soil in field by core cutter method as per IS Code.
4. Determination of bulk unit weight dry and unit weight of soil in field by sand replacement method as per IS Code.
5. Determination of Liquid limit of given soil sample as per IS Code
6. Determination of Plastic limit of given soil sample as per IS Code.
7. Determination of Shrinkage limit of given soil sample as per IS Code.
8. Determination of grain size distribution of given soil sample by sieve
9. Determination of coefficient of permeability by constant head test
10. Determination of coefficient of permeability by falling head test.
11. Determination of shear strength of soil using direct shear test.
12. Determination of shear strength of soil using Laboratory Vane shear test
13. Determination of shear strength of soil using Laboratory tri-axial test
14. Determination of shear strength of soil using unconfined compressive strength test
15. Determination of MDD & OMC by standard proctor test on given soil sample as per IS Code



Course Code :	DE04509
Course Title :	Summer Internship
Credit :	3
Max. ESE Marks: 35	Min. Marks : 14

OBJECTIVE:

With the advancement in technology and industry, we need to prepare our young Indian technical talent to meet the present demand. Our diploma pass outs are either supposed to work as supervisor in the industries or start their own enterprise, hence upon the completion of diploma programme, they need to be adequately equipped with knowledge, skills and attitude required by the world of work in their relevant field. To attain this, students need to be sent for industrial visit and industrial training during the course of study. With these provision of industrial exposures relevant practical and professional skills are developed in the students and as a result of this students are readily employed and widely accepted by cross section of the industries, even sometimes during such training itself. Series of continues interactions with the industry personnel are required to be done for planning and arranging and also effectively implementing such exposures.

- 1) Layout of different Departments, Sections of Industry, stores, entry and exit etc.
- 2) Display of Quotations in the Industry
 - a) Systems of Industry
 - b) Procedures/Rules/standards
 - c) Hierarchy at Industries
 - d) Products & Services
 - e) Targets
 - f) Safety Precautions/Norms
 - g) Flow diagrams of different process
 - h) Other Aspects
- 3) Demonstration of Specific Equipment, not available in the Institute or Department or even the Demonstration of Performance of Specific Experiment.



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- 4) Demonstration of latest Engineering Tools or Techniques or Software's or Procedures

Scheme of Teaching and Examination

Diploma in Civil Engineering

Semester – VI

Sn.	Code	Course Title	Hours per week			Total Contact hrs/week	Credits L+T+P/2
			L	T	P		
1	DE04601	Quantity Surveying & Costing-II	3	0	0	3	3
2	DE04602	Structural Design & Drafting-II	3	0	0	3	3
3	DE04603	Construction Management	3	0	0	3	3
4	DE04604	Entrepreneurship Development and Management	2	1	0	3	3
5		Elective - II					
	DE04605(01)	Repair and Maintenance of Structure	3	0	0	3	3
	DE04605(02)	Precast and Prestressed Concrete					
	DE04605(03)	Green Building & Energy Conservation					
6	DE04606	Quantity Surveying & Costing-II (Lab)	0	0	2	2	1
7	DE04607	Structural Design & Drafting-II (Lab)	0	0	2	2	1
8	DE04609	Major Project	0	0	6	6	3
Total			17	01	10	28	21

Scheme of Teaching and Examination

Diploma in Civil Engineering

Semester – VI

Sn.	Code	Course Title	Maximum Marks			Total Marks	Credits
			ESE	CT	TA		
1	DE04601	Quantity Surveying & Costing-II	70	10	20	100	3
2	DE04602	Structural Design & Drafting-II	70	10	20	100	3
3	DE04603	Construction Management	70	10	20	100	2
4	DE04604	Entrepreneurship Development and Management	70	10	20	100	4
5		Elective - II	70	10	20	100	3
	DE04605(01)	Repair and Maintenance of Structure					
	DE04605(02)	Precast and Prestressed Concrete					
	DE04605(03)	Green Building & Energy Conservation					
6	DE04606	Quantity Surveying & Costing-II (Lab)	35	0	15	50	1
7	DE04607	Structural Design & Drafting-II (Lab)	35	0	15	50	1
8	DE04609	Major Project & seminar	70	0	30	100	4
Total			490	100	410	700	22



Course Code :	DE04601
Course Title :	Quantity Surveying and Costing-II
Credit :	3
Max. ESE Marks: 70	Min. Marks : 28

OBJECT:

One of the job specifications of a diploma holder is to prepare estimate of civil engineering structures as for cost and quantity of various construction materials required. This is an essential and basic requirement for all projects. This is the first step towards efficient management of the project including proper estimation and utilization of human resources required for the project. This subject is in continuation of quantity surveying and costing-I. In this, the timber structure, R.C.C. structures and steel structures bridge and culverts, water supply and sanitary engineering are included. The students will be able to calculate the quantity of works of the structure of the above mentioned chapters. A provision has also been made to use various software for accuracy and speedy determination of quantity. A chapter on valuation and rent fixation is also included so that the students will be familiar with the method for valuation work and fixing rent.

Unit I Estimate of R.C.C. structures and *Bar bending schedule*

Introduction, Items of work in RCC structures, bar bending schedule; Estimate of slab; Estimate of beam; Estimate of T-beam; Estimate of RCC column with footing; *typical estimate of building*, , Preparation of abstract of cost above estimates.

Unit II Estimate of Steel Structures

Introduction, Items of work in steel structure; Estimate of steel beam and column (Stanchion) with base; Estimate of steel truss; Estimate of roof covering materials;; Estimate of steel frames for doors and windows,. Preparation of abstract of cost above estimates



Unit III Estimate of Culverts and Bridges

Introduction, definition of culverts and bridge, Items of work in culverts and bridges, method of estimating culverts and bridges; Estimate of hume pipe culvert with splayed type of wing wall, turn wall, face wall; Estimate of R.C.C. slab culvert, straight / return type wing walls; Estimate of single span R.C.C.T beam bridge, estimate of splayed wing walls. Preparation of abstract of cost above estimates

Unit IV Estimates Of Water Supply And Sanitary Works

*Introduction, Items of work in Water Supply and Sanitary Engineering Works; Detailed estimate of water supply for building work; Detailed estimate of sanitary works for building work; Estimate of S.W., R.C.C. and H.D.P.E pipe line; Estimate of septic tank **and soak well** ; Estimate of manhole. Preparation of abstract of cost above estimates*

Unit V - Valuation and Dismantling, Demolishing and Repair Works

*Introduction, Definition of valuation, purpose of valuation; Gross income/Net income, Out goings; Scrap value, Salvage value, Market value, Book value, Rateable value, Obsolescence, Annuity, Capital Cost, Capitalized value, Year's purchase, potential value, speculative value and Sinking fund; Depreciation, Methods of calculating depreciation; Methods of valuation; Free hold property and Leasehold Property; Rent fixation of building, **security of loans**. Dismantling and Demolishing work and their estimate; Repair works and their estimates. Preparation of abstract of cost above estimates*



Text Books:

1. Estimating and Costing in Civil Engineering – B.N. Dutta (UBS Publishers, New Delhi)
2. Estimating and Costing and specifications – M. Chakrabarty (UBS Publishers, New Delhi)
3. A Textbook of Estimating and Costing – Kohli & Kohli (S. Chand & Co.)
4. Engineering Economics – R. Panneerselvam, (PHI)

Reference Books:

1. Textbook of Estimating and Costing – G.S. Birdi (Dhanpat Rai Publications)
2. Valuation of real properties – S.C. Rangwala (Charotar Publication)
3. Estimating, & Costing Anand Birdi, J.C. Kapoor Dhanpat Rai & Sons, Delhi & Julandhar Latest Revised Edition
4. Estimating & Costing Vol. I & II J.C. Malhotra, Khanna Publishers, 28, Nath Market, Nai Sarak, New Delhi Latest Revised Edition



Course Code :	DE04602
Course Title :	Structural Design and Drafting-II
Credit :	3
Max. ESE Marks: 70	Min. Marks : 28

OBJECT:

The Civil Engg Diploma pass outs must have the concept of steel structure and should be able to design simple steel structures. The course has been designed for this objective and it also includes the fabrication of steel structures. For the design of steel structures ,the properties of steel, different steel sections, various grades and strength characteristics of steel and design of connections are required as per IS 800-2007.IS 875-1987 is to be used for loading conditions. The latest good practice of design is based on Limit State Method. Hence, knowledge of this latest method is most important for civil engineers. LSM of design has been followed.\

Unit I Introduction to IS: 800–2007,Working Stress Method and Plastic Analysis

Introduction to IS: 800 – 2007; Structural steel and properties of structural steel; Standard structural steel sections; Permissible stresses in structural steel; Limit state design; Limit state of strength; Limit state of serviceability; Action (loads); Design strength; Partial safety factor for materials; Loads, Load combination and partial safety factors for loads; Maximum effective slenderness ratio; Introduction to Working Stress Method; General design requirements of Working Stress; Introduction to plastic Analysis; Assumptions in plastic analysis; Plastic moment, shape factor for different common sections, load factor, concept of plastic hinge; Principle of virtual work and calculation of collapse moment for simple beams (simple numerical problems.) Method Permissible stresses as per section 11 of IS800-2007.

Unit II Design of bolted and Welded Connections

Bolted Connections



Definition of general terms related to bolting, Types of bolts; Permissible stresses in bolts; Types of bolted joints; Specifications as per IS 800-2007; Failure of bolted joints, strength and efficiency of bolted joint ; Design of Bolted Connections (only axially loaded members)

Welded Connections

Definition of terms related to welded joints , Types of welded joints; Types of welds; Strength of welded joint; Design of welded joints

Unit III Design of Tension and Compression members

Tension Members:

Introduction of Tension Members, Types of tension members; Sections used as tension members; Net sectional area, effective net area Slenderness Ratio; Types of failures 3.1.6 Design of axially loaded tension members

Compression Members

Introduction of Compression Members Standard sections used as compression member; Effective length and slenderness ratio; Design compressive stress and strength; Find design strength of strut; Design of strut; Design of simple columns and built up columns; Design of lacings; Design of battens

Unit-IV

Design of column base

Introduction of column base, Types of column bases Slab base and gusseted base; Design of M.S. Slab base with concrete pedestal; Cleat angles, their use only; Sketch of gusseted base;

Design of beams



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Introduction of beams, Types of beams; Common sections used as beams; laterally supported and laterally unsupported beams; Web buckling and web crippling; Design of laterally supported beams for flexure, shear and deflection; Design of built up beams (plated beams)

Unit V Roof trusses

Introduction of Roof trusses, Types of Trusses; Definitions of terms related to truss; Combination of loads for design of truss; Selection of truss; Forces in the member; Design of members of truss; Design of purlin; Detailing of different roof joints and purlin connection

TEXT BOOKS:

1. Limit State Design of Steel Structure by S K Duggal McGraw Hill
2. Design of Steel Structures Limit State Method by N. Subramanian Oxford University Press
3. Indian Standard – General Construction in Steel –Code of Practice (3rd Revision) (IS:800 –2007)
4. Design of steel structural. By S.S.Bhavikatti. IK International Publishing House

REFERENCE BOOKS:

1. Limit State Design in Structural Steel by M R Shiyekar PHI
2. Limit State Design of Steel Structures (IS:800- 2007) by V. L. Shah, V. Gore Structures Publications



Course Code :	DE04603
Course Title :	Construction Management
Credit :	2
Max. ESE Marks: 70	Min. Marks : 28

OBJECT:

A Civil Engineering Diploma pass out is supposed to know different facets of construction management. The subject on Construction Management develops abilities related to solving day to day problems arising during constructions maintenance work such as handling live problems in the department, issuing of tender documents, handling of cash book, muster role, settlement of imprest account, time scheduling with the help of CPM and PERT, understanding labour laws and successfully dealing with labour and sub ordinate staff. In brief the subject has been introduced to develop managerial skills in the students, so that he can successfully handle live situations at work.

UNIT-I Execution of work by Govt. Departments Organization

Introduction, Major departments executing civil works, Structure of departments; Procedure of initiating the work- Detailed Project Report (DPR), administrative approval, technical sanction, budget provision, land acquisition

Methods used in for carrying out works and Different types of accounting papers

Contract Method And Departmental Method Measurement Books, Nominal Muster Roll, Imprest Cash, indent, Invoice, Bills, Vouchers, Cash Book, Temporary advance.

Unit II Contract

General introduction, objects of contract, requirements of valid contract, *Types of contract*, Class of contractor, Registration of contractor; Classification of civil engineering contract, *Measurement contract -item rate contract, percentage rate contract, cost plus percentage contract*; Management Contractconstruction management contract, Design, Management and



construction Contract; Integrated Contract – Design Build, Turnkey, BOT and BOOT contract; Mode of payment to the contractor - Interim payment and its necessity, Advance payment, secured advance, on account payment, first and final payment, retention money, reduced rate payment, petty advance, mobilization advance.

Unit-III Tender Process

Introduction, Definition of Tender, necessity of Tender, Types of tenders, Tender Notice; Notice, Types of Notice, Meaning of terms: Earnest money, security deposit, validity period, corrigendum to tender notice and its necessary; Tender documents – Contract drawings, specifications, General Conditions of contract, Special conditions of contract, bill of quantities; Bidding Process-Pre-qualification process, Notice inviting tender, Submission of bids, Analysis of submitted tenders, basis for evaluation and acceptance, Letter of Intent, Work Order, agreement, PWD contract conditions

Unit-IV Planning and Scheduling

Introduction, Methods of Scheduling, Development of bar charts and milestone chart, Merits & limitations of bar chart; CPM networks, activity time estimate, Event Times by forward & backward pass calculation, start and finish time of activity, project duration. Floats: Types of Floats Free, independent and total floats, critical activities and critical path, Purpose of crashing a network, Normal Time and Cost, Crash Time and Cost, Cost slope, Optimization of cost and duration; PERT-Introduction to PERT; Project Monitoring and Control System- Updating bar chart and CPM/PERT, Monthly progress report, stage wise completion cost. Store management and various records related to store management. Material Management- Ordering cost, inventory carrying cost, Economic Order Quantity

Unit-V Safety and Labour Welfare



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Introduction, Safety in Construction Industry- Causes of Accidents, Remedial and Preventive Measures; Labour welfare and Laws ,Acts pertaining to Civil construction activities- Building and other Construction Workers (Regulation of Employment and Conditions of Services) Act 1996 and Central Rules 1998 (Introduction only)

TEXT BOOKS:

1. Construction Engineering and Management Sharma S C and Deodhar S V Khanna Book Publishing, New Delhi
2. Construction Engineering and Management Gahlot,P.S. and Dhir B.M New Age International Ltd. Publishers, New Delhi
3. Construction Engineering and Management Shrivastava, U.K. Galgotia Publication Pvt Ltd. New Delhi
4. The A To Z of Practical Building Construction and its Management, Mantri, S. Satya Prakashan New Delhi

REFERENCE BOOKS:

1. Construction Management and Planning, Punmia, B.C. and Khandelwal Tata-McGraw Hill
2. Construction Management and Accounts Harpal, Singh Mc-Graw Hill
3. Construction Project Management Kumar Neeraj Jha Pearson



Course Code :	DE04604
Course Title :	Entrepreneurship Development and Management
Credit :	4
Max. ESE Marks: 70	Min. Marks : 28

OBJECT:

Our fast growing economy provides ample opportunities for diploma engineers to succeed in entrepreneurship. Diploma engineers can be their own masters and job provider to others by starting their service industry/assembly/marketing/consultancy/manufacturing enterprises. As entrepreneurship requires distinct set of skills which may not be developed while undergoing technical subjects. Hence a separate course has been introduced for developing such skills set amongst diploma students. This course aims at developing competencies in the diploma engineer for becoming an intrapreneur or a successful entrepreneur. After successfully completing this course students who develop qualities of successful entrepreneur can set up their own manufacturing industry/service industry/business/startup or be self employed and those who prefer job can become intrapreneur and share profits with their company.

Unit I Entrepreneurial Development

Definition of Entrepreneurship, Characteristics of Entrepreneurship, Factor influencing Entrepreneurship. Need for promotion of Entrepreneurship, Entrepreneurial Environmental, Environmental analysis, opportunity in service industries.

Unit II Motivation Management

Motives, motivation and motivational cycle. Concept of Need for Achievement. Need for Achievement assessment through various tools. Ring toss game, Boat making exercise, Building block exercise, TAT stories, Who am I? Interpretation and action plan for self-development.



Unit III Management of Creativity.

Creativity: Divergent thinking, creativity techniques. Innovation, types and applications
Product life cycle, New product development process. Product development and innovation through creativity and innovation.

Unit IV Critical Resources

Forms of business organization: Proprietorship, Partnership, Cooperative, Private, Public Ltd Company, Section 8 company, LLP Institutional Support for entrepreneurship: MSMESI, CED, DTIC, CITCON, CSIDC, LUN, NSIC, KVIC, NABARD, Banks, SIDBI Entrepreneurship promotion schemes of centre and state. Marketing Mix, Market survey for project identification Inventory control, vendor development, material movement, store management. Manpower plan, hiring process, compensation, performance appraisal.

Unit V Sustainable business plan

Format of business plan/techno-economic feasibility report. Demand and annual production target based on market survey. Outline production/service process. Land, building and machinery requirement. Power, utilities and raw material requirement. Fixed capital, Working capital, Subsidy and Cost of Project. Means of finance, calculation of interest. Profitability analysis, Break-even point.

Project

Project selection and formulation, Scope of project report, Content and format of project report, Need of project appraisal, Steps of project appraisal.

TEXT BOOKS:

1. Entrepreneurial Development Desai Vasant Himalaya Publishing House
2. Starting your own business, step by step Blue print for the First – time Entrepreneur Harper Stephen C. Mc Craw-Hill
3. The Business Planning GUIDE H.Bangs David Upstart Publishing Company in



4. Entrepreneurship Development in India Gupta Dr.C.B. Shrinivasa NP Sultan Chand & Sons

REFERENCE BOOKS:

1. Entrepreneurship Development Khanka Dr.S.S. S.Chand New Delhi
2. Entrepreneurship Development and small Business Enterprises Charantimath M. Pearson Edu.Soc.INDIA
3. Entrepreneurship Development Sharma Sangita PHI, DELHI



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Course Code :	DE04605(01)
Course Title :	Repair and Maintenance of Structure
Credit :	3
Max. ESE Marks: 70	Min. Marks : 28

OBJECT:

Retro fitting of structures is one of the most important subjects in civil engineering. This subject covers repair, maintenance, re-strengthening and rehabilitation of existing structures. It is one of the major areas in Civil Engineering construction. In this scenario standards of retrofitting and maintenance are continuously being improved with latest technology. Diploma engineers must be able to analyze structure and suggest suitable method for retrofitting and maintenance. Curriculum intends to give adequate knowledge about repair, maintenance as well as retrofitting of existing structures. It is to cater the needs of present scenario of fully utilizing and extending the serviceability of structures. This subject aims at basic knowledge of rehabilitation of RCC structures in respect of their various types, materials used, functions of component parts, methods of repair, aspects of supervision and maintenance.

Unit I Basics of Maintenance and Retrofitting

Types of Maintenances Repair, retrofitting, Re-strengthening, Rehabilitation and Restoration. Necessity, objectives and importance of maintenance Approach of effective management for maintenance. Periodical Maintenance- check list, Maintenances Manual containing building plan, reinforcement details, Material Sources, Maintenance frequency, Corrective Maintenance Procedure and sources Pre and post monsoon maintenance. Retrofitting of concrete structures retrofitting techniques, shear walls, infill walls, adding steel bracing, adding wing walls or braces, base isolation. Retrofitting of steel structures- using steel and fiber reinforced polymers (FRP)

UNIT II Causes of Damages and Tests on Damaged Structure

Causes of damages due to distress, earthquake, wind, flood, dampness, corrosion, fire, deterioration, termites, pollution and foundation settlement. Various aspects of visual observations for detection.

Damages. Load test and non-destructive tests. Non Destructive Tests (NDT) on damaged structure rebound hammer, ultrasonic pulse velocity, rebar locator, crack detection microscope, digital crack measuring gauge. Chemical test - Chloride test, sulphate attack, carbonation test, pH measurement, resistivity method, Half-cell potential meter.

Unit III Materials for Repairs

Types of repair material, material selection. Essential parameters for maintenance and repair materials such - bond with substrate, durability. Waterproofing materials based on polymer modified cement slurry, UV resistant acrylic Polymer, Ferro-cement. Repairing materials for masonry: plastic/aluminum nipples, non-shrink cement, polyester putty or 1:3 cement sand mortar, galvanized steel wire fabrics and clamping rods, wire nails, ferro-cement plates. Repairing materials for RCC: epoxy resins, epoxy mortar, cement mortar impregnated with polypropylene, silicon, polymer concrete composites, sealants, fiber reinforcement concrete.

UNIT IV Repair of Masonry Structure

Causes of cracks in walls - bulging of wall, shrinkage, bonding, shear, tensile, vegetation. Probable crack location: junction of main and cross wall, junction of slab and wall, cracks in masonry joints. Repair methods based on crack type - for minor & medium cracks grouting and for major cracks fixing mesh across cracks, RCC band, installing ferro-cement plates at corners, dowel bars, propping of load bearing.

Retrofitting of masonry structures reinforced masonry walls and jacketing. Remedial measures for dampness & efflorescence in wall.



UNIT V Repair of RCC Structures

Repair stages such as concrete removal and surface preparation, fixing suitable formwork, bonding /passive coat and repair application, various methods of surface preparation. Repair options such as grouting, patch repairs, carbonated concrete, cleaning the corroded steel, concrete overlays, latex concrete, epoxy bonded mortar and concrete, polymer concrete, corrosion protection such as jacketing.

Building cracks and its prevention, common methods for dormant crack repairs such as Epoxy injection, grooving and sealing, stitching, grouting and grunting / shotcreting . Strengthening methods for live cracks such as addition of reinforcements, Jacketing, brackets, collars, supplementary members i.e. shoring, underpinning and propping of framed structure.

TEXT BOOKS:

1. Building Repair and Maintenance Management, Gahlot, P. S., Sharma, S., CBS Publishers & Distributors Pvt. Ltd ,Latest.
2. Maintenance and Repairs of Buildings, Guha, P. K., New Central Book Agencies , Latest.
3. Maintenance and Repairs of Buildings Hutchin Son, B. D., Newnes -Butterworth Latest.

REFERENCE BOOKS:

1. Repair and Rehabilitation of Concrete Structures, Modi Poonam I. Patel Chirag N. PHI Latest.
2. Maintenance and Rehabilitation and Minor Works of Building, Vargese P.C. ,PHI Latest.



Course Code :	DE04605(02)
Course Title :	Precast and Prestressed Concrete
Credit :	3
Max. ESE Marks: 70	Min. Marks : 28

OBJECT:

Precast concrete is a construction product produced by casting concrete in a reusable mould or "form" which is then cured in a controlled environment, transported to the construction site and lifted into place. Using a precast concrete system offers many potential advantages over onsite casting. Precast concrete production can be performed on ground level. There is greater control over material quality and workmanship in a precast plant compared to a construction site. The forms used in a precast plant can be reused hundreds to thousands times before they have to be replaced, often making it cheaper than onsite casting when looking at the cost per unit of formwork. Prestressed concrete is concrete where an internal stress has been introduced to put the element into compression. Tensile bending stresses due to self and applied loading are then offset by the inbuilt compression. Prestressed concrete is used in a wide range of building and civil engineering structures where its improved performance can allow for longer spans, reduced structural thicknesses, and material savings compared with simple reinforced concrete. Typical applications include high-rise building, slabs, foundation systems, bridge and dam structures silos and tanks, and nuclear containment structures.

Unit I Precast Concrete

Advantages and disadvantages of precast concrete member. Non-structural Precast elements – Paver blocks, Fencing Poles, Transmission Poles, Manhole Covers, Hollow and Solid Blocks, kerb stones as per relevant BIS specifications Structural Precast elements – tunnel linings, Canal lining, Box culvert, bridge panels, foundation, sheet piles. Testing of Precast components as per BIS Standards.



Unit II Prefabricated Building

Precast Structural Building components such as slab panels, beams, columns, footings, walls, lintels and chhajja , staircase elements .Prefabricated building using precast load bearing and non load bearing wall panels, floor systems – Material characteristics, Plans & Standard specifications. Modular co-ordination, modular grid and finishes . Prefab systems and structural schemes and their classification . Joints requirements of structural joints. Manufacturing , storage , curing, transportation and erection of above elements, equipment needed.

Unit III Prestressed Concrete

Principles of pre-stressed concrete and basic terminology.Applications, advantages and disadvantages of prestressed concrete. Materials used and their properties, Necessity of high grade materials. Types of Pre-stressing steel -Wire Cable, tendon, merits demerits and applications. Methods of prestressing – Internal and External pre-stressing, Pre and Post tensioning- applicationse.

Unit IV Systems of Prestressing

Systems for pre tensioning – process, applications, merits and demerits - Hoyer Systeme . Systems for post-tensioning process, applications, merits and demerits – Freyssinet system, Gifford Udall system. Prestressing force in Cable, Loss of prestress during the tensioning process – loss due to friction, length effect, wobbling effect and curvature effect, (Simple Numerical problems to determine loss of pre-stress), Loss of pre-stress at the anchoring stage. Loss of pre-stress occurring subsequently: losses due to shrinkage of concrete, creep of concrete, elastic shortening, and creep in steel, (Simple Numerical problems to determine loss of pre-stress).

Unit V Analysis and Design of Prestressed Beam



Basic assumptions in analysis of pre-stressed concrete beams. Cable profile in simply supported rectangular beam section – concentric, eccentric straight and parabolic. Effect of cable profile on maximum stresses at mid span and at support. Numerical problems on determination of maximum stresses at mid spans with linear (concentric and eccentric) cable profiles only. Simple steps involved in design of simply supported rectangular beam section.

TEXT BOOKS:

1. Pre-stressed Concrete Krishna Raju Tata McGraw Hill, New Delhi Latest publication.
2. Prestressed Concrete Shrikant B. Vanakudre, Khanna publishing house New Delhi Latest publication.
3. Pre Cast and Pre Stress technology process method and future technology Marzuki, Nor Ashikin, Create space independent application Latest publication.
4. Design of Pre –Stressed Concrete Structures, John Wiley and Sons Pearson education India Latest publication.

REFERENCE BOOKS:

1. Precast Concrete Structures, Elliott, Kim S CRC Press, New York Latest publication.
2. Handbook on Precast Indian Concrete Institute Indian Concrete Institute Latest publication.
3. IS 12592 Precast Concrete Manhole Cover and Frame BIS, New Delhi BIS, New Delhi Latest publication.
4. IS 15658 Precast concrete blocks for paving - Code of Practice BIS, New Delhi, BIS, New Delhi Latest publication.



Course Code :	: DE04605(03)
Course Title :	: Green Building and Energy Conservation
Credit :	: 3
Max. ESE Marks: 70	: Min. Marks : 28

OBJECT:

Concept of Green Building is to days need of the hour. With whole world facing Energy crises this method of construction of building could help in reducing Energy demand and thus this course is of immense importance for Civil Engineers Diploma pass outs. This subject aims at basic knowledge about construction of Energy efficient Building in respect of their various types of materials used, methods of construction , aspects of supervision of such construction.

UNIT-1 Green Building Design Features

Definition of Green building, benefits of green building, components/ features of green building. *Principle of green building, planning of green building*, Energy Efficiency, Energy benchmark ,Water efficiency, rain water use, grey water use, Material Efficiency, Indoor Air Quality, temperature, visual comfort, acoustics. Site selection strategies- Landscaping, building form, orientation, building envelope and fenestration, Materials, land use and consumption. Construction Techniques- roofs, walls, fenestration and shaded finishes. *Green building materials and product*, Advanced passive heating and cooling techniques, waste reduction during construction.

Unit 2 Energy Audit and Environmental Impact Assessment (EIA)

Energy Audit: *Objective based type*, Meaning, Necessity, Procedures, Energy Management Programs. Types of energy audit and selection of suitable energy audit. Environmental Impact Assessment(EIA): Introduction, EIA regulations, Steps in environmental impact



assessment process, Benefits of EIA. Environmental clearance for the civil engineering projects. *Environmental audit meanings, necessity, norms.*

Unit-3 Energy and Energy conservation

Renewable Energy Resources: Solar Energy, Wind Energy, Ocean Energy, Hydro Energy, Biomass Energy. Non-renewable Energy Resources: Coal, Petroleum, Natural Gas, Nuclear Energy, Chemical Sources of Energy, Fuel Cells, Hydrogen, Biofuels . Energy conservation: Introduction, *LEED India rating system*. Specific objectives, present scenario, Need of energy Conservation. Indoor climate control system. *Functions of government organization and audit.*

Unit-4 Design and Construction of Green Building

Introduction: Definition of Green building, Benefits of Green building. Principles: Principles and planning of Green building. *Concept and process of green building*, Construction Features: Salient features of Green building, building envelop, heat insulation, solar protection, glare protection, noise protection. Materials: Green building materials and products- Bamboo, Rice husk ash concrete, plastic bricks, Bagasse particle board, insulated concrete forms, smart materials. Facade construction quality management, *Environmental pollution affect in green building*. use of natural resources.

Unit-5 Rating System for Green Buildings

Ratings system for sustainable building, Indian Green Building Council (IGBC) rating, US Green Building Council (LEED) criteria, Green Rating for Integrated Habitat Assessment (GRIHA) criteria, key aspect in assessment and levels of certification. Heating Ventilation Air Conditioning (HVAC) unit in green building. *Indian green building council green rating*. Functions of Government organization working for Energy conservation and Audit(ECA)-



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National Productivity Council (NPC), Ministry of New and Renewable Energy (MNRE),
Bureau of Energy Efficiency (BEE), *HVAC unit in green building*.

TEXT BOOKS:

1. Sustainable construction: Green Building design and Delivery Kibert , C.J., John Wiley Hoboken, New Jersey ,latest
2. Non-conventional Energy Resources Chauhan, D S Sreevasthava, S K New Age International Publication latest
3. Energy Technology O P Gupta Khanna Publishing House New Delhi latest
4. Alternative Building Materials and Technology Jagadish K S, Reddy Venkatrama, Najunda Rao K S New Age International Publisher Delhi latest

REFERENCE BOOKS:

1. Hand Book of Green Building Design and Construction Sam Kubba Butterworth-Heinemann latest
2. Green Building-Project Planning and Cost Estimating Means R S John Willey & Sons latest
3. Energy Management and Conservation Sharma K.V., Venkateshaiah P I K International latest



Course Code :	: DE04606
Course Title :	: Quantity Surveying & Costing-II (Lab)
Credit :	: 3
Max. ESE Marks: 70	: Min. Marks : 28

LIST OF PRACTICALS (Perform any 10):-

1. Estimate the quantities and prepare abstract of cost for RCC slab from given working drawing.
2. Estimate the quantities and prepare abstract of cost for RCC beam from given working drawing.
3. Estimate the quantities and prepare abstract of cost for RCC staircase from given working drawing.
4. Estimate the quantities and prepare abstract of cost for RCC column and footing from given working drawing.
5. Estimate the quantities and prepare abstract of cost for steel beam and column with base from given working drawing.
6. Estimate the quantities and prepare abstract of cost for steel truss from given working drawing.
7. Estimate the quantities and prepare abstract of cost for GIC roof and AC roof from given working drawing
8. Estimate the quantities and prepare abstract of cost of hume pipe culvert from given working drawing.
9. Estimate the quantities and prepare abstract of cost of slab culvert from given working drawing.
10. Estimate the quantities and prepare abstract of cost of single span R.C.C.T beam bridge from given working drawing.
11. Estimate the quantities and prepare abstract of cost for water supply works in buildings from given working drawing.



12. Estimate the quantities and prepare abstract of cost for sanitary works in buildings from given working drawing.
13. Estimate the quantities and prepare abstract of cost for septic tank with soak pit from given working drawing.
14. Estimate the quantities and prepare abstract of cost for manhole from given working drawing.
15. Estimate the quantities and prepare abstract of cost for HDPE drainage pipe from given working drawing.



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Course Code :	: DE04607
Course Title :	: Structural Design & Drafting-II (Lab)
Credit :	: 3
Max. ESE Marks: 70	Min. Marks : 28

LIST OF PRACTICALS (Perform any 10):-

1. To Draw sketches of different types of bolts
2. To Draw sketches of different types of lap joints
3. To Draw sketches of different types of butt bolted joints
4. To Design and draw various axially loaded tension members
5. To Design and draw various axially loaded compression members
6. To Design and draw M.S. Slab base with concrete pedestal
7. To Sketching of gusseted base
8. To Design and draw laterally supported beams
9. To Draw different types of trusses
10. Working drawing of steel roof truss.
11. Working drawing of steel roof truss with details of joint
12. To draw the layout of different types of rivitted connection.
13. To draw the neat sketch of staggered joint and show pitch gauge and edge distance .
14. To draw the plane and elevation of grillage foundation.
15. Draw the neat sketch of column made by channel section with necessary arrangement of lacing and battening.



Course Code :	: DE04609
Course Title :	: Major Project
Credit :	3
Max. ESE Marks: 25	Min. Marks : 28

OBJECTIVE:

Project work plays a very important role in engineering educations in developing core technical skills, soft skills and higher level of cognitive, psychomotor and affective domain skills. It encourages the thinking process in the students. Project work is normally done when students have acquired sufficient knowledge, skills and attitude and are able to integrate all these, entirely in new situation or task to solve the problems of the industries. Through project work, students get direct exposure to the world of work in their relevant field. They are intrinsically motivated to explore new things, new methods, new design and many more ideas. They also develop many soft skills like confidence, communication skills, creative ability, inquisitiveness, learning to learn skills, lifelong learning skills, problem solving skills, management skills, positive attitude, ethics etc. through project work.

Normally in a curriculum document, there is a mention of project work in two different situations.

In situation one, Project work is reflected as Mini Project under each and every course curricular detailing, in the form of sessional work mentioned under different semesters. These projects are normally related to the developing skills in respective course of the specific programme. In another situation, project work is reflected as a complete course or as a major project in the total programme structure, normally at higher semester either at 4th, 5th and 6th, depending on the requirement of the programme Normally. Once the project is identified and allocated to students, teacher's role is very important. Teachers act as guide, facilitator, catalyser, motivator to promote brain storming, thinking, creatively, initiativeness and many other skills



in the students. Teachers should help or guide continually to monitor whether the students are proceeding in the right direction as per outcomes to be attained.

It is also suggested that teachers are not supposed to guide and plan each and every step from the point of view of execution of the project, otherwise it will curb their creativity or thinking process. Teachers have to see that he or she is able to create think tank for this fast technological world of work for the growth of our country. Following points should be taken into consideration while planning and implementing the project work.

1. Identification of project and allocation methodology :

Though the teachers and students, both are involved in identification of project titles, but the prime responsibility of identification of project titles goes to the teachers involved in implementing the course or programme. Teachers are fully aware of course/programme curriculum. They are also aware of related industrial problems. They try to explore the possibility of identification of project titles through these problems. These small industrial problems in the form of project titles may be brought into the laboratories or workshop of institutions of a specific programme, which are equipped with all necessary facilities and resources to carry out the project work. These labs or workshop can function as miniature industry to solve the industrial problems in the form of simulated industrial projects. These projects may be integrated problem of courses or programme. The project identified may be application type, product type, Research type and review type.

1.1 Criteria for Identification and Implementation of Project Titles :

Identification of project title is planned to be done based on many considerations like :

- Cost effectiveness
- Safety considerations
- Ethical issues
- Environmental considerations
- Improvised process



- Improved equipment
- Simulated industry's problem
- Application or utility in the world of work.
- Relevance to the Curriculum
- Mapping of Outcomes of Project with POs and PSOs
- Feasibility of implementation of the project

Implementation and Evaluation of Project Work:

Once the identification of project titles and guide allocation process is over, quality of student's project, on different criteria including the report writing need to be continually monitored. Projects planning, design, execution and report writing is done by the students under the guidance and feedback by respective teachers for attainment of courses specific outcomes, POs and PSOs. Continual Monitoring, feedback and assessment mechanism on weekly progress/updates on action taken on different criteria and sub-criteria of the project work need to be planned for individual and team of students. Path breaking teachers who think out of the box are required to guide, monitor and evaluate the project work. For objective, valid and reliable assessment, teachers should use different tools of assessment such as checklist, rating scale, assessment rubric, observation schedule, portfolio assessment, incidental records etc. Even the students may be encouraged to adopt self assessment techniques using the assessment rubrics.

2.1 Criteria of Evaluation of Project:

The different criteria of evaluation of project under different sub heads of project work completion are given below :

2.2.1 Project Planning :



Project planning, its action plan, steps of realizing the projects, may be specifically planned in advance based on feasibility, resources available, time allocation, finance and manpower requirement for each and every step or activity of project work. Under project planning, many points need to be considered like -

- Selection of relevant industry based projects as per the requirement of curriculum
- Rationale/Application
- Objectives Set
- Literature survey

Literature survey on the project title need to be done through abstract, journals, websites, open sources and other relevant sources available. It need to be ensured that objectives are written properly with clear specific, measurable and attainable statements. The sample size has to be delimited and decided as per the time limit allotted, feasibility and many other considerations. Objectives formulated will decide the further course of action, depth and breadth of the project and implementation plan.

2.2.2 Design, Development and Execution of Project :

Following important characteristic features of project are need to be given special emphasis during the implementation of the project work-

- Innovativeness
- Creativity
- Originality
- Pro-activeness
- Initiativeness
- Cost Effectiveness
- Resourcefulness
- Development of soft skills/generic skills

There may be deviation from planning, design and implementation of the project as per the requirement.



2.2.3 Quality of Report Writing :

Following points need to be taken care of for report writing-

- Report writing as per prescribed format
- Clarity of Objectives
- Presentation of Data
- Data Analysis, Interpretation and Result
- Quality of Product

2.2.4 Presentation & Discussion :

Quality of presentation of data need to be ensured using the following criteria -

- Clarity in Communication and Presentation
- Voice Audibility
- Use of Media and methods
- Satisfying the queries of audience
- Attainment of objectives set

2.2.5 Project's Potential :

Futuristic scope and recommendation for further studies related to project may be assessed from the following criteria -

- Papers published or award received
- Exhibition or Display or showcase of project in competition or exhibition or Tech Fest
- Evaluation of working of projects or prototype
- Relevance and Applications in the world of work
- Recognition in any form
- Related areas/sub areas for further studies

The students need to be assessed continuously based on the assessment rubric prepared by the



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implementing teachers on different stages of project work completion.