DR. A P J ABDUL KALAM UNIVERSITY, INDORE

SYLLABUS

For

DIPLOMA CIVIL ENGINEERING, ELECTRICAL ENGINEERING

(FIRST YEAR, 1st SEM)

(Session July- December 2016)

College of Polytechnic Engineering

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Diploma Civil Engineering, Electrical Engineering

List of Subject (First Year, 1st Sem)

Unit 1: Composition and Resolution of Forces:

Definition , Effect, characteristics of force, System of Forces, Principle of Transmissibility of Forces, Concept of Resultant Force, Law of Parallelogram of Forces, Triangle of Forces, Polygon of Forces, Determination of Resultant of two or more concurrent forces (analytically and graphically)

Unit 2: Parallel Forces and Couples:

Classification of Parallel Forces
Methods of finding resultant Force of parallel forces- analytically & graphically, Position of resultant force of parallel forces, Definition, Classification and characteristics of a force Couple, moment of couple

Unit 3: Moments and Their Applications:

Definition, Types and law of moment
Varignon's Principle of moment and its applications, Lever and its Applications, Types of supports and determination of support reactions of a simply supported beam subjected to point load and uniformly distributed load (UDL)

Unit 4: Equilibrium of Forces:

Equilibrium of a system of concurrent forces, Conditions and types of Equilibrium, Lami's Theorem and its applications

Unit 5: Centre of Gravity:

Difference between Centroid and Center of Gravity (CG), Centroid of standard plane figures and CG of simple solid bodies, Method of finding out Centroid of composite plane laminas and cut sections, Method of finding out CG of Composite solid bodies

Unit 6: Friction:

Concept and types of friction
Limiting Friction, coefficient of friction, angle of friction, angle of repose, Laws of friction (Static and Kinetic), Analysis of equilibrium of Bodies resting on Horizontal and inclined Plane, Utility / Nuisance value of friction

Unit 7: Simple Lifting Machines:

Concept of lifting Machines, Definition of Mechanical Advantage, Velocity Ratio and Efficiency of Machines and their relation, Reversibility of Machines and condition for self locking machine, Law of Machines, Maximum mechanical advantage and maximum efficiency of machine, Friction in machine (In terms of Load and effort), Calculation of M.A.,

V.R. and efficiency of following machines, Simple wheel and axle, Differential wheel and axle, Single purchase crab, Double purchase crab, Simple screw jack, Different System of simple pulley blocks

Unit 8: Motion of a Particle:

Definition of speed, velocity, acceleration, uniform velocity, uniform acceleration and variable acceleration, Motion under constant acceleration/ retardation (equations of motion), Motion under force of gravity, Concept of relative velocity, Definition of projectile, velocity of projection , angle of projection, time of light, maximum height, horizontal range and their determination, Definition of angular velocity, angular acceleration and angular displacement, Relation between linear and angular velocity of a particle moving in a circular path, Motion of rotation under constant angular acceleration

Unit 9: Laws of Motion:

Newton's Laws of motion and their applications

Unit 10: Work, Power and Energy:

Definition unit and graphical representation of work, Definition and unit of power and types of engine power and efficiency of an engine. Definition and concept of Impulse, Definition, unit and types of energies, Total energy of a body falling under gravity

References

[1] A text book of Applied Mechanics – R.S. Khurmi , S.C. Chand & Co. , New Delhi
[2] Applied Mechanics – I.B. Prasad, Khanna Publishers, New Delhi
[3] Applied Mechanics (Hindi) – R.S. Jog, Anand Publishers, Gwalior
[4] Applied Mechanics (Hindi) – A.R. Page, Deepak Prakashan, Gwalior

List of Experiments

1. Verification of laws of parallelogram of forces.
2. Verification of laws of polygon of forces
3. Verification of laws of moments
4. Determination of forces in the members of Jib Crane
5. Determination of Centroid of plane lemina by graphical method
6. Determination of coefficient of friction for surfaces of different materials on horizontal plane
7. Determination of coefficient of friction for surfaces of different materials on an inclined plane
8. Determination of mechanical advantage, velocity ratio and efficiency of the following lifting machines
   8.1 Simple wheel and axle
   8.2 Differential wheel axle
   8.3 Single purchase crab
   8.4 Double purchase crab
   8.5 Simple pulley block
   8.6 Simple screw jack
9 Measurement of B.H.P. of an engine using roap break dynamometer

Sub Code: DE 1107 Sub Name: Environmental Engineering and Safety 6 Credits

Unit 1: Introduction to Environment:

The Biosphere, biotic and abiotic, an aquatic ecosystem, types of pollution, Impact of human being on environment, Impact of environment on human being, Basic approach to improve environmental qualities, role of an environmental engineer.

Unit 2: Air Pollution Sources and Effects:

Standard definition of air pollution, Composition of natural air, Names of air pollutants, Classification of air pollutants, primary and secondary pollutants, Classification of source of air pollutants on different bases, Definition of different types of aerosols. Effect of air pollution on: human health, material properties, vegetation, Major toxic metals and their effects, Major environmental phenomenon e.g., acid rain, global warming, green house effect, ozone layer depletion. Air quality standards, Brief description of air pollution laws.

Meteorological Aspects Of Air Pollutant Dispersion
Meteorological parameters influencing air pollution, Environmental laps rate, temperature inversion, atmospheric stability and adiabatic loss rate, Turbulence, topographical effects, Plume behavior, looping, coning, fanning fumigation, lofting, trapping.

Unit 3: Air Pollution Control Methods and Equipments:

Natural purification processes of air, Artificial purification methods of air, Brief description of following control equipments along with sketch e.g, gravitation settling chamber, cyclone, scrubber, bag house filter, electrostatic precipitator, Brief description of following processes for the control of gaseous pollutants e. g., absorption, adsorption, condensation, combustion etc.

Unit 4: Water Pollution Sources and Classification:

Water resources, Uses of water, Classification of water Origin, composition and characteristics of domestic waste water as well as industrial waste water, Biochemical oxygen demand, Water pollution laws and standards, Uses of waste water, Classification of waste water, Chemical oxygen demand.

Waste Water Treatment Method

Basic processes of water treatment, Meaning of primary, secondary and tertiary treatment, Flow chart of a simple effluent treatment plant, Theory of industrial waste treatment, Volume reduction, neutralization and proportioning.

Unit 5: Solid Waste Management:

Sources and classification of solid waste, Public health aspects, Disposal methods–open dumping, sanitary, land fill, Incineration, compositing, Potential methods of disposal, Recovery and recycling of paper, glass, metal and plastic.

Noise Pollution and Control

Sources of noise pollution, Units of Noise pollution measurement, Allowable limits for different areas, Problems of noise pollution and measures to control it.

Reference book:

1. Harris, CE, Prichard MS, Rabin's MJ, "Engineering Ethics"; Cengage Pub.
2. Rana SVS ; "Essentials of Ecology and Environment"; PHI Pub.
3. Raynold, GW "Ethics in information Technology"; Cengage.
4. Svakumar; Energy Environment & Ethics in society; TMH
5. AK De "Environmental Chemistry"; New Age Int. Publ.
6. BK Sharma, "Environmental Chemistry" ; Goel Publ. House.
7. Bala Krishnamoorthy; "Environmental management"; PHI
8. Gerard Kiely, "Environmental Engineering"; TMH
9. Miller GT JR; living in the Environment Thomson/cengage
10. Cunninghan WP and MA; principles of Environment Sc; TMH
11. 11.Pandey, S.N. & Mishra, S.P. Environment & Ecology, 2011, Ane Books, Pvt. Ltd, New

List of Experiments

GROUP A AIR POLLUTION (Any one experiment may be selected from this group)
1. Air monitoring and determination of SPM, CO, Nox, SO2 with high volume sampler.
2. Monitoring of stack gases and determination of SPM, CO, Nox, SO2 with slack monitoring kit.
3 Determination of CO,HC, in exhaust gases from petrol vehicle

GROUP B NOISE POLLUTION
4 Determination of sound pollution in (a) Auditorium (b) Factories (c) Busy roads (d) Theatre (e) TV rooms (select any three situations)

GROUP C INDUSTRIAL WASTE WATER (Any Two experiment may be selected from this group)
5 Determination of BOD/COD ratio in industrial waste water.
6 Determination of Ph and alkanity/ acidity in industrial waste water.
7 Dermination of solids in industrial waste water.
8 Determination of turbidity, cobur,and temperature of industrial waste water.

GROUP D POLLUTION STANDARDS (Any Two experiment may be selected from this group)
9 Study of drinking water standards.
10 Study of effluent standards for water disposal.
11 Study of air pollution standards.

Sub Code: DE 1108 Sub Name: Introduction to Computers 6 Credits

Unit 1: Introduction to Computers:

1.1 Basic Concepts: Generations of Computers, Overview of computer Systems, Classifications of Computers, Characteristics of Computes, Applications of Computers.
1.2 Numbers System & Codes: Decimal, Binary, Octal, Hexadecimal, Conversions from one system to other, Binary Coded Decimal & ASCII Code.
1.3 Computer Hardware: Input Devices, Keyboard, Mouse, Trackball, Joystick, Scanner, OMR OCR Bar-Code Reader, MICR, Digitizer, Card Reader, Voice Recognition, Web Cam, Video Cameras, Etc. Output Devices, Monitors, Printers : Dot matrix, Inkjet & Laser, Plotters, Commuter, Output Micro Film (COM), Multimedia Projector, Speech Synthesizsr, Dumb, Smart & Intelligent Terminal. Storage Devices Primary and Secondary Storage, Characteristics and Limitation, Floppy, Hard disk, CD ROM DVD, Disk Cartidge. Microprocessor Registers, Arithmetic Unit, Control Unit, Buses, Instruction Set, Processor Speed. Memory Concepts Concept of Memory, Unit of Memory, Types of Memory, RAM, ROM, PROM, EPROM, EEPROM, and Cache Memory.
1.4 Computer Software: Computer Software, System Software V/s Application Software, Operating System Programs, Language Processor, Assembler, Compiler & Interpreter, Application Software, Types of Application Software and their examples. High Level Language, Low Level Language, Assembly Language.
1.5 Multimedia: Basics of Multimedia Components- Tex, Graphics, Animation, Audio, Images & Video. Multimedia Applications.

Unit 2: Operating System:

2.1 Overview of DOS: Internal Commands, External Commands
2.2 Windows Operating System: Overview of different versions of Windows, Characteristics and Facilities of Windows, Terminologies of Windows – Desktop, Icon, Menu etc. Components of Desktop. Working with Files and Folders. Windows Utilities and Accessories Notepad, WordPad, Paintbrush, Windows Explorer, Calculator.
2.3 Introduction to Linux: An overview of Linux, Basic Linux elements System, Features Software, Features File structure, Linux H/W & S/W requirements.

Unit 3: Word Processing:

Saving, Closing, Opening of documents, Selecting text, Editing text, Finding and replacing text, Printing documents, Merge Documents, Character and paragraph Formatting Page Design and layout Spell Check Creating Tables and Charts. Handling Graphics

Unit 4: Spreadsheet Package:

Spreadsheet concept: Need, advantage, Terminology like cell, row, column etc. Working with Spreadsheet – Creating, Saving, Editing and printing Entering data, Entering number, text, date, time etc. Selecting cells – Cut, copy, paste date, Editing Worksheet data, Formatting Text and Cells, Applying border shading, background patterns, conditional formats, positioning cells, formatting numbers, text, Date, time. Creating formulas Entering, Editing, Using Functions controlling calculations. Working with Charts- Creating charts, adding & changing text, changing the view and display, types of charts.

Unit 5: Presentation Software:

Introduction, Presentation design tools, Presentation terminologies, Creating, Opening and Saving Presentation, Working with different views, Creating and Organizing slides, Adding and Formatting text in slides, Formatting paragraphs, Adding drawings and objects, Creating special effects, Working with table and charts, Printing Presentation

Unit 6: Database:

Introduction – need, Characteristics and terminologies of database, Types of database – relational, Hierarchical and Network, Basic entities – Tables, records, Data types, Data Validation and constraints, keys relation between tables. Query – Select, Insert, Update, Delete. Forms – Creating forms, Forms controls Report Designer- Customize formats, grouping reports

Unit 7: Computer Communication & Networks:

7.1 Information Networks The Technology of Workgroup Computing Types of network Network topology, Network components.
7.2 Data Communication, Introduction to Data Communication Types of Data Transmission media.
7.3 Internet and E-mail, Internet Basics, Websites- Applications, terminologies, naming conventions. Web Browsers- Types, Navigation and tools.
E-mail – concept, terminologies, mailing services provider, advantages comparison with Conventional mailing
Search engine – concept, search engine websites, searching methods.

REFERENCES

1. A First Course in Computers - S . Jaiswal Golgotha Publication
2. Computers & Application, - Slotnick, Butterfield, Colantonio and Kopetzky C.C. Health & Company
3. Computers Today, Suresh K. Basandra Galgotia Publication
4. The Complete Guide to Microsoft Office Professional, Ron Mansfield Sybex /BPB Asian Edition
5. inside IBM PC Norton Peter
6. Hardware Bible BPB Publication
7. Computer Hardware Osborne Series
8. DOS & Utilities BPB Publication
9. Learning Windows in 24 Hours Sam Techmedia
10. Multimedia making it work Tay Vaughan Tata McGrawHill
11. Understanding windows BP Chapman B Publication

List of Experiments

1. Study of various components of computer like CPU, keyboard, mouse, monitor, printer, CVT and storage devices.
2. Internal and external commands of DOS.
3. Using Windows operating system, study of desktop, control panel, accessories and settings. File management in windows explorer, Study of WordPad, Notepad, Paint Brush, Calculator etc.
4. Study of Linux operating system.
5. Study of MS-word – opening and saving of documents, formatting, editing and spell check, find and replace, printing, merging. Creating Table, Charts and Graphics.
6. Study of Spreadsheet – creating, saving, editing and printing. Entering data, selecting cells, formatting text, applying border shades and backgrounds, creating formulas, creating charts.
7. Study of Power Point – creating, opening, editing and saving of slides. Adding and formatting text, creating animations, working with images and special effects. Printing presentation.
8. Study of MS Access– creating, saving, editing and printing of tables. Managing relationships, writing queries e.g. SELECT UPDATE, DELETE, and INSERT. Forms designing and report printing.
9. Study of Web Browser and mailing programs.

Unit 1: Introduction to Drawing Instruments:

Introduction of drawing instruments, materials and their uses, Applications of minidrafter, Applications of compass and divider, Applications of French curves and spline, Pencils grades and their uses, Designation and sizes of drawing sheet and drawing board.

Unit 2: Planning and Lay- Out Of Drawing Sheet:

Planning of drawing sheet as per I.S.: 696-1972 (SP 46: 1988), This should include Margin. Title Block, Zoning, Revision panel, folding marks, Numbering of sheet.

Unit 3: Conventional Representation:

Conventional representation of the following as per BIS practice, Common Engineering materials, Electrical installations and fittings, Main switches, (lighting and power), socket outlets (3 pin 5AMP, 3pin15AMP), bell, buzzer, loud speaker, Aerial, ceiling fan, exhaust fan, Bracket fan, fan regulator, battery and earth point.
Electronics components-Diode: Zener, varactor, Scotty, step recovery, light emitting diode (LED), PNP and NPN transistors, résistance, capacitor, Inductors (fixed and variable both), IC (8pin and 14pin) SCR, TRIAC, DIAC, UJT, FET, MOSFET, LOGIC GATES.
Sanitary fittings- showerhead, wall lavatory basin, corner, Lavatory basin, urinal stall, kitchen sink, Indian type WC, Water closets (Asian pan, urissapan, Anglo-Indian, European)
Building -single and double swing doors and windows.
Mechanical components- Internal and external threads, slotted head, Square end and flat, radial arms and ribs, serrated shaft, splined shaft, Chain wheel, bearing, straight and diamond knurling, Compression and tension spring, leaf spring (with and without eye), Spur and helical gear.

Unit 4: Lines, Lettering and Dimensioning:

Introduction of type of lines and their applications, Single stroke vertical, inclined letters (capital and lowercase) and numerals. Dimensioning: Elements of dimensioning- dimension line, extension line, arrowhead And leader line, Dimensioning system – Aligned and unidirectional. Dimensioning of Arcs and Circles, Angular Dimensioning, Dimension of counter sunk and counter bore.

Unit 5: Geometrical Constructions and Engineering Curves:

Divide a line into any number of equal parts by parallel line method, Bisecting of line and angle, Construction of triangles and polygons, Introduction of conic sections (curves), Construction of Ellipse by Eccentricity and Concentric circles methods, Construction of Parabola by Eccentricity and Rectangle methods, Construction of Hyperbola by Eccentricity method, Construction of Cycloid, Construction of Involutes of circle and polygon, Construction of Archimedean Spiral of any number of convolutions.

Unit 6: Scales:

Introduction of scales and their applications, Concept of reducing, enlarging and full size scale, Classification of scales – plain, diagonal, vernier, Scale of chord and comparative scales, Definition of R.F, Construction of plain and diagonal scales.

Unit 7: Theory of Projection and Projection of Points, Lines and Planes:

Definition of various term associated with theory of projection, Planes of projection, Quadrants, first & third angle projection method, Projection of points in all the four quadrants, Projection of lines **1.** Parallel to HP and VP both. **2.** Perpendicular to one plane and parallel to other **3.** Inclined to one plane and parallel to other **4.** Knowledge of projection of line inclined to both the planes (No practice required). Projection of planes. **1.** Perpendicular to HP and VP both **2.** Perpendicular to one plane and parallel to other. **3.** Inclined to one plane and perpendicular to other. **4.** Knowledge of projection of plane inclined to both the planes (No practice required).

Unit 8: Projections of Solids:

Projection of cylinder, cone, prism and pyramid. Under the following conditions:
1 Axis parallel to HP and VP , 2 Axis perpendicular to HP and parallel to VP, 3 Axis perpendicular to VP and parallel to HP, 4 Axis inclined to HP and parallel to VP, 5 Axis inclined to VP and parallel to HP, 6 Axis inclined to both HP and VP (No Practice required)

Unit 9: Section of Solids and Development of Surfaces:

Section of cone, cylinder, prism and pyramid (Solid resting on its base in the HP i.e. the Axis perpendicular to HP and parallel to VP) in the following cases: 1 Section plane parallel to HP and perpendicular to VP, 2 Section plane parallel to VP and perpendicular to HP, 3 Section plane inclined to HP and perpendicular to VP, 4 Section plane inclined to VP and perpendicular to HP, Drawing True shape of section, Introduction to development of lateral surface of solids Cone, Cylinder, Prism and Pyramids (Simple and truncated), Under the condition – solid resting on its base in the HP and axis Perpendicular to HP and parallel to VP, Development of funnel and elbow

Unit 10: Intersection of Surfaces:

Intersection of following cases Cylinder to cylinder and Prism to prism (With their axis intersecting and perpendicular to each other.)

Unit 11: Orthographic Projections & Free Hand Sketching:

Principles of orthographic projections, Identification of necessary views and superfluous view, Selection of front view, Preparation of necessary orthographic views of simple objects, From given pictorial views, Dimensioning of orthographic views as per standard practice, Free hand sketches of simple objects (Using Pencil, Eraser & Paper only).

Unit 12: Isometric Views:

Concept of isometric projection and isometric view (Isometric Drawing), Construction of isometric scale, Construction of isometric view of polygon and circle, Construction of isometric view of cone, cylinder, prism and pyramids, Construction of isometric view of simple objects from given orthographic views.

REFERENCES

1. ENGINEERING DRAWING– N.D. Bhatt
2. ENGINEERING DRAWING– R.K. Dhawan
3. ENGINEERING DRAWING– P.S.Gill
4. FIRST YEAR ENGINEERING DRAWING– A.C.Parkinson
5. SP: 46-1988 Bureau of Indian standard
6. PRINCIPLES OF ELECTRONICS - Malvino
7. ABHIYANTRIK AAREKHAN -SHIVDATT UPADHYAY

Sub Code: DE 1110	Sub Name: Workshop Practice	2 Credits

Unit1: Introduction to Work Shop:

General Safety rules of workshop, State the General Safety Measures to be observed in Workshop, State the General house keeping activities, Prepare a list of general safety Rules to be followed in Workshop

Unit 2: Fitting Shop:

Layout of Shop, Sketch & Label Details of shop Layout, Type of jobs produced in fitting shop, Understand the functions of fitting shop, Understand different Metals, Alloys & their Sections, List the Commonly used Metals, Alloys, State at least Five Sections, Shape & Size of Metals, Alloys, Use relevant IS Code for commonly used materials with their samples of different Cross sections, Fitting tools, Know use of fitting tools, sketch various tools & label their parts, Classify fitting tools as marking tools, Clamping devices, striking tools, cutting tools etc, Know the marking out & inspection instruments such as surface plate, marking block, scriber, tri square, bevel protractor etc, Fitting operation: -Use of Various fitting tools, inspection & measuring Instruments. To produce given jobs, Choose correct Shape & Size of Blank for a given drawing, Marking as per drawing using correct method, tools & sequence, Choose correct sequence of operations for the job viz. Sawing, filing, scraping, drilling & Tapping etc, Select appropriate Tools, inspection and measuring instruments.- Clamping the job in correct position in an appropriate clamping device, Perform the operation with appropriate body posture, method & precision, exercising personal judgment of need of the force, Inspect the job as and when necessary, Introduction to screw threads, Know common types of screw threads & the terminology used, Sketch and label details of Metric &Whitworth thread.

Unit 3: Carpentry Shop:

Carpentry shop lay out, Sketch & Label Details of shop Layout, Type of jobs produced in carpentry shop, Understand the functions of carpentry shop, Introduce type of jobs produced by carpenter, Commonly used raw materials: Know commonly used raw materials &their commercially available size, Name various types of raw materials used such as Timber: - logs, planks, battens etc. Ply, Teak ply, block board, sun mica, Formica etc, Carpentry tools: - Know various carpentry tools with their specifications and uses e.g. different saws, chisels, gauges, scales, hammers, tri squares, planners, vice etc, Carpentry Joints:- Introduction of various joints like T, corner, mortise & tennon joints, dovetail, pin, cross half lap joint, etc, Choose correct shape &size of timber blank for a given job drawing.
- **Do marking as per drawing using correct method, tools &sequence.** Identify correct operations e.g. sawing, chiseling, planning, grooving etc, Select appropriate Tool, inspection & measuring Instruments, Clamping the jobs in correct position in an appropriate clamping device, Perform the operation with appropriate body posture, method & precision, exercising personal judgment of need of the force, Inspect for size & quality of finish as and when necessary, Assemble the components produced. Inspect for proper joint quality & take remedial steps.

Unit 4: Black Smithy Shop:

Understand the function of black smithy & forging shop, Layout of Shop, Sketch & Label Details of shop lay out, Know the different jobs produced in smithy shop e.g. round to hexagonal shapes or vice versa J -hook, S- hook, circle, chain etc, Commonly used raw materials: - M.S. Bars of different shapes and size, Smithy Tools: - Know various smithy tools with their specifications e.g. different type of hammers, hot / cold chisel, flatters, tongs, leg vice, swage block, anvils, open hearth and furnaces etc, Preparation of job (any three): J-hook, S-hook, chain, circle, tong, chisel etc, Safety measures: Know the safety regulation in black smithy shop.

Unit 5: Sheet Metal Shop:

Layout of Shop, Sketch & Label Details of shop lay out, Know the different jobs produced in sheet metal shop e.g. Open tray, cylinder, prism, Funnel etc, Commonly used raw materials: -M.S. sheet (black), G.I., M.S.rivets, and aluminum rivet etc, Understand foil, sheet and plate, Tools used:- Different snips, shears, stacks, latter punch, figure punch, Solid punch, hollow punch, mallet, soft hammers, channel, Square bars, std. Sheet gauge, Type of joints and operations: - Introduction of various sheet metal operations &joints e.g. seaming, single seam, double seam, Grooved seam, corner joint, cap joint etc, Preparation of job (any two): - Open tray, cylinder, prism, Funnel etc, Choose correct shape &size of sheet for a given job drawing considering allowances for joint or seam, Do marking as per drawing using correct method, tools and sequence, Identify correct operation e.g. shearing, punching, bending, debarring, folding, strengthening, stamping, riveting, etc, Select appropriate Tool, inspection & measuring Instruments, Holding the job in correct position. Perform the operation with appropriate body posture, method & precision, exercising personal judgment of need of the force, Inspect for proper joint quality and take remedial steps.

Unit 6: Welding Shop:

Layout of Shop, Sketch & Label Details of shop lay out, Know the different jobs produced in Welding shop e.g. Lap joint, single butt, double butt, corner, T joint, etc, Tools & equipments used:-Specifications & use of various tools and equipments used in Welding shop e.g. A.C. welding transformer, Gas welding set, electrode used, chipping hammer, wire brush, shield, gloves, apron etc, Preparation of job: - (any two) Lap joint, single butt, double butt, corner, T joint, etc, Safety measures: - Know the safety regulation in Welding shop.

Unit 7: Plastic Molding

Know the commonly used plastic materials i.e. Thermosetting, Thermo plastic, Sketch & label various parts of bench molding m/c, Production of any product on bench molding m/c.

Unit 8: Revision:

Understand the difference in theory and practice, Explain the importance of skills in production of quality jobs

References

1. Workshop technology vol. I - Hazra & Chaudhary
2. Production technology vol. I- R.C. Patel &C.G. Gupta
3. Production technology vol. I- Dalela
4. Work shop technology vol. I- Raghuwanshi
5. Work shop technology vol. I- Chapman
6. Workshop Vol. I . - P.N.Vijayvargiya (Hindi medium)

Sub Code: DE 9999 Sub Name: Professional Activities 0 Credits

DETAILED INSTRUCTIONS TO CONDUCT PROFESSIONAL ACTIVITIES:

A. Study hours, if possible should be given greater time slot with a minimum of two hrs/week to a maximum of four hrs/week.

B. This course should be evaluated on the basis of grades and mark sheet of students, should have a separate mention of the grade awarded. There will be no pass/fail in professional activities (PA).

C. Following grade scale of evaluation of performance in PA has been established.

Grades	Level of performance
A	Excellent
B	Good
C	Fair
D	Average
E	Below Expectations

D. Grades once obtained in a particular examination shall become final and no chance of improvement in grades will be given to the students.

E. Assessment of performance in PA is to be done internally by the Institution, twice in a Semester/Term through a simultaneous evaluation of the candidate by a group of three teachers, of the deptt. Concerned. Group of teachers will jointly award the grade to candidate in the assessment. Best of the grades obtained by the student in these two assessments shall be finally taken on the mark sheet of the respective Semester/Term.

Candidate abstaining from the prescribed course work and/or assessment planned at the Institute shall be marked ABSENT in the mark sheet, instead of any grade.

F. While awarding the grades for performance in PA, examining teacher should reach the final consensus based on the attendance, punctuality, interest, presentation skills in seminar on the topic assigned (collection of relevant data, observations, analysis, findings/conclusion) and its written report, awareness of latest developments in the chosen programme of study.

G. Institution shall maintain the record of grades awarded to all the students in PA for a period of 1 year.

H. It shall be mandatory for students to submit a compendium for his PA in the form of a Journal.

I. Compendium shall contain following:

I. Record of written quiz.

II. Report/write up of seminar presented

III. Abstract of the guest lectures arranged in the Institution.

IV. Topic and outcome of the group discussion held.

V. Report on the problems solved through case studies.

VI. Report on social awareness camps(organized for social and environmental prevention).

VII. Report on student chapter activities of professional bodies like ISTE, IE (India), CSI etc.

J. PA is not a descriptive course to be taught in the classroom by a particular teacher. Various activities involved in the achievement of objectives of this course should be distributed to a number of teachers so that the talent and creativity of group of teacher's benefit the treatment of the course content.

These activities should preferably be conducted in English language to maintain continuity and provide reinforcement to skill development.
Small groups shall be formed like in tutorials, group discussion, case studies, seminar, project methods, roll play and simulation to make the development of personality affective.
Treatment of PA demands special efforts, attention, close co-operation and creative instinct on the part of teachers of department concerned. Since this course is totally learner centered, many of the activities planned under this course shall come out from the useful interaction of student, among themselves and with the teachers. The guide teacher/s shall best act as a facilitator of these creative hunts/ exercises, which unfold many of the hidden talents of the students or bring out greater amount of confidence in them, to execute certain activity.

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

SYLLABUS

For

DIPLOMA CIVIL ENGINEERING, ELECTRICAL ENGINEERING

(FIRST YEAR, 2nd SEM)

(Session July- December 2016)

College of Polytechnic Engineering

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Diploma Civil Engineering, Electrical Engineering

List of Subject (First Year, 2nd Sem)

Unit 1: Communication Process and Its Needs*:*

1.1 How to make communication effective, Barriers in communication, Removal of barriers
1.2 Grammar and vocabulary for correct English usage,Determiners, Prepositions, Auxiliary verbs and subject-verb agreement, Rewrite as directed (change voice, correct form of verbs/ tenses), Vocabulary – One word substitution, words often misused and wrongly spelt.

Unit 2: Passages of Comprehension:

2.1 Prescribed passages (six from existing syllabus)
- i Language of Science
- ii Desalination or Desalting Process
- iii Safety Practices
- iv Non-conventional Sources of Energy
- v Our Environment
- vi Entrepreneurship

2.2 Writing summary, moral and characterization of any one story from the book prescribed.

Unit 3: BUSINESS COMMUNICATION (One Question with Internal Choice):

3.1 Principles of effective business correspondence Its parts, mechanics, styles and forms.
3.2 Application for job, Bio-Data and C.V.
3.3 Letter of Enquiry
3.4 Placing order
3.5 Complaint

Unit 4: Composition & Translation:

4.1 Writing paragraphs of 150 words on topics of general interest i.e. pollution, ragging in college, importance of computers, importance of communication skill, importance of science and technology etc.
4.2 Translation (Hindi to English and vice-versa).

Unit 5: Unseen Passages & Precis Writing:

i Answer the questions based on the passage.
ii Give suitable title
OR
iii Writing Precis

References

1. English Conversation Practice - Grant Taylor
2. Practical English Grammar - Thomson & Martinet
3. Communication Skills for Technical Students Book – I, Book – II - M/S Somaiya Publication, Bombay
4. Living English Structure- S. Allen
5. English Grammar, Usage, and Composition - Tickoo & Subramanian, S. Chand & Co. Standard Allen Longman.
6. Essentials of Business Communication - Dr. Rajendra Pal & J.S. Korlahalli S.Chand & Sons, New Delhi.
7. Effective Business Communication - M.V. Rodriques, Concept Pub. Co., New Delhi.
8. Communication for Business - Shirely Taylor, Longman, England.
9. Communication for Engineers and Professors - P. Prasad, S.K.Kataria and sons publications, New Delhi
10. Technical English Book-II, - Somaya Publications, New Delhi

Unit 1: Units & Measurement:

Fundamental and derived units Scalar and vector, Basic requirements to represent vector Symbols, abbreviation, and Proculation Linear measurement by vernier calipers, screw gauge and spherometer Angular measurement by angular vernier.

Unit 2: Motion:

Motion and its type Linear motion Circular motion Angular velocity and relation with linear velocity Centripetal acceleration, Centripetal and Centrifugal forces Rotatory motion, Axis of rotation, Moment of Inertia, Radius of gyration Kinetic energy of rotation Numerica problems and solution on the topic.

Unit 3: Properties of Matter:

Elasticity: Meaning, definition, stress, stain, Hook's law and elastic limit Surface Tension : Meaning, definition, molecular forces, cohesive and adhesive forces, surface energy, capillary rise and capillary rise method. Viscosity : Meaning, definition, stream line and turbulent flow, critical velocity, Stock's law. Numerical problems and solution on the topic.

Unit 4: Heat:

Heat and temperature, concept of heat as molecular motion Transmission of heat, study state and variable state. Concept of heat capacity, specific heat and latent heat. Calorimeter and its uses. Thermodynamics Relation between heat and work Mechanical equivalent of heat First law of thermodynamics and its application Second law of thermodynamics and its application Carnot cycle. Numerical problems and solution on the topic.

Unit 5: Heating Effect of Current And Thermoelectricity:

Heating effect of electric current: Joule's law, work energy and power in electric circuit, calculation of electric energy. Thermo electricity Seeback effect and thermoelectric power. Neutral temperature, temperature of inversion and relation between them Thermo electric thermometer and thermo couples. Numerical problems and solution on the topic.

Unit 6: Optics and Optical Instruments:

Refraction, critical angle and total internal reflection, refraction through lenses and problems, Power of lenses Spherical and chromatic aberrations Simple and compound microscope, telescope and derivation for their magnifying power Numerical problems and solution on the topic.

Unit 7: Electrostatics and Electromagnetic Induction:

Coulomb's law, Electric field intensity, potential. Capacity, principle of capacitor, types of

capacitor, combination of capacitors Electromagnetic Induction: Faraday's law, Lenz's law Self and mutual inductance Transformer and electric motor, Induction coil.

Unit 8: Basic Electronics:

Semiconductors, Types of semiconductors Explanation of conductor, semiconductor and Insulators on the basis of band theory. P-N junction diode as rectifier.

References

1. Applied Physics Vol. 1 & 2 - Saxena and Prabhakar
2. Physics - TTTI Publication
3. Physics Vol. 1 &2 - Halliday and Resnic R
4. Engineering Physics - Gaur and Gupta
5. Principle Of Physics - Brij Lal & Subramanyan
6. Physics for Technical Education - Ls Zednov

List of Experiments

1. Refractive index of prism (I-d) Curve
2. Refractive index of prism (spectrometer)
3. Focal length of a convex lens by u
4. Focal length of a convex lens by displacement method
5. Verification of Ohm's law
6. To find out unknown resistance by meter brid
7. To find out internal radius of hollow tube by vernier calipers.
8. To find out volume of given cylinder by screw gauge.
9. Surface tension by Capillary rise method. Coefficient of viscosity
10. Coefficient of Thermal conductivity by searl's method.
11. Verification of Newton's cooling law.

Sub Code: 203	Sub Name: Chemistry	6 Credits

Unit 1: Atomic Structure and Radioactivity:

Discovery of electron, proton, neutron and nucleus. Rutherford's and Bohr's model of an atom. Bohr Burry scheme of filling the electrons in various orbits. Idea of s, p, d, f orbital. Alfa, Beta and Gamma rays, theory of radio activity, Group displacement law, half life period, numerical problems on half life period, fission and fusion.

Surface Chemistry and Its Application

True solution, colloidal solution and suspension, lyophobic and lyophillic colloids, optical and electrical properties of colloids, coagulation, coagulants, idea about gels and emulsions.

Unit 2: Electrochemistry:

Electrolysis, Faraday's laws of electrolysis, Numerical problems on Faradays Law, electroplating of copper and nickel.

Colligative Properties

Osmosis & osmotic pressure, Relative vapour pressure and Raoult's law. Internal energy (enthalpy), Entropy, Entropy fusion free energy, Effect of change in temperature catalysis.

Unit 3: Chemical Bonding:

Nature of bonds, Electrovalent, Covalent, coordinate and hydrogen bond

Metals and Alloys

Physical and chemical properties of metals, copper, iron, aluminum, tin, nickel, General principle of metallurgy, minerals/ ores, ore dressing, roasting, smelting, bassemerisation, fluxes, purification. Explanation of alloying purposes, methods of alloying, composition and uses of alloy like brass, bronze, duralium, German silver, gun metal, solder, stainless steel, casting and bearing alloy.

Unit 4: Glass, Cement and Refractory

Glass: Basic raw materials for glass, composition and manufacture of glass, varieties of glass and annealing of glass,. Cement: Constituting compounds in cement, Composition of Portland Cement, its manufacture, setting and hardening of cement. Refractories: Meaning, characteristics, use of common refractory materials.

High Polymers, Rubber And Insulators

Polymerization and condensation, classification of plastics, Compounding and Moulding constituents of plastics. Preparation, Properties and uses of PVC, polyethene, polystyrene, polyamides, polyesters, Bakelite. Synthetic fibers–nylon, rayon, decron, and polyesters. Definition characteristics, classification and properties of insulators. Glass, wool and thermocol.

Unit 5: Lubricants, Paints and Varnishes

Lubricants: Meaning, type and theory of lubricants, properties of a good lubricants, Flash and fire point and cloud point, emulsification number, viscosity. Paints and Varnishes: Meaning, ingredients and characteristics of good paints and varnishes, their engineering application.

Fuels, Fire Extinguishers and Explosives

Classification of fuel, gross and net calorific value, Determination of a solid fuel by bomb calorimeter, octane and octane number, Proximate analysis of fuel, its utility, crude petroleum, products of fractional distillation, Fire extinguishers–Description and use, Explosives–Meaning, types, characteristic and use of explosives. Name Dynamite, lead azide, T.N.T., Picric acid.

Reference books –

1. Physical chemistry – Bahl and Tuli
2. Inorganic chemistry – Satyaprakash
3. Modern text book of applied chemistry – Dr. G. C. saxena, Jain prakashan, indore
4. Applied chemistry - Dr. G. C. saxena, Deepak Prakashan, gwalior
5. Applied chemistry – Shrivastava & Singhal, PBS Publication, Bhopal.
6. Engineering chemistry – UPPAL.
7. Engineering chemistry – Rao and Agrawal
8. Engineering chemistry – P.C. Jain
9. Polymer chemistry – O.P. Mishra
10. Applied chemistry – H.N. Sahni, Deepak Prakashan.

List of Experiments

1. Determine the percentage of moisture content in the given coal sample.

2. Determine the change of viscosity of given lubricating oil with Change in temperature by Redwood viscometer No.1.

3. Determine the change of viscosity of given lubricating oil with Change in temperature by Redwood viscometer No.2.

4. Determine the flash & fire point given lubricating oil by able's closed cup apparatus.

5. Determine the type & extent of alkalinity of given sample of water by N/20 HCl (hydrochloric acid when P>1/2 M).

6. Determination of the chloride ions in given water sample by Mohr's method.

7. To determine the strength (in g/L) of the given unknown strength sodium thiosulfate (hypo) solution by a known strength (5.0000 g/L) N/40 standard cupper sulfate solution.

8. To determine the strength (in g/L) of the given unknown strength sodium thiosulfate (hypo) solution by a known strength (5.0000 g/L) N/40 standard cupper sulfate solution.

9. To determine the strength (in g/L) of ferrous ammonium sulfate ($FeSO_4$, $(NH_4)_2SO_4$,$6H_2O$) by titrating it against standard (1.0 g/L) potassium dichromate ($K_2Cr_2O_7$) solution.

10. Determination of iron content in an iron are by titrating it against standard N/20 $K_2Cr_2O_7$ solution using potassium ferricyanide $[K_3Fe(CN)_6]$,H_2SO_4, $FeSO_4$ as an external indicator.

Sub Code: 204	Sub Name: Mathematics	4 Credits

Unit 1: Differential calculus:

Define constant, variable, function., Value of the function, Concept of limit of a function. Definition and concept of differential, coefficient as a limit, Derivatives of sum, difference, product, quotient of two functions., Diff. coeff. of function of a function., differential coefficient of implicit function.

Unit 2: Integral Calculus

Definition as a inverse process of differentiation, Methods of Integration, Integration by parts, breaking up into partial fraction, Concept of Definite Integral.

Unit 3: Trigonometry & Matrix:

Partial Fractions, Define a proper, Break a fraction into partial, Allied angles. Trigonometrical ratios of sum and ,difference of angles, Sum and difference of trigometric ratios ,Multiple angles , Definition of Matrix., Types of Matrix, Row, Column, Square, Unit, Upper and lower triangular, Symmetric , Adjoint of a Matrix., Inverse of a Matrix.

Unit 4: Co-Ordinate Geometry:

Co-ordinate System : Cartesian and Polar., Distance, Division, Area of a triangle., Slope of St. Line, Angle between two , Standard and general equation of St.line,. Point of intersection of two st lines.

Unit 5: Statistics:

Measures of Central tendency (Mean, Mode, Median), Measures of Dispersion (Mean deviation, standard deviation)

Unit 6: Vector Algebra:

Concept of Vector and Scalar Quantities., Different types of vectors. Addition and subtraction of vectors, Components of a vector, Multiplication of two vectors, Scalar Product, Vector Product

Reference

1. Mathematics for Polytechnics Vol. I and II- Prepared by T.T.T.I. Bhopal
2. Differential Calculus- Gorakh Prasad
3. Integral Calculus-Gorakh Prasad
4. Co-ordinate Geometry -S.L. Loni
5. Engineering Mathematics- Dr. S.K. Chouksey
6. Mathematical Statistics- Ray and Sharma
7. Higher Engineering- B.S. Grewal

DETAILED INSTRUCTIONS TO CONDUCT PROFESSIONAL ACTIVITIES:

A. Study hours, if possible should be given greater time slot with a minimum of two hrs/week to a maximum of four hrs/week.

B. This course should be evaluated on the basis of grades and mark sheet of students, should have a separate mention of the grade awarded. There will be no pass/fail in professional activities (PA).

C. Following grade scale of evaluation of performance in PA has been established.

Grades	Level of performance
A	Excellent
B	Good
C	Fair
D	Average
E	Below Expectations

D. Grades once obtained in a particular examination shall become final and no chance of improvement in grades will be given to the students.

E. Assessment of performance in PA is to be done internally by the Institution, twice in a Semester/Term through a simultaneous evaluation of the candidate by a group of three teachers, of the deptt. Concerned. Group of teachers will jointly award the grade to candidate in the assessment. Best of the grades obtained by the student in these two assessments shall be finally taken on the mark sheet of the respective Semester/Term.

Candidate abstaining from the prescribed course work and/or assessment planned at the Institute shall be marked ABSENT in the mark sheet, instead of any grade.

F. While awarding the grades for performance in PA, examining teacher should reach the final consensus based on the attendance, punctuality, interest, presentation skills in seminar on the topic assigned (collection of relevant data, observations, analysis, findings/conclusion) and its written report, awareness of latest developments in the chosen programme of study.

G. Institution shall maintain the record of grades awarded to all the students in PA for a period of 1 year.

H. It shall be mandatory for students to submit a compendium for his PA in the form of a Journal.

I. Compendium shall contain following:

I. Record of written quiz.

II. Report/write up of seminar presented

III. Abstract of the guest lectures arranged in the Institution.

IV. Topic and outcome of the group discussion held.

V. Report on the problems solved through case studies.

VI. Report on social awareness camps (organized for social and environmental prevention).

VII. Report on student chapter activities of professional bodies like ISTE, IE (India), CSI etc.

J. PA is not a descriptive course to be taught in the classroom by a particular teacher. Various activities involved in the achievement of objectives of this course should be distributed to a number of teachers so that the talent and creativity of group of teacher's benefit the treatment of the course content.

These activities should preferably be conducted in English language to maintain continuity and provide reinforcement to skill development.

Small groups shall be formed like in tutorials, group discussion, case studies, seminar, project methods, roll play and simulation to make the development of personality affective.

Treatment of PA demands special efforts, attention, close co-operation and creative instinct on the part of teachers of department concerned. Since this course is totally learner centered, many of the activities planned under this course shall come out from the useful interaction of student, among themselves and with the teachers. The guide teacher/s shall best act as a facilitator of these creative hunts/ exercises, which unfold many of the hidden talents of the students or bring out greater amount of confidence in them, to execute certain activity.

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

SYLLABUS

For

DIPLOMA CIVIL ENGINEERING

(SECOND YEAR, 3rd SEM)

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Diploma CIVIL Engineering

List of Subject (Second Year, IIIrd Sem)

Sub Code: CED301 **Sub Name: SURVEYING** **4 Credits**

Unit 1: Types of survey: Definition. Objects of Surveying. Principles of Surveying. Uses of survey, Classification of Surveying. Primary –Plain, Geodetic. Secondary – Based on Instruments, method, object, Nature of field.

Unit 2: Chain & cross staff survey: Principle of Chain Survey. Study and use of Instruments for linear measurements – chain, Tape, Ranging Rod, arrows, pegs, cross Staff, optical Square, line Ranger. Ranging –Direct and Indirect Ranging Chaining – Plain and sloping grounds. Chain Triangulation – Survey Station and their Selections, factors affecting selection of survey station. Survey lines, Check lines, Tie lines, base line. Taking offsets. long and short offset, degree of offset. Obstacles in chaining. Chain & cross staff Survey for finding area of a field (Numerical problems) Errors in chain Surveying & applying Corrections for chain & Tape (Numerical problems).Conventional signs related to survey

Unit 3: Compass survey: Principle of Compass Survey. Bearing of lines – Meridian –True, Magnetic, and Arbitrary. Bearing –fore bearing, Back bearing, Whole circle bearing, Quadrennial bearing system and Reduced bearing, Conversion of bearings, finding included angles from bearings. Prismatic Compass – Component, construction and use. Local attraction, Causes, precautions to be taken to avoid and correction of bearings affected due to local attraction, calculation of included angles. Traversing – traversing by chain and compass. open traverse, closed traverse, check on open and closed traverse. Graphical adjustment for closing error. Numerical problems on calculation of bearings, Angles and local attraction.

Unit 4 Leveling: Definitions, meaning of various terms used in leveling – Level surface, Level line, horizontal line, Vertical line, Datum surface , Reduced level, Bench mark and its types .Dumpy

Unit 5: Practical Metallography: Preparation of specimen, selecting the specimen, mounting the specimen, grinding , polishing, etching and etching reagents. The metallurgical microscope. Use and care of microscope. level –Components, Construction, Line of sight, Line of Collimation, Bubble tube axis, leveling Staff – Telescopic and folding type .Foresight, back sight, Intermediate sight, Change point, Height of collimation .Fundamental axes and their relationship Recording in level book. Temporary adjustments of dumpy level. Method of Reduction of levels – Height of instrument method and Rise and fall method. Arithmetical checks, Numerical problems, Computation of missing readings. Classifications of leveling -
simple, differential, profile, cross sectional, fly and check leveling. Study and use of tilting level & Auto level. Sources and errors in leveling, precautions and difficulties faced in leveling

Unit 6: Contouring : Definitions – Contour, contour interval, Horizontal equivalent. Characteristics of contours .Method of locating contours. Interpolation of contours. Establishing grade contours. Uses of Contour Maps. Calculation of reservoir capacity by contour map by trapezoidal and prismoidal formula. Interpretation of Typical Contour Sheets

Unit 7: Area and volume measurements : Construction and use of polar planimeter for measurement of area and simple numerical problems. Study and use of Digital Planimet.

Concept of computation of Volume by Trapezoidal and Prismoidal formulae.(No numerical problems)

REFERENCES

1 Surveying And Levelling N.N.Basak Tata Mc Graw-Hill
2. Surveying And Levelling,Part I And IIT .P. Kanetkar & S. V.Kulkarni, Pune Vidhyarthi Griha Prakashan.
3 Surveying And Levelling, Vol. I And II, Dr. B. C. Punmiya Laxmi Plublication.
4 Text Book Of Surveying, S.K.Husain & M.S. Nagaraj, S. Chand And Company.
5 Surveying And Levelling, Vol. I And II S. K. Duggal, Tata Mc Graw-Hill.
6 Plane Surveying, A.M.Chandra,

LIST OF EXPERIMENTS

1. Measurement of distances with chain & tape on ground with direct or indirect ranging.
2 Construction and use of optical square and open cross staff for setting out perpendicular and running a survey line for locating details.
3 Measurement of Area by Chain and cross staff survey.
4 Use of prismatic compass and observing fore bearing and back bearing.
5 Measuring Fore bearing and Back bearing of 5-6 side closed polygon. Identifying stations affected by local attraction and calculation of corrected F.B. & B.B.
6 Measuring fore bearing and back bearing for an open traverse (5 to 6 sided). Calculate direct angles between successive lines.
7 Use of Dumpy level, temporary adjustments and taking reading on levelling staff.
8 Recording readings in field book.
9 Differential leveling practice, reduction of level by H.I. method.
10 Differential leveling practice, reduction of level by rise & fall method.
11 Carrying Bench mark from one point to another point about 200 m by fly leveling with tilting level.
12 Use of auto level and taking observation.
13 Measurement of Area of irregular figure by polar planimeter. Measuring area enclosed by closed contours on contour map prepared earlier, by simple digital planimeter.

Sub Code: CED302 **Sub Name: MATERIAL TECHNOLOGY** **4 Credits**

Unit 1. Introduction: Importance of material Technology for Civil Engineer. name of common Engineering materials used in construction

Unit 2. Masonary materials: a) Building stones- classification of rocks, requirement of good building stone, dressing of stones, quarrying of stones, artificial or cast stones. b) Bricks – properties of good building bricks, conventional bricks , standard bricks, composition of clay brick, method of preparation of bricks, strength of bricks, proportions of burnt clay bricks , testing of bricks, special bricks, hollow blocks, fly ash bricks

Unit 3. Binding Materials : Murum, Properties of Murum for Road work. Lime - Types and properties of lime : Fat lime, Hydraulic Lime, Quick lime. Cement - Different ingredients used for manufacturing cement with their percentage. Physical properties of ordinary Portland cement (OPC), hydration of cement. Physical properties of cement – fineness, standard consistency, initial and final setting time, compressive strength and soundness, different grades of OPC, 33, 43, 53 and their specification of physical properties as per relevant IS codes, field test of cement, storing cement at site, effect of storage of cement on properties of cement, Types of cement and their functional uses.

Unit 4. Aggregates: Properties of fine aggregates - Concept of size, shape, surface texture, strength, specific gravity, bulk density , water absorption, surface moisture, soundness, bulking impurities. Determination of fineness modulus & grading zone of sand by sieve analysis, determination of silt content in sand & their specification as per IS 383, Bulking of sand, phenomenon of bulking, its effect on concrete mix proportion. Properties of coarse aggregates - Concept of size, shape, surface texture, water absorption, soundness, specific gravity & bulk density, Determination of fineness modulus of coarse aggregate by sieve analysis, grading of Coarse Aggregates. Determination of crushing value, impact value & abrasion value of coarse aggregate, flakiness index & elongation index of coarse
aggregate and their specification.

Unit 5. Mortars: Classifications, lime mortar, cement mortar, special mortars. Functions of mortar, proportions, properties of mortar and tests for mortar

Unit 6. Concrete: Introduction to concrete - Definition of concrete, necessity of supervision for concreting operation, different grades of concrete (as per provisions of IS 456- 2000), minimum grade of concrete for different exposure conditions, minimum grade of concrete for R.C.C., water retaining structure & in sea water construction, durability of concrete. Water cement (w/c) ratio, Definition of w/c ratio, significance of w/c ratio, maximum w/c ratio for different grades of concrete for different exposure conditions. Properties of fresh concrete, Definition of workability, factors affecting workability of concrete. Determination of workability of concrete by slump cone test, compaction factor test, vee bee consistometer. Range values of workability requirement for different types of concrete works, cohesiveness, segregation, bleeding, creep of concrete. Curing of concrete. Testing of concrete for strength and workability. Properties of hardened concrete

Unit 7. Timber : Difference between wood and timber. Timber based material: use of timber, characteristics of good timber, defects in timber, plywood, particle board, veneer, sun mica ,fore mica, nuwood, artificial timber, rubber wood.

Unit 8. Paints, Varnishes & Colors: Different in gradients used in manufacturing/ preparation of paints, Primers, their different types for steel and timber. Use of paint as protecting surface device for steel surface type of paint used and for wood surface types of paint used. VARNISH : Method of preparation of varnish, component materials used in varnish

Unit 9. Steel And Aluminum Products : Steel used as Engineering Material in different shapes. Like T- section , Angle section, Channel Section, I-Section steel sheets used in manufacturing of Doors. Aluminum : Used as construction materials

Unit 10 Miscellaneous: Give the concepts about the other materials which can be used as Engineering Materials like Glass, Rubber, Tar, Emulsion, Bitumen, Glass wool, Use of J bolts, U hooks, Stoneware pipes, Galvanized iron pipes. Miscellaneous materials: glass, plastic- P.V.C. pipes used as materials in pipe laying for water supply purposes, Irrigation etc. Water tanks. fibers, aluminum, steel , galvanized iron, asphalt bitumen etc. micro silica, PVC, CPVC, PPF. Waterproofing and termite proofing materials, admixtures in concrete, bonding agents, epoxy resins, Polishing materials etc. readymade concrete cover. Readymade ornamental material (wall papers, carpets, radium prints, blocks etc.).

REFERENCES

1.Engineering Materials By Rangwala
2. Engineering Materials By Deshpande
3 Engineering Materials By Ojha
4 Engineering Materials By Surendra Singh
5 Civil Engineering Materials By T.T.T.I., Madras.
6 Building Materials By S.K. Duggal
7. construction Materials By D.N. Ghose
Engineering Materials By Rangwala
2. Engineering Materials By Deshpande
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6 Building Materials By S.K. Duggal
7. construction Materials By D.N. Ghose.

LIST OF EXPERIMENTS

Test on Aggregate
(1) Fineness Modulus of fine aggregate.
(2) Fineness modulus of Coarse Aggregate.
(3) Flakiness Index.
(4) Aggregate crushing test (Demonstration)
(5) Impact Test.

2 **Test on Bricks**
(1) Water Absorption Test.
(2) Compressive strength of bricks.
(3) Effloresce Test.

3. **Test for Cement**
(1) Fineness of cement.
(2) Normal consistency of cement
(3) Setting time test initial and final.
(4) Tensile strength.
(5) Specific gravity

4 **Test for concrete**
(1) slump cone test
(2) Compressive strength of cubes (7 days ,28 days)
(3) Rebound hammer test
(4) Compaction factor test

5 Test for mortar
(1) bulking of sand
(2) silt content
(3) slaking of quick lime

6 . Testing for Steel
(1) Tensile strength of M.S. bar.
(2)Shear strength on M.S. bar

Sub Code: CED303 Sub Name: Building Construction 4 Credits

Unit 1 Building Components and Materials: Building components and types of structure - building components & their function. Substructure – foundation, plinth. Superstructure – walls, sill, lintel, doors & windows, floor, roof, parapet, beams, columns. Types of structures – load bearing structures, Framed structures, composite structures.

Unit 2. Construction of Sub Structure : Job layout – necessity and procedures, site clearance, preparing job layout, layout for load bearing structure and framed structure by center line And face line method, precautions while marking layout on ground. Earthwork - excavation for foundation, timbering and strutting, earthwork for embankment, material for plinth filling. Tools and plants used for excavation and earthwork. Foundation - importance and necessity, types of foundation, open foundations, shallow Foundation, stepped foundation, isolated and combined column footing, raft foundation, deep foundation and pile foundation. Selection of foundation. Pumping method of dewatering, cofferdams. Bearing capacity of foundation soil, under reamed pile Foundation

Unit 3. Construction of Super Structure : stone masonry – terms used in stone masonry – facing, backing, hearting, through stone, corner stone. Uncoursed rubble masonry, coursed rubble masonry, point to be observed in construction of stone masonry, mortars for
stone masonry, tools and plants used for Stone masonry, col-grout masonry. Brick masonry : common terms used in brick masonry, requirements of good brickwork, bonds in brick masonry, English, Flemish, stretcher and header bonds only. Brick laying ,line level and plumb of brickwork, striking and raking of joints, lead and lift, precautions in brick masonry, tools and plants used in brick masonry. Comparison between brick and stone masonry. Hollow concrete block masonry, composite masonry, cavity wall- purpose and construction. Doors and windows: doors -components and, construction of paneled doors, battened doors, flush doors, collapsible doors, rolling shutters, revolving doors, Aluminum doors, glazed doors. Sizes of door – as per IS specification. Windows -component and construction of fully paneled, partly paneled and glazed, glazed wooden, steel, aluminum windows, sliding windows, louvered window, ventilators, cement grills. Protective treatment for doors and windows, fixtures and fastenings
for doors and window. Selection of doors and windows. Sill, lintel and weather shed - functions, types and construction . Vertical communication means of vertical communication – stair case,
elevators, escalators etc. terms used in stair case, characteristics of good staircase, types of staircase - fabricated stair. Relation between rise and tread, IS standards, design of staircase for the given situation, Scaffolding and shoring: purpose, types of scaffolding, process of erection
and dismantling. Merits and demerits of different types of scaffolding, Purpose and types of shoring, underpinning, safety precautions.

Unit 4. Building Finishes : *floors and roofs* - floor finishes, brick flooring, flag stone, Shahabad , Kota, marble, granite, Kadappa, ceramic tiles, vitrified, mosaic tiles, Chequerred tiles, glazed tiles, pavement blocks, concrete floors, Tremix floor, skirting and dado. Process of laying- process of laying and construction, finishing and polishing of floors. *Roofing materials* – AC sheets ,GI sheets, plastic sheets, fiber sheets, Mangalore tiles etc. Steel trusses. R.C.C. slab,

lean to roof, King post and Queen post trusses (Line Diagram). *Wall finishes*: plastering – necessity of plastering, single coat plaster, double coat plaster, Neeru finishing and pop, special plasters - stucco plaster, plaster board and Wall claddings. Precaution to be taken while plastering. Defects in plaster. *Pointing* – necessity and procedure of pointing, Difference between plastering and pointing. *Painting* – necessity, surface preparation, method of application, selecting suitable painting material, white Wash and colour wash

Unit 5. Introduction to Auto CAD: Coordinate system. Draw command-line ,arc, circle rectangle, polygon, point, ellipse, hatch, table. Modify commands-erase, copy, offset, array, trim, extend, break, join, chamfer, fillet, move, rotate, scale, stretch, lengthen. Dimensioning Tray settings: snap, grid, ortho, polar, osnap Format commands: line type, point style, units, layers, drawing limit, dimension style.

Unit 6. Building Maintenance : *Cracks* **-** causes and types of cracks, identification and repair of cracks. Guniting and grouting, use of epoxy and crack fills. *Settlement* - causes and remedial measures plinth protection – necessity and materials used. *Demolition* - necessity, method of demolition, hand demolition, Machine demolition, controlled blasting demolition, precautions during demolition. *Re-baring techniques* - necessity and equipment for re-baring techniques.

Unit 7. Presentation: Block, creating layout, insert layout ,ploting/printing

Unit 8. Safety And Environmental Aspects : Safety precautions to be observed during the construction viz. trenching, digging pits for foundation using machineries, masonry works, erection, scaffolding, centering etc. Environmental consideration to be observed during construction of a building e.g. laying out of drainage line and water supply line, soak pit, septic tank, precautions

Unit 9. Gear Drawing : Gear terminology such as pitch, pitch circle diameter module, addendum, root circle diameter, hole depth, blank diameter etc. construction of cycloidal, involute teeth profiles, pinion and rack mashing, spur gear mashing. to be taken during site clearance considering environmental effect. Avoiding unnecessary cutting of bushes and tress etc.

REFERENCES

1.Building Construction, S. P. Arora and Bindra,Dhanpat Rai Publication
2. Building Construction, S. C. Rangawala Charotar Publication
3 Building Construction, Sushil Kumar, Standard Publication
4 Building Construction, B. C. Punmia Laxmi Publication
5 Building Construction, S.K. Sharma, Tata McGraw-Hill
6 Building Construction,Dr.Janardan Zha, khanna Publication Construction,
Mantri Construction

LIST OF EXPERIMENTS

1 Preparing foundation plan and marking on ground layout of load bearing structure by face line method from the given plan of the building.
2 Preparing foundations plan and marking on ground layout of framed structure by face line method from the given plan of the building.
3 Checking and transferring line and level of plinth, sill, lintel, flooring, slab level of a building and writing report of the process.
4 Checking verticality (plumb line) of formwork for column, beam and wall at construction site and writing report of the process.
5 Observing and writing report of the process of plastering.
6 Observing and writing report of the process of water proofing of terrace or basement.
7 Observing the models, specimen of building materials kept in the model room for few building items and writing a report for any five models/materials.
8 Visit to a building where slab casting is in progress. **3**
9 Use of water level, plum bob, sprit level, Thread, gunia, etc. **2**
10 Study and use of various tools used in building construction.

Sub Code: CED304 Sub Name: HYDRAULICS 4 Credits

Unit 1. Properties Of Fluid : Definition of fluid, Difference in behavior of fluid with respect to solids. Introduction to fluid mechanics and hydraulics, Branches of hydraulics- Hydrostatics and hydrodynamics, Importance of Hydraulics with respect to Irrigation and Environmental engineering. Physical properties of fluid Mass density, Weight density, Specific volume, Specific gravity, Surface tension and capillarity, Compressibility, Viscosity, Newton's law of viscosity – Dynamic and kinematics viscosity. Ideal and Real liquids

Unit 2. Hydrostatic Pressure : Free liquid surface, Definition of pressure and its SI unit, Hydrostatic pressure at point, Pascal's law, Variation of pressure in horizontal and vertical direction in static liquid, Pressure diagram. Total hydrostatic pressure and center of pressure, Determination of total pressure & center of pressure on vertical& inclined faces of dams, sluice gates, sides and bottom of water tanks. Numerical Problems.

Unit 3. Measurement Of Liquid Pressure In Pipes : Concept of pressure head and its unit, Intensity of pressure, Variation of pressure with depth of liquid, Types of pressure- atmospheric gauge and absolute pressure. Conversion of pressure head of one liquid in to other, devices for pressure measurements in pipes – Piezometer, U-tube manometer, Bourdon's pressure gauge. Principle of working and limitations. Measurement of pressure difference using differential manometer – Utube differential manometer and inverted U-tube differential manometer. Simple Numerical Problems.

Unit 4. Fundamentals Of Fluid Flow : Concept of flow, Gravity flow and pressure flow. Types of flow – steady and Unsteady, uniform and non-uniform , Laminar and turbulent. Various combinations of flow with practical examples, Reynolds number and its application, Stream line and equi-potential line. Flow net and its uses. Discharge and its units, Continuity equation for fluid flow. Various forms of energies present in fluid flow-potential, kinetic, & pressure energy. Datum head, pressure head, velocity head and total head, Bernoulli's theorem, its assumptions and limitations. Loss of head and modified Bernoulli's theorem.s.

Unit 5. Flow Of Liquid Through Pipes : Loss of head due to friction, Darcy-Weisbach Equation Friction factor, relative roughness. Common range of friction factor for different types of pipe material. Minor loss of head in pipe flow- loss of head due to sudden Contraction, sudden expansion, gradual contraction & expansion, at entrance and exit of pipes and in various pipe fittings. Pipes in series and parallel, Equivalent pipe – Dupuit's equation. Hydraulic gradient line and Energy gradient line, Siphon pipe. Water hammer in pipes – cause effects and remedial measures, Use of Nomograms for design of water distribution system. Simple Numericals on head loss..

Unit 6. Flow Through Open Channel : Types of channels- artificial & natural, purposes of artificial channel, Different shapes of artificial channels. Geometrical properties of channel section – wetted area, wetted Perimeter, hydraulics radius. Prismatic channel sections, steady-uniformflow through prismatic channel section. Chezy's equation and Manning's

equation for calculation of discharge through an open channel, common range of values of Chezy's constants and Manning's constant of different types of channel surfaces. Most economical channel section, conditions for most economical channel sections. Froud's number and its significance. Critical, sub-critical and supercritical flow in channel, Hydraulic jump its occurrence in field, uses of hydraulic jump.

Unit 7. Flow Measuring Devices : Velocity measuring devices for open channels. Float surface, sub-surface and float rod, Pitot tube – principle, expression for velocity, current meter - cup type & propeller type. Discharge measuring devices for channels – Notches, Types of notches, expression for discharge. Francis formula, End contraction and velocity of approach, Weirs – Broad crested weir, ogee spillway, and expression for discharge. Flumes - Venturi flume, standing wave flume, expression for discharge. Velocity area method for measurement of discharge through open channels. Discharge measuring devices for pipes. Venturimeter – Component parts, principle of working, Study and use of Water meter, Flow through orifice. Orifice- Definition and use, Types of orifice based on various criteria. Coefficient of contraction, coefficient of velocity and coefficient of discharge, Relationship between them. Discharge through small sharp-edged circular orifice. Determination of hydraulic coefficient of orifice. Simple Numerical.

Unit 8. Hydraulic Machines : Pumps - Definition and types. Suction head, delivery head, static head and manometric head. Centrifugal pump - component parts and their functions, principle of working, priming. Reciprocating pump - component parts and working. Submersible pump and Jet pump. Selection and choice of pump. Computation of power required for pumps. Turbines - Definition and types.

REFERENCES

1 Hydraulics & Fluids Mechanics, Dr. P.N.Modi & Dr. S.M.Seth, Standard Book House, Dehli.
2. Hydraulics & Fluids Mechanics, S.Ramamrutham, Dhanpat Rai & Sons, Delhi.
3 A Text Book of Hydraulics, R.S.Khurmi.
4 Fluids Mechanics & Hydraulics Machines, S.Chand & Company

LIST OF EXPERIMENTS

1 Measurements of pressure and pressure head by Piezometer, U-tube manometer.
2 Measurement of pressure difference by U-tube differential manometer. Study of bourdon's gauge.
3 Verification of Bernoulli's theorem.
4 Reynolds experiment to study types of flow.
5 Determination of Darcy's friction factor for a given pipe.
6 Determination of Minor losses in pipes (any two).
7 Determination of Manning's constant or Chezy's constant for given rectangular channel Section.
8 Demonstration of Hydraulic jump.
9 Determination of coefficient of discharge for given rectangular or triangular notch.
10 Determination of coefficient of discharge for a given Venturimeter.
11 Demonstration and use of Pitot tube and current meter.
12 Determination of hydraulic coefficients for sharp edge orifice.
13 Study & use of water meter.
14 Study of a model of centrifugal and reciprocating pump.
15 Use of characteristic curves/ charts / catalogs from manufactures for selection of pump for the designed discharge and head (Refer IS: 9694)

Sub Code: CED305 **Sub Name: BUILDING DRAWING** **4 Credits**

UNIT 1 Conventions : Conventions as per IS:962-1967 and other practices Types of Lines – Visible line, Centerline, Hidden line, Section line, Dimension line, Extension line, Pointers, Arrow heads or dots. Dimensioning systems. Symbols – Materials used in construction, building components. Reading of available ammonia
prints of residential buildings

UNIT 2 Planning Of Building : Principles of planning of Residential and Public building. Space requirements and norms for various units of Residential and Public building. Rules and byelaws of local governing authorities for construction. Drawing of line
plans for Residential and Public building

UNIT 3 Building Drawing : Development of plan from line plan of a residential building, Elevation, Section, Site plan, Location Plan, Foundation plan, Area statement and other details. Submission Drawing and Working Drawing

UNIT 4 Detailed Drawing : Drawing of staircase, drawing of steel truss & lean to roof, drawing of layout plan of water supply line with accessories. Layout plan of sanitary line - position of inspection chamber, septic tank, sanitary fittings. Position of wash basin, sink
etc.

UNIT 5 Perspective Drawing : Definition, Necessity, Principles of Perspective Drawing, Terms used in perspective drawing, Two point perspective view of a small object like pedestal, step block, small single storied building with flat roof etc

REFERENCES

1 Text Book of Building Drawing, Shah, Kale & Patki
2. Elements of Building Drawing, D. M. Mahajan
3 Planning and Design of Building Y. S. Sane

LIST OF EXPERIMENTS

1.Drawing various types of lines, lettering and symbols of materials, doors and windows etc. Used in construction on Full Imperial size drawing sheet.
2.Drawing the lines plans of following buildings on Full Imperial size **graph paper.**
3.Residential Building (Min. three rooms)
4.Public Building – School building, Primary health center / Hospital building, Bank, Post Office, Hostel building etc.(At least four)
5.Measured Drawing of an existing residential Building (Load bearing/ Framed structure Type) , showing Plan , Elevation, Sections, Construction notes, Schedule of openings, Site Plan, Area statement etc.
6.Submission Drawing of two storied residential building (Framed structure type) showing Plans , Elevation, Sections, Foundation Plan ,construction notes, Schedule of openings, Site Plan ,Area statement etc.
7.Working drawing of above drawing sheet preferably one plan, section through stair case to scale 1:50
8.Two point perspective view of a building drawn in submission drawing.
9.Tracing of a submission drawing prepared at Sr. No.4 above.
10.Ammonia print of submission drawing prepared at Sr. No.4 above

Sub Code: DE9999 Sub Name: Professional Activities 0 Credits

Professional Activities is not a descriptive course, as per conventional norms;

therefore specific content for this course cannot be prescribed. It is a group of openended activities; where in variety of tasks are to be performed, to achieve objectives. However general guidelines for achieving the target and procedure for its
assessment are given under the course content. As the student has to practice this course in all the six semesters, the guidelines given therein are common and applicable to each semester.

Objectives:

To allow for professional development of students as per the demand of engineering profession.

- To provide time for organization of student chapter activities of professional bodies) i.e. Institute of engineers, ISTE or Computer Society of India etc.)
- To allow for development of abilities in students for leadership and public speaking through organization of student's seminar etc.
- To provide time for organization of guest lectures by expert engineers/eminent professionals of industry.
- To provide time for organization of technical quiz or group discussion or any other group activity.
- To provide time for visiting library or using Internet.
- To provide time for group discussion or solving case studies.
- To provide time for personality development of students.
- To provide time for working for social cause like awareness for environmental and ecology etc.

DETAILED INSTRUCTIONS TO CONDUCT PROFESSIONAL ACTIVITIES:

A. Study hours, if possible should be given greater time slot with a minimum of two hrs/week to a maximum of four hrs/week.

B. This course should be evaluated on the basis of grades and mark sheet of students, should have a separate mention of the grade awarded. There will be no pass/fail in professional activities (PA).

C. Following grade scale of evaluation of performance in PA has been established.

Grades	**Level of performance**
A	Excellent
B	Good
C	Fair
D	Average
E	Below Expectations

D. Grades once obtained in a particular examination shall become final and no chance of improvement in grades will be given to the students.

E. Assessment of performance in PA is to be done internally by the Institution, twice in a Semester/Term through a simultaneous evaluation of the candidate by a group of three teachers, of the deptt. Concerned. Group of teachers will jointly award the grade to candidate in the assessment. Best of the grades obtained by the student in these two assessments shall be finally taken on the mark sheet of the respective Semester/Term.
Candidate abstaining from the prescribed course work and/or assessment planned at the Institute shall be marked ABSENT in the mark sheet, instead of any grade.
F. While awarding the grades for performance in PA, examining teacher should reach the final consensus based on the attendance, punctuality, interest, presentation skills in seminar on the topic assigned (collection of relevant data, observations, analysis, findings/conclusion) and its written report, awareness of latest developments in the chosen programme of study.
G. Institution shall maintain the record of grades awarded to all the students in PA for a period of 1 year.
H. It shall be mandatory for students to submit a compendium for his PA in the form of a Journal.

I. Compendium shall contain following:
I. Record of written quiz.
II. Report/write up of seminar presented
III. Abstract of the guest lectures arranged in the Institution.
IV. Topic and outcome of the group discussion held.
V. Report on the problems solved through case studies.
VI. Report on social awareness camps (organized for social and environmental prevention).
VII. Report on student chapter activities of professional bodies like ISTE, IE (India), CSI etc.

J. PA is not a descriptive course to be taught in the classroom by a particular teacher. Various activities involved in the achievement of objectives of this course should be distributed to a number of teachers so that the talent and creativity of group of teacher's benefit the treatment of the course content.

These activities should preferably be conducted in English language to maintain continuity and provide reinforcement to skill development.
Small groups shall be formed like in tutorials, group discussion, case studies, seminar, project methods, roll play and simulation to make the development of personality affective.
Treatment of PA demands special efforts, attention, close co-operation and creative instinct on the part of teachers of department concerned. Since this course is totally learner centered, many of the activities planned under this course shall come out from the useful interaction of student, among themselves and with the teachers. The guide teacher/s shall best act as a facilitator of these creative hunts/ exercises, which unfold many of the hidden talents of the students or bring out greater amount of confidence in them, to execute certain activity.

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

SYLLABUS

For

DIPLOMA CIVIL ENGINEERING

(SECOND YEAR, 4TH SEM)

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Diploma CIVIL Engineering

List of Subject (Second Year, IV Sem)

Sub Code: CED 401 **Sub Name: ADVANCE SURVEYING** **4 Credits**

Unit 1: PLANE TABLE SURVEY : Principles of plane table survey. Accessories required. Setting out of plane table , Leveling ,Centering and orientation. Methods of plane table surveying – Radiation, Intersection, and Traversing. Merits and Demerits of plane table Surveying. situations where plane table survey is used. Use of Telescopic Alidade.

Unit 2: THEODOLITE SURVEY: Components of Transit Theodolite and Their functions. Technical terms used. Temporary adjustments of Transit Theodolite. Swinging the telescope, Transiting, Changing the face. Measurement of Horizontal angle, method of Repetition, errors eliminated by method of repetition. Measurement of Deflection angle. Measurement of Vertical angle. Measurement of magnetic bearing of a line by Theodolite. Prolonging a Straight line. Sources of errors in Theodolite Surveying. Permanent adjustment of transit Theodolite (only relationship of different axes of Theodolite.) Traversing with Theodolite – Method of included angles, locating details, checks in closed traverse,Calculation of bearings from angles. Traverse Computation - Latitude, Departure Consecutive Co-ordinates error of Closure, Distribution of a angular error, balancing the traverse by Bodwitch rule and Transit Rule, Gale's traverse table. simple problems on above topic.

Unit 3: TACHEOMETRIC SURVEY: Principle of Tacheometry. Essential requirements of Tacheorneter. Use of Theodolite as a Tacheometer with staff held in vertical and fixed hair method (No derivation). Determination of tacheometric constants, simple numerical problems on above topics

Unit 4 CURVES: Types of curves used in road and railway alignments. Notations of simple circular curve. Designation of curve by radius and degree of curves. Method of Setting out curve by offset from Long chord method and Rankine's method of deflection. angles. Simple Numerical problems on above topics.

Unit 5: ADVANCED SURVEY EQUIPMENTS: Construction and use of one second Micro Optic Theodolite, Electronic Digital Theodolite. Features of Electronic Theodolite Principle of E.D.M, Components of E.D.M and their functions, use of E.D.M. Total station

Unit 6: AERIAL SURVEY AND REMOTE SENSING: Aerial Survey Introductions, definition, Aerial photograph. Remote Sensing – Introduction, Electro-Magnetic Energy , Remote sensing system- Passive system , Active system. Applications – mineral, land use / Land cover, Natural Hazards and Environmental engineering system

REFERENCES

1 Surveying And Levelling N.N.Basak Tata Mc Graw-Hill
2. Surveying And Levelling,Part I And IIT .P. Kanetkar & S. V.Kulkarni, Pune Vidhyarthi
Griha Prakashan.
3 Surveying and Levelling, Vol. I And II, Dr. B. C. Punmiya Laxmi Plublication.
4 Text Book of Surveying, S.K.Husain & M.S. Nagaraj, S. Chand And Company.
5 Surveying and Levelling, Vol. I And II S. K. Duggal, Tata Mc Graw-Hill.

LIST OF EXPERIMENTS

1 Using accessories carry out temporary adjustments of plane table. Locating details by method of Radiation.
2 Locating details with plane table by method of intersection.
3 Understanding the components of Theodolite and their functions, reading the vernier and temporary adjustments of theodolite.
4 Measurement of Horizontal angle by transit theodolite.
5 Measurement of Horizontal angle by method of Repetition.
6 Measurement of vertical angles by theodolite.
7 Measurement of Magnetic bearing of a line using theodolite.
8 Measurement of deflection angle by taking open traverse of 4 –5 sides.
9 To find reduced levels and horizontal distances using theodolite as a Tacheometer.
10 To find constants of a given Tacheometer.
11 Study and use of 1 second Micro Optic Theodolite for measurement of Horizontal and Vertical angles.
12 Study of E.D.M. for knowing its components.
13 Use of EDM for finding horizontal and vertical distances and educed levels.
14 Determine the geographical parameters by total station.
15 Use of Arial survey (GPS, google earth, ISRO satellite etc.).

Unit 1. PHYSICAL PROPERTIES OF SOIL: Soil as a three phase system. Water content, Determination of water content by oven drying method as per IS code. Void ratio, porosity and degree of saturation, density index. Unit weight of soil mass – bulk unit weight, dry unit weight, unit weight of solids, saturated unit weight, submerged unit weight. Determination of bulk unit weight and dry unit weight by core cutter method and sand replacement method as per IS code. Specific gravity, determination of specific gravity by pycnometer

Unit 2. CLASSIFICATION OF SOIL : Field identification tests of fine grained soil, IS. classification chart. Consistency of soil, stages of consistency, Atterberg's. limits of consistency viz. Liquid limit, plastic limit and shrinkage limit, plasticity index. Determination of liquid
limit, plastic limit and shrinkage limit as per IS code. Classification of fine grained soil by using plasticity chart. Seive analysis of soil and sedimentation of soil, log, scale of particle size. Strokes law, Consistency limit diagram. Particle size distribution, mechanical sieve analysis as per. IS code particle size distribution curve, effective diameter of soil, Uniformity coefficient and coefficient of curvature, well graded and uniformly graded soils. Particle size classification of soils & IS classification of soil

Unit 3. PERMEABILITY OF SOIL & SEEPAGE ANALYSIS : Definition of permeability. Laminar and turbulent flow. Importance of permeability. Darcy's law of permeability, coefficient of permeability, typical values of coefficient of permeability for different soil. Factors affecting permeability. Determination of coefficient of permeability by constant head and falling head permeability tests, simple problems to determine coefficient of permeability. Seepage through earthen structures, seepage velocity, seepage pressure, phreatic line, flow lines and equipotential lines. Flow net, characteristics of flow net, application of flow net (no numerical problems)

Unit 4. SHEAR STRENGTH OF SOIL : Shear failure of soil, field situation of shear failure. Concept of shear strength of soil. Components of shearing resistance of soil – cohesion, internal friction. Mohr-coulomb failure theory (Coulomb's Law), Strength envelope, strength Equation. Purely cohesive and cohesion less soils. Laboratory determination of shear strength of soil – Direct shear test, Box shear test and tri-axial test Unconfined compression test & vane shear test, plotting strength envelope.

Unit 5. BEARING CAPACITY OF SOILS AND EARTH PRESSURE : 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. 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. Definition of active earth pressure and passive earth pressure, structures subjected to earth pressure in the field. Earth pressure, effective pressure. Neutral pressure, and total pressure Magnitude of earth pressure. Rankines theory, Assumptions made in the Rankine's theory. Earth

retaining structures. Earth pressure on earth retaining structures. Bearing capacity of soil during earthquake.

Unit 6. COMPACTION OF SOIL & STABILIZATION: 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. Modified proctor test. Factors affecting compaction. Field methods of compaction – rolling, ramming & vibration and Suitability of various compaction equipments. California bearing ratio, CBR test, significance of CBR value. Difference between compaction
and consolidation. 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

Unit 7. SITE INVESTIGATION AND SUB SOIL EXPLORATION : Necessity of site investigation & sub-soil exploration. Types of exploration – general , detailed. Method of site exploration open excavation & boring. Criteria for deciding the location and number of test pits and bores. Trial pits types of Augers. Auger boring, wash boring and percussion drilling. Disturbed & undisturbed soil samples for lab testing. Field identification of soil – dry strength test, dilitancy test & toughness test. Empirical correlation between soil properties and SPT values. Record of boring Bore hole log.

REFERENCES

Soil Mechanics & Foundation Engineering, Dr. B. C. Punmia, Standard Book house, New Delhi.
Soil Mechanics & Foundation Engineering, V.N.S. Murthi Tata McGraw Hill , New Delhi.
Soil Mechanics, B. J. Kasmalkar Pune Vidhyarti Griha, Pune
Geo-technical Engineering, Gulhati & Dutta Tata McGraw Hill , New Delhi

LIST OF EXPERIMENTS

1 Determination of water content of given soil sample by oven drying method as per IS Code.
2Determination of bulk unit weight dry unit weight of soil in field bycore cutter method as per IS Code.
3 Determination of bulk unit weight dry unit weight of soil in field by sand replacement method as per IS Code.
4 Determination of Liquid limit & Plastic limit of given soil sample as per IS Code.
5 Determination of grain size distribution of given soil sample by mechanical sieve analysis as per IS Code
6 Determination of coefficient of permeability by constant head test.
7 Determination of coefficient of permeability by falling head test Practical (Live demo or Prerecorded demo)
8 Determination of shear strength of soil using direct shear test.
9 Determination of shear strength of soil using Laboratory Vane shear test.
10 Determination of MDD & OMC by standard proctor test on given soil sample as per IS Code.
11 Determination of CBR value of given soil sample.
12 Determination of shear strength of soil using unconfined compressive strength.
13 Determination of shear strength of soil using tri-axial shear test.

Sub Code: CED403 **Sub Name: MECHANICS OF STRUCTURES** **4 Credits**

Unit 1 STRESS & STRAIN : Definition of rigid body, plastic body, mechanical properties of metal such as elasticity & elastic limit . Definition of stress, strain, modulus of elasticity, S.I. Unit.
Classification of stress, strain, Sign convention. Stress, strain curve for mild steel and HYSD bar , yield stress/ proof stress, Ultimate stress, breaking stress and percentage elongation. Deformation of body due to axial load. Deformation of a Body subjected to axial forces. Deformation of body of stepped c/s due to axial load, max. stress and min. stress induced. Stresses in bars of composite section & deformation. Shear stress, shear strain & modulus of rigidity, complementary shear stress, state of simple shear, punching shear

Unit 2. ELASTIC CONSTANTS & PRINCIPAL STRESSESS : Definition of lateral strain, Poisson's ratio, Change in lateral dimensions. Volumetric strain due to uni-axial force and change in volume. Biaxial and tri-axial stresses and volumetric strain & change in volume. Definition of bulk modulus, volumetric strain. Relation between modulus of elasticity, modulus of rigidity and bulk modulus. Definition of principal planes & principal stresses. Principal planes & stress due to bi-axial stress system & due to state of simple shear(Analytical method only). Strain Energy : Types of loading – gradual, suddenly applied load & Impact load. Definition of strain energy, modulus of resilience and proof resilience. Comparison of stresses due to gradual load, sudden load and impact load

Unit 3. SHEAR FORCE AND BENDING MOMENT : Types of beams - cantilever, simply supported, fixed and continuous beams, types of loading- point load, uniformly distributed load, support reactions for determinate structures. 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, overhanging beams and cantilever subjected to point loads, UDL and couples, point of contra flexure

Unit 4. MOMENT OF INERTIA : Concept of moment of inertia, M.I of plane areas such as rectangle, triangle, circle, semicircle and quarter circle. Parallel axis and perpendicular axis theorem, M.I of composite sections, built up sections, symmetrical and unsymmetrical sections, radius of gyration & polar moment of inertia.

Unit 5. Building Maintenance STRESSES IN BEAMS: Bending Stresses in Beams: 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, meaning of terms in equation, shear stress distribution for rectangular, hollow rectangular, circular sections and hollow circular sections, I sections and T sections. Relation between max. shear stress and average shear stress.

Unit 6. ANALYSIS OF TRUSSES: Definition frames, classification of frames, perfect, imperfect, redundant and deficient frame, relation between members and joints, assumption in analysis. Method of joint, method of section and graphical method to find nature of forces.

Unit 7. COLUMNS : End conditions, and equivalent length. Radius of gyration and slenderness ratio classification as per mode of failure. Euler's and Rankine's formulae. Use of Euler's and Rankine's
formulae in solving various problems

REFERENCES

1 Strength of Materials F. L. Singer, Harpe CollinsPublishers India , Delhi

2. Strength of Materials, R. S. Khurmi, S. Chand & Company, Delhi

3 Mechanics of Structures, S. B. Junnarkarvolume –I & II, Charotar Publishing House, Anand.

4 Strength of Materials, Sadhu Singh.

Sub Code: CED 404 **Sub Name: TRANSPORTAION ENGG.-I** **4 Credits**

Unit 1. OVERVIEW OF TRANSPORTATION ENGINEERING : Role of transportation in the development of nation. Modes of transportation system – roads, railway, airways, waterways, Importance of each mode, comparison and their relative merits and demerits. Necessity & importance of Cross drainage works for roads & railways.

Unit 2. RAILWAY ENGINEERING : Alignment and Gauges, Classification of Indian Railways, zones of Indian Railway. Alignment- Factors governing rail alignment. Rail Gauges – types, factors affecting selection of gauge. Rail track cross sections – standard cross section of BG & M.G Single & double line in cutting and embankment. Permanent ways.

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Unit 3. IDEAL REQUIREMENT, COMPONENT PARTS : *Rails* – function & its types. *Rail Joints* – requirements, types, *Creep of rail* - causes & prevention of creep. *Sleepers* – functions & Requirement, types – wooden, metal, concrete sleepers & their suitability, sleeper density. *Ballast* – function & different types with their properties, relative merits & demerits. *Rail fixtures & fastenings* – fish plate, bearing plates, spikes, bolts, keys, anchors & anti creepers. Railway Track Geometrics. Coning of wheels, tilting of rails, Gradient & its types, Super elevation, limits of Super elevation on curves, Cant deficiency, negative cant, grade compensation on curves. Branching of Tracks. Definition of point & crossing, a simple split switch turnout consisting of points and crossing lines. Sketch showing different components, their functions & working. Line sketches of track junctions-crossovers, scissor cross over, diamond crossing, triangle. Inspection of points and crossings. *Station and Yards* : Site selection for railway stations, Requirements of railway station, Types of stations (way side, crossing, junction & terminal) Station yards , types of station yard, Passenger yards, Goods yard Locomotive yard, its requirements, water column , Marshalling yard, its types. *Track Maintenance* - Necessity, types, Tools required and their function, organization, duties of permanent way inspector, gang mate, key man

Unit 4. BRIDGE ENGINEERING : Site selection and investigation Factors affecting selection of site of a bridge. Bridge alignment Collection of design data Classification of bridges according to
function, material, span, size, alignment, position of HFL. Component parts of bridge. Plan & sectional elevation of bridge showing component parts of substructure & super structure. Different terminology such as effective span, clear span, economical span, waterway, afflux, scour, HFL, freeboard, etc. *Foundation* – function, types Piers- function, requirements, types. *Abutment* – function, types, *Wing walls* – functions and types. *Bearing* – functions, types of bearing for RCC & steel bridges. *Approaches* – in cutting and embankment. *Bridge flooring*- open and solid floors. *Permanent and Temporary Bridges*- Permanent Bridges – Sketches & description in brief of culverts, causeways, masonry, arch, steel, movable steel bridges, RCC girder bridge, pre-stressed girder

bridge, cantilever, suspension bridge. Temporary Bridges- timber, flying, floating bridges *Inspection & Maintenance Of Bridge* - Inspection of bridges, Maintenance of bridges & types, routine & special maintenance.

Unit 5. TUNNEL ENGINEERING : Definition, necessity, advantages, disadvantages. Classification of tunnels. Shape and Size of tunnels. Tunnel Cross sections for highway and railways. *Tunnel investigations and surveying* –Tunnel surveying locating center line on ground, transferring center line inside the tunnel. *Shaft* – its purpose & construction. *Methods of tunneling in Soft rock* – needle beam method, fore-poling method. line plate method, shield method. *Methods of tunnelling in Hard rock* – Full face heading method, Heading and bench method, drift method. Precautions in construction of tunnels. *Drilling equipments*-drills and drills carrying equipments. Types of explosives used in tunnelling. Tunnel lining and ventilation.

REFERENCES

1 Railway Engineering, S.C. Saxena Dhanpatrai & sons
2. Railway Track K.R. Antia, The New Book Co. Pvt. Ltd Mumbai
3 Principles of Railway Engineering S.C. Rangwala, Charotar Publication.
4 Principles and Practice of Bridge Engineering,
S.P. Bindra Dhanpatrai & sons.
5 A Text Book of Transportation Engineering N.L.Arora and S.P.Luthra, IPH New Delhi.

TOPICS FOR VISITS & REPORTS

1. Through packing
2. Shovel packing
3. Track maintenance
4. Systematic overhauling
5. Lifting of track
6. Lowering of track
7. Counteraction, measurement and adjustment of creep
8. Organization, Tools and equipments for maintenance.
9. Maintenance of points and crossings
10. Maintenance of level crossing.
11. Maintenance of proper Drainage
12. Maintenance of gauge
13. Maintenance of track components.
14. Welding of Rails.
15. Visit to a nearby bridge site where the construction is in Progress
16. Visit for cross drainage works for roadways and railways

Other items may be suggested by Teacher/guide

Sub Code: DE411 **Sub Name: ENTERPRENEURSHIP** **4 Credits**

UNIT 1 INTRODUCTION TO ENTERPRENEURSHIP

- Definition of Entrepreneur / Entrepreneur
- Difference between Entrepreneurship / Entrepreneurship
- Need for Entrepreneurship
- qualities of successful entrepreneur
- Myths about Entrepreneurship
- Classification of entrepreneurs on the basis of different criteria
- Reasons for the failure of entrepreneurs

UNIT 2 INDUSTRIES AND BUSINESS ORGANIZATIONS

- Concept of Industry or Enterprise
- Classification of Industries

(a) On the basis of capital investment
- Tiny (Micro) Industry
- Small Scale
- Medium Scale
- Large Scale

(b) Others
- Rural Industry
- Cottage Industry

(c) Forms of Business Organization
- Proprietorship
- Board & Co-operative
- Partnership
- Public Ltd.
- Private Ltd.
- IT Sector
- Government Co-operative / Undertakings

(d) Tiny small scale Industry
- Definition
- Its significance in National Development.
- Govt. policies for SSI promotions

UMIT 3 INCENTIVES / CONCESSION / FACITLITIES AVAILABLE

- Seed money
- Incentive / subsidies
- Others (Phones, Lands etc)

UNIT 4 ACHIVEMENT MOTIVATION

- Historical perspective
- Concept of achievement motivation

- Significance of achievement motivation
- Development of achievement motivation

UNIT 5 FINANCIAL MANAGEMENT OF AN INDUSTRIAL UNIT (SSI)

- Tools of financial analysis
- Ratio analysis
- Fund Flow / Cash flow analysis
- Working capital and concepts
- Financial accounting

REFERENCES

1 Entreprenerial Development Vol. I,II,III By Vasant desai Himalaya Publicaton

2 CEDMAP (Center of Entrepreneurial development Madhya Pradesh)

3. Udyamita Vikas By Anand Prakashan

LIST OF EXPERIMENTS

1. To prepare chart to showing various factors affecting entrepreneurship.
2. To collect details related to various schemes run by the Govt. for Self-Employment and Entrepreneurship.
3. To identify and select a project and conduct Market-Survey thereof.
4. To collect various formats used in industries & departments/institutions working in the field of entrepreneurship.
5. Visit few small scale industries situated in city, nearby industrial area.
6. Discuss the problems related to SSI (Small Scale Industries) with an entrepreneur.
7. Collect information about market rates quality and quantity of goods for their choice.
8. Develop logical and analytical approach to purchase the raw material / finished goods.
9. To prepare case study of successful entrepreneurs.
10. Preparation of Project report for the industry/ Business they are willing to start.

Sub Code: DE412 Sub Name: MARKETING MANAGEMENT 4 Credits

UNIT 1. MARKETING & CONCEPT

1.1 Evolution of marketing-a historical background
- 1.1.1 The stage of barter
- 1.1.2 The stage of money economy
- 1.1.3 The stage of industrial revolution
- 1.1.4 The stage of competition
- 1.1.5 The emergence of marketing

1.2 Selected definitions of marketing

1.3 Different concept of marketing
- 1.3.1 The exchange concept
- 1.3.2 The production concept
- 1.3.3 The product concept
- 1.3.4 The sales concept
- 1.3.5 The marketing concept

1.4 Difference between selling & marketing

1.5 Benefits & significance of marketing
- 1.5.1 Helps to remove causes for under development
- 1.5.2 Improve productivity & efficiency
- 1.5.3 Canalize country's economic resources properly
- 1.5.4 Insure better deal for consumer
- 1.5.5 Make economic planning meaningful

UNIT 2 MARKETING ENVIRONMENT

2.1 Internal & external factors
- 2.1.1 Demographic environment
- 2.1.2 Economic environment
- 2.1.3 Political environment
- 2.1.4 Physical environment
- 2.1.5 Technological environment

UNIT 3 MARKETING PLANNING & ORGANIZATION

3.1 Scope & importance of planning

3.2 Steps in marketing planning process

3.3 Purpose & principle of organization

3.4 Models of marketing organization
- 3.4.1 Line & staff type
- 3.4.2 Product based organization
- 3.4.3 Territory oriented organization
- 3.4.4 Complex organization

3.5 Task of chief marketing executive

3.6 Decentralization

UNIT 4 MARKET SEGMENTATION

4.1 Types of market
4.2 Definitions & benefits of segmentation
4.3 Method s of segmentation
    4.3.1 Geographic segmentation
    4.3.2 Demographic segmentation
    4.3.3 Psychographic segmentation
    4.3.4 Buyer behavior Segmentation
    4.3.5 Volume segmentation
4.4 Steps in market segmentation
4.5 Market targeting

UNIT 5 **MARKET MIX**

5.1 Definition of market mix
5.2 Elements of marketing mix (4 P'S)-Product, Place, Price, Promotion
5.3 Environmental variable (uncontrollable variables)
    5.3.1 Customer variable
    5.3.2 Competition variable
    5.3.3 Trade variable
    5.3.4 Environmental variable

REFERENCES

1 Marketing management -Analysis, Planning & ControlPhilip Kotler

2 Principles & practice ofMarketing in IndiaC.B.Memoria &R.L.Joshi

Sub Code: CED406 **Sub Name: COMPUTER AIDED DRAWING** **2 Credits**

A: Building Drawing : Following exercises shall be completed with CAD software and Print of all the drawings should be prepared on A3 / A4 size paper :

1) Preparation of line plan of a residential building.
2) Preparation of line plan of a Public building.
3) Preparation of detailed plan of a small residential building
4) Preparation of submission drawing of residential building
– showing Plan, Elevation, Section, Schedule of openings,
Site Plan and Area Statement

B: Civil Engineering Drawing: Preparation of Drawings with
CAD software for the following exercises (Any *Three*) and Print of all the drawings should be prepared on A3 /A4 size paper.

1) Plan, Cross Section and Longitudinal section of a Culvert (Pipe culvert/Box Culvert).
2) Section of an Earthen Dam.
3) Plan and Section of K. T. Weir.
4) Cross Section of Retaining wall.
5) Bonds in brickwork – Plan and Elevation for English bond and Flemish bond for one brick thick wall.
6) Cross Section of ESR (Over Head Tank).
7) Cross Section of Clarri - flocculator

Sub Code: DE9999 Sub Name: Professional Activities 0 Credits

Professional Activities is not a descriptive course, as per conventional norms; therefore specific content for this course cannot be prescribed. It is a group of openended activities; where in variety of tasks are to be performed, to achieve objectives. However general guidelines for achieving the target and procedure for its assessment are given under the course content. As the student has to practice this course in all the six semesters, the guidelines given therein are common and applicable to each semester.

Objectives:

To allow for professional development of students as per the demand of engineering profession.

- To provide time for organization of student chapter activities of professional bodies) i.e. Institute of engineers, ISTE or Computer Society of India etc.)
- To allow for development of abilities in students for leadership and public speaking through organization of student's seminar etc.
- To provide time for organization of guest lectures by expert engineers/eminent professionals of industry.
- To provide time for organization of technical quiz or group discussion or any other group activity.
- To provide time for visiting library or using Internet.
- To provide time for group discussion or solving case studies.
- To provide time for personality development of students.
- To provide time for working for social cause like awareness for environmental and ecology etc.

DETAILED INSTRUCTIONS TO CONDUCT PROFESSIONAL ACTIVITIES:

A. Study hours, if possible should be given greater time slot with a minimum of two hrs/week to a maximum of four hrs/week.

B. This course should be evaluated on the basis of grades and mark sheet of students, should have a separate mention of the grade awarded. There will be no pass/fail in professional activities (PA).

C. Following grade scale of evaluation of performance in PA has been established.

Grades	**Level of performance**
A	Excellent
B	Good
C	Fair
D	Average
E	Below Expectations

D. Grades once obtained in a particular examination shall become final and no chance of improvement in grades will be given to the students.

E. Assessment of performance in PA is to be done internally by the Institution, twice in a Semester/Term through a simultaneous evaluation of the candidate by a group of three teachers, of the deptt. Concerned. Group of teachers will jointly award the grade to

candidate in the assessment. Best of the grades obtained by the student in these two assessments shall be finally taken on the mark sheet of the respective Semester/Term.
Candidate abstaining from the prescribed course work and/or assessment planned at the Institute shall be marked ABSENT in the mark sheet, instead of any grade.

F. While awarding the grades for performance in PA, examining teacher should reach the final consensus based on the attendance, punctuality, interest, presentation skills in seminar on the topic assigned (collection of relevant data, observations, analysis, findings/conclusion) and its written report, awareness of latest developments in the chosen programme of study.

G. Institution shall maintain the record of grades awarded to all the students in PA for a period of 1 year.

H. It shall be mandatory for students to submit a compendium for his PA in the form of a Journal.

I. Compendium shall contain following:

I. Record of written quiz.

II. Report/write up of seminar presented

III. Abstract of the guest lectures arranged in the Institution.

IV. Topic and outcome of the group discussion held.

V. Report on the problems solved through case studies.

VI. Report on social awareness camps (organized for social and environmental prevention).

VII. Report on student chapter activities of professional bodies like ISTE, IE (India), CSI etc.

J. PA is not a descriptive course to be taught in the classroom by a particular teacher. Various activities involved in the achievement of objectives of this course should be distributed to a number of teachers so that the talent and creativity of group of teacher's benefit the treatment of the course content.

These activities should preferably be conducted in English language to maintain continuity and provide reinforcement to skill development.
Small groups shall be formed like in tutorials, group discussion, case studies, seminar, project methods, roll play and simulation to make the development of personality affective.
Treatment of PA demands special efforts, attention, close co-operation and creative instinct on the part of teachers of department concerned. Since this course is totally learner centered, many of the activities planned under this course shall come out from the useful interaction of student, among themselves and with the teachers. The guide teacher/s shall best act as a facilitator of these creative hunts/ exercises, which unfold many of the hidden talents of the students or bring out greater amount of confidence in them, to execute certain activity.

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

SYLLABUS

For

DIPLOMA CIVIL ENGINEERING

(THIRD YEAR, 5th SEM)

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Diploma Civil Engineering

List of Subject (Third Year, 5th SEM)

Unit 1 INTRODUCTION

Definition – Irrigation and irrigation engineering, advantages of irrigation, ill effects of over irrigation, and types of irrigation project purpose wise and administrative wise, Methods of irrigation. Analyze data for irrigation project, supervision of reservoir and canal structure, weir and barrages, lift irrigation scheme, its suitability, advantages and limitations Capacity of reservoir ,Principle of Hydrology Relation between water and crop Rainfall, Crops, Dams Weir, Barrages, Area Capacity curve Capacity Canal Concept of runoff duty delta and base period

Unit 2 HYDROLOGY

Hydrological cycle**,** Definition of rainfall , rain gauge and rain gauge station , types of rain gauges (names only) average annual rain fall and its calculation , definition of run off, factor affecting run off, calculation of run off by run off coefficient, English formula , Stranges and Binnie's tables and curves. Maximum flood discharge and methods of calculation. Unit hydrograph Yield and Dependable yield and methods calculation.

Unit 3 WATER REQUIREMENT OF CROPS

Cropping seasons and crop in Madhya Pradesh. Definition – Crop period base period Duty Delta , factors affecting Duty , relation between Duty Delta and base period Definition – CCA , GCA, IA, intensity of irrigation time factor capacity factor. Crop rotation. Problems on water requirement and capacity of canal. Assessment of irrigation water

Unit 4 INVESTIGATION AND RESERVOIR PLANNING

Survey for irrigation project data collected for irrigation project. Area capacity curve, silting of reservoir, rate of silting, factors affecting silting, methods to control levels and respective storage in reservoir. Fixing control levels

Unit 5 DAMS AND SPILLWAYS

Types of dams – Earthen dams and Gravity dams (masonry and concrete) Comparison of earthen and gravity dams with respect to foundation, seepage, construction and maintenance Earthen Dams – Components and their function , typical cross section seepage through embankment and foundation seepage control though embankment and foundation . Methods of constructions, types of failure of earthen dams and remedial measures. Gravity Dams Theoretical and practical profile, typical cross section, drainage gallery, joint in gravity dam, high dam and low dam Spillways-Definition, function, location and components. Emergency and services, ogee spillway and bar type spillway, discharge over spillway. Spillway with and with out gates

Unit 6 SMALL IRRIGATION STRUCTURE , BANDHARA, PERCOLATION TANKS AND LIFT IRRIGATION

Advantages and disadvantages of Bandhara irrigation layout and component parts, solid and open Bandhara. Percolation Tanks – necessity and importance, selection of site. Layout of lift irrigation scheme. Irrigation department standard design and specification. Small irrigation structures, like Stop dam, stop dam cum cause way, ring bund , small ponds

Unit 7 DIVERTION HEAD WORKS

Weirs – components parts, unction and types, layout of diversion head works wits its components and their function, canal head regular, silt excluders and silt ejectors. Barrages – components and their function. Difference between weir and barrage irrigation department standard design and specifications.

Unit 8 CANALS

Classification of canals according to alignment and position in the canal network. Design of most economical canal section. Canal lining – Definition, purpose, types of canal lining advantages of canal lining properties of good canal lining material. CD. works- different C.D. works, canal falls, escapes, cross regulators and canal outlets

LIST OF REFEENCE BOOKS

1. Irrigation and water power Engineering by B.C. Punmia
2. Introductory Irrigation Engineering by B.C. Punmia Laxmi Publication, Delhi.
3. Fundamental principle of Irrigation Engineering by V.B. Priyani
4. Fundamental principle of Irrigation Engineering by Bharat Singh
5. Irrigation Engineering. & Hydraulic structures by S.K. Garg Khanna publisher, New Delhi
6. Principles of Irrigation. Engineering by S.K. Verma
7. Irrigation Engineering by Birdie.

Unit 1 Overview Of Estimating & Costing

Meaning of the terms estimating, costing. Purpose of estimating and costing . Types of estimate - Approximate and Detailed. Approximate estimate Types- Plinth area rate method, Cubic Content method, Service Unit method, Typical bay method, Approximate Quantity method , Problems on Plinth area rate method & application of Service unit method for selection of service unit for different types of civil Engineering Structures. Types of detailed estimate, Detailed estimate for new work. Revised estimate. Supplementary estimate. Revised & Supplementary estimate. Maintenance & Repair estimate. Uses of detailed estimate

Unit 2 Detailed Estimate

Unit quantity method, Total quantity method, Data required for detailed estimate. Factors to be considered during preparation of detailed estimate, Specification, Quantity availability of material, Location of site, Labour Component. Steps in preparing detailed estimate. Taking out quantities, squaring, abstracting. Preparing check list – by adoption of Sequence of execution. drafting Brief Specification of items, contents of measurement Sheet , Abstract sheet , face sheet

Unit 3 Mode of Measurements.

General Rules for fixing units of Measurements for different– items of work as per IS 1200 & As per PWD Hand Book , Desired accuracy in taking measurements of various items of work & rules for deductions as per IS 1200 & P.W.D. handbook.

Unit 4 Procedure for Preparing Detailed Estimate

Procedure for taking out quantities for various items of works by P.W.D & IS 1200 for.
a) for Load bearing Structure –Long Wall and short wall method, Center line method .
b) Framed Structure building. --
- By using thumb rules for reinforcement quantity calculation
- By preparing bar bending Schedule

Provisions in detailed estimate for contingencies, work charged establishment, Provisional items, Provisional Sum,
Provision for water Supply & Sanitary works, Electrical wiring & installations, centage charges, Tools & Plants, Prime cost, Day work.

Unit 5 Rate analysis

Meaning of term Rate analysis –Factors affecting rate analysis, lead, lift, task work, materials and labour component, Market Rate and labour rate.
Transportation of Materials, load factor for different materials. Standard lead , extra lead, Transportation Charges , Labour - Categories of labours, labour rates, overheads contractor's profit, water charges, taking out quantities of materials for different items of works.
Preparing rate analysis of different items of work
Standard Schedule of rates, full rates & labour rates.

Unit 6 Taking out quantities of work for different Civil Engineering Works

Roads, Dam , Canals ,Railway embankments, methods of mean area , mid sectional area, trapezoidal, Prismoidal formula. Calculation of quantity of earth work. Estimate of Road of 1km. length for pavement surface – WBM Bitumen Cement concrete road Use of software for estimation & for analysis of rates.

LIST OF REFEENCE BOOKS

1. Estimating & costing in Civil Engineering by B.N. Datta UBS Publishers Distributors
2. Pvt Ltd New Delhi
3. Estimating & costing, Specification and Valuation in Civil Engineering by M. Chakraborti M. Chakraborti , Calcutta
4. Estimating & costing by S.C. Rangwala Charotar Publication Anand
5. Civil Engineering Estimating, Contracts and accounts Vol . I by B.S. Patil Orient Longman, Mumbai
6. Estimating & costing by G. S. Birdie Dhanpat Rai and Sons Delhi

Sub Code: CED 503 Sub Name: WORK ORGANIZATION & MANAGEMENT 4 Credits

Unit 1 Procedure of Execution of work by P.W.D.
Organization of P.W.D. functions of their personnel. P.W.D. procedure of initiating the work administrative approval, technical sanction, budget provision. Method used in P.W.D. for carrying out works contract method and departmental method, Rate list method, piece work method, day's work method, department method. (NMR and casual muster roll).

Unit 2 Contract
Definition of contract, objects of contract, requirements of valid contract. Types of engineering contract- Lump sum contract, item rate contract, percentage rate contract, cost plus percentage, cost plus fixed fee, cost plus variable percentage and cost plus variable fee contract, labor contract, demolition contract , fee contract, target contract, negotiated contract. Class of contractor, Registration of contractor. BOT Project.

Unit 3 Tender & Tender documents
Definition of Tender, necessity of Tender, Types of Local & Global.Tender Notice, points to be included while drafting Tender Notice, Drafting of Tender Notice. Meaning of terms: Earnest money, security deposit, validity period, right to reject one or all tenders, corrigendum to tender notice and its necessary. Tender documents – List, scheduled A, Schedule B, Schedule C. Terms related to Tender documents – Contract conditions, time limit, time extension, penalty, defective material and workmanship, Termination of contract, Suspension of work, subletting of contract, extra item, escalation, arbitration, price variation clause, defect liability period, liquidated and un liquidated damages. Filling the tender by contractor and points to be observed by him.Procedure of submitting filled in Tender document. Procedure of opening tender, comparative statement, scrutiny of tenders, award of contract, acceptance letter and work order. Unbalanced Tender, Ring Formation.

Unit 4 Accounts of P.W.D.
Various Accounts Forms and their uses – measurement, Books, Nominal Muster Roll, Imprest Cash, indent, Invoice, Bills, Vouchers, Cash Book, Temporary advance

Unit 5 Payment to Contractors
Mode of payment to the contractor : Interim payment and its necessity, Advance payment, secured advance, on account payment, Final payment, first and final payment, retention money, reduced rate payment, petty advance, mobilization advance.

Unit 6 Specifications
Necessity and importance of specifications of an items, points to be observed in framing specifications of an item, types of specification. Brief and detailed, standard and manufacturers specifications. Preparing detailed specifications of items in Civil engineering works, standards specification book. Legal aspects of specification.

Unit 7 CASH, BILLS, AUCTION & T.A. RULES
Procedure to settle account of money received, modes of payment, permanent and temporary advance, comparison, checking of bills and vouchers, auction procedure, T.A. rules etc.

Unit 8 TIME SCHEDULE FOR WORKS

Importance of management of works Gantt bar chart, limitation of chart, CPM network, project chart

Unit 9 MISCELLANEOUS

Necessity of maintaining daily dairy, need for presence of sub engineer, A/R & S/R , charge to be handled to be cash transferred, inspection of rest houses. Measures to improve the efficiency of labour, causes of accident, trade unions, aims of labour legislation, labour courts, attitudes of sectional officers towards labour

LIST OF REFERENCE BOOKS

1. A.B.C. of PWD Accounts by C.M. Kaul
2. Overseer accounts & Duties by Kumar
3. PWD Managements, Accounts & Labour Relation by H.S. Pandit
4. Construction Management & PWD Accounts by Agrawal & Arora
5. MPPWD Manual Vol-I & Vol-II
6. Manual of Labour Relations by R.C. Shrivastava
7. Civil Engineering management by O.N. Wakhle, D.K. Publisher
8. Estimating & costing in civil Engg by B.N. Datta USB Publisher
9. Estimating & costing by G.S. Birdie Dhanpat rai & son

Assignments:

1. Collecting old set of tender document and writing a report on it.

2. Collection of tender notices published in newspapers for various items of civil engineering works (At least 5) write salient features of them.

3. Drafting Tender Notice for construction of a Civil Engineering work (W.B.M. Road, Residential Building)

4. Preparation of Tender Document for the building. (Detailed Estimate prepared for R.C.C. building in estimating and costing shall be used)

5. Collection of various account forms from PWD & wiring report on in it.

6. Writing a report on store procedure and account producer of PWD. For it A – a) Guest Lecture of PWD Official may be arranged.

7. Writing detailed specifications for one item from each of following :

A) Building construction system.

B) Irrigation engineering system.

C) Transportation engineering system.

D) Environment engineering system.

8. Preparing muster rolls.

9. Preparing imprest account and temporary advance forms and developing skill for filling in forms.

10. Solving CPM and Net work problems

11. CPM PERT RELATED SOFTWARE

12. Preparation a ‘ E” Tendering of a particular project .

VISITS:

1. Visit to public sector/Govt. Industry/ Organization.like PWD ,RES,

2. Visit to private sector Industry.

Sub Code: CED 504 Sub Name: TRANSPORTATION ENGINEERING - II 6 Credits

Unit 1 ROAD ENGINEERING

Importance of road in India. Classification of roads according to Nagpur plan (Location and function), and third road development plan. Traffic and tonnage, Classification of urban roads.different road yojana ,like pradhan mantra gram sadak yojana ,Mukhya mantra sadak yojna .

Unit 2 INVESTIGATION FOR ROAD PROJECT

Reconnaissance survey, Preliminary survey and Location survey for a road project. Detailed survey for cross drainage- L-section and C/S sections. Fixing the alignment of road, factors affecting alignment of road. Drawings required for road project- Key map, Index map, Preliminary survey plan and detailed location survey plan, L section and C/S sections cross drainage work, land acquisition plan. Survey for availability of construction material, location plan of quarries

Unit 3 GEOMETRIC DESIGN OF HIGHWAYS

Camber- definition, purpose, types, IRC – specifications. Kerbs, road margin, road formation, right of way. Design speed- IRC – specifications. Gradient – definition, types, IRC specification. Sight distances– definition, types, IRC specification. Curves–Necessity, types– horizontal, vertical and transition curves. Widening of roads on curves. Super Elevation – definition, formula for calculating super elevation, minimum and maximum values of super elevation, and methods of providing super elevation. Sketching of standard C/S of national highway in embankment and cutting. Simple problems on geometric design of road

Unit 4 CONSTRUCTIONS OF ROADS PAVEMENTS AND MATERIALS

Types of road materials and Tests – soil, aggregates, bitumen, Cement Concrete. Test on soil sub grade- C.B.R. test, Test on Aggregate – Los Angeles abrasion, impact, and shape test. Tests on bitumen- Penetration, Ductility and Softening point test. Pavement – objective of pavement, structure of pavement, function of pavement components, types of pavement. Construction of earthen road – general terms used- borrows pits, spoil bank, lead and lift, balancing of earthwork. Construction procedure. Soil stabilized roads – necessity, methods of soil stabilization, brief details of mechanical soil stabilization. Water bound macadam roads – materials used, size and grading of aggregates and screening, construction procedure including precautions in rolling. Construction of bituminous roads. Terms used– bitumen, asphalt, emulsion, cutback, tar, common grades adopted for construction. Types of bituminous surface – prime coat, tack coat, seal coat, Surface dressing – procedure of construction bituminous penetration macadam, and Bitumen/Tar carpets – procedure of construction. Cement concrete pavements- Construction procedure and equipments, Construction joints, joint filler, joint sealer.

Unit 5 TRAFFIC ENGINEERING

Traffic volume study, Traffic control devices-road signs, marking, Signals, Traffic Island. Road intersections- intersections at grade and grade separator intersections. Road accident. Building

code IS:1904. Definition of active earth pressure and passive earth pressure, structures subjected to earth pressure in the field

Unit 6 HILL ROADS

Parts and functions of hill road components, types of curves, Hill road formation. Land slides-causes and prevention. Structures- drainage structures

Unit 7 DRAINAGE OF ROADS

Surface drainage – side gutter, catch water drains, surface drainage. Sub-surface drainage – Longitudinal drains and cross drains

Unit 8 MAINTENANCE AND REPAIRS OF ROADS

Necessity of maintenance of roads, Classification of maintenance operation – ordinary, routine and periodic maintenance. Maintenance of W.B.M., bituminous and cement concrete roads.

Unit 9 ARBORICULTURE

Road side arboriculture, necessity, planning of plantation of trees selection of types of threes and development of nursery considering the environment aspects.

LIST OF REFERENCE BOOKS

1. Highway Engineering by Khanna & Justo Khanna Pub.
2. Traffic Engineering by L.R. Kadiyali
3. Transportation Engineering by N.L.Arora,S.P.Luthara I.P.H. New Delhi
4. Transportation Engineering by Vazarani & Chandola Khanna Pub.
5. Road, Railway, Bridges by Biridi & Ahuja. S.B.H.New Delhi
6. Transportation Engineering by Kamala T.M.H. New Delhi
7. DATA book of P.W. D.
8. MOST

IS / International Codes. : IRC 36 – 1970, IRC 16 –1965, IRC 20 -1966

SUGGESTED TERMS –WORK

List of Assignments:

1. Road project for a road of minimum 0.5 km. length having at least one small cross drainage work.

Site selection.

Reconnaissance survey.

Fixing the alignment.

Detailed profile survey along the alignment and cross section of road and CD Work.

Prepare computer generated drawing of longitudinal section and typical cross sections of the road in cutting and filling.

Prepare computer generated drawing of proposed typical CD work/culvert. (Using CAD)

2. Visit to a road under construction/constructed to study the construction of (a) WBM road (b) flexible pavement (c) Rigid pavement roads for observing the type of construction and construction equipments.

3. Preparing drawings of detailed cross sections of (a) major district road (b) state Highway (c) National highway (d) Express Highway in cutting and banking showing details and dimensions with proper scale. (Any two)

4. Traffic volume study and its representation of an important road intersection in your city.

5. Visit to a W.B.M. and Bituminous road for observing the different types of defects in roads.

6. Prepare a visit report. Which should consist of (a) List of various defects observed b) Suggestions regarding the possible remedial measure.

7. Types of road materials and Tests – soil, aggregates, bitumen, Cement Concrete. Test on soil sub grade- C.B.R. test, Test on Aggregate – Los Angeles abrasion, impact, and shape test. Tests on bitumen- Penetration, Ductility and Softening point test.

8. Study of Different Highway software. Road SOR , MOST

1- Geometrics 2- Pythagoras 3- C-Lx

Sub Code: CED 505 Sub Name: Structural Design & Drafting – I (RCC) 6 Credits

Unit 1 INTRODUCTION TO RCC

S.I. Units, Meaning of R.C.C. purpose of reinforcement. Materials of reinforcement steel as a reinforcing material. Types of steel used for reinforcement mild steel, Tor steel, permissible stresses in concrete and steel. Different mixes of concrete to be used for R.C.C. work use of I.S. code No. 456-2000 and I.S. 875-1984 for designing R.C.C. structures. Introduction to RCC design software like STRUUDS,resist,

Unit 2 FIXED & CONTINUOUS BEAM

Concept of fixity, effect of fixity, advantages and disadvantages of fixed beam. Fixed end moments from first principle for beam subjected to UDL over entire span, central point load, Point load other than mid span. Application of standard formulae in finding moments and drawing S.F. and B.M. diagrams for a fixed beam. Clapevron's theorem of three moment (no derivation). Application of theorem maximum up to three spans and two unknown support moment only, Support at same level, spans having same moment of inertia subjected to concentrated loads and uniformly distributed loads over entire span. Drawing SF and BM diagrams for continuous beams.

Unit 3 Working Stress Method & Prestressed Concrete

Introduction to reinforced concrete, R.C. Sections their behavior, grades of concrete steel. Permissible stresses, Assumptions in W.S.M. Equivalent bending stress distribution diagram for singly reinforced section. Concept of under-reinforced, over-reinforced and balanced section, neutral axis co-efficient Simple numerical problems on determining design constants, moment of resistance and area of steel for singly & doubly reinforced beam. Concept of pre stressed concrete, externally and internally pre stressed member. Advantages and disadvantages of pre stressed concrete. Methods of pre stressing, pre tensioning and post tensioning. Losses in pre stressing.(No numerical problems shall be asked in written examination on pre-stressed concrete).

Unit 4 Limit State Method

Definition, types of limit states, partial safety factors for materials strength, characteristics strength, characteristics load, design load. Loading on structure as per I.S. 875.

I.S. Specification regarding spacing of reinforcement in slab, cover to reinforcement in slab, beam column & footing, minimum reinforcement in slab, beam & column, lapping, anchoring effective span for beam & slab.

Unit 5 Analysis and Design of Singly Reinforced Sections (LSM)

Limit State of collapse (Flexure), Assumptions stress. Strain relationship for concrete and steel neutral axis, Stress block diagram and Strain diagram for singly reinforced section. Concept of under-reinforced, over-reinforced and balanced section, neutral axis co-efficient, limiting value of moment of resistance and limiting percentage of steel required for balanced singly R.C. Section.

Simple numerical problems on determining design constants, moment of resistance and area of steel.

Unit 6 Analysis and Design of Doubly Reinforced Sections (LSM)
General features, necessity of providing doubly reinforced section reinforcement limitations. Analysis of doubly reinforced section, strain diagram stress diagram, depth of neutral axis, moment of resistance of the section. Simple numerical problems on finding moment of resistance and design of beam sections.

Unit 7 Shear, Bond and Development Length (LSM)
Nominal Shear stress in R.C. Section, design shear strength of concrete, Maximum shear stress, Design of shear reinforcement, Minimum shear reinforcement, forms of shear reinforcement. Bond and types of bond, Bond Stress, check for bond stress, Development length in tension and compression, anchorage value of hooks 90° bend and 45° bend Standard Lapping of bars, check for development length.Simple numerical problems on deciding whether shear reinforcement is required or not, check for adequacy of the section in shear. Design of shear reinforcement; Minimum shear reinforcement in beams; Determination of Development length required for tension reinforcement of cantilevers beams and slab, check for development length.

Unit 8 Analysis and Design of T-Beam (LSM)
General features, advantages, effective width of flange as per IS:456-2000 code provisions.
Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam Section with neutral axis lying within the flange.Design of T-beam for moment and shear for Neutral axis within or up to flange bottom. Simple numerical problems on deciding effective flange width.(Problems only on finding moment of resistance of T-beam section with N.A. lies within or upto the bottom of flange shall be asked in written examination.

Unit 9 Design of Slab (LSM)
Design of simply supported one-way slabs for flexure check for deflection control, and shear.
Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear. Design of two-way simply supported slab for flexure with corner free to lift. Design of dog-legged staircase. Simple numerical problems on design of one-way simply supported slabs cantilever slab & two –way simply supported slab. (No problem on design of dog-legged staircase shall asked in written examination.)

Unit 10 Design of Axially Loaded Column and Footing (LSM)
Assumptions in limit state of collapse- compression.
Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties. Analysis and design of axially loaded short, square; rectangular and circular columns with lateral ties only, check for short column and check for minimum eccentricity may be applied. Types of footing, Design of isolated square footing for flexure and shear. Simple numerical problems on the design of axially loaded short columns and isolated square footing. (Problems on design of footing shall be asked in written examination for moment and two way shear only.)

Unit 11 Principal of earth quake engineering
Introduction ,RICHTER SCALE, Soft story effect, detailing of structural elements ,ductile detailing ,earthquake zone in India Different earthquake I S codes (IS 1893-1984) IS 4326-1976 .causes of failure of structure during earth quake ,principal of constructing earthquake resistant buildings .

List of Reference Books

1. Limit State Theory & Design of Reinforced Concrete by Dr. V.L. Shah & Late Dr. S.R. Karve. Structure Publications
2. Fundamentals of Reinforced concrete by N.C. Sihna & S.K. Roy S.Chand& Company
3. Reinforced concrete Design (IS 456-2000) Principles & Practice by N.Krishna Raju R.N. Pranesh New Age International
4. Prestressed Concrete by N. Krishna Raju
5. Reinforced concrete Design by S.U. Pillai & Devdas Menon Tata Mcgraw Hill.
6. Limit State Design of Reinforced Concrete by P.C. Varghase Prentice Hall of India.
7. R.C.C. Design by Shah & Kale

Sketch book:

Sketch book consists of approximately ten plates from R.C.C. Design shall include important information of clauses of IS 456-2000 code. Typical sketches of components members/stress distribution & strain distribution diagrams R.C.C. section / detailing of reinforcement in joints / members. Design of R.C.C. structural components by LSM.

Introduction to RCC design software STRUUDS

The students should make detailed simple design and drawing of reinforcement detailing on two full imperial size sheets finished in pencil on any five of the following R.C.C. components members of a two-storied building with detailing of reinforcement (G+1) at the joints as per requirements & IS 13920.

1. One-way simply supported slab.

2. Two-way simply supported slab.

3. Cantilever slab/chajja.

4. T-Beam

5. Column and column footing.

6. Dog-legged staircase.

Sub Code: CED 506 Sub Name: FIELD VISIT/ SEMINAR 2 Credits

1. **FIELD VISITS** –

I. Visit to a construction site where the RCC work is in progress.
II. Visit to a construction site where the irrigation work is in progress.
III. Visit to a bridge site. Batching plant for cement concrete and bituminous road
IV. Visit to water treatment plant.
V. Visit to a dam site Canal site .
VI. Visit for a power plant site .
VII. Visit for a construction site where multistoried mal /shoping complex i

2. SEMINAR –

I. Seminar on low cost housing,
II. interlinking of rivers & irrigation structure rain water harvesting
III. Cement concrete roads & joints in cement concrete roads.
IV. Traffic engineering
V. Ductile detailing,
VI. use of different ISI codes for civil engineers ,releted to RCC & Earth quake resistant structure
VII. Earthquake resistant structure ,design concepts for buildings

Sub Code: DE9999 Sub Name: Professional Activities – V 0 Credits

Unit 1 Industrial /field /site Visits

Structured industrial visits shall be arranged and report of the same should be submitted by the individual student, to form a part of the term work.

Following are the suggested type of Industries/ Fields – (Any three visits)

i) Irrigation project for observing components of dam and canal.

ii) Concrete mixing & batching plant

iii) Residential apartment /public building to study plumbing system.

iv) Hot mix plant

v) Market rate analysis of different materials and labour rate for different type of civil works.

vi)Visit to a site where RCC work is in progress, slab casting Road work , Thermal Power Plant ..

Unit 2 The Guest Lecture/s from field/industry experts, professionals to be arranged (2 Hrs duration), minimum 2 nos. from the following or alike topics.

The brief report to be submitted on the guest lecture by each student as a part of Term work.

a) Construction of highway, material of construction, machinery used and manpower requirement .RMC ,Highway project (DPR)

b) To set up a small scale industry.

c) Planning and design of irrigation project. Lift irrigation project

d) design of earth quake resistant structures.

Unit 3 Information Search (data collection and writing a report on the topic)

a) Collecting an estimate from P.W.D.

b) International Plumbing code and material specifications from market.

c) Collecting market rates for material and labor for building items .

d) Collecting D.S.R. /C.S.R. from PWD and its use for preparing revise estimate

Unit 4 The students should discuss in group of six to eight students and write a brief report on the same as a part of term work. The topic of group discussions may be Selected by the faculty members. Some of the suggested topics are -

i) Recent trends in civil engineering as a service industry.

j) Waterproofing and leakage prevention. sound proofing ,air ducting

k) Troubleshooting in plumbing system.

l) Causes of failure of road.

m)interlinking of rivers

n) traffic volume study

Unit 5 Seminar :

Seminar topic shall be related to the subjects of fourth/fifth semester. Each student shall submit a report of at least 05 pages and deliver a seminar. A power point presentation preferred to caliber student skill.

(Presentation time – 5 minutes)

List of Reference Books:

1. Time management by Marshall Cooks Adams Viva Books
2. Basic Managerial Skills for All by E.H. Mc Grath , S.J. Pretice,Hall of India Pvt Ltd
3. Body Language by Allen Pease, Sudha Publications Pvt. Ltd.
4. Creativity and problem solving by Lowe and Phil, Kogan Page (I) P Ltd
5. Decision making & Problem Solving by Adair J. , Orient Longman
6. Develop Your Assertiveness by Bishop Sue, Kogan Page India
7. Organizational Behavior by Steven L McShane and Mary Ann Glinow, Tata McGraw Hill
8. Organizational Behavior by Stephen P. Robbins Pretice, Hall of India, Pvt Ltd
9. Presentation Skills by Michael Hatton, (Canada – India Project) ISTE New Delhi
10. Stress Management Through Yoga and Meditation by Sterling Publisher Pvt Ltd
11. Target setting and Goal Achievement by Richard Hale ,Peter Whilom, Kogan page India
12. Time management by Chakravarty & Ajanta, Rupa and Company
13. Working in Teams by Harding ham, A Orient Longman

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

SYLLABUS

For

DIPLOMA CIVIL ENGINEERING

(THIRD YEAR, 6th SEM)

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Diploma Electronics & Telecommunication

List of Subject (Third Year, 6th Semester)

Unit 1 Introduction: Duties of P.H. Engineer, Need and importance of P.H.E.

Unit 2 Quantity of Water & Source of water:
Demands of water: Domestic, Industrial, Commercial & Institutional, Public use, Losses and wastes, Fire demand ;Factors affecting rate of Demand, Variations of water demands, Forecasting of population, Methods of forecasting of population, Design period for water supply scheme. Estimation of quantity of water supply required for a town or city, Types of water supply schemes.
Source of water: Surface and Subsurface sources of water**,** Ground water, Open well, Tube-Well, infiltration well, infiltration gallery, infiltration pipes. Construction of dug well. Construction of tube well, Well Testing. Yield of well. Intake Structures-Definition and types, Factors governing the location of an intake structure, Water conservation, Ground water recharging – Necessity, Importance and advantages

Unit 3 Quality of Water & Purification of Water: Effect of different impurities on water, surface/ ground water, Water borne disease. Need for analysis of water, Characteristics of water-Physical, Chemical and Biological, Testing of water for Total solids, hardness, chlorides, dissolved Oxygen, pH, Bacteriological tests, Sampling of water, Water quality standards as per I.S.
Purification of Water : Screening- Types of screens, Aeration- objects and methods of aeration, Plain sedimentation, Sedimentation with coagulation, principles of coagulation, types of coagulants, Jar Test, process of coagulation, types of sedimentation tanks, Filtration theory of filtration, classification of filters : slow sand filter, rapid sand filter, pressure filter, domestic filter, filter media, construction and working of slow sand filter and rapid sand filter, Disinfection: Objects, methods of disinfection, Chlorination- Application of chlorine, forms of chlorination, types of chlorination practices, residual chlorine and its importance, Flow diagram of water treatment plants,

Unit 4 Conveyance and Distribution of Water:
Types of Pipes used for conveyance of water, choice of pipe material, Types of joints & Types of valves- their use, location and function on a pipeline. Methods of distribution of water- Gravity, pumping, and combined system Service reservoirs – functions and types , Layouts of distribution of water- Dead end system, grid iron system, circular system, radial system ; their suitability, advantages and disadvantages

SANITARY ENGINEERING

Unit 5 Building Sanitation:
Importance and necessity of sanitation, Necessity to treat domestic sewage, Recycling and Reuse of domestic waste Definitions-Sewage, sullage, types of sewage, Definitions of the terms related to Building Sanitation-Water pipe, Rain water pipe, Soil pipe , Sullage pipe, Vent pipe, Building Sanitary fittings- Water closet –Indian and European type, flushing cistern, wash basin, sinks, Urinals, Traps- types, Systems of plumbing – one pipe, two pipe, single stack, layout plan for building sanitary fittings (drainage plan) , inspection and junction chambers, their necessity, location.

Unit 6 Systems of Sewerage:
Types of Sewers, Systems of Sewerage, Principle of Design of sewers, self cleansing velocity and non scouring velocity Laying, Testing and maintenance of sewers. Sewer Appurtenances**,** Manholes and Drop Manhole-component parts, location, spacing, Sewer Inlets, Street Inlets, Flushing Tanks – manual and automatic.

Unit 7 Analysis of Sewage:
Characteristics of sewage, B.O.D./ C.O.D. and significance. , Aerobic and anaerobic process, Madhya Pradesh Pollution Control Board Norms for the discharge of treated sewage.
Treatment of Sewage:
Objects of sewage treatment, General layout and flow diagram, Screening, Grit removal, Skimming, Sedimentation of sewage, Sludge digestion, Trickling filters, Activated sludge process, Disposal of sewage, Septic tank, Oxidation pond, Oxidation ditch. Common Complaints in the operation of septic tank and remedies**.**

Unit 8 Rural Sanitation:
Environmental Sanitation Necessity and importance, Rural sanitation- Types of Privies – Aqua privy and Bore Hole Latrine construction and working Composting (Nadep or Vermiculture).

References

1. Text Book of Water supply and sanitary Engg by Husain. S.K., Oxford and IBH publlshing Co. New Delhi
2. Water supply and Sanitary Engg. By Birdie G.S. and Bridie J.S. , Dhanpat Rai & Sons,
3. Delhi
4. Jal Apurti Evam Swachchhata Engg by Sunil and Rajjan, Navbhart Prakashan, Meerut
5. Water Supply & Sanitary Engg. By Gurucharan Singh, Standard Publishers
6. 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.
7. I.S. : 1172, 1742, 2065, 2470 and 5329
8. Lok Swasthya Yantriki by Saxena A.K., Deepak Prakashan Gwalior
9. Environmental Engg. (Volume I & II) by Santosh Garg, Khanna Publishers
10. Water Supply & Sanitary Engg by S.C. Rangwala , Charottas Publishing House,

List of Experiments

1. Turbidity test. 2. Colour test.
3. Test for PH, Hardness, Chlorides, Iron & manganese.
4. Test for B-Coil.
5. Test for residual chlorime.
6. Test for total, volatile, fixed suspended and settable.
7. Test for D.O., B.O.D., C.O.D. and starbility.
8. To determine suspended solids, dissolved solids and total solids of waste water sample.
9) Design the Septic Tank for the public building such as hostel or hospital. Draw Plan and Section of the same along with the drainage arrangement in soak pit.

Unit 1 Estimate of R.C.C. Structure:
Estimate of slab, beam, T-beam. Estimate of R.C.C. column with its footing. Preparation of Abstract of above items. Preparation of Bar bending schedule, and to calculate amount of steel

Unit 2 Estimate of Steel / Timber Structures:
Estimate of steel column (Stanchion) Estimate of steel Truss and Gusset Plate. Estimate of Roof covering materials. G.I. Roof, A.C. Roof. Estimate of steel frames for Doors & Windows. Estimate of Wooden Doors and Windows. Estimate of Roof Covering materials.

Unit 3 Estimate of Culverts & Bridges:
Estimate of Hume pipe culvert with splayed type of wing wall, Turn wall, face wall. Estimate of R.C.C. Slab Bridge, straight type wing walls.

Unit 4 Estimate of Water Supply and Sanitary Fittings:
Detailed Estimate of Water Supply for building work. Detailed Estimate of Sanitary works for building work. Estimate of S.W. pipe line. Estimate of Septic Tank.

Unit 5 Valuation & Rent Fixation:
Definition, Necessity of Valuation. Definition, Cost price, Value, Difference between them. Types of value, Book value, scrap value, salvage value, Market value, Depreciation, obsolescence, Sinking fund. Methods of calculation of depreciation, straight line method, sinking fund method constant percentage method, quantity survey method. Computation of capitalized value, Gross income, outgoing, net income, Years purchase. Types of outgoing and their percentages. Valuation of Lands & Buildings, factors affecting their valuation, Fixation of Rent as per PWD practice.

References

1. Estimating and costing By. B.N. Dutta, S.Datta & Co. Tagroe Path Motilal Bose Road, Lucknow
2. Estimating and costing & Valuation By Rangwala, Charotar Publications Station Road, Anand
3. Estimating & Costing By Birdie,J.C, Kapoor , Dhanpat Rai & Sons Delhi and Jullunder
4. Estimating & Costing Vol-I & Vol.-II By J.C. Malhotra, Khanna Publishers
5. Current Schedule of Rates from PWD/PHE/Irrigation Deptts.

List of Experiments

1. Use of different Schedule of Rates like .PWD.C.P.W.D. D.S.R.,RES, HOUSING BOARD , IRRIGATION & PHE
2. Estimating & abstract and rate analysis with the help of different software eg. QE-PRO, ESTIMATOR, & Print out of report .
3. Taking out quantities of following items for small R.C.C. Hall
   i) Concreting for footing, Column, Beam, slab.
   ii) Reinforcement for above items by preparing Schedule of bars.
   iii) Form work for all above items.
4. Preparing Rate analysis of following items: Building work – Brick work, P.C.C., R.C.C., Plastering, Flooring, Doors, Windows
5. Taking out quantities of Steel work for given shed supported on steel trusses & having GI sheet/profile sheet roofing
6. Taking out quantities of work for pipe culvert.(Drawings shall be provided for the above exercises by subject teacher.)

Unit 1 Introduction:
Types of sections used, Hollow Square section Rectangular section Tubular section, Z Section, Angle Section, T, I, C, L Section etc. Grades of steel and strength characteristics; advantages and disadvantages of steel as construction material; Use of steel table and relevant I. S. code; Types of loads on steel structure and its I. S. code specification.

Unit 2 Connections:
Riveted connections, Types of rivets and their use, Nominal dia, Gross dia. Unwin's formula, Pitch of rivets, Edge distance, Tacking rivets, permissible stress in rivet riveted joint and its failure, Strength of riveted joint and efficiency of a riveted joint. Assumptions in theory of riveted joint, Design of riveted joint for axially loaded member. Eccentric riveted connection Welded connection Introduction, Permissible stress in weld, strength of weld, advantages and disadvantages of welded joint. Types of weld and their symbols. Design of fillet weld and butt weld subjected to axial load.

Unit 3 Tension member:
Types of Sections used, Permissible Stresses in Axial Tension, gross and net cross sectional area of tension member, Analysis and design of tension member with welded and riveted connection.

Unit 4 Compression Member:
Criteria of failure of short column and long column, end conditions effective length of a column, slenderness ratio and corresponding compressive stress: Angle struts Types of sections used, Analysis and Design of axially loaded angle struts with welded and riveted connection. Stanchion and Columns, types of sections used, simple and built up sections. Analysis and design of axially loaded column. Design of compound column. Design of lacing angles and Batten plates.

Unit 5 Column Bases:
Types of column bases ,design of slab base & concrete block. Cleat angles, their use, introduction to gusseted base (no numerical problems on gusseted Base)

Unit 6 Steel Beams:
Different steel sections used; Simple and built-up sections Permissible bending stresses. Design of simple beams, check for shear only. Design of built-up beams (Symmetrical I Section with cover plates only), check for shear only, bending, bearing and deflection. Introduction to Plate Girder: Various components and their functions. (No numerical Problem on Plate Girder)

Unit 7 Roof Truss:
Types of steel roof truss & its selection criteria. span and slope, Rise and pitch, loads acting on the Roof. Dead load; Live load and wind load as per I.S. 875-1987. Combination of loads for design of truss, Forces in the members (Graphical method). Design of members oftruss, Design of Angle purlin as per I.S.06 16 .Arrangement of members.

Unit 8 Timber Structures:
Grades of Timber – stress in timber. Factors affecting stress/strength of timber. Design of Timber column & Timber Beam.

References

1. Steel structures By Ramanatham
2. Structural Engg. Vol.-IV (Steel) By Vazirani
3. Steel Structures By Ramchandra
4. Steel Structures By Arya and Ajmani
5. Steel Structures By Malhotra M.M.
6. I.S. Code 800-1984
7. Steel Structures By R.K. Dhoble & D.S.Dharmadhikari
8. Steel Structures By Neggi.

List of Experiments

Term work shall consists of sketch book and design report of steel roof truss for an industrial building. Sketch book shall consists of any five plates out of the below mentioned

1. Sketching of different types of riveted joints and welded joints. Typical sketches of sections of tension member, determination of net effective cross-sectional area of tension member for angle section.
2. Typical sketches of sections of compression member, lacing and battening.
3. Graphical solution of frames to find out the stress in the member. Type of trusses for different spans.
4. Working drawing of steel truss with the details of joint
5. Detailed drawing of slab base and gusseted base.
6. Important information of clauses of IS800-1984 and IS875 (Part-1,2 & 3)30

Sub Code: CED 604	Sub Name: PROJECT	10 Credits

1. **Introduction** : Importance of project work, guide line and general introduction

2. **Selection of Project:** The project can be selected from any four civil engineering system like Building construction system, transportation engineering system, irrigation engineering system. A topic for project can also be selected on recent development in civil engineering

3. **Planning of project:** Planning of field work, line of action, work distribution, data to be collected by different batches**.** projects to be undertaken by a group of 4 to 6 students

4. **The project report shall be in the following format:**
   - ☐ Topic and objectives
   - ☐ Collection of data, required survey work,
   - ☐ Management and construction procedure
   - ☐ Resources scheduling and networking
   - ☐ Design details
   - ☐ Required drawing set
   - ☐ Utility to society if any
   - ☐ Conclusion

LIST OF CIVIL ENGINEERNG PROJECTS:

1) Design of Check Dam/Stop Dam.
2) Study of G Dam (Earthen/Gravity)
3) Micro irrigation –Drip/Sprinkler Irrigation.
4) Junction planning for city roads/planning for roads for congested area/parking Studies etc.
5) Rain water harvesting for domestic or public building.
6) Campus development.
7) Interior decoration.
8) Concrete mix design.
9) Solid waste management.
10) Hospital waste disposal.
11) Recycling of resources.
12) Manufacturing of Pre cast concrete products.
13) Prestressed concrete.
14) Non conventional sources of energy.
15) Concrete pipe manufacturing unit.
16) Planning Estimating and design for residential apartments/commercial complex.
17) Planning and design of water treatment plant for given data.
18) Planning and design of water supply scheme for given lay out.
19) Planning and design of sewage treatment plant for given data.
20) Planning and design of sanitary scheme for given lay out.
21) Intelligent & green building material.
22) Low cost housing project.
23) Planning and design of overhead water tank and sump well
24) Study of Lay out of small railway station.
25) Planning & design and estimation of roads (PMGSY/MGSX/BRTS)

Any other similar project can be selected.

Term Work: Shall consist of ----Detailed project report in above format. Separate drawing sheets covering details of the project shall also be prepared.

Sub Code: DE9999	Sub Name: PROFESSIONAL ACTIVITIES	0 Credits

Structured industrial visits shall be arranged and report of the same should be submitted by the individual student, to form a part of the term work. (Minimum 3 visits).

1. Following are the suggested type of Industries/ Fields -
   i) Visit to RCC framed structure building for details of reinforcement.
   ii) Visit to water /sewage treatment plant.
   iii) Visit to works carried out under watershed development/micro irrigation scheme.
   iv) Visit to any structure undergoing rehabilitation/retrofitting.

2. The Guest Lecture/s from field/industry experts, professionals to be arranged (2 Hrs duration), minimum 2 nos. from the following or alike topics. The brief report to be submitted on the guest lecture by each student as a part of Term work.
   a) HRD and civil engineering projects.
   b) Project planning and execution of civil engineering projects.
   c) PWD system of accounts
   d) Contract Management
   e) RCC design and detailing

3. Information Search ,data collection and writing a report on the topic
   a) Collection of data for valuation of old building
   b) Collection of details of BOT project under execution.
   c) Collection of Data and case study of failure of RCC structure.
   d) Collection of information on any topic from journal available in library.

4. The students should discuss in group of six to eight students and write a brief report on the same as a part of term work. The topic of group discussions may be selected by the faculty members. Some of the suggested topics are -
   a) Role of civil engineer in disaster management.
   b) Scope of out sourcing of civil engineering services.
   c) Pollution control.

5. Seminar Presentation**:** The students should select a topic for Seminar based on recent developments in civil engineering field, emerging technology etc.