Module 3: Introduction to Open Channel Flow-Comparison between open channel flow and pipe flow, geometrical parameters of a channel, classification of open channels, classification of open channel flow, Velocity Distribution of channel section. **(5 Hours)**

Module 4: Uniform Flow-Continuity Equation, Energy Equation and Momentum Equation, Characteristics of uniform flow, Chezy's formula, Manning's formula. Factors affecting Manning's Roughness Coefficient "n.*Most economical section of ch*annel.Computation of Uniform flow, Normal depth.Non-Uniform Flow- Specific energy, Specific energy curve, critical flow, discharge curve Specific force Specific depth, and Critical depth. Channel Transitions. Measurement of Discharge and Velocity – Venturi Flume, Standing Wave Flume, Parshall Flume, Broad Crested Weir. Measurement of Velocity- Current meter, Floats, Hot-wire anemometer. Gradually Varied Flow-Dynamic Equation of Gradually Varied Flow, Classification of channel bottom slopes, Classification of surface profile, Characteristics of surface profile.Computation of water surface profile by graphical, numerical and analytical approaches. Direct Step method, Graphical Integration method and Direct integration method. **(10 Hours)**

Module 5: Hydraulic Jump- Theory of hydraulic jump, Elements and characteristics of hydraulic jump in a rectangular Channel, length and height of jump, location of jump, Types,applications and location of hydraulic jump. Energy dissipation and other uses, surge as a moving hydraulic jump. Positive and negative surges. Dynamics of Fluid FlowMomentum principle, applications: Force on plates, pipe bends, moments of momentum equation. **(4 Hours)**

Module 6: Flow through Pipes: Loss of head through pipes, Darcy-Wiesbatch equation, minor losses, total energy equation, hydraulic gradient line, Pipes in series, equivalent pipes, pipes in parallel, flow through laterals, flows in dead end pipes, siphon, power transmission through pipes, nozzles. Analysis of pipe networks: Hardy Cross method, water hammer in pipes and control measures, branching of pipes, three reservoir problem. Modern pump: Drilling and flow estimation, deep submersible pump, monoblock pump, jet pump, airlift pump, selection of pumps and other hydraulic machineries. **(6 Hours)**

Practical Work: (Any 12)

1. Flow Visualization
2. Studies in Wind Tunnel
3. Boundary Layer
4. Flow around an Aerofoil / circular cylinder
5. Uniform Flow
6. Velocity Distribution in Open channel flow
7. Venturi Flume
8. Standing Wave Flume
9. Gradually Varied Flow
10. Hydraulic Jump
11. Flow under Sluice Gate
12. Flow through pipes
13. Turbulent flow through pipes

14. Flow visualization
15. Laminar flow through pipes
16. Major losses / Minor losses in pipe
17. Application of momentum equation for determination of coefficient of impact jet on flat and curve blade and pelton bucket

Reference Books:

1. Hydraulics and Fluid Mechanics, P.M. Modi and S.M. Seth, Standard Book House
2. Theory and Applications of Fluid Mechanics, K. Subramanya, Tata McGraw Hill.
3. Open channel Flow, K. Subramanya, Tata McGraw Hill.
4. Open Channel Hydraulics, VenTe Chow, Tata McGraw Hill.
5. Burnside, C.D., "*Electromagnetic Distance Measurement*," Beekman Publishers,1971.
6. Fluid Mechanics, R. K. Bansal S. Chand
7. Fluid Mechanics, S. K. Agrawal , McGrawal
8 Fluid Mechanics, Dr VS Pawar, Zakerullah Khan.

Course Outcomes:

CO1) students will be able to apply their knowledge of fluid mechanics in addressing problems in open channels.*(BT4)*

CO2) They will possess the skills to solve problems in uniform, gradually and rapidly varied flows in steady state conditions. *(BT3)*

CO3) They will have knowledge in Modern hydraulic pump. *(BT2)*

CO4) Understand Laminar and Turbulent flow.*(BT2)*

CO5) They will have knowledge about open channel flow .*(BT1)*

CO6) Students wil be able to apply knowledge of hydraulic jump in solving problems. *(BT4)*

PCC-CE404	Strength of Materials	3L:0T:2P	4 credits

Objectives:

1) The objective of this Course is to introduce to continuum mechanics and material modelling of engineering materials based on first energy principles: deformation and strain; momentum balance, stress and stress states; elasticity and elasticity bounds; plasticity and yield design.
2) The overarching theme is a unified mechanistic language using thermodynamics, which allows understanding, modelling and design of a large range of engineering materials.
3) The subject of Strength of materials involves analytical methods for determining the strength, stiffness (deformation characteristics), and stability of the various members in a structural system.
4) The behaviour of a member depends not only on the fundamental laws that govern the equilibrium of forces, but also on the mechanical characteristics of the material. These mechanical characteristics come from the laboratory, where materials are tested under accurately known forces and their behaviour is carefully observed and measured.

Proposed Syllabus

Module1: *Simple Stresses and Strains*- Concept of stress and strain, St. Venant's principle, stress and strain diagram,Elasticity and plasticity – Types of stresses and strains, Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications. (8 Hours)

Module 2: Compound Stresses and Strains- Two dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr circle of stress, ellipse of stress and their applications. Two dimensional stress-strain system, principal strains and principal axis of strain, circle of strain and ellipse of strain. Relationship between elastic constants. (6 Hours)

Module 3: Bending moment and Shear Force Diagrams- Bending moment (BM) and shear force (SF) diagrams.BM and SF diagrams for cantilevers simply supported and fixed beams with or without overhangs. Calculation of maximum BM and SF and the point of contra flexure under concentrated loads, uniformly distributed loads over the whole span or part of span, combination of concentrated loads (two or three) and uniformly distributed loads, uniformly varying loads, application of moments. (6 Hours)

Module 4: *Flexural Stresses-Theory of simple bending* – Assumptions – Derivation of bending equation: M/I = f/y = E/R - Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.*Shear Stresses- Derivation of formula* – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections. (06 Hours)

Module 5: Columns & Thin Cylinders and Spheres

.Euler's theory of long column, buckling load for different end conditions. Limitation of Euler's theory, Rankine's formula. Numericals. (4 Hours)

Thin Cylinders and Spheres- Derivation of formulae and calculations of hoop stress, longitudinal stress in a cylinder, and sphere subjected to internal pressures. (4 Hours)

Module 6: Friction: Laws of friction, cone of friction, equilibrium of bodies on an inclined plane, application to problems involving wedges, ladders. Belt Friction: Transmission of power by belts and ropes, centrifugal and initial tension in the belts or ropes. Condition for maximum power transmission. Flat belts on flat pulleys & ropes on grooved pulleys. (4 Hours)

List of Experiments: (Any 10 Experiments)

1. Tension test on steel.
2. Bending tests on simply supported beam.
3. Compression test on concrete
4. Shear test on steel.
5. Investigation of Hook's law that is the proportional relation between force and stretching in elastic deformation.

6. Measurement of forces on supports in statically determinate beam.
7. Determination of shear force & bending moment in beams.
8. Measurement of strain in a bar.
9. Flexure test on timber and cast iron beams
10. Flexure test on flooring tiles.
11. Abrasion test on flooring tiles.
12. Deflection test on mild steel and wooden beam specimens
13. Determine unknown force using law of moment apparatus.
14. Determine center of gravity for given plane laminas. (Any four laminas)

Text/Reference Books:

1. Timoshenko, S. and Young, D. H., "Elements of Strength of Materials", DVNC, New York, USA.
2. Kazmi, S. M. A., "Solid Mechanics" TMH, Delhi, India.
3. Crandall, S. H., N. C. Dahl, and T. J. Lardner. An Introduction to the Mechanics of Solids. 2nd ed. New York, NY: McGraw Hill, 1979
4. Mechanics of Materials - Ferdinand P. Beer, E. Russel Jhonston Jr., John T. DEwolf – TMH 2002.
5. Strength of Materials by R. Subramanian, Oxford University Press, New Delhi.
6. Strength of Material by Ramamurutham
7. Mechanical of Material by H. J. Shah
8. Strength of Material, by *Mrs More J. B.* And *Mr. Dad R. B.* GRACE.

Course Outcomes:

On completion of the course, the student will be able to:

CO1) Describe the concepts and principles, understand the theory of elasticity including strain/displacement and Hooke's law relationships; and perform calculations, relative to the strength and stability of structures and mechanical components; *(BT1 and BT2)*

CO2) Define the characteristics and calculate the magnitude of combined stresses in individual members and complete structures; analyze solid mechanics problems using classical methods and energy methods; *(BT1 and BT4)*

CO3) Analyse various situations involving structural members subjected to combined stresses by application of Mohr's circle of stress; locate the shear center of thin wall beams; *(BT4)*

CO4) Calculate the deflection at any point on a beam subjected to a combination of loads; *(BT3)*

CO5) solve for stresses and deflections of beams under unsymmetrical loading; *(BT3)*

CO6) apply various failure criteria for general stress states at points; solve torsion problems in bars and thin walled members; *(BT3)*

PCC-CE405	Surveying and Geomatics	2L:0T:2P	3 credits

Course Objectives

With the successful completion of the course, the student should have the capability to:

1) Describe the function of surveying in civil engineering construction,
2) Work with survey observations, and perform calculations,
3) Customary units of measure. Identify the sources of measurement errors and mistakes; understand the difference between accuracy and precision as it relates to distance, differential leveling, and angular measurements,
4) Be familiar with the principals of recording accurate, orderly, complete, and logical field notes from surveying operations, whether recorded manually or with automatic data collection methods,
5) Operate an automatic level to perform differential and profile leveling; properly record notes; mathematically reduce and check levelling measurements,
6) Operate a total station to measure distance, angles, and to calculate differences in elevation. Reduce data for application in a geographic information system,

Proposed Syllabus:

Module 1: *Introduction to Surveying (06 hours):* Principles, Linear, angular and graphical methods, Survey stations, Survey lines- ranging, Bearing of survey lines, Levelling: Plane table surveying, Principles of levelling- booking and reducing levels; differential, reciprocal leveling, profile levelling and cross sectioning. Digital and Auto Level, Errors in levelling; contouring: Characteristics, methods, uses; areas and volumes.

Module 2:*Triangulation and Trilateration (08 Hours)***:**

Theodolite survey: Instruments, Measurement of horizontal and vertical angle; Horizontal and vertical control - methods -triangulation network- Signals. Baseline - choices - instruments and accessories - extension of base lines corrections - Satellite station - reduction to centre - Intervisibility of height and distances - Trigonometric leveling - Axis single corrections.

Module 3: Curves (06 hours)

Elements of simple and compound curves – Method of setting out– Elements of Reverse curve - Transition curve – length of curve – Elements of transition curve - Vertical curves

Module 4: *Modern Field Survey Systems (8 Hours)*:

Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments, Distomat, Total Station – Parts of a Total Station – Accessories –Advantages and Applications,

Field Procedure for total station survey, Errors in Total Station Survey; Global Positioning Systems- Segments, GPS measurements, errors and biases, Surveying with GPS, Co-ordinate transformation, accuracy considerations.

Module 5: *Photogrammetry Surveying (6 Hours)*:

Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control

extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereoplotting instruments, mosaics, map substitutes.

Module 6: *Remote Sensing (6 Hours)*:
Introduction –Electromagnetic Spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, remote sensing data acquisition: platforms and sensors; visual image interpretation; digital image processing.

Practical List: (Minimum 12)

1. Direct and indirect ranging for Road / Canal / Railway Line & Measurement of distances with chain and tape.
2. Setting Prismatic Compass and observe Fore and Back bearings.
3. Measuring Fore and Back Bearings of 5-6 side closed traverse. Identifying stations affected by local attraction and calculating corrected F.B. and B.B. and included angles. Apply arithmetic check for sum of interior angles.
4. Carry out the temporary adjustments of Plane Table and locating details by Radiation Method.
5. Plane Table Survey: Intersection method.
6. Carry out the Plane Table traverse of 4-5 sides.
7. Plane Table Survey: Resection method – Two Point Problem.
8. Use of Dumpy Level, its temporary adjustments and carry out the simple leveling. Reduction of level by H.I. method & Rise and fall method.
9. Use of Dumpy Level, its temporary adjustments and carry out the differential leveling. Reduction of level by H.I. method / Rise and Fall method.
10. Use of Auto Level, its temporary adjustments and carry out the differential leveling. Reduction of level by H.I. method / Rise and Fall method.
11. Street Road: Profile leveling and Cross Sectioning for 60 m length with spot level at 05 m interval and cross section at 20 m intervals.
12. Carry out Block contouring of plot 30 m x 30 m with each block 5mx5m.
13. Locate a contour on a field by direct contouring method.
14. To find area of given contour map with digital planimeter.
15. Study different components of transit theodolite, Temporary adjustment and reading the vernier and recording it.
16. Measurement of horizontal angle by transit theodolite (direct method) and Measurement of horizontal angle by transit theodolite (repetition method)
17. Measurement of magnetic bearing by transit theodolite, deflection angle by transit theodolite and vertical angle by transit theodolite.
18. Setting curve by offset from long chord method and by Rankine's deflection angle method.
19. Measure horizontal and vertical angle with micro-optic theodolite&with digital theodolite.
20. Measuring horizontal distance, vertical distance, sloping distance, horizontal angle and vertical angle by total station.

Mini projects: (Minimum 3)

1. Carry out Block contouring project for a plot 100mx120m with a block size 10mx10m plot the contours on imperial drawing sheet and plot on A1 size imperial drawing sheet.

2. State Highway: Profile Levelling and Cross Sectioning for 500 m length. Spot levels at 10 m interval and 30 m cross section at 50 m interval. Plotting Plan, longitudinal section and cross section on A1 size imperial drawing sheet (show the formation level on drawing and write values in the columns for gradient, formation level, height of banking, depth of cutting, nature of soil on the drawing of profile leveling.
3. Setting out curve for highway road by offset from long chord method/ Rankine's deflection angle method..
4. Layout of a building on ground with total station.

Text/Reference Books:

1 Madhu, N, Sathikumar, R and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, 2006.
2 Manoj, K. Arora and Badjatia, Geomatics Engineering, Nem Chand & Bros, 2011
3 Bhavikatti, S.S., Surveying and Levelling, Vol. I and II, I.K. International, 2010 4Chandra, A.M., Higher Surveying, Third Edition, New Age International (P) Limited, 2002.
5 Anji Reddy, M., Remote sensing and Geographical information system, B.S. Publications, 2001.
6 Arora, K.R., Surveying, Vol-I, II and III, Standard Book House, 2015.
7 Surveying Volum- I &II by (Dr. B. C. Punmia Ashakkjain Arun K. Jain)
8 Surveying by N. M. Basak Reference.
9 Surveying by G. I. Kochher
10 "Surveying and Geomatics", by *Prof. Zakerullah Khan*, GRACE.

Course Outcomes:

The course will enable the students to:

CO1) Apply the knowledge, techniques, skills, and applicable tools of the discipline to engineering and surveying activities *(BT1 abd BT3)*

CO2) Apply the knowledge, techniques, skills, and applicable tools for setting out curves. *(BT1 abd BT3)*

CO3) Translate the knowledge gained for the implementation of Civil infrastructure facilities *(BT1 and BT2)*

CO4) Relate the knowledge on Surveying to the new frontiers of science like Hydrographic surveying, Electronic Distance Measurement, Global Positioning System, Photogrammetry and Remote Sensing. *(Bt1 and BT2)*

PCC-CE406	Concrete Technology	3L:0T:2P	4 credits

Objectives:

1) *To study different ingredients of concrete.*
2) *To study properties of different ingredients.*
3) To study various admixtures .
4) To study properties of fresh and harden concrete.
5) To study concrete mix design.

Proposed Syllabus

Module 1:

Introduction Classification, properties, grades, advantages and disadvantages of concrete of concept of quality of control. (01hrs)

Cement ;

Basic properties of cement compound, manufacturing process, hydration of cement, physical property of Portland cement, chemical properties of cement, types of cement. (05 Hours)

Module 2:

Aggregates Classification of aggregate, properties of aggregate, strength, toughness, hardness, partical shape and texture, specific gravity, bulk density, voids porosity and absorption, bulking of sand, deleterious substances, alkali, aggregate reaction, fineness modulus, maximum size of aggregate grading and surfaces area, gap graded aggregate and grading limit. (08 Hours)

Module 3:

Water Quality of mixing water, impurities in water and its effect. (02 Hours)

Admixtures, Retarders acceletor, plasticisers, super plasticizers, air entering agent, water proofing agent. (03 hrs)

Module 4:

Fresh Concrete Manufacturing Process of Concrete, Workability ,measurement, factors affecting workability, effect of time and temperature on workability. Requirements of workability, segregation and bleeding, ready mixed concrete, pumped concrete. (10 Hours)

Module 5:

Properties of Hardened Concrete Strength of concrete, Types, factors influencing strength, Stress –Strain characteristics of concrete. Shrinkage and temperature effects. Creep Permeability and Durability of concrete. Nondestructive testing of concrete. Rebound hammer test, ultrasonic pulse velocity test. (06 Hrs)

Module 6:

1. Special Concretes;Light weight concrete, high density concrete, Ferro cement, fiber reinforced concrete, Polymer concrete.

2. Concrete Mix Design; Concept of mix design, variables in proportion statistical quality control of concrete Common terms.Different methods Trial and error, ACI method and IS code method. (06 Hours.)

Concrete Technology Laboratory Term work:
Term work shall consist of a journal based on the following experiments.

1)Test on Cement: Fineness, Standard Consistency, Setting time, Compressive strength and Soundness test. (Minimum four)

2) Test on Aggregates: Bulk density specific gravity, finesses modulus, Aggregate impact value, flakiness index, elongation index of aggregates, Abrasion value, crushing value, silt content, bulking of sand. (Min:four)

3) Test on Fresh Concrete : Slump, Vee – Bee, Compaction factor and flow test for fresh concrete . (Min: Three)

4) Tests on Hardened Concrete: Split tensile strength, modulus of rupture, young's modulus, compressive strength, Non destructive Testing, Rebound hammer and Ultrasonic pulse velocity test. (Min: four)

Text/Reference Books:
1. Various related updated & recent standards of BIS, IRC, ASTM, RILEM, AASHTO, etc. corresponding to materialsused for Civil Engineering applications
2. Kyriakos Komvopoulos (2011), Mechanical Testing of Engineering Materials, Cognella
3. E.N. Dowling (1993), Mechanical Behaviour of Materials,Prentice Hall International Edition
4. Concrete Technology Reference by S. Uhead publication S. Chand (M. Shetty Author)
5. Concrete Technology by M. L. Gambhir (Mc Grawhill)
6. Concrete Technology, by *Mr. Md. Anwaruddin* and *Ms Sayali V. Pawar*, GRACE.

Outcomes:
After completion of this subject student will be

CO1) Familiar with different ingredients of concrete. *(BT1)*
CO2) Familiar with properties of different ingredients of concrete. *(BT1)*
CO3) Familiar with different admixtures. *(BT1 and BT2)*
CO4) Student will familiar with properties of fresh and harden concrete. *(BT1 and BT2)*
CO5) Able to prepare concrete mix design, and also familiar with special concretes. *(BT3)*

HSMC407	Civil Engineering – Societal & Global Impact	0L:0T:2P	1 credits

Course Objectives:

1. The course is designed to provide a better understanding of the impact which Civil Engineering has on the Society at large and on the global arena.
2. Civil Engineering projects have an impact on the Infrastructure, Energy consumption and generation, Sustainability of the Environment, Aesthetics of the environment, Employment creation, Contribution to the GDP, and on a more perceptible level, the Quality of Life.
3. It is important for the civil engineers to realise the impact which this field has and take appropriate precautions to ensure that the impact is not adverse but beneficial.
4. Awareness of the importance of Civil Engineering and the impact it has on the Society and at global levels.
5. Awareness of the impact of Civil Engineering for the various specific fields of human endeavour
6. Need to think innovatively to ensure Sustainability.

Module 1: Introduction to Course and Overview; Understanding the past to look into the future: Pre-industrial revolution days, Agricultural revolution, first and second industrial revolutions, IT revolution; Recent major Civil Engineering breakthroughs and innovations; Present day world and future projections, Ecosystems in Society and in Nature; the steady erosion in Sustainability; Global warming, its impact and possible causes; Evaluating future requirements for various resources; GIS and applications for monitoring systems; Human Development Index and Ecological Footprint of India Vs other countries and analysis;

Module 2: Understanding the importance of Civil Engineering in shaping and impacting the world; The ancient and modern Marvels and Wonders in the field of Civil Engineering; Future Vision for Civil Engineering

Module 3: Infrastructure - Habitats, Megacities, Smart Cities, futuristic visions; Transportation (Roads, Railways & Metros, Airports, Seaports, River ways, Sea canals, Tunnels (below ground, under water); Futuristic systems (ex, Hyper Loop)); Energy generation (Hydro, Solar (Photovoltaic, Solar Chimney), Wind, Wave, Tidal, Geothermal, Thermal energy); Water provisioning; Telecommunication needs (towers, above-ground and underground cabling); Awareness of various Codes & Standards governing Infrastructure development; Innovations and methodologies for ensuring Sustainability;

Module 4: Civil Engineering Projects – Environmental Impact Analysis procedures; Waste (materials, manpower, equipment) avoidance/ Efficiency increase; Advanced construction techniques for better sustainability; Techniques for reduction of Green House Gas emissions in

various aspects of Civil Engineering Projects; New Project Management paradigms & Systems (Ex. Lean Construction), contribution of Civil Engineering to GDP, Contribution to employment(projects, facilities management), Quality of products, Health & Safety aspects for stakeholders; Innovations and methodologies for ensuring Sustainability during Project development;

ORGANISATION OF COURSE (2-0-0)

S. No.	Module	No of Lectures	Details
1	Introduction	8	
2	Understanding the Importance of Civil Engineering	6	
3	Infrastructure	7	
4	Civil Engineering Projects	9	
	TOTAL	**30**	

Text/Reference Books:

1. *Žiga* Turk (2014), Global Challenges and the Role of Civil Engineering, Chapter 3 in: Fischinger M. (eds) Performance-Based Seismic Engineering: Vision for an Earthquake Resilient Society. Geotechnical, Geological and Earthquake Engineering, Vol. 32. Springer, Dordrecht
2. Brito, Ciampi, Vasconcelos, Amarol, Barros (2013) Engineering impacting Social, Economical and Working Environment, 120th ASEE Annual Conference and Exposition
3. NAE Grand Challenges for Engineering (2006), Engineering for the Developing World, The Bridge, Vol 34, No.2, Summer 2004.
4. Allen M. (2008) Cleansing the city. Ohio University Press. Athens Ohio.
5. Ashley R., Stovin V., Moore S., Hurley L., Lewis L., Saul A. (2010). London Tideway Tunnels Programme – Thames Tunnel Project Needs Report – Potential source control and SUDS applications: Land use and retrofit options
6. http://www.thamestunnelconsultation.co.uk/consultation-documents.aspx
7. Ashley R M., Nowell R., Gersonius B., Walker L. (2011). Surface Water Management and Urban Green Infrastructure. Review of Current Knowledge. Foundation for Water Research FR/R0014
8. Barry M. (2003) Corporate social responsibility – unworkable paradox or sustainable paradigm? Proc ICE Engineering Sustainability 156. Sept Issue ES3 paper 13550. p 129-130
9. Blackmore J M., Plant R A J. (2008). Risk and resilience to enhance sustainability with application to urban water systems. J. Water Resources Planning and Management. ASCE. Vol. 134, No. 3, May.
10. Bogle D. (2010) UK's engineering Council guidance on sustainability. Proc ICE Engineering Sustainability 163. June Issue ES2 p61-63
11. Brown R R., Ashley R M., Farrelly M. (2011). Political and Professional Agency Entrapment: An Agenda for Urban Water Research**.** Water Resources Management.

Vol. 23, No.4.European Water Resources Association (EWRA) ISSN 0920-4741.
12. Brugnach M., Dewulf A., Pahl-Wostl C., Taillieu T. (2008) Toward a relational concept of uncertainty: about knowing too little, knowing too differently and accepting not to know. Ecology and Society 13 (2): 30
13. Butler D., Davies J. (2011). Urban Drainage. Spon. 3rd Ed.
14. Cavill S., Sohail M. (2003) Accountability in the provision of urban services. Proc. ICE. Municipal Engineer 156. Issue ME4 paper 13445, p235-244.
15. Centre for Water Sensitive Cities (2012) Blueprint for a water sensitive city. Monash University.
16. Charles J A. (2009) Robert Rawlinson and the UK public health revolution. Proc ICE Eng History and Heritage. 162 Nov. Issue EH4. p 199-206.
17. Environmental studies – (ErachBharucha)
18. Water supply &Semitoryorganary(Rangwala).

Course Outcomes:

CO1) The impact which Civil Engineering projects have on the Society at large and on the global arena and using resources efficiently and effectively. **(BT2)**

CO2) The extent of Infrastructure, its requirements for energy and how they are met: past, present and future **(BT4)**

CO3) The Sustainability of the Environment, including its Aesthetics, **(BT1)**

CO4) The potentials of Civil Engineering for Employment creation and its Contribution to the GDP **(BT3)**

CO5) The Built Environment and factors impacting the Quality of Life **(BT4)**

CO6) The precautions to be taken to ensure that the above-mentioned impacts are not adverse but beneficial. **(BT2)**

CO7) Applying professional and responsible judgement and take a leadership role;**(BT4)**

HSMC408	Group Discussion and Personality Development	0L:0T:2P	0 credits

Course Objective (s):

5. To improve the cognitive skills, perception level, and comprehension ability of the learners.
6. To make them skilled, competent to devise their career graph, work on it efficiently and simultaneously gauge their performances accordingly.
7. To enhance essential communication skills- LSRW and make them communicate effectively through both verbal and non-verbal channels.
8. To foster a team spirit, collaborative skills and interpersonal management proficiency by putting learners in different situations of teamwork.
9. To encourage learners to participate dynamically in group discussions and trace out leadership skills required for the all round development of the learners.

Detailed Contents:

Module 1: Improving Perception and Career Planning (05 Hours)

A] Improving Perception:

Perception meaning and importance, Factors influencing perception, Improving perception, Perception and organization, Self image and esteem, Attitude formation, Aggressive, submission and assertive behaviours, Lateral thinking, Exercise: Test your perception.

B] Career Planning:

Career planning – meaning and scope, Benefits of career planning, Guidelines for choosing a career, Tips for successful career planning, Setting up a career goal, Exercise: Test your career interests.

Module 2: Art of Listening and Speaking (06 Hours)

A] Art of Listening:

Listening meaning and scope, Types of effective listening, Benefits of active listening, - Types of listening – Factors affecting effective listening, Poor listening habits – Tips for effective listening. Exercise- Test your listening skills.

B] Art of Speaking:

Effective Speaking - Introduction, What makes effective speaking? The art of public speaking, Importance of public speaking, Overcoming public fear, Verbal communication, Voice modulations, Conversation tips, Exercise: Test your speaking skills.

Module 3: Art of Reading and Writing (06 Hours)

A] Art of Reading:

Effective reading – Introduction, Reading as an art, Reading as a cognitive process, Benefits of effective reading. Types of reading, Barriers in reading, Role of an effective reader, The SQ3R techniques of reading, Exercise- Test your reading skills. Exercise: Test your reading skills.

B] Art of Writing:

Effective writing- Introduction, The art of writing and drafting, Cretive writing, Writing tips, Drawbacks in written communication, The writing discipline, Making the subject matter significant, Use of punctuations, Staying relevant, Exercise: Test your art of writing, Drafting E-mails. Exercise: Test your writing skills.

Module 4: Team Building and Teamwork: (08 Hours)

A] Team Building and Teamwork:

Introduction - Meaning, Essential skills for teamwork, A model of team building Characteristics of effective team, Role of a effective team leader - Role of team members Advantages of inter-group collaboration, Factors shaping inter-group collaboration. Exercise: Test your teamwork skills.

B] Group Discussion:

What is group discussion, Importance of group discussion, Types of group discussion, Essential skills for group discussion, Useful tips for group discussion, Manners and etiquettes in group discussion, Non-verbal clues in group discussion, Dos and donts of group discussion, Preparation for group discussion, Effective group discussion. Exercise- Test your group discussion skills.

List of Practical / Assignments:

1. Assessment of self perception, attitude, self-identity, self-esteem and values by using worksheets, modals and charts and correcting attitude of the learner.
2. Testing of perception level and ability of the learner by using a chart or worksheet.
3. Devise a career goal, graph for the career of the learner and assess his / her performance accordingly.
4. Arrange a classroom/ language lab activity for effective listening and improving listening habits of the learners.
5. Arrange a classroom/ language lab activity for effective speaking and improve speaking habits of the learners.
6. Arrange a classroom/ language lab activity for reading and improve reading habits of the learners.
7. Arrange a class / language lab activity for reading and improve writing habits of the learners.
8. Arrange listening activities for group discussions in the language labs and make the learners listen.
9. Arrange listening sessions of effective speeches by eminient speakers and make the learners listen and incorporate their effective public speaking skills.

10. Arrange team building activities, projects, classroom activities for building up team spirit amongst the learners.

11. Arrange group discussions on current topics relating to social, educational, economical, national issues in the world.

Note: *This is the suggestive list of assignments / practical to be conducted in the classroom / language lab. However, the subject teacher is free to set, design new assignment / practicals in relevance with the subject content.*

(Any eight assignments to be conducted and submitted to the subject teacher to form the record of the subject).

Reference Books:

1. Barun K. Mitra, "Personality Development and Soft Skills" IIT Kharagpur, Oxford University Press. 2011. Print.
2. Dr. K. Alex. "Soft Skills – Know Yourself and Know Your World by– S. Chand and Publications, New Delhi. Print.
3. Hundiwala, S. "GD- A Complete Kit for Group Discussion" English, Paperback Edition, Arihant Publicaiton ISBN: 9789311121017. 2016. Print.
4. Meenakshi Raman and Sangeeta Sharma, "Technical Communication Principles and Practice," Third Edition. OXFORD University Press, New Delhi, 2015. Print.
5. Presonality development and soft skills –by Barun K Mishra – Oxford University Press.- 2011. Print.

Course Outcome (COs): ***Learner(s) will be able to…***

CO1) Cultivate an ability to identify self identity, attitude and motivate them to express effectively in small and larger groups of people.

CO2) Participate, collaborate, manage and communicate effectively, influentially by enhancing L-listeing, S-speaking, R-reading and W-writing skills amongst the learners.

CO3) Emerge as an outstanding personality and learn to express, convey their own ideas, principles, concepts, philosophy through eligent expressions and manners by participating in group discussion and team projects.