



SANDIP UNIVERSITY

Courses of Study

2019-20

Diploma Civil Engineering

IILP



Diploma (Part Time) Civil Engineering 2018-19																																																					
Semester	Course I				Course II				Course III				Course IV				Course V				Course VI				Course VII				Course VIII				L	T	P	C	Contact Hours																
I																									Code				Code				Code																				
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C									
	4	1	0	5	3	0	4	5	3	1	2	5	3	0	2	4	2	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	2	10	22	27				
	BS				PC				PC				PC				HSS																																				
Applied Mathemaics				Surveying				Applied Mechanics				Building Construction and Material				Communication Skills																																					
II																									Code				Code																								
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C					
	2	0	4	4	4	0	0	4	3	0	2	4	3	0	2	4	2	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	10	19	24				
	BS				PC				PC				PC				HSS																																				
Advanced Surveying				Transportation Engineering				Mechanics of Structure				Concrete Technology				Technical Communication																																					



Diploma (Part Time) Civil Engineering 2018-19																																																	
Semester	Course I				Course II				Course III				Course IV				Course V				Course VI				Course VII				Course VIII				L	T	P	C	Contact Hours												
III	Code				Code				Code				Code				Code				Code				Code																								
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C									
	3	1	0	4	2	0	4	4	3	0	2	4	3	0	2	4	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	8	19	20				
	PC				PC				PC				PC				PWSI												1	1	8	19	20																
	Theory of Structure				Building Planning and Drawing				Geotechnical Engineering				Hydraulics				Internship I																																
IV	Code				Code				Code				Code				Code				Code				Code																								
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C					
	3	0	2	4	3	0	0	3	3	0	2	4	3	0	2	4	0	0	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	14	19	26				
	PC				PC				PC				PC				PWSI												1	0	14	19	26																
	Estimating and Costing				Irrigation Engineering				Design of RCC Structure				Design of Steel Structure				Seminar																																



SANDIP
UNIVERSITY

School of Engineering and Technology

Diploma (Part Time) Civil Engineering 2018-19																																					
Semester	Course I				Course II				Course III				Course IV				Course V				Course VI				Course VII				Course VIII				L	T	P	C	Contact Hours
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C					
V	3	0	0	3	0	0	2	1	0	0	0	4	2	0	0	2	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	5	0	2	2	29
	PC				PC				PC				BS				PWSI				PWSI																
	DEI				Project & Viva Voce				Internship II				Environmental Studies																								

Department Elective I				
Transportation Engineering				
Course Code	Course	L	T	P C
1	Public Health Engineering	3	0	0 3
2	Solid Waste Management	3	0	0 3
3				

Course		DTCE101		Surveying						
Year	First			Semester	I			Prerequisite		XXX
Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)				End Semester Examination		Total Marks
L	T	P	C	CIA-1	CIA-2	CIA-3	LAB	Theory	Lab	
4	0	2	5	20	20	10	25	50	25	100
Max. Time, End Semester Exam (Theory) -3Hrs.								End Semester Exam (Lab) - 2Hr		
Course Objectives										
1. Define and state use of surveys and also its classification										
2. Describe construction and use different instruments for linear measurements										
3. Write construction and use of different instruments for setting offsets and Calculate the area of field										
4. Describe construction and state use of prismatic compass.										
5. Describe different methods of orientation of Plane Tabling										

Course Content			
Unit No.	Module No.	Content	Hours
1	I	Introduction: Definition of survey, Objects of different surveys, Uses of surveys. Classification of surveys- Primary and Secondary, Primary Division- Plane and Geodetic Surveys, Secondary- Based on instruments used, Nature of field and Objective. Principles of survey. Conventional symbols in survey plans/maps.	5
2	I	Linear Measurements: Study and use of instruments for linear measurements- Metric chain, Measuring Tapes and its types, Ranging rod, Arrow, Peg, Digital tape, Methods of linear measurements- By pacing, by speedometer, by chaining, by digital tape.	7
	II	Ranging- Direct and indirect ranging and procedure, Code of signals used in ranging	6
	III	Chaining- Procedure on plane and sloping ground. Correction of linear measurement for incorrect length of chain/tape. (Simple problems)	6
3	I	Chain Triangulation and cross staff survey: Principles of chain survey- Triangulation, Survey station types and their selection, survey line, Base line, Check line, Tie line. Offset: Types of offsets- Long, Short, Perpendicular and oblique, Instrument for setting offsets- Open cross staff, optical square, Principle of optical square, Setting offset with open cross staff and optical square. Survey field book and recording entries. Chain and Cross staff survey for finding area of	5



		the field. Simple numerical problems Types of obstacles in chaining and methods of overcoming them. Simple numerical problems.	
4	1	Compass Traverse Survey: Principle of compass survey- Traversing, Prismatic compass- Component parts and their functions, setting of compass,. Meridian- True meridian, magnetic meridian and arbitrary meridian. Magnetic declination, dip of needle. Bearing of a line- True bearing, Magnetic bearing and arbitrary bearing. Systems of bearing- Whole circle bearing and Quadrantal bearing, Fore and back bearing of line and their relationship. Compass traversing-Open and close traverse, Local attraction and its detection. Correction for local attraction and finding corrected bearings and included angles. Numerical problems. Plotting the compass traverse and its graphical adjustment by Bowditch Rule. Sources of errors in compass survey.	8
5	1	Plane Table Survey: Principle of plane table survey. Different accessories of plane table and their use. Setting of plane table, Telescopic alidade and its advantages. Orientation of plane table- Back sighting and Magnetic meridian. Methods of plane table surveys- Radiation, Intersection and Traversing. Merits and demerits of plane table survey.	8
		Levelling: Meaning of terms used in leveling- Level surface, Level line, Horizontal surface and line, Vertical line, Datum line, Reduced Level, Bench Mark and its types. Levelling instruments- Dumpy level and Auto level. Dumpy level- Component parts, Line of collimation, Axis of telescope, Axis of bubble-tube and their relationships, temporary adjustment, permanent adjustment of dumpy level Auto Level- Component parts and temporary adjustments. Leveling Staff- Telescopic. Fore Sight, Back Sight, Intermediate Sight, Negative staff reading, Change point, Height of plane of collimation, Station point, Rise and Fall, Level book and its recording, Methods of leveling- Simple levelling, Differential levelling, Profile and Cross sectioning, Fly levelling, Check levelling and reciprocal levelling Method of reduction of level- Height of instrument, Rise and Fall method. Arithmetic check. Numerical problems. Sources of errors in leveling, precautionary measures.	8
		Total No. of Hrs	52

Beyond the Syllabus

Course Outcome

Students should be able to

CO1	<input type="checkbox"/> Understand the need of surveying.
CO2	Understand handling and use of different survey instruments for the field operations.
CO3	Understand linear and angular measurements
CO4	Understand the preparation of plans/maps by using field observations
CO5	Select suitable instruments and appropriate method of survey

Recommended Resources	
Text Books	
Reference Books	Surveying and Leveling- 38th edition by N N Basak (Tata McGraw Hill) Surveying- Volume-I, Third Edition S.K. Duggal (Tata McGraw Hill)
E-Resources	https://nptel.ac.in/courses/105107122/1

Course		DTCE102		Applied Mechanics						
Year		First		Semester		I		Prerequisite		XXX
Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)				End Semester Examination		Total Marks
L	T	P	C	CIA-1	CIA-2	CIA-3	LAB	Theory	Lab	
4	0	2	5	20	20	10	25	50	25	150
Max. Time, End Semester Exam (Theory) -3Hrs.								End Semester Exam (Lab) - 2Hr		
Course Objectives										
1. Calculate velocity ratio for given machine & Find Efficiency of given machine.										
2. Define related terms in mechanics & Calculate Components of forces.										
3. Calculate resultant analytically for given force system & Calculate resultant graphically.										

4. State conditions of equilibrium for given force system & Calculate reactions of beams for different static loading.

5. Define terms related to friction & Apply conditions of equilibrium for forces acting on a body associated with friction

Course Content			
Unit No.	Module No.	Content	Hours
1	I	<p>Introduction: Definitions, Simple machine, compound machine, load, effort, mechanical advantage, velocity ratio, input of a machine, and output of a machine efficiency of a machine, ideal machine, ideal effort and ideal load, load lost in friction, effort lost in friction.</p> <p>Analysis: Law of machine, maximum mechanical advantage and maximum efficiency of a machine, reversibility of a machine, condition for reversibility of a machine, self-locking machine. Simple numerical problems.</p> <p>Velocity Ratio for simple machines: Simple axle and wheel, differential axle and wheel, Weston's differential pulley block, single purchase crab, double purchase crab, worm and worm wheel, geared pulley block, screw jack, calculation of mechanical advantage, efficiency, identification of type such as reversible or not etc.</p>	10
2	I	<p>Fundamentals and Force systems: Definitions of mechanics, Engineering mechanics, statics, dynamics, Kinetics, Kinematics, rigid body, classification of force system according to plane coplanar and non-coplanar ,sub classification of coplanar force system- collinear , concurrent, non-concurrent, parallel, like parallel, unlike parallel, general etc. Definition of a force, S.I. unit of a force, representation of a force by vector and by Bow's notation method. Characteristics of a force, effects of a force, principle of transmissibility.</p>	14
	II	<p>Resolution of a force and Moment of a force: Definition, Method of resolution, along mutually perpendicular direction and along two</p>	10



		given direction. Definition of moment, S. I. unit, classification of moments, sign convention, law of moments Varignon's theorem of moment and its use, definition of couple, S.I. unit, properties of couple with example.	
3	I	<p>Composition of Forces : Analytical method, definition of Resultant force, methods of composition of forces, Law Of parallelogram of forces, Algebraic method for determination of resultant for concurrent and non concurrent, parallel coplanar force system.</p> <p>Graphical method:Space diagram, vector diagram, polar diagram, and funicular polygon. Resultant of concurrent and parallel force system only.</p>	10
4	I	<p>Equilibrium</p> <p>Equilibrant and Lami's Theorem: Definition of equilibrant, relation between resultant and equilibrant, equilibrant of concurrent and non-concurrent force system. Analytical and graphical conditions of equilibrium for concurrent, non-concurrent and parallel force system, free body and free body diagram. Statement and explanation of Lami's theorem, Application of Lami's theorem for solving various engineering problems</p> <p>Beams:Definition, Types of beams (cantilever, simply supported, overhanging, fixed, continuous), Types of end supports (simple support, hinged, roller), classification of loads, point load, inclined point load, uniformly distributed. load. Analytical method to determine reactions of simply supported, cantilever and over hanging beam subjected to point loads and UDL and graphical method to determine reactions for beams subjected to vertical point loads & udl only.</p>	10
5	I	<p>Friction: Definition, Friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction, angle of repose and coefficient of friction. Cone of friction, types of friction, laws of friction, advantages and</p>	10



	disadvantages. Equilibrium of body on Horizontal and inclined plane: Equilibrium of body on horizontal plane subjected to horizontal and inclined force. Equilibrium of body on inclined plane subjected to forces applied parallel to the plane only. Concept of ladder fraction.	
	Total No. of Hrs	54

Beyond the Syllabus

Course Outcome

Students should able to

CO1	Understand the effect of different types of coplanar forces.
CO2	Apply Principles of equilibrium in finding reactions of different types of beams.
CO3	Apply principles of equilibrium for locating centroid and centre of gravity for given solids.
CO4	Understand working of different types of machines.
CO5	Understand the effect of different types of coplanar forces.

Recommended Resources

Text Books: **Nirali Publication**

Reference Books

1. Engineering Mechanics by R.S.Khurmi - S. Chand & Company Ltd
2. Engineering Mechanics by Shames and Rao - Pearson Education
3. Applied Mechanics by S. Ramamrutham - Dhanpat Rai & Sones, Delhi

E-Resources <https://nptel.ac.in/courses/122102004/>

Course		DTCE103		Applied Mathematics						
Year	First			Semester	I			Prerequisite		XXX
Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)				End Semester Examination		Total Marks
L	T	P	C	CIA-1	CIA-2	CIA-3	LAB	Theory	Lab	
4	1	-	5	20	20	10	-	50	-	100
Max. Time, End Semester Exam (Theory) -3Hrs.										
Course Objectives										
1 Find roots of algebraic equations which are not in real.										
2. Identify the function and find the value of function.										
3. To evaluate limit of function.										

Course Content			
Unit No.	Module No.	Content	Hours
1	I	Complex number: Definition of complex number, Cartesian, polar and exponential forms of complex number. Algebra of complex number such as equality, addition, subtraction, multiplication and division. De- Moivre's theorem with simple examples. Euler's form of circular functions, hyperbolic functions and relation between circular and hyperbolic functions.	18
2	I	Differential Calculus: 2.1 Function: Definition of function, range and domain of function. Value of function at a point. Types of functions and examples	6
	II	2.2 Limits: Concept and definition of limit. Limits of algebraic, trigonometric, logarithmic and exponential functions with examples.	6
	III	2.3 Derivatives: Definition of derivatives, notation, derivatives of standard function using first principle. Rules of differentiation such as, derivatives of sum or difference, product, and quotient	6



		with proofs. Derivative of composite function with proof (Chain rule), Derivatives of inverse trigonometric functions using substitution, Derivatives of inverse function, Derivatives of implicit function, Derivatives of parametric function, Derivatives of one function w.r.t another function, Logarithmic differentiation. Second order differentiation	
3	I	Numerical Method: Solution of algebraic equation: Bisection method, Regula falsi method, Newton Raphson method	10
	II	Numerical solution of simultaneous equations: Gauss elimination method, Jacobi's method, Gauss Seidal method	8
		Total No. of Hrs	54

Beyond the Syllabus

Course Outcome

Students should be able to

- | | |
|------------|---|
| CO1 | Use complex numbers for representing different circuit component in complex form to determine performance of electrical circuit and machines. |
| CO2 | Apply rules and methods of differential calculus to solve problems. |
| CO3 | Apply various numerical methods to solve algebraic and simultaneous equations. |
| CO4 | |

Recommended Resources

Text Books Nirali Publication

- Reference Books**
1. Mathematics for polytechnic by S. P. Deshpande- Pune Vidyarthi Griha Prakashan, Pune
 2. Higher Engineering Mathematics by B. S .Grewal - Khanna Publication, New Delhi

E-Resources www.khan academy



Course		DTCE104		Building construction & Material						
Year	First	Semester	I	Prerequisite				XXX		
Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)				End Semester Examination		Total Marks
L	T	P	C	CIA-1	CIA-2	CIA-3	LAB	Theory	Lab	
4	0	2	5	20	20	10	25	50	25	150
Max. Time, End Semester Exam (Theory) -3Hrs.										
Course Objectives										
1. Define and state use of surveys and also its classification										
2. Describe construction and use different instruments for linear measurements										
3. Write construction and use of different instruments for setting offsets and Calculate the area of field										
4. Describe construction and state use of prismatic compass.										
5. Describe different methods of orientation of Plane Tabling										

Course Content			
Unit No.	Module No.	Content	Hours



1	I	Building Structures And Components: Load bearing, Framed and composite structure, Sub structure: foundation, Plinth and DPC its function. Super structure: Wall, sill, lintel, doors and windows, floor, roof, parapet, slab, columns, beams, and their functions. General design Principles of Earthquake Resistant structures: while planning and during construction	10
2	I	Construction of Sub Structure Site Clearance, preparing job layout, layout for load bearing structure and framed structure by centre line and face line method. Precautions while marking layout on ground. Excavation for foundation, timbering and strutting for foundation trench, dewatering of foundation, tools and plants used for excavation.	10
	II	Foundations: Definition, Function, requirements of good foundation, Types a) Shallow foundation- wall footing, isolated and combined column footing, stepped foundation, raft foundation.	5
	III	Deep Foundation: Pile foundation, well foundation and caisson. Precautions to be taken while constructing foundation in black cotton soil.	5
3	I	Construction of Superstructure 3.1 Masonry Work Stone masonry: Terms used in stone masonry- facing, backing, hearting, through stone, corner stone, cornice etc. Type of stone masonry: Rubble masonry, Ashlar Masonry and their types. Requirements of good stone masonry, expansion joints in stone masonry their purpose and procedure. Brick masonry: Terms used in brick masonry- bond, joints, lap, frog, line, level and plumb. Bonds in brick masonry- header bond, stretcher bond, English bond and Flemish bond. Requirements of good brick masonry, expansion joints in brick masonry their purpose and procedure. Comparison between stone masonry and Brick Masonry. Tools and plants required for construction of stone masonry and brick masonry. Hollow concrete block masonry and composite masonry. Scaffolding: Necessity, component parts and types of Scaffolding , Scaffolding and platforms used for multi storeyed building	10
	II	Doors and windows Door & window frames, location of Doors and Windows, various sizes of doors and windows for residential and public buildings. a) Types of doors: Batten Ledged braced framed door, panelled, glazed, flush, collapsible, revolving doors, rolling shutters. b) Types of windows: Casement, Panelled, Steel, Aluminium, Sliding, louvered window, Grills and Ventilators. Fixture and Fastening for	10



		doors, windows Sill, lintel - types and function, Arch - types and function. Procedure for replacing the glass of existing sliding window.	
	III	Vertical Communication Means of vertical communications: Stairs, lift/ Elevators, Escalators, Ramp (sketches and suitability). Terms used in stair- Step, riser, tread, flight, Winder, Kite step, landing, soffit, pitch, Newel posts, hand rail, balustrade, head room. Types of stairs: straight, quarter turn, half turn, open well, doglegged, spiral, bifurcated, circular, sketch and suitability, Requirements of good staircase, thumb rule for stair design	4
		Total No. of Hrs	54

Beyond the Syllabus

Course Outcome

Students should be able to

CO1	Classify various types of structure
CO2	List various components of building and their function
CO3	Draw sketches and label the parts of various components.
CO4	Set out layout of building structure on ground & State various terms related to substructure.
CO5	Sketch and label various components of super structure

Recommended Resources

Text Books	Nirali Publication
Reference Books	Building Construction by Sushil Kumar - Standard, New Delhi Building Construction by P C Varghese - PHI, New Delhi Building Construction by S. C. Rangwala – Charotar publication
E-Resources	https://nptel.ac.in/courses/105102088/



Semester 2

Course		DTCE201		Advance Surveying						
Year	First			Semester	II		Prerequisite		DTCE101	
Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)				End Semester Examination		Total Marks
L	T	P	C	CIA-1	CIA-2	CIA-3	LAB	Theory	Lab	
4	0	2	5	20	20	10	25	50	25	150
Max. Time, End Semester Exam (Theory) -3Hrs.								End Semester Exam (Lab) - 2Hr		
Course Objectives										
1. State the meaning of contour, contour interval and horizontal equivalent.										
2. Computethe area & volume										
3. Use the theodolite for measurement of horizontal angle, deflection angle, magnetic bearing and vertical angle										
4. Use tacheometer to find horizontal and vertical distances										
5.										

Course Content			
Unit No.	Module No.	Content	Hours
1	I	<p>Contouring :Concept of contour, contour interval and horizontal equivalent. Factors affecting contour interval, Characteristics of contours, Interpretation of ground features from contour map, Uses of contour map.</p> <p>Methods of contouring, Direct method and Indirect method (block contouring, Longitudinal and cross sectioning) Interpolation of contour and its methods, Concept of grade contour, Establishing grade contour on ground, Locating grade contour on contour map</p>	10
2	I	<p>Area and Volume Measurement: Instruments used for measuring the area- Polar Planimeter and Digital Planimeter. Polar Planimeter-</p>	10



		Component parts and procedure of measurement of area. Simple numerical problems. Digital planimeter- Component parts and procedure of measurement. Computation of volume from contour maps by Trapezoidal and Prizmoidal formulae, Simple numerical problems.	
3	I	Theodolite Surveying : Types of theodolite, uses of theodolite, Component parts of transit theodolite and their functions, Reading the vernier of transit theodolite, Technical terms- Swinging, Transiting, Face left, Face right, Fundamental axes of transit theodolite and their relationship	8
	II	Temporary adjustment of transit theodolite, Measurement of horizontal angle- Direct and Repetition method, Errors eliminated by method of repetition, Measurement of magnetic bearing of a line, Prolonging and ranging a line, Measurement of deflection angle, Measurement of vertical Angle. Permanent adjustment of transit theodolite	8
	III	Theodolite traversing by included angle method and deflection angle method. Check in open and closed traverse, Calculations of bearing from angles, Traverse computation-Latitude, Departure, Consecutive coordinates, Independent coordinates, Balancing traverse by Bowditch's rule and Transit rule, Gale's table calculations, Simple numerical problem	8
4	I	Tacheometry : Meaning of tacheometer and tacheometry, Principle of tacheometry, Essential requirement of tacheometer. Tacheometric formula for horizontal distance with telescope horizontal and staff vertical, Field method for determining constants of tacheometer, Determining horizontal and vertical distances with tacheometer by fixed hair method and staff held vertical, Limitation of tacheometry Simple numerical problems. Contouring by tacheometer-Method and specific use.	10
		Total No. of Hrs	54

Beyond the Syllabus

Course Outcome

Students should be able to

- | | |
|------------|---|
| CO1 | Understand handling and use of various survey instruments for field observations. |
| CO2 | Understand linear and angular measurements |
| CO3 | Select suitable instruments and appropriate method of survey. |
| CO4 | Understand the preparation of maps from the field observations. |

C05 Interpret survey maps.

Recommended Resources

Text Books Nirali Publication

Reference Books Surveying and Leveling- 38 th edition by N.N. Basak - Tata McGraw Hill
Surveying- Volume-I, II Third Edition by S K Duggle - Tata McGraw Hill
Surveying and Leveling-1,II by T.P. Kanetkar and Kulkarni - Pune Vidyarthi Grigh
Prakashan

E-Resources <https://nptel.ac.in/courses/105104100/>

Course		DTCE202		Transportation Engineering						
Year	First			Semester	II		Prerequisite		XXX	
Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)				End Semester Examination		Total Marks
L	T	P	C	CIA-1	CIA-2	CIA-3	LAB	Theory	Lab	
4	0	2	5	20	20	10	25	50	25	150
Max. Time, End Semester Exam (Theory) -3Hrs.								End Semester Exam (Lab) - 2Hr		
Course Objectives										
1. Know component parts of railway, bridges, tunnels, airport and dock and harbour engineering										
2. Understand methods of survey and investigation of alignment of railway, bridges and tunnels.										
3. Organize, supervise and coordinate the construction activities related to railway, bridges and tunnels										
4. Define different terminologies related to bridge engineering										
5. State functions of component parts of bridge										

Course Content			
Unit No.	Module No.	Content	Hours
1	I	Railway Engineering: Alignment and Gauges and Permanent ways, 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 and M.G Single and double line in cutting and embankment.	10
	II	Permanent ways Ideal requirement, component parts. Rails - function and its types. Rail Joints - requirements, types, Creep of rail, causes and prevention of creep. Sleepers - functions and Requirement, types - wooden, metal, concrete sleepers and their suitability, sleeper density Ballast - function and different types with their properties, relative merits and demerits. Rail fixtures and fastenings – fish plate, bearing plates, spikes, bolts,	10

		keys, anchors and anti creepers.	
	III	<p>Railway Track Geometrics and Branching of Tracks</p> <p>Coning of wheels, tilting of rails, Gradient and its types, Super elevation limits of Super elevation on curves, cant deficiency negative cant, grade compensation on curves</p> <p>Branching of Tracks</p> <p>Definition of point and crossing, a simple split switch turnout consisting of points and crossing lines. Sketch showing different components, their functions and working. Line sketches of track junctions-crossovers, scissor cross over, diamond crossing, triangle. Inspection of points and crossings.</p> <p>Site selection for railway stations, Requirements of railway station, Types of stations (way side, crossing, junction and terminal)</p> <p>Station yards , types of station yard, Passenger yards, good yard Locomotive yard – its requirements, water column , Marshalling yard – its types. .</p> <p>Track Maintenance</p> <p>Necessity, types, Tools required and their function, orgnisation, duties of permanent way inspector, gang mate key man.</p>	8
2	I	<p>Bridge Engineering:</p> <p>Site selection and investigation</p> <p>Factors affecting selection of site of a bridge. Bridge alignment</p> <p>Collection of design data, Classification of bridges according to function, material, span, size, alignment, position of HFL.</p>	10
	II	<p>Component parts of bridge</p> <p>Plan and sectional elevation of bridge showing component parts of, substructure and super structure.</p> <p>Different terminology such as effective span, clear span, economical span, waterway, afflux, scour, HFL, freeboard, etc.</p> <p>Foundation – function, types. Piers-function, requirements, types.</p> <p>Abutment – function, types. Wing walls – functions and types.</p> <p>Bearing – functions, types of bearing for RCC and steel bridges.</p> <p>Approaches –in cutting and embankment.</p> <p>Bridge flooring- open and solid floors</p>	8
	III	<p>Permanent and Temporary Bridges and Maintenance of Bridge</p> <p>Permanent Bridges - Sketches and description in brief of culverts, causeways, masonry, arch, steel, movable steel bridges, RCC girder bridge, prestressed girder bridge, cantilever, suspension bridge. Temporary Bridges- timber, flying, floating bridges</p> <p>Inspection and Maintenance Of Bridge</p> <p>Inspection of bridges-General points to be observed. Pre and post monsoon inspection-Purpose</p> <p>Maintenance of bridges: types – routine and special Maintenance.</p>	8
		Total No. of Hrs	52



Beyond the Syllabus

Course Outcome

Students should able to

CO1	List various modes of transportation system with their merits and demerits & State importance of cross drainage works
CO2	State component parts of permanent way with their functions types, merits and demerits.
CO3	Draw different track junctions and station yards
CO4	Define different terminologies related to bridge engineering
CO5	State functions of component parts of bridge

Recommended Resources

Text Books	Nirali Publication
Reference Books	Principles of Railway Engineering by S.C. Rangwala - Charotar Publication Principles and Practice of Bridge Engineering by S P Bindra - Dhanpatrai & sons Railway Track by K.R. Antia - The New Book Co. Pvt. Ltd Mumbai
E-Resources	https://nptel.ac.in/downloads/105101087/

Course		DTCE203		Mechanics of Structure						
Year	First	Semester	II	Prerequisite				XXX		
Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)				End Semester Examination		Total Marks
L	T	P	C	CIA-1	CIA-2	CIA-3	LAB	Theory	Lab	

4	0	2	5	20	20	10	25	50	25	150
Max. Time, End Semester Exam (Theory) -3Hrs.								End Semester Exam (Lab) - 2Hr		
Course Objectives										
1. Calculate moment of inertia Standard plane figures & Calculate moment of inertia, Radius of gyration of Built up sections.										
2. Draw stress-strain curve for ductile and brittle materials and locate salient points.										
3. Calculate change in dimensions and volume of the body subjected to uniaxial, biaxial, triaxial loads.										
4. Draw Shear force and Bending Moment diagrams and locate salient points.										
5. Draw bending stress and shear stress distribution diagram										

Course Content			
Unit No.	Module No.	Content	Hours
1	I	Moment of Inertia Concept of Moment of Inertia, Moment of Inertia of plane areas such as square, rectangle, triangle, circle, semicircle and quarter circle Parallel axis and perpendicular axis theorem, M.I of built up sections, symmetrical and Unsymmetrical sections, radius of gyration and polar moment of inertia.	10
2	I	Simple Stress and Strain Definition of rigid body, plastic body, mechanical properties of metal such as elasticity and 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.	5
	II	Deformation of body due to axial load. Deformation of a Body subjected to axial forces. Deformation of body of stepped cross section due to axial load, maximum stress and minimum stress induced. Stresses in bars of composite section and deformation. Shear stress, shear strain and modulus of rigidity, complementary shear stress, state of simple shear, punching shear	5
3	I	Elastic Constants Definition of lateral strain, Poisson's ratio, Change in lateral dimensions Volumetric strain due to uni-axial force and change in dimension, Biaxial and tri-axial stresses and volumetric strain and change in volume Definition of bulk modulus, volumetric strain. Relation between modulus of elasticity, modulus of rigidity and bulk modulus.	10



		Definitions of temperature stress and strain, Nature of stress and strain due to change in temperature (no composite sections) in a bar.	
4	I	Shear Force And Bending Moment Types of beams - cantilever, simply supported, fixed and continuous beams with overhang, 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, (combination of any two types of loading) point of contra flexure	12
5	I	Stresses in Beam Bending Stresses 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 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 Relation between maximum shear stress and average shear stress	12
Total No. of Hrs			54

Beyond the Syllabus

Course Outcome

Students should be able to

- | | |
|------------|--|
| CO1 | Understand various mechanical properties of materials. |
| CO2 | Understand the behavior of members under different types of load. |
| CO3 | Apply principles of equilibrium for determining shear force and bending moment for a given beam. |
| CO4 | Understand the principles of calculating moment of Inertia for simple and composite sections. |
| CO5 | Understand various mechanical properties of materials. |

Recommended Resources	
Text Books	Nirali Publication
Reference Books	Strength of Material by R. S. Khurmi - S. Chand & Company Delhi Strength of Material by S. Ramamurtham – dhanpat Rai & sons Strength of material by R. K. Bansal – Laxmi Publication
E-Resources	www.nptel.com, www.nittr.com

Course		DTCE204		Concrete Technology						
Year	First	Semester	II	Prerequisite				XXX		
Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)				End Semester Examination		Total Marks
L	T	P	C	CIA-1	CIA-2	CIA-3	LAB	Theory	Lab	
4	0	2	5	20	20	10	25	50	25	150
Max. Time, End Semester Exam (Theory) -3Hrs.								End Semester Exam (Lab) - 2Hr		
Course Objectives										
1. State physical properties and tests of cement & State use of various types of cement.										
2. List and describe different properties of Aggregates & Carry out various Tests on the Aggregates of concrete.										
3. Design concrete mix										
4. Understand Techniques of quality control of concrete.										



5.

Course Content			
Unit No.	Module No.	Content	Hours
1	I	<p>Cement</p> <p>Chemical Constituents of OPC and their effects on properties of OPC, Bogue's compounds and their properties, Hydration of cement. Physical properties of OPC-Fineness, setting, compressive strength and soundness. Different grades of OPC. 33, 43, and 53 with specifications of physical properties as per relevant IS codes.</p> <p>Testing of OPC –field tests and laboratory tests-fineness test, standard consistency test, setting time test, compressive strength test, soundness test. Storage of cement and effect of storage on properties of cement.</p> <p>Physical properties, I.S. Specifications and field application of following types of cement :- Rapid hardening cement, Low heat cement, Portland pozzolana cement, Sulphate resisting cement, Blast furnace slag cement, White cement.</p>	12
2	I	<p>Aggregate</p> <p>Requirement of Good Aggregate. Classification of Aggregate according to source, Size and Shape.</p> <p>Properties of fine aggregates :Concept of size, specific gravity, bulk density, water Absorption and Bulking. Determination of fineness modulus and grading zone of Sand by sieve analysis, determination of silt content in sand and their specification as per IS 383.</p> <p>Determination of Bulking of sand. Concept of crushed Sand. Properties of coarse aggregates: Concept of size, shape, surface texture, water absorption, soundness, specific gravity and bulk density</p> <p>Determination of fineness modulus of coarse aggregate by sieve analysis, grading of Coarse Aggregates.</p> <p>Determination of crushing value, impact value and abrasion value of coarse aggregate with specification.</p>	12
3	I	<p>Concrete</p> <p>Introduction to concrete</p> <p>Definition of concrete, necessity of supervision for concreting operation, different grades of concrete (ordinary Concrete, standard concrete and high strength concrete as per provisions of IS 456- 2000.</p> <p>Water cement ratio:- Definition of w/c ratio, Duff Abraham w/c law, significance of w/c ratio, selection of w/c ratio for different grades of concrete prepared from different grades of OPC as per graphs specified in IS 10262 -1982, maximum w/c ratio for different grades of concrete for different exposure conditions.</p>	10



	II	<p>Properties of fresh and Hardened concrete</p> <p>Definition of workability, factors affecting workability of Concrete. Determination of workability of concrete by slump cone test, compaction factor test. Range values of workability requirement for different types of concrete works. Segregation, bleeding.</p> <p>Definition of compressive strength, durability and Impermeability of concrete. Factor affecting compressive strength, durability and Impermeability of concrete.</p>	5
	III	<p>Concrete Mix Design and Testing of Concrete</p> <p>Objectives of mix design, list of different method of mix design, study of mix design procedure by I.S. method as per I.S. 10262-1982 (Only procedural steps)</p> <p>Testing of concrete:-Significance of testing, determination of compressive strength of concrete cubes at different ages, interpretation and co-relation of test results</p> <p>Non- destructive testing of concrete:- Importance of NDT, methods of NDT - rebound hammer test and ultrasonic pulse velocity test, working principle of rebound hammer and factor affecting the rebound index, specification for deciding the quality of concrete by Ultrasonic pulse velocity as per I.S.13311 (part 1 and 2).</p> <p>Determination of compressive strength of concrete by rebound hammer test as per I.S. 13311, determination of Quality of concrete by ultrasonic pulse velocity test.</p>	5
4	I	<p>Quality of Concrete</p> <p>Concreting Operation</p> <p>Batching- Definition and Types of Batching.</p> <p>Mixing- Types of Mixing and Types of mixers.</p> <p>Form work : Form work for concreting, different types of form works for members like beams, slabs, Columns, materials used for form work, requirement of good form work. Stripping time for removal of form works per IS 456-2000 provision for different structural members.</p> <p>Transportation: Modes of transportation of concrete, precautions to be taken during transportation.</p> <p>Placing: placing of concrete in form work, precautions to be taken while placing of concrete.</p> <p>Compaction of concrete: methods of compaction, care to be taken during</p>	20



	compaction. Finishing of concrete: purpose of finishing, types of Finishing. Curing of concrete: definition of curing, necessity of curing, different methods of curing and their application Waterproofing and Joints of concrete Waterproofing: Importance and need of waterproofing, methods of Waterproofing and materials used for waterproofing. Joints in concrete construction: Types of joints, joining old and new concrete, methods of joining, Materials used for filling joints.	
	Total No. of Hrs	54

Beyond the Syllabus

Course Outcome

Students should able to

- | | |
|------------|---|
| CO1 | Ensure the quality of ingredients of concrete. |
| CO2 | Design concrete mix. |
| CO3 | Understand Techniques of quality control of concrete. |
| CO4 | Describe various concrete operations. |

Recommended Resources

Text Books

Nirali Publication

Reference Books

Concrete Technology by M. S. Shetty – S Chand Publication
 Concrete Technology by M L Gambhir - Tata Mc-Graw. Hill
 Publishing Co. Ltd. New Delhi Concrete Technology by A. M. Neville and
 J. J. Brooks - Pearson Education Pvt. Ltd. New Delhi

E-Resources

<https://nptel.ac.in/courses/105102012/>



School of Engineering and Technology

Common to All

Year: First Year

Semester: I

Course: English Communication Skill (HSS)

Course Code: 17YHS111

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Orals	Lab	
2	-	2	3	10	20	10	10	-	50	-	100
Max. Time, End Semester Exam									End Semester Orals –1 Hr.		

Prerequisite	1. Functional grammar-Parts of speech, Tenses, Sentence pattern 2. Formal letter 3. Fluency in reading and speaking
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Course Objectives

- 1 To acquire basic language skills (LSRW) to communicate with speakers of English language.
- 2 To develop their intellectual, personal and professional abilities.
- 3 To develop skill to communicate fluently.
- 4 To enhance team building and time management skills.
- 5 To inculcate employability skills among students.

Course Content			
Unit No.	Module No.	Content	Hours
1	I	English Vocabulary building: Affixes, Prefixes & Suffixes	3
	II	Word building- Compound words, Standard Abbreviations	2
	III	Antonyms and Synonyms- functional usage	2
	IV	Active & Passive voice	2
2	I	Writing skills: Parts of speech	3
	II	Paragraph writing	2
	III	Use of Idioms, Phrases and Proverbs in sentences	2
	IV	Basic sentence pattern	1
	V	Importance of punctuation	1
3	I	CALL- Computer Assisted Language Laboratory Listening exercises- Extempore	4
	II	Vocabulary building -Task based Lab Activities	5
	III	Language fluency Linguistic accuracy & Communicative fluency	5
	IV	Listening to varied registers-Role play - Situational Dialogues	2
	V	Pronunciation, Intonation, Stress and Rhythm- Public speaking	4



4	I	Oral & Written Presentation Tenses	2
	II	Ice breaking, reporting, Question & answer skill	2
	III	Formal & Informal speech	3
Total No. of Hrs			45

Beyond the Syllabus

Self Introduction, SWOT/SWOC, Group Discussion

Course Outcome

Students should able to

- | | |
|------------|--|
| CO1 | Students will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills. |
| CO2 | Students will be able to write formal letters effectively. |
| CO3 | Students will be able to prepare, organize and deliver oral presentation. |
| CO4 | Students will develop reading speed and build academic vocabulary. |
| CO5 | Students will demonstrate behavior and attitudes appropriate to university environment. |

List of Experiments

Sr. No.	Description
1	Module 1 CALL- Computer Assisted Language Laboratory Listening exercises- Extempore
2	Module 2 Vocabulary building -Task based Lab Activities
	Module 3 Language fluency Linguistic accuracy & Communicative fluency
	Module 4 Listening to varied registers-Role play - Situational Dialogues
	Module 5 Pronunciation, Intonation, Stress and Rhythm- Public speaking

Recommended Resources
Text Books

1. Communication Skills by Sanjay Kumar and PushpaLata, Oxford University Press.
2. Developing Communication Skill by Krishna Mohan, MeeraBanerji, McMillan India Ltd.
3. English for Business Communication by Simon Sweeney, Cambridge University Press.
4. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

Reference Books

1. Ethics in Engineering Practice and Research by Caroline & Whitbeck, Cambridge University Press.
2. Basic Managerial Skills by E. H. McGrath, Eastern Economy Edition, Prentice hall India.
3. Change Your Thoughts; Change Your Life by Wayne Dyer, Hay House India, ISBN-139788189988050.
4. The Power of Your Subconscious Mind by Dr Joseph Murphy MaanuGraphics , ISBN-13 9789381529560.
5. Baltra, A. (1986). "Computer assisted language learning: What is it all about?" Paper presented at a conference at the University of California, Irvine.
6. Jones, C. (1986). It's not so much the program, more what you do with it: The importance of methodology in CALL. "System, 14"(2), p.171-78.
7. Rivers, W. (Ed.). (1987) "Interactive language teaching." NY: Cambridge University Press.

E-Resources

- https://www.britishcouncil.in/sites/default/files/esfe_report.pdf
<https://www.britishcouncil.org/sites/default/files/english-soft-skills-maghreb-research-report.pdf>
<http://nptel.ac.in/courses/109104030/references/references.pdf>
<http://promeng.eu/downloads/training-materials/ebooks/soft-skills/effective-communication-skills.pdf>



School of Engineering and Technology

Common to All

Year: First Year

Semester: II

Course: Technical Communication

Course Code: 17YHS211

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Orals	Lab	
2	-	2	3	10	20	10	10	-	50	-	100
Max. Time, End Semester Exam									End Semester Orals –1 Hr.		

Prerequisite	4. Functional grammar-Paragraph writing, Tenses, Sentence pattern 5. Voice 6. Fluency in reading and speaking
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Course Objectives

- 1 To help the students in building interpersonal skills.
- 2 To develop Emotional Intelligence to deal with difficult situations.
- 3 To create an open environment for Communication.
- 4 To enhance team building and time management skills.
- 5 To inculcate employability skills among students.

Course Content			
Unit No.	Module No.	Content	Hours
1	I	Business Communication skill Communication: Importance & barriers to communication.	2
	II	Listening Skills: Listening for Comprehension	2
	III	Reading Skills: passages from varied registers	1
	IV	Written Skills: Formal writing, Email writing, picture composition	2
	V	Writing for social media	1
2	I	Corporate / Business Etiquettes Role play	3
	II	Conversational skills- telephonic, email, situational	2
	III	Time management	1
	IV	Application of modern electronic devices	2
3	I	Soft Skills Self-awareness: SWOT/SWOC, Positive Attitude	2
	II	Body language	1
	III	Interpersonal skills	2
4	I	Reference & Study Skills Use of Dictionary and Thesaurus	1
	II	Use of Articles, Journals and Reference books	1



	III	Writing Reviews	2
5	I	CALL- Computer Assisted Language Laboratory Common Everyday Situations: Conversations and Dialogues	5
	II	Communication at Workplace	5
	III	Interview Techniques	5
	IV	Formal Presentations	5
		Total No. of Hrs	45

Beyond the Syllabus

Interview Techniques, Group Discussions, Formal Dress Code, Professional Ethics

Course Outcome

Students should able to

- | | |
|------------|--|
| CO1 | Students will acquire communication strategies to participate in group and class discussions |
| CO2 | Students will be able to utilize digital literacy tools to develop listening skills. |
| CO3 | Students will be able use a variety of accurate sentence structures. |
| CO4 | Students will be able to comprehend, analyze and interpret texts written in English. |
| CO5 | Students will use grammatical structures appropriately & deliver an effective oral presentation. |

List of Experiments

Sr. No.	Description
1	Module 1 CALL- Computer Assisted Language Laboratory Common Everyday Situations: Conversations and Dialogues
2	Module 2 Communication at Workplace
3	Module 3 Interview Techniques
4	Module 4 Formal Presentations



Recommended Resources	
Text Books	<ol style="list-style-type: none"> 1. Communication Skills by Sanjay Kumar and Pushpa Lata, Oxford University Press. 2. Developing Communication Skill by Krishna Mohan, Meera Banerji, McMillan India Ltd. 3. English for Business Communication by Simon Sweeney, Cambridge University Press.
Reference Books	<ol style="list-style-type: none"> 1. Ethics in Engineering Practice and Research by Caroline & Whitbeck, Cambridge University Press. 2. Personality Development and Group Discussions by Barun K. Mitra, Oxford University Press. 3. Group Discussions and Interview Skills by Priyadarshi Patnaik , Foundation Books , Cambridge University Press. 4. The Power of Your Subconscious Mind by Dr Joseph Murphy MaanuGraphics , ISBN-13 9789381529560. 5. The 80/20 Principal by Richard Koch, Nicholas Brealey Publishings , ISBN-13 9781857883992. 6. Time management from inside out by Julie Morgenstern, Owl Books (NY), ISBN-13 9780805075908. 7. You can win by Shiv Khera, Macmillan, ISBN-139789350591932.
E-Resources	<p>https://www.britishcouncil.in/sites/default/files/esfe_report.pdf</p> <p>https://www.britishcouncil.org/sites/default/files/english-soft-skills-maghreb-research-report.pdf</p> <p>https://pdfs.semanticscholar.org/c1d3/e21ea8496e2d828678cde2981aac1bd4ce3e.pdf</p> <p>http://www.iosrjournals.org/iosr-jhss/papers/Vol11-issue4/D01142022.pdf</p>

