Discipline-Civil Engneering	Semestar- 5th	Name Of the teaching Faculty: Er. Laxmipriya Mohapatra
Subject:- Th.1 Surveying	No. of Days/per week class alloted:3	Semester From Date:01/07/2026 to 05/11/2026 No. of weeks-17
Week	**Class Day**	**Theory/Practical Topics**
1st	1st	**UNIT-I** **Overview and Classification of Survey** Survey- Purpose and Use.
	2nd	Types ofsurveying- Primary and Secondary, Classification: Plane, Geodetic,
	3rd	Cadastral, Hydrographic, Photogrammetry and Aerial.
2nd	1st	Principles of Surveying.
	2nd	Scales: Engineer's scale, Representative Fraction (RF) and diagonal scale.
	3rd	**UNIT-II** **Chain Surveying** Instruments used in chain survey: Metric Chain, Tapes, Arrow, Ranging rod, Line ranger, Off-set rod, Open cross staff, Optical square.
3rd	1st	Chain survey Station, Base line, Check line, Tie line, Offset, Tie station.
	2nd	Ranging: Direct and Indirect Ranging. Methods of Chaining, obstacles in chaining.
	3rd	Errors in length: Instrumental error, personal error, error due to natural cause, random error.
4th	1st	Types of offsets: Perpendicular and Oblique. Conventional Signs, Recording of measurements in a field book.
	2nd	**UNIT-III** **Compass Traverse Survey** Compass Traversing- open, closed. Technical Terms: Geographic/ True Magnetic Meridians and Bearings, Whole Circle Bearingsystem and Reduced Bearing system and examples on conversion of given bearing to anotherbearing (from one form to another),
	3rd	Fore Bearing and Back Bearing, Calculation of internal and external angles from bearings at a station, Dip of Magnetic needle, Magnetic Declination.
5th	1st	Types of Compass-prismatic and surveyor compass, Components of Prismatic Compass and Surveyor compass and their Functions, Methods of using Prismatic Compass, Temporary adjustments and observing bearings.
	2nd	Local attraction, Methods of correction of observed bearings - Correction at station and correction to included angles.
	3rd	Methods of plotting a traverse and closing error, Graphical adjustment of closing error.
6th	1st	**UNIT-IV** **Levelling and Contouring** Basic terminologies: Level surfaces, Horizontal and vertical surfaces, Datum, Bench Marks- GTS, Permanent, Arbitrary and Temporary, Reduced Level, Rise, Fall, Line of collimation, Station, Back sight, Fore sight, Intermediate sight, Change point, Height of instruments.

6th	2nd	Types of levels: Dumpy, Tilting, Auto level, Digital level, Components of Dumpy Level and its fundamental axes, Temporary adjustments of Level.
	3rd	Types of Leveling Staff: Self-reading staff and Target staff. Reduction of level by Line of collimation and Rise and Fall Method. Leveling Types: Simple, Differential, Fly, Profile and Reciprocal Leveling
7th	1st	Contour, contour intervals, horizontal equivalent. Uses of contour maps, Characteristics of contours, Methods of Contouring: Direct and indirect.
	2nd	**Measurement of Area and Volume** Components and use of Digital planimeter. Measurement of area using digital planimeter. Measurement of volume of reservoir from contour map.
	3rd	**UNIT-V** **Theodolite Surveying** Types and uses of Theodolite, Components of transit, Theodolite and their functions, Reading the Vernier of transit Theodolite.
8th	1st	Technical terms- Swinging, Transiting, Face left, Face right. Fundamental axes of transit Theodolite and their relationship Temporary adjustment oftransit Theodolite.
	2nd	Measurement of horizontal angle- Direct and Repetition method, Errors eliminated by method of repetition.
	3rd	Measurement of magnetic bearing of a line, Prolonging and ranging a line, deflection angle. Measurement of vertical Angle.
9th	1st	Theodolite traversing by Included angle method and Deflection angle method. Checks for open and closed traverse, Calculations of bearing from angles.
	2nd	Traverse computation-Latitude, Departure, Consecutive coordinates, Independent coordinates, balancing the traverse by Bowditch's rule and Transit rule, Gale's
	3rd	Traverse table computation. (Simple numerical problems and concept only)
10th	1st	Traverse table computation. (Simple numerical problems and concept only)
	2nd	**UNIT-VI** **Tacheometric surveying and Curve setting** Principles ofTacheometry, Anallatic lens. Tacheometric formula for horizontal distance with telescope horizontal and staff vertical.
	3rd	Field method for determining constants of tacheometer,
11th	1st	Determining horizontal and vertical distances with tacheometer by fixed hair method and staff held vertical,
	2nd	Limitations of tacheometry.
	3rd	Types of curves used in roads and railway alignments. Designation of curves.
	1st	Setting simple circular curve by offsets from long chord.
	2nd	Setting simple circular curve by offsets from Rankine's method of deflection angles.

12th	3rd	**UNIT-VII** **Advanced surveying equipment** Principle of Electronic Distance Meter (EDM), its component parts and their Functions, use of EDM.
13th	1st	Use of micro optic Theodolite and Electronic Digital Theodolite.
	2nd	Use of Total Station, Use of function keys.
	3rd	Measurements of Horizontal angles, vertical angles using Total Station, Traversing, Profile Survey and Contouring with Total Station.
14th	1st	Measurements of distances and coordinates using Total Station, Traversing, Profile Survey and Contouring with Total Station.
	2nd	**UNIT-VIII** **Remote sensing, GPS and GIS** Remote Sensing – Overview, Remote sensing system,
	3rd	Applications of remote sensing in Civil engineering, land use / Land cover, mapping, disaster management.
15th	1st	Use of Global Positioning System (G.P.S.) instruments, and DGPS
	2nd	Geographic Information System (GIS): Over view, Components, Applications,
	3rd	Software for GIS. Introduction to Drone Surveying.
16th	1st	Revision Unit - I & II
	2nd	Revision Unit - III
	3rd	Revision Unit - IV
17th	1st	Revision UNIT-V & VI
	2nd	Revision Unit - VII & VIII
	3rd	Previous year question answer practice
		Laxmipriya Mohapatra Signature of the Faculty

Discipline: Civil Engineering	**Semester: 5th**	**Name of the Teaching faculty: Mr. Subrat Kumar Panigrahi**
Subject:DESIGN OF RCC STRUCTURE (TH-2)	**No. of days/ per week class alloted: 3**	**Semester From Date: 01.07.2026 To Date: 05.11.2026**
	Total Periods :45 Hrs	**No. of Weeks: 15**
Week	**Class Day**	**Theory/ Practical Topics**
1st	1	Design philosophies; Limit State Method – introduction and basic concepts
	2	Design of singly reinforced RCC beam – basic concepts
	3	Singly reinforced beam – design for flexure using LSM
2nd	1	Doubly reinforced RCC beam – concepts and design
	2	Nominal shear stress in RCC section; design shear strength of concrete
	3	Design of shear reinforcement in RCC beams
3rd	1	Minimum shear reinforcement; provisions of IS 456:2000
	2	Forms of shear reinforcement; simple numerical problems on shear
	3	Types of bond; bond stress; checking bond stress

4th	1	Development length in tension and compression members; codal checks
	2	Anchorage value of 90° hook; lapping of bars; introduction to serviceability limit state
	3	Definition and classification of columns; compression members
5th	1	Limit state of compression members; effective length of column
	2	IS 456:2000 provisions – minimum steel, maximum steel and cover
	3	Spacing of lateral ties and other reinforcement provisions
6th	1	Design of axially loaded short square column
	2	Design of axially loaded short rectangular column
	3	Design of axially loaded short circular column
7th	1	Numerical problems and design practice on short columns
	2	General features of T-beam and L-beam; advantages
	3	Effective width of flange as per IS 456:2000
8th	1	Stress-strain diagram and depth of neutral axis in flanged beams
	2	Moment of resistance of T and L beams
	3	Design of singly reinforced T-beam with neutral axis in flange
9th	1	Numerical problems – location of neutral axis and effective flange width
	2	Design of simply supported one-way slab – basic concepts and load calculation
	3	One-way slab – design for flexure
10th	1	One-way slab – design/check for shear
	2	One-way slab – deflection and serviceability checks
	3	Development length and detailing checks in one-way slab
11th	1	Design of one-way cantilever slab / Chajja
	2	Chajja – flexural design and development length check
	3	Chajja – shear stress check and detailing
12th	1	Design of two-way simply supported slab – basic principles
	2	Two-way slab – design procedure and reinforcement
	3	Introduction to design of dog-legged staircase
13th	1	Design of footing – introduction; types and design requirements
	2	Footing for axially loaded column – load transfer and sizing
	3	Design of isolated footing for axially loaded column
14th	1	Minimum eccentricity and its consideration in footing design
	2	Design of footing for uniaxial bending
	3	Column with uniaxial moment – pressure distribution
15th	1	Design of footing with uniaxial moment as per IS 456 provisions
	2	Numerical problem – complete design of isolated footing
	3	Revision, design problems and important codal provisions

Signature of the Faculty

Discipline: Civil Engineering	**Semester-5th**	**Name of the teaching faculty: Er. Chittaranjan Panda**

Subject: Building services and Maintenance (TH:3C)	No. of Days/Per week Class alloted: 3	Semester From Date: 01/07/26 To Date: 05/11/26 No. of Weeks: 15
Week	**Day**	**Theory Topics to be covered**
1st	1st	Introduction to building services; classification of building services
	2nd	Functional requirements of buildings; different types of building services
	3rd	HVAC – Heat, Ventilation and Air Conditioning: introduction and basic concepts
2nd	1st	HVAC components and applications in buildings
	2nd	Plumbing services: basic introduction; water supply and sanitation
	3rd	Sewerage and drainage systems
3rd	1st	Rainwater harvesting and its importance in buildings
	2nd	Solar water heating systems
	3rd	Lighting and acoustics in buildings
4th	1st	Sound insulation and electrical installation
	2nd	Role and responsibilities of a Building Services Engineer
	3rd	BMS (Building Management Services): introduction, functions and smart-building concept
5th	1st	Objectives and types of vertical communication in buildings
	2nd	Lifts: types and uses
	3rd	Lift components – lift well, travel, pit, hoistway, machine room
6th	1st	Lift components – buffer, door locks, landing doors, car, counterweight, etc.
	2nd	Lift car dimensions and basic space requirements
	3rd	Lift circulation, safety measures and basic design considerations
7th	1st	Escalators: types and uses
	2nd	Escalator components and terminology
	3rd	Escalator design provisions and space requirements
8th	1st	Ramps: necessity, design considerations and gradient
	2nd	Ramp layout and special provisions for physically handicapped users
	3rd	Fire protection requirements in multistoried buildings
9th	1st	Causes of fire in buildings
	2nd	Fire detection systems and working principles
	3rd	Fire extinguishing and fire suppression systems
10th	1st	Fire safety requirements in residential buildings
	2nd	Fire safety requirements in public buildings
	3rd	National Building Code provisions for fire safety
11th	1st	Fire-resistant materials and their properties
	2nd	Fire safety inspection of existing buildings
	3rd	Evacuation provisions, escape routes and emergency planning
12th	1st	Introduction to plumbing services; AHJ and role of plumbing authorities
	2nd	Plumbing terminology and basic plumbing systems
	3rd	Plumbing fixtures: types and applications

13th	1st	Water supply for buildings – storage systems
	2nd	Hot and cold water supply systems
	3rd	Drainage systems for buildings
14th	1st	Two-pipe and one-pipe drainage systems
	2nd	Types of vents and purpose of venting
	3rd	Concept of grey water and reclaimed water
15th	1st	Pipe materials and their selection
	2nd	Pipe joining methods, fittings, hangers and supports
	3rd	Suitability of plumbing materials; overall revision / syllabus consolidation

Discipline: Civil Engineering	**Semester: 5th**	**Name of the Teaching faculty: Mr. Subrat Kumar Panigrahi**
Subject: ADVANCED CONSTRUCTION TECHNOLOGY (TH-4-A)	**No. of days/ per week class alloted: 3**	**Semester From Date: 01.07.2026 To Date: 05.11.2026**
	Total Periods :45 Hrs	**No. of Weeks: 15**
Week	**Class Day**	**Theory/ Practical Topics**
1st	1	Introduction to advanced construction materials; need and applications
	2	Fibres: Steel and polypropylene fibres – properties and uses
	3	Fibres: Carbon and glass fibres – properties and uses
2nd	1	Plastics: PVC, RPVC and HDPE – properties and applications
	2	Plastics: FRP and GRP – properties and applications
	3	Acoustics materials, wall claddings, plaster boards, micro-silica, waterproofing materials and adhesives
3rd	1	Waste products and industrial by-products in bricks, blocks, concrete and mortar; Unit-I revision
	2	Ready Mix Concrete – necessity, advantages and uses
	3	Ready Mix Concrete plant – products and equipment
4th	1	Conveying of RMC; transit mixers
	2	Concrete vibrators – principles; internal/needle vibrators
	3	Surface, platform and form vibrators
5th	1	Underwater concreting – Tremie method: procedure and equipment
	2	Drop bucket method; properties, workability and water-cement ratio
	3	Special concrete – Roller Compacted Concrete (RCC)
6th	1	Self-Compacting Concrete (SCC) and Steel Fibre Reinforced Concrete
	2	Foam concrete and shotcreting; Unit-II revision
	3	Advanced technology in construction – overview; bridge construction
7th	1	Equipment and machinery for bridge foundations
	2	Equipment and machinery for bridge superstructure
	3	Flyover construction – methods, equipment and machinery
8th	1	Multi-storeyed building construction – modern equipment
	2	Use of lifts, belt conveyors and concrete pumping in multi-storeyed buildings
	3	Prefabricated construction – concept and advantages
	1	Methods of prefabrication; plant fabrication and site fabrication

9th	2	Prefabricated elements – wall panels, slab panels, beams, columns, door and window frames
	3	Equipment for placing/jointing prefabricated elements; geosynthetics for strengthening embankments; Unit-III revision
10th	1	Principles and working of Derrick Pole and Gin Pole
	2	Cranes – power-driven Scotch derrick and hand-operated crane
	3	Locomotive crane and Tower crane
11th	1	Lattice girder, winches, elevators and ladders
	2	Crawler cranes, truck-mounted cranes and gantry cranes
	3	Mast cranes – working and applications; selection of hoisting equipment
12th	1	Conveying equipment – belt conveyors, types of belts and conveying mechanism
	2	Capacity and use of dumpers, tractors and trucks; Unit-IV revision
	3	Excavation equipment – bulldozers and scrapers
13th	1	Graders, clam shell and trenching equipment
	2	Tunnel Boring Machine and wheel-mounted belt loaders
	3	Power shovels, JCB and drag lines
14th	1	Compaction equipment – plain rollers and sheep-footed rollers
	2	Vibratory rollers, pneumatic rollers and rammers; output comparison
	3	Pile driving equipment and pile hammers
15th	1	Hot-mix bitumen plant, bitumen paver, grouting and guniting equipment
	2	Floor polishing/cutting machines; drilling pattern for blasting; bentonite/mud slurry in drilling
	3	Explosives for blasting, dynamite and process of using explosives; complete course revision

Subrat Kumar Panigrahi

Signature of the Faculty

Discipline-Civil Engineering	**Semester-5th**	**Name of the teaching faculty:- Er.Laxmipriya Mohapatra**
Subject:- Pr.1 Surveying Lab.	**No. of days /per week class alloted:-**	**Semester From Date: 01/07/2026 to 05/11/2026**
		No. of weeks-17
1st	1st	Measure distance between two survey stations using chain, tape and ranging rods when two stations are inter visible.
	2nd	Measure distance between two survey stations using chain, tape and ranging rods when two stations are inter visible.
2nd	1st	Measure distance between two survey stations using chain, tape and ranging rods when two stations are inter visible.
	2nd	Determine area of open field using chain and cross staffsurvey.
3rd	1st	Determine area of open field using chain and cross staffsurvey.
	2nd	Determine area of open field using chain and cross staffsurvey.
4th	1st	Measure Fore Bearing and Back Bearing of survey lines of open traverse using PrismaticCompass.

	2nd	Measure Fore Bearing and Back Bearing of survey lines of open traverse using PrismaticCompass.
5th	1st	Measure Fore Bearing and Back Bearing of survey lines of open traverse using PrismaticCompass.
	2nd	Undertake differential leveling; determine reduced levels by height of instrument method and rise, and fall method using dumpy level/auto level and leveling staff.
6th	1st	Undertake differential leveling; determine reduced levels by height of instrument method and rise, and fall method using dumpy level/auto level and leveling staff.
	2nd	Undertake differential leveling; determine reduced levels by height of instrument method and rise, and fall method using dumpy level/auto level and leveling staff.
7th	1st	Undertake Survey Project with Leveling instrument for Profile leveling and cross-sectioning for a road length of 500 m with cross-section at 30 m interval..
	2nd	Undertake Survey Project with Leveling instrument for Profile leveling and cross-sectioning for a road length of 500 m with cross-section at 30 m interval..
8th	1st	Use digitalThedolite as a Tacheometer to compute reduced levels and horizontal distances
	2nd	Use digitalThedolite as a Tacheometer to compute reduced levels and horizontal distances
9th	1st	Use digitalThedolite as a Tacheometer to compute reduced levels and horizontal distances
	2nd	Set out a circular curve by Rankine's Method of Deflection Angles.
10th	1st	Set out a circular curve by Rankine's Method of Deflection Angles.
	2nd	Set out a circular curve by Rankine's Method of Deflection Angles.
11th	1st	Measure area of irregular figure using Digital planimeter.
	2nd	Measure area of irregular figure using Digital planimeter.
12th	1st	Use Totalstation instrument to measure horizontal distances and vertical angle
	2nd	Use Totalstation instrument to measure horizontal distances and vertical angle
13th	1st	Use Totalstation instrument to carry out Survey Project for closed traverse for minimum five sides.
	2nd	Use Totalstation instrument to carry out Survey Project for closed traverse for minimum five sides.
14th	1st	Use DGPS to locate the coordinates of a station
		Use DGPS to locate the coordinates of a station
	2nd	Preparation ofMap using GIS software
15th	1st	Preparation ofMap using GIS software
	2nd	Vivavoce

Laxmipriya Mohapatra

Signature of the Faculty

Discipline: Civil Engineering	**Semester: 5th**	**Name of the Teaching faculty: Mr. Subrat Kumar Panigrahi**

Subject: DESIGN OF RCC STRCUTURES LAB(PR-3)	No. of days/ per week class alloted: 2	Semester From Date: 01.07.2026 To Date: 05.11.2026
	Total Periods :60 Hrs	No. of Weeks: 15
Week	**Class Day**	**Theory/ Practical Topics**
1st	1	Introduction to RCC beam detailing; draw cross-section of singly reinforced beam using AutoCAD; identify main reinforcement, stirrups, cover and dimensions.
	2	Draw stress diagram and strain diagram for a singly reinforced beam; label neutral axis, compression and tension zones.
2nd	1	Draw cross-section of doubly reinforced beam; show tension and compression reinforcement, stirrups, cover and dimensions.
	2	Draw stress and strain diagrams for doubly reinforced beam and identify important design zones.
3rd	1	Complete dimensions, reinforcement notation, bar placement and detailing in beam drawings.
	2	Complete and verify singly/doubly reinforced beam drawings, stress/strain diagrams and present the work.
4th	1	Draw and label sketch of isolated column footing; identify column, footing slab, reinforcement and soil level.
	2	Draw and label sketch of combined footing; identify major components and reinforcement arrangement.
5th	1	Draw and label strap footing; identify columns, footings and connecting strap beam.
	2	Draw and label raft footing and discuss its basic structural arrangement.
6th	1	Compare different footing types and complete reinforcement/detailing indications in sketches.
	2	Complete the set of footing sketches and conduct practical viva on footing types and components.
7th	1	Study actual site drawings and identify beam size, reinforcement, stirrups, spacing, cover and detailing symbols.
	2	Read column drawings and identify longitudinal reinforcement, ties, spacing, dimensions and detailing notes.
8th	1	Study staircase reinforcement drawings; identify main reinforcement, distribution reinforcement and structural details.
	2	Study footing drawings and identify footing dimensions, column location, reinforcement and detailing.
9th	1	Interpret a complete set of RCC drawings and trace reinforcement details of beam, column, staircase and footing.
	2	Present interpretation of actual RCC drawings and answer questions on reinforcement details and drawing symbols.
10th	1	Prepare checklist covering beam size, main bars, stirrups, spacing, anchorage, cover and other drawing details.
	2	Prepare checklist for column reinforcement, ties, spacing, laps, dimensions and cover based on actual drawings.
11th	1	Prepare checklist for staircase reinforcement and detailing from actual drawings.
	2	Prepare checklist for footing reinforcement, dimensions, cover, anchorage and column connection details.
12th	1	Combine beam, column, staircase and footing checks into a site-oriented reinforcement checklist.

12th	2	Review checklist against actual drawings and discuss common reinforcement detailing observations.
13th	1	Observe actual reinforcement detailing of beams and columns at construction site; record bar sizes, spacing and detailing.
	2	Observe reinforcement detailing of staircase and footing; record observations and take photographs where permitted.
14th	1	Prepare detailed report covering beams, columns, staircase and footing reinforcement detailing, with observations and photographs.
	2	Introduction to STAAD.Pro workflow; create beam model, define geometry, supports, material and loading as applicable.
15th	1	Run analysis/design of the beam model; review results and basic design output.
	2	Interpret beam analysis/design results, review model assumptions and complete practical record; final practical viva.

Signature of the Faculty