<u>LESSION PLAN</u>

Discipline: Civil Engineering, Govt. Polytechnic, Bargarh

Semester: 6th

Name of the Faculty: Mrs. Utkalika Pradhan

Subject: Railway & Bridge Engineering (CET-603)

No of Class/Week allotted: 04(L)

Session: 2019-2020

Week	Class	Theory/Practical Topics	Remarks
	Section A	Railway Engg.	
1	1-4	**1.Introduction :** Railway terminology, Advantages of railways, Classification of Indian Railways **2. Permanent way** 2.1 Definition and components of a permanent way	
2	5-8	2.2 Concept of gauge, different gauges prevalent in India, suitability of these gauges under different conditions **3.Track materials** 3.1.1 Rails: Functions and requirement of rails, Types of rail sections, length of rails	
3	9-12	3.1.2 Rail joints – types, requirement of an ideal joint 3.1.3 Purpose of welding of rails & its advantages 3.1.4 Creep definition, cause & prevention	
4	13-16	3.2 Sleepers: Definition, function & requirements of sleepers, Classification of sleepers, Advantages & disadvantages of different types of sleepers 3.3 Ballast: Functions & requirements of ballast, Materials for ballast 3.4 Fixtures for Broad gauge: Connection of rails to rail-fishplate, fish bolts, Connection of rails to sleepers	
5	17-20	**4.Geometric for Broad gauge** 4.1 Typical cross – sections of single & double broad gauge railway track in cutting and embankment 4.2 Gradients for drainage	
6	21-24	4.3 Super elevation – necessity & limiting valued	
7	25-28	**5. Points and crossings** 5.1 Definition, necessity of Points and crossings 5.2 Types of points & crossings with tie diagrams	
8	29-32	**6.Laying & maintenance of track** 6.1 Methods of Laying & maintenance of track 6.2 Details of a permanent way inspector	
	Section B	Bridge Engg.	
9	33-36	**7. Introductions** 7.1 Definitions ,Components of a bridge, Classification of bridges,Requirements of an ideal bridge **8. Bridge Site investigation& planning**	

		8.1 Selection of bridge site
		8.2 Bridge alignments
		8.3 Collection of bridge design data & sub surface investigation
10	37-40	**9. Bridge Hydrology** 9.1 Determination of flood discharge 9.2 Waterway & economic span 9.3 Afflux, clearance & free board 9.4 Scour depth minimum depth of foundation
11	41-44	**10. Bridge foundation** 10.1 Types of bridge, foundations – spread foundation, pile foundation- pile driving, well foundation – sinking of wells, caissons foundation 10.2 Coffer dams
12	45-48	**11. Bridge substructure and approaches** 11.1 Types of piers 11.2 Types of abutments 11.3 Types of wing walls 11.4 Approaches
13	49-52	**12. Permanent bridges** 12.1 Masonry bridges 12.2 Steel bridges – classification with sketches 12.3 Concrete bridges – classification, brief description with sketches
14	53-56	**13. Culvert & cause ways** 13.1 Types of culvers - brief description 13.2 Types of causeways - brief description
15	57-60	Revision and Discussion

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Signature of H.O.D   7/12/19

LESSION PLAN

Discipline: Civil Engineering, Govt. Polytechnic, Bargarh

Semester: 6th

Name of the Faculty: Mrs. Utkalika Pradhan

Subject: Disaster Management (CET-601)

No of Class/Week allotted: 04(L)

Session: 2019-2020

Week	Class	Theory/Practical Topics	Remarks
1	1-4	**1.0-Introduction** 1.1- Definition of hazards, disasters. Explain the difference between hazard and disaster. 1.2 – Concept of risk and vulnerability. Risk reduction: preparedness and mitigation. 1.3 – Disaster management cycle. 1.4- Personal and community awareness. 1.5- Types of disasters, earthquake, Tsunami, Landslide, cyclone ,flood,drought,forest fire, Chemical and industrial accidents.	
2	5-8	**2.0-Earthquakes.** 2.1- definition and concept ,intensity, Richter's scale. 2.2- Element of risk. 2.3- Hazard Zones in India. 2.4- Typical effects. 2.5- Main mitigation strategies	
3	9-12	**3.0- Tsunami.** 3.1- Definition concept. 3.2- Onset, type and cases. 3.3- Warning. 3.4- Elements at risk. 3.5-Typical effects :Physical damage, environmental damage ,casualties and Public health. 3.6-Specific preparedness: Hazard mapping, early warning systems, Community preparedness. 3.7- Main mitigation strategies: Site planning and land management, Engineering structures. Flood management.	
4	13-16	**4.0- Landslides.** 4.1-Definition, concept. 4.2- Onset time and warning. 4.3- Causes. 4.4-Elements at risk. 4.5-Hazard zones and Indian landslides. 4.6-Typical effects: Physical damage, casualties. 4.7- Main mitigation strategies: Hazard mapping, Landslide practice, retaining walls,Surface drainage control works, Engineering structures. 4.8- Community based mitigation	

5	17-20	**5.0-Cyclones.** 5.1-Definition, concept. 5.2-Onset type, Warning. 5.3-Elements at risk. 5.4-Typical effects. 5.5-Indian Hazard Zones. 5.6- Main mitigation strategies: Hazard mapping, Land use control , Engineering Structures, Flood management, improving vegetation cover, community based mitigation	
6	21-24	**6.0- Floods.** 6.1- Definition, concept, Onset type. 6.2- Warning. 6.3- Elements at risk. 6.4- Hazard zones and Indian floods. 6.5- Typical effects: Physical damage, Casualties and Public health ,Crops and flood. 6.6- Main mitigation strategies: Mapping of the flood prone areas, land use control, Flood control and management. 6.7- Community based mitigation.	
7	25-28	**7.0- Droughts.** 7.1- Definition, concept. 7.2- Onset type and warning. 7.3- Elements at risk. 7.4- Typical effects. 7.5- Main mitigation strategies: drought monitoring, water supply augmentation and conservation. 7.6- Drought Planning.	
8	29-32	**8.0- Forest Fire.** 8.1- Definition and concept. 8.2- Forest fire damages in India. 8.3- Operational fire management systems and organizations. 8.4-Public policies concerning fire. 8.5- the needs of fire management.	
9	33-36	**9.0- Other type of Hazards and disasters.** 9.1- Chemical and Industrial disasters: brief description, effects, preparedness	
10	37-40	9.2- Epidemic: Onset type, warning, causes and effects, risk reduction measures.	
11	41-44	9.3- Heat waves: definition, dangers and effects, Forecasts and warning, awareness.	
12	45-48	**10.0- Policy, Planning and Institutions for disaster mitigation.** 10.1-Role of policy makers in disaster risk reduction, course for specific action.	
13	49-52	10.2-Institutional arrangement in India: Central level, State Level, District and Block level. 10.3- Major institutions in National and State level	
14	53-60	Revision and Discussion	

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Discipline: Civil Engineering, Govt. Polytechnic, Bargarh

Semester: 4th

Name of the Faculty: Mrs. Utkalika Pradhan

Subject: Highway Engineering (Th-4)

No of Class/Week allotted: 05 (L)

Session: 2019-2020

Week	Class	Theory/Practical Topics	Remarks
1	1-5	1.Introduction 1.1 Importance of Highway transportation: importance organizations like Indian roads congress, Ministry of Surface Transport, Central Road Research Institute. 1.2 Functions of Indian Roads Congress 1.3 IRC classification of roads 2. Road Geometrics 2.1 Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation level, camber and gradient	
2	6-10	2.2 Design and average running speed, stopping and passing sight distance	
3	11-15	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods o f providing super – elevation 3. Road Materials 3.1 Difference types of road materials in use: soil, aggregates, and binders 3.2 Function of soil as highway sub grade	
4	16-20	3.3 California Bearing Ratio: methods of finding CBR valued in the laboratory and at site and their significance 3.4 Testing aggregates: Abrasion test, impact test, crushing strength test, water absorption test & soundness test	
5	21-25	4.Road Pavements 4.1 Road Pavement: Flexible and rigid pavement, their merits and demerits, typical cross-sections, functions of various components 4.2 Sub-grade preparation	
6	26-30	4.3 Sub base Course: Necessity of sub base, stabilized sub base, purpose of stabilization (no designs),Types of stabilization: Mechanical stabilization, Lime stabilization, cement stabilization, Fly ash stabilization 4.4 Base Course: Preparation of base course, Brick soling, stone soling and metalling, Water Bound Macadam and wet-mix Macadam, Bituminous constructions: Different types	
7	31-35	4.4 Base Course: Preparation of base course, Brick soling, stone soling and metalling, Water Bound Macadam and wet-mix Macadam, Bituminous constructions: Different types 4.5 Surfacing: Surface dressing, Premix carpet and Semi dense carpet	

		,Bituminous concrete ,Grouting 4.6 Rigid Pavements: Concept of concrete roads as per IRC specifications	
8	36-40	5.Hill Roads: 5.1 Introduction: Typical cross-sections showing all details of a typical hill road in cut, partly in cutting and partly in filling	
9	41-45	5.2 Breast Walls, Retaining walls, different types of bends 6. Road Drainage: 6.1 Necessity of road drainage work, cross drainage works	
10	46-50	6.2 Surface and sub-surface drains and storm water drains. Location, spacing and typical details of side drains, side ditches for surface drainage, intercepting drains, pipe drains in hill roads, details of drains in cutting embankment, typical cross sections.	
11	51-55	7. Road Maintenance : 7.1 Common types of road failures – their causes and remedies	
12	56-60	7.2 Maintenance of bituminous road such as patch work and resurfacing ,Maintenance of concrete roads – filling cracks, repairing joints, maintenance of shoulders (berm),	
13	61-65	7.4 Basic concept of traffic study, Traffic safety and traffic control signal ,maintenance of traffic control devices	
14	66-70	8. Construction equipments: 8.1 Hot mixing plant ,Tipper, tractors (wheel and crawler) scraper, bulldozer, dumpers, shovels, graders, roller dragline Asphalt mixer and tar boilers ,Road pavers 8.2 Modern construction equipments for roads.	
15	71-75	Revision and Discussion	

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Discipline: Civil Engg., Govt. Polytechnic,Bargarh

Semester: 4Th

Name of the Teaching Faculty :   Sri Amit Kumar Sahu, Lecturer (Civil Engg.)

Subject: Structural Design-I (Th-1)

No of Days/week class allotted: 05 (L)

Session: Summer- 2020

Week	Class Day	Theory/Practical Topics	Remarks
1	1-5	**Working stress method (WSM):**Objectives of design and detailing. State the different methods of design of concrete structures.,Introduction to reinforced concrete, R.C. sections their behavior, grades of concrete and steel. Permissible stresses, assumption in W.S.M.	
2	6-10	Basic concept of under reinforced, over reinforced and balanced section, flexural design & analysis of singly and doubly reinforced rectangular sections.	
3	11-15	Limit state method (LSM):Definition, types of limit states, partial safety factors for materials strength, characteristic strength, characteristic load, design load, loading on structure as per I.S. 875,I.S specification regarding spacing of reinforcement in slab, cover to reinforcement in slab, beam column & footing, minimum reinforcement in slab, beam & column, lapping, anchorage, effective span for beam & slab.	
4	16-20	Analysis and design of singly reinforced sections (LSM):Limit state of collapse (flexure), Assumptions, Stress-Strain relationship for concrete and steel, neutral axis, stress block diagram and strain diagram for singly reinforced section.	
5	21-25	Concept of under- reinforced, over-reinforced and limiting section, neutral axis co-efficient, limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section.,Numerical problems on determining design constants, moment of resistance and area of steel for rectangular sections.	
6	26-30	Analysis and design of doubly reinforced section (LSM):General features, necessity of providing doubly reinforced section, reinforcement limitations.,Analysis of doubly reinforced section, strain diagram, stress diagram, depth of neutral axis, moment of resistance of the rectangular section.,Numerical problems on finding moment of resistance and design of beam sections.	
7	31-35	Shear, Bond and Development Length (LSM):Nominal	

		shear stress in R.C. section, design shear strength of concrete, maximum shear stress, design of shear reinforcement, minimum shear reinforcement, forms of shear reinforcement.	
8	36-40	Bond and types of bond, bond stress, check for bond stress, development length in tension and compression, anchorage value for hooks 90^0 bend and 45^0 bend standards lapping of bars, check for development length.	
9	41-45	Numerical problems on deciding whether shear reinforcement is required or not, check for adequacy of the section in shear. Design of shear reinforcement; Minimum shear reinforcement in beams; Determination of Development length required for tension reinforcement of cantilevers beam and slab, check for development length.	
10	46-50	Analysis and Design of T-Beam (LSM):General features, advantages, effective width of flange as per IS: 456-2000 code provisions.,Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam section with neutral axis lying within the flange.,**Design of T-beam for moment and shear for neutral axis within or up to flange bottom.**,Simple numerical problems on deciding effective flange width.	
11	51-55	**Analysis and Design of Slab and Stair case (LSM)** Design of simply supported one-way slabs for flexure check for deflection control and shear.,Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.	
12	56-60	Design of dog-legged staircase, Detailing of reinforcement in stairs spanning longitudinally.	
13	61-65	**Design of Axially loaded columns and Footings (LSM)** Assumptions in limit state of collapse- compression.,Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.,Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).	
14	66-70	Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.	
15	71-75	Revision	

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LESSON PLAN

Discipline:	Civil Engg., Govt. Polytechnic,Bargarh
Semester:	6TH
Name of the Teaching Faculty :	Sri Amit Kumar Sahu, Lecturer (Civil Engg.)
Subject:	Structural Design-II (CET-602)
No of Days/week class allotted:	04 (L)
Session:	Summer- 2020

Week	Class Day	Theory/Practical Topics	Remarks
1	1-4	**Introduction:**Common steel structures, Advantages & disadvantages of steel structures.,Types of steel, properties of structural steel.,Rolled steel sections, special considerations in steel design.,Loads and load combination,Structural analysis and design philosophy.,Brief review of Principles of Limit State design.	
2	5-8	**Structural Steel Fasteners and Connections:**Bolted Connections., Classification of bolts, advantages and disadvantages of bolted connections.,Different terminology, spacing and edge distance of bolt holes.,Types of bolted connections.,Types of action of fasteners, assumptions and principles of design.	
3	9-12	Strength of plates in a joint, strength of bearing type bolts (shear capacity& bearing capacity), reduction factors, and shear capacity of HSFG bolts.,Analysis & design of Joints using bearing type and HSFG bolts (except eccentric load and prying forces),Efficiency of a joint.Welded Connections:Advantages and Disadvantages of welded connection.Types of welded joints and specifications for welding.Design stresses in welds.Strength of welded joints.,Reduction of design stresses for long joints.	
4	13-16	**Design of Steel tension Members:**Common shapes of tension members.,Design strength of tension members, yielding of gross cross section, rupture of critical section and the concept of block shear.,Maximum values of effective slenderness ratio.	
5	17-20	Analysis and Design of tension members., **Design of Steel Compression members.**Common shapes of compression members.Bulking class of cross sections and slenderness ratio.	

6	21-24	Design compressive stress and strength of compression members., Analysis and Design of compression members (axial load only).	
7	25-28	Design of slab base (subjected to axial loading) with concrete footing.,Design of gusseted base (subjected to axial loading) with concrete footing.	
8	29-32	**Design of Steel beams:** Common cross sections and their classification. Plastic moment capacity of sections, moment capacity and shear resistance	
9	33-36	Deflection limits, web buckling and web crippling., Design of laterally supported beams against bending and shear.	
10	37-40	Types of built up sections and design of simple built up sections using flange plates with I-sections or web plates., Design of Tubular Steel structures,Round tubular sections, permissible stresses	
11	41-44	Tube columns and compression members, crinkling.,Tube tension members and tubular roof trusses.,Joints in tubular trusses,Design of tubular beams and purlins.Design of Timber Structures:Types of timber, grading of timber, defects, permissible stresses.	
12	45-48	Design of axially loaded timber columns (solid, box &built up section except spaced columns).,Design of simple timber structural elements in flexure (Solid sections & flitched beams, form factor and moment of resistance of built-up sections, check for shear, bearing and deflection).	
13	49-52	Design consideration for masonry wall, Load bearing walls - Permissible stresses, Slenderness ratio, Effective length, Effective height, Effective thickness, Eccentricity of loads, Grade of mortar. Non-Load bearing walls – Panel walls, Curtain walls, Partition walls	
14	53-56	Design consideration for masonry columns, piers and buttresses., Design considerations for masonry wall footings.	
15	57-60	Revision	

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LESSON PLAN

Discipline: Civil Engg., Govt. Polytechnic,Bargarh

Semester: 6TH

Name of the Teaching Faculty :   Sri Amit Kumar Sahu, Lecturer (Civil Engg.)

Subject: ECE-II (CET-604)

No of Days/week class allotted: 04 (L)

Session: Summer- 2020

Week	Class Day	Theory/Practical Topics	Remarks
1	1-4	**Detailed estimate of culverts and bridges:**Detailed estimate of a simple Hume pipe culvert with right angled wing walls	
2	5-8	RCC deck slab culvert with right angled wing wall	
3	9-12	RCC deck slab culvert with splayed wing wall,Quantity of steel for deck slab with bar bending schedule of the above jobs	
4	13-16	**Estimate of irrigation structures:** Detailed estimate of simple type of vertical fall to given specification	
5	17-20	Detailed estimate of simple type of vertical fall to given specification	
6	21-24	Detailed estimate of siphon well drop to given specification.	
7	25-28	Detailed estimate of siphon well drop to given specification.	
8	29-32	Detail estimate of a water bound macadam road	
9	33-36	Detailed estimate of a National Highway in cutting /filling	
10	37-40	PWD accounts works:Works,Classification of work-original, major, petty, repair work, annual repair, special repair, quadrantal repair,Method of execution of works through the contractors, departmentally, contract and agreement, work order, item rate contract, lump sum contract, labour contract and daily labour, piece work agreement, scheduled contract, cost plus percentage contract	
11	41-44	Accounts of works:Explanation of various terms,Administrative approval, technical sanction, contingency budget, tender, preparation of notice inviting tender, receiving of quotations, earnest money, security deposit, advance payment, on account payment, intermediate payment, final payment, running bill, final, regular and temporary establishment, cash, major & subhead of account, temporary advance, issue rate, storage, supervision charges, suspense account, debit, credit, book transfer, voucher and related accounts .	

12	45-48	Measurement book use & maintenance, procedure of marking entries of measurement of work and supply of materials, labour employed, standard measurement books and common irregularities	
13	49-52	Muster roll : Its preparation & use for making payment of pay & wages,Acquitance Roll : Its preparation & use for making payment of pay & wages,Labour & labour report, method of labour payment, use of forms and necessity of submission	
14	53-56	Classification of stores, receipt / issue statement on standard form, method of preparation of stock account, preparation and submission of returns, verification of stocks,shortage and excess	
15	57-60	Revision	

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LESSON PLAN

Discipline: Civil Engg. Bargarh
Semester: 4TH
Name of the Teaching Faculty: Mansi Pradhan, lect. (Civil Engg.)
Subject: HYDRAULICS & IRRIGATION ENGINEERING
No of Days/week class allotted: 05 (5Theory)
Session: 2019-20

Week	Class Day	Theory/ Practical topic	Remark
1		**PART: A (Hydraulics And Machines)**	
	1-12	Hydrostatics 1.1 Properties of fluid: density, specific gravity, surface tension, capillarity, viscosity and their uses 1.2 Pressure and its measurements: intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure; relationship between atmospheric pressure, absolute pressure and gauge pressure; pressure head; pressure gauges. 1.3 Pressure exerted on an immersed surface: Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface.	
2	13-30	Kinematics Of Fluid Flow 2.1 Basic equation of fluid flow and their application: Rate of discharge, equation of continuity of liquid flow, total energy of a liquid in motion- potential, kinetic & pressure, Bernoulli's theorem and its limitations. Practical applications of Bernoulli's equation. 2.2 Flow over Notches and Weirs: Notches, Weirs, types of notches and weirs, Discharge through different types of notches and weirs-their application (No Derivation) 2.3 Types of flow through the pipes: uniform and non uniform; laminar and turbulent; steady and unsteady; Reynold's number and its application 2.4 Losses of head of a liquid flowing through pipes: Different types of major and minor losses. Simple	

		numerical problems on losses due to friction using Darcy's equation, Total energy lines & hydraulic gradient lines (Concept Only). 2.5 Flow through the Open Channels: Types of channel sections-rectangular, trapezoidal and circular, discharge	
3	31-35	Pumps 3.1 Type of pumps 3.2 Centrifugal pump: basic principles, operation, discharge, horse power & efficiency. 3.3 Reciprocating pumps: types, operation, discharge, horse power & efficiency	
4		Part: B (Irrigation Engineering)	
	36-39	Hydrology 1.1 Hydrology Cycle 1.2 Rainfall: types, intensity, hyetograph 1.3 Estimation of rainfall, rain gauges, Its types(concept only), 1.4 Concept of catchment area, types, run-off, estimation of flood discharge by Dicken's and Ryve's formulae	
5	40-43	Water Requirement Of Crops 2.1 Definition of irrigation, necessity, benefits of irrigation, types of irrigation 2.2 Crop season 2.3 Duty, Delta and base period their relationship, overlap allowance, kharif and rabi crops 2.4 Gross command area, culturable command area, Intensity of Irrigation, irrigable area, time factor, crop ratio	
6	44-50	Flow Irrigation 3.1 Canal irrigation, types of canals, loss of water in canals 3.2 Perennial irrigation 3.3 Different components of irrigation canals and their	

		functions 3.4 Sketches of different canal cross-sections 3.5 Classification of canals according to their alignment, Various types of canal lining – Advantages and disadvantages	
7	51-52	Water Logging And Drainage 4.1 Causes and effects of water logging, detection, prevention and remedies	
8	53-60	Diversion Head Works And Regulatory Structures 5.1 Necessity and objectives of diversion head works, weirs and barrages 5.2 General layout, functions of different parts of barrage 5.3 Silting and scouring 5.4 Functions of regulatory structures	
9	61-67	Cross Drainage Works : 6.1 Functions and necessity of Cross drainage works - aqueduct, siphon, super-passage, level crossing 6.2 Concept of each with help of neat sketch	
10	68-75	Dams 7.1 Necessity of storage reservoirs, types of dams 7.2 Earthen dams: types, description, causes of failure and protection measures. 7.3 Gravity dam- types, description, Causes of failure and protection measures. 7.4 Spillways- Types (With Sketch) and necessity.	

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LESSON PLAN

Discipline: Civil Engg. Bargarh

Semester: 6TH

Name of the Teaching Faculty: NiharikaPattanayak, lect. (CivilEngg.)

Subject: ENVIRONMENTAL STUDIES (BST-501)

No of Days/week class allotted: 05 (5Theory)

Session: 2019-20

Week	Class Day	Theory/Practical Topics	Remarks
1	1-4	UNIT-1 THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES 1.1Definition 1.2 scope and importance 1.3Need for public awareness.	
2	5-16	UNIT-2 NATURAL RESOURCES 2.1Renewable and non renewable resources: a) Natural resources and associated problems. • Forest resources: Use and over-exploitation, deforestation, case studies, Timber- extraction mining, dams and their effects on forests and tribal people. • Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems. • Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources. • Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, and salinity. • Energy Resources: Growing energy need, renewable and non-renewable energy sources, use of alternate energy sources, case studies. • Land Resources: Land as a resource, land degradation, man induces landslides, soil erosion, and desertification. b) Role of individual in conservation of natural	

		resources. c) Equitable use of resources for sustainable life styles.	
3	17-28	UNIT-3 SYSTEMS 3.1 Concept of an eco system. 3.2 Structure and function of an eco system. 3.3 Producers, consumers, decomposers. 3.4 Energy flow in the eco systems. 3.5 Ecological succession. 3.6 Food chains, food webs and ecological pyramids. 3.7 Introduction, types, characteristic features, structure and function of the following 3.8 eco system: Forest ecosystem: 3.9 Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries).	
4	29-36	UNIT-4 BIODIVERSITY AND IT'S CONSERVATION 4.1 Introduction-Definition: genetics, species and ecosystem diversity. 4.2 Biogeographically classification of India. 4.3 Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and optin values. 4.4 Biodiversity at global, national and local level. 4.5 Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts.	
5	37-54	UNIT-5 ENVIRONMENTAL POLLUTION. 5.1 Definition Causes, effects and control measures of: a) Air pollution. b) Water pollution. c) Soil pollution d) Marine pollution e) Noise pollution. f) Thermal pollution g) Nuclear hazards. 5.2 Solid waste Management: Causes, effects and control measures of urban and industrial wastes. 5.3 Role of an individual in prevention of pollution. 5.4 Disaster management: Floods, earth quake, cyclone and landslides.	
6	55-66	Unit-6 SOCIAL ISSUE AND THE ENVIRONMENT 6.1 Form unsustainable to sustainable development. 6.2 Urban problems related to energy. 6.3 Water conservation, rain water harvesting, water	

		shed management. 6.4 Resettlement and rehabilitation of people; its problems and concern. 6.5 Environmental ethics: issue and possible solutions. 6.6 Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. 6.7 Air (prevention and control of pollution) Act. 6.8 Water (prevention and control of pollution) Act. 6.9 Public awareness.	
7	66-75	UNIT-7 HUMAN POPULATION AND THE ENVIRONMENT 7.1 Population growth and variation among nations. 7.2 Population explosion- family welfare program. 7.3 Environment and human health. 7.4 Human rights. 7.5 Value education 7.6 Role of information technology in environment and human health.	

Niharika Pattanayak

Signature of Faculty:

Signature of HOD:

LESSON PLAN

Discipline: CIVIL Engg. GP,Bargarh

Semester: 4TH

Name of the Teaching Faculty: Shri Priyajit Behera,Lect.(CIVIL Engg.)

Subject: Survey-1(TH-3)

No of Days/week class allotted: 05

Session: 2019-20

Week	Class Day	Theory/Practical Topics	Remarks
1	1-5	**1.INTRODUCTION TO SURVEYING, LINEAR MEASUREMENTS:** 1.1 Surveying: Definition, Aims and objectives 1.2 Principles of survey-Plane surveying- Geodetic Surveying-Instrumental surveying. 1.3 Precision and accuracy of measurements, instruments used for measurement of distance, Types of tapes and chains. 1.4 Errors and mistakes in linear measurement – classification, Sources of errors and remedies.	
2	6-10	1.5 Corrections to measured lengths due to-incorrect length, temperature variation, pull, sag, numerical problem applying corrections. **2. CHAINING AND CHAIN SURVEYING :** 2.1 Equipment and accessories for chaining 2.2 Ranging – Purpose, signaling, direct and indirect ranging, Line ranger – features and use, error due to incorrect ranging. 2.3 Methods of chaining –Chaining on flat ground, Chaining on sloping ground – stepping method, Clinometer-features and use, slope correction. 2.4 Setting perpendicular with chain & tape, Chaining across different types of obstacles –Numerical problems on chaining across obstacles.	
3	11-15	2.5 Purpose of chain surveying, Its Principles, concept of field book. Selection of survey stations, base line, tie lines, Check lines. 2.7 Offsets – Necessity, Perpendicular and Oblique offsets,	

		Instruments for setting offset – Cross Staff, Optical Square.	
		2.8 Errors in chain surveying – compensating and accumulative errors causes & remedies, Precautions to be taken during chain surveying. 3 **ANGULAR MEASUREMENT AND COMPAS SURVEYING :**	
		3.1 Measurement of angles with chain, tape & compass 3.2 Compass – Types, features, parts, merits & demerits, testing & adjustment of compass	
		3.3 Designation of angles- concept of meridians – Magnetic, True, arbitrary; Concept of bearings – Whole circle bearing, Quadrantal bearing, Reduced bearing, suitability of application, numerical problems on conversion of bearings	
4	16-20	3.4 Use of compasses – setting in field-centering, leveling, taking readings, concepts of Fore bearing, Back Bearing, Numerical problems on computation of interior & exterior angles from bearings.	
		3.5 Effects of earth's magnetism – dip of needle, magnetic declination, variation in declination, numerical problems on application of correction for declination.	
		3.6 Errors in angle measurement with compass – sources & remedies.	
5	21-25	3.7 Principles of traversing – open & closed traverse, Methods of traversing.	
		3.8 Local attraction – causes, detection, errors, corrections, Numerical problems of application of correction due to local attraction.	
		3.9 Errors in compass surveying – sources & remedies. Plotting of traverse – check of closing error in closed & open traverse, Bowditch's correction, Gales table	
6	26-30	**MAP READING CADASTRAL MAPS & NOMENCLATURE:**	
		4.1 Study of direction, Scale, Grid Reference and Grid Square Study of Signs and Symbols	
		4.2 Cadastral Map Preparation Methodology	
		4.3 Unique identification number of parcel	
		4.4 Positions of existing Control Points and its types	
8	31-35	4.5 Adjacent Boundaries and Features, Topology Creation and verification. **5 PLANE TABLE SURVEYING :** 5.1 Objectives, principles and use of plane table surveying. 5.2	

		Instruments & accessories used in plane table surveying.	
9	36-40	5.3 Methods of plane table surveying – (1) Radiation, (2) Intersection, (3) Traversing, (4) Resection. 5.4 Statements of TWO POINT and THREE POINT PROBLEM. Errors in plane table surveying and their corrections, precautions in plane table surveying. **6 THEODOLITE SURVEYING AND TRAVERSING:** 6.1 Purpose and definition of theodolite surveying	
10	41-45	6.2 Transit theodolite- Description of features, component parts, Fundamental axes of a theodolite, concept of vernier, reading a vernier, Temporary adjustment of theodolite 6.3 Concept of transiting –Measurement of horizontal and vertical angles. 6.4 Measurement of magnetic bearings, deflection angle, direct angle, setting out angles, prolonging a straight line with theodolite, Errors in Theodolite observations.	
11	46-50	6.5 Methods of theodolite traversing with – inclined angle method, deflection angle method, bearing method, Plotting the traverse by coordinate method, Checks for open and closed traverse. 6.6 Traverse computation – consecutive coordinates, latitude and departure, Gale's traverse table, Numerical problems on omitted measurement of lengths & bearings	
12	51-55	6.7 Closing error – adjustment of angular errors, adjustment of bearings, numerical problems 6.8 Balancing of traverse – Bowditch's method, transit method, graphical method, axis method, calculation of area of closed traverse.	
13	55-60	**LEVELLING AND CONTOURING :** 7.1 Definition and Purpose and types of leveling– concepts of level surface, Horizontal surface, vertical surface, datum, R. L., B.M. 7.2 Instruments used for leveling, concepts of line of collimation, axis of bubble tube, axis of telescope, Vertical axis. 7.3 Levelling staff – Temporary adjustments of level, taking reading with level, concept of bench mark, BS, IS, FS, CP, HI.	

14	61-65	7.4 Field data entry – level Book – height of collimation method and Rise & Fall method, comparison, Numerical problems on reduction of levels applying both methods, Arithmetic checks.	
		7.5 Effects of curvature and refraction, numerical problems on application of correction.	
		7.6 Reciprocal leveling – principles, methods, numerical problems, precise leveling.	
		7.7 Errors in leveling and precautions, Permanent and temporary adjustments of different types of levels.	
15	66-70	7.8 Definitions, concepts and characteristics of contours.	
		7.9 Methods of contouring, plotting contour maps, Interpretation of contour maps, toposheets.	
		7.10 Use of contour maps on civil engineering projects – drawing crosssections from contour maps, locating proposal routes of roads / railway / canal on a contour map, computation of volume of earthwork from contour map for simple structure.	
		7.11 Map Interpretation: Interpret Human and Economic Activities (i.e.: Settlement, Communication, Land use etc.), Interpret Physical landform (i.e.: Relief, Drainage Pattern etc.), Problem Solving and Decision Making	
16	71-75	**COMPUTATION OF AREA & VOLUME:**	
		8.1 Determination of areas, computation of areas from plans.	
		8.2 Calculation of area by using ordinate rule, trapezoidal rule, Simpson's rule.	
		8.3 Calculation of volumes by prismoidal formula and trapezoidal formula, Prismoidal corrections, curvature correction for volumes.	

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