LESSON PLAN:ENTREPRENEURSHIP and MANAGEMENT & SMART TECHNOLOGY (TH-1) GOVT. POLYTECHNIC, BERHAMPUR		
Discipline: Civil Engineering	Semester: 5th	Name of the Teaching Faculty: **Narasingh Mahanty**
Subject: ENTREPRENEURSHIP and MANAGEMENT & SMART TECHNOLOGY (TH-1)	No. of days/ per week class allotted: 4	Semester From Date 14\7\25 to Date: 15\11\25 No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
1st	1st	**UNIT-1 Entrepreneurship** Concept /Meaning of Entrepreneurship
	2nd	Need of Entrepreneurship
	3rd	Characteristics, Qualities of entrepreneur,
	4th	Types of entrepreneur,
2nd	1st	Functions
	2nd	Barriers in entrepreneurship
	3rd	Entrepreneurs vrs. Manager
	4th	Forms of Business Ownership: Sole proprietorship,
3rd	1st	partnership forms and others
	2nd	Types of Industries, Concept of Start-ups
	3rd	Entrepreneurial support agencies at National, State, District Level(Sources)
	4th	NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.
4th	1st	Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks
	2nd	**UNIT-2 Market Survey and Opportunity Identification (Business Planning)** Business Planning
	3rd	SSI, Ancillary Units, Tiny Units, Service sector Units
	4th	Time schedule Plan, Agencies to be contacted for Project Implementation
5th	1st	Assessment of Demand and supply and Potential areas of Growth
	2nd	dentifying Business Opportunity
	3rd	Final Product selection
	4th	**UNIT-3 Project report Preparation** Preliminary project report
6th	1st	Detailed project report,
	2nd	Techno economic Feasibility
	3rd	Project Viability
	4th	**UNIT-4 Management Principles** Definitions of management
7th	1st	Principles of management unctions of management (planning, organising, staffing, directing and controlling etc.)
	2nd	Level of Management in an Organisation
	3rd	**UNIT-5 Functional Areas of Management** Production management
	4th	Functions, Activities

8th	1st	Productivity
	2nd	Quality control
	3rd	Production Planning and control
	4th	Financial Management Functions of Financial management
9th	1st	Management of Working capital Costing (only concept)
	2nd	Break even Analysis
	3rd	Brief idea about Accounting Terminologies: Book Keeping, Journal entry,
	4th	Petty Cash book, P&L Accounts, Balance Sheets(only Concepts
10th	1st	Marketing Management Concept of Marketing and Marketing Management
	2nd	Concept of 4P s (Price, Place, Product, Promotion)
	3rd	e) Human Resource Management Functions of Personnel Management
	4th	Manpower Planning, Recruitment, Sources of manpower, Selection process,
11th	1st	UNIT-6 Leadership and Motivation Leadership Definition and Need/Importance Qualities and functions of a leader Manager Vs Leader
	2nd	Motivation Definition and characteristics Importance of motivation Factors affecting motivation
	3rd	Theories of motivation (Maslow) Methods of Improving Motivation
	4th	Importance of Communication in Business Types and Barriers of Communication
12th	1st	**UNIT-7 Work Culture, TQM & Safety** Human relationship and Performance in Organization Relations with Peers, Superiors and
	2nd	TQM concepts: Quality Policy, Quality Management, Quality system
	3rd	Accidents and Safety, Cause, preventive measures, General Safety Rules , Personal Protection Equipment(PPE)
	4th	**UNIT-8 Legislation** a) Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights
13th	1st	Features of Factories Act 1948 with Amendment (only salient points)
	2nd	Features of Payment of Wages Act 1936 (only salient points)
	3rd	**UNIT-9 Smart Technology** Concept of IOT, How IOT works
	4th	Components of IOT, Characteristics of IOT,
14th	1st	Categories of IOT
	2nd	Applications of IOT- Smart Cities,
	3rd	Smart Transportation, Smart Home,
	4th	Smart Healthcare, Smart Industry,
15th	1st	Smart Agriculture,
	2nd	Smart Energy Management etc.
	3rd	Revision and Previous Year Question Discussion
	4th	Revision and Previous Year Question Discussion

Nanaksingh Mahanty
15-9-25

LESSON PLAN: Th2. STRUCTURAL DESIGN– II FOR THE SESSION 2025-26(WINTER-2025), GOVT. POLYTECHNIC,BERHAMPUR		
Discipline: Civil	**Semester: 5th**	**Name of the Teaching Faculty : RUPELI KUMARI PATRO**
Subject:Th2. STRUCTURAL DESIGN– II	**No. of days/ per week class allotted: 4**	**Semester From Date : 14/07/2025 to Date: 15/11/2025** **No. of Weeks: 15**
Week	**Class Day**	**Theory/ Practical Topics**
1st	1st	**1.0 Introduction** : 1.1 Common steel structures, Advantages & disadvantages of steel structures. 1.2 Types of steel, properties of structural steel.
	2nd	1.3 Rolled steel sections, special considerations in steel design.
	3rd	1.4 Loads and load combinations.
	4th	1.5 Structural analysis and design philosophy.
2nd	1st	1.6 Brief review of Principles of Limit State design
	2nd	**2 Structural Steel Fasteners and Connections.** 2.1 Bolted Connections 2.1.1 Classification of bolts, advantages and disadvantages of bolted connections.
	3rd	2.1.2 Different terminology, spacing and edge distance of bolt holes. 2.1.3 Types of bolted connections.
	4th	2.1.4 Types of action of fasteners, assumptions and principles of design. 2.1.5 Strength of plates in a joint, strength of bearing type bolts (shear capacity& bearing capacity), reduction
3rd	1st	2.1.6 Analysis & design of Joints using bearing type and HSFG bolts (except eccentric load and prying forces)
	2nd	2.1.7 Efficiency of a joint.
	3rd	2.2 Welded Connections: 2.2.1 Advantages and Disadvantages of welded connection
	4th	2.2.2 Types of welded joints and specifications for welding
4th	1st	2.2.3 Design stresses in welds
	2nd	2.2.3 Design stresses in welds
	3rd	2.2.4 Strength of welded joints.
	4th	2.2.4 Strength of welded joints.
5th	1st	**3 Design of Steel tension Members** 3.1 Common shapes of tension members
	2nd	3.1 Common shapes of tension members
	3rd	3.1 Common shapes of tension members
	4th	3.2 Maximum values of effective slenderness ratio.
6th	1st	3.2 Maximum values of effective slenderness ratio.

	2nd	3.2 Maximum values of effective slenderness ratio.
	3rd	3.4 Analysis and Design of tension members.(Considering strength only and concept of block shear failure.)
	4th	3.4 Analysis and Design of tension members.
7th	1st	3.4 Analysis and Design of tension members.
	2nd	3.4 Analysis and Design of tension members.
	3rd	**4 Design of Steel Compression members.** 4.1 Common shapes of compression members.
	4th	4.1 Common shapes of compression members.
8th	1st	4.2 Buckling class of cross sections, slenderness ratio
	2nd	4.2 Buckling class of cross sections, slenderness ratio
	3rd	4.3 Design compressive stress and strength of compression members.
	4th	4.3 Design compressive stress and strength of compression members.
9th	1st	4.3 Design compressive stress and strength of compression members.
	2nd	4.4 Analysis and Design of compression members (axial load only).
	3rd	4.4 Analysis and Design of compression members (axial load only).
	4th	4.4 Analysis and Design of compression members (axial load only).
10th	1st	4.4 Analysis and Design of compression members (axial load only).
	2nd	**5 Design of Steel beams:** 5.1 Common cross sections and their classification.
	3rd	5.1 Common cross sections and their classification.
	4th	5.1 Common cross sections and their classification.
11th	1st	5.2 Deflection limits, web buckling and web crippling
	2nd	5.2 Deflection limits, web buckling and web crippling
	3rd	5.2 Deflection limits, web buckling and web crippling
	4th	5.2 Deflection limits, web buckling and web crippling
12th	1st	5.3 Design of laterally supported beams against bending and shear.
	2nd	5.3 Design of laterally supported beams against bending and shear.
	3rd	5.3 Design of laterally supported beams against bending and shear.
	4th	**6 Design of Tubular Steel Structures:** 6.1 Round Tubular Sections, Permissible Stresses
13th	1st	**6 Design of Tubular Steel Structures:** 6.1 Round Tubular Sections, Permissible Stresses
	2nd	6.2 Tubular Compression & Tension Members

	3rd	6.2 Tubular Compression & Tension Members
	4th	6.3 Joints in Tubular trusses
14th	1st	6.3 Joints in Tubular trusses
	2nd	**7 Design of Masonry Structures:** 7.1 Design considerations for Masonry walls
	3rd	Design considerations for Columns
	4th	Design considerations for Load Bearing
15th	1st	Design considerations for Non-Load Bearing walls
	2nd	Permissible stresses, Slenderness Ratio, Effective Length, Height & Thickness.
	3rd	Permissible stresses, Slenderness Ratio, Effective Length, Height & Thickness.
	4th	Permissible stresses, Slenderness Ratio, Effective Length, Height & Thickness.

Rupali Kumari Patro
09/09/2025 (G.F in civil dept)

LESSON PLAN: RAILWAY & BRIDGE ENGINEERING (TH-3) FOR THE SESSION 2025-26 (WINTER-2025), GOVT. POLYTECHNIC,BERHAMPUR		
Discipline: Civil	**Semester: 5th**	**Name of the Teaching Faculty : A. GUPTESWAR PATRO**
Subject: RAILWAY & BRIDGE ENGINEERING (TH.3)	**No. of days/ per week class allotted: 4**	**Semester From Date : 14/07/2025 to Date: 15/11/2025** **No. of Weeks: 15**
Week	**Class Day**	**Theory/ Practical Topics**
		Section – A: RAILWAYS
1st	1st	**1.0 Introduction :** 1.1Railway terminology 1.2Advantages of railways
	2nd	1.3Classification of Indian Railways
	3rd	**2.0 Permanent way** 2.1 Definition and components of a permanent way
	4th	2.1 Definition and components of a permanent way
2nd	1st	2.2 Concept of gauge
	2nd	different gauges prevalent in India
	3rd	suitability of these gauges under different conditions
	4th	**3.0 Track materials** 3.1 Rails 3.1.1 Functions and requirement of rails
3rd	1st	3.1.2 Types of rail sections, length of rails 3.1.3 Rail joints – types, requirement of an ideal joint
	2nd	3.1.4 Purpose of welding of rails & its advantages 3.1.5 Creep definition, cause & prevention
	3rd	3.2 Sleepers 3.2.1 Definition, function & requirements of sleepers
	4th	3.2.2 Classification of sleepers 3.2.3 Advantages & disadvantages of different types of sleepers
4th	1st	3.3 Ballast 3.3.1 Functions & requirements of ballast
	2nd	3.3.2 Materials for ballast 3.4 Fixtures for Broad gauge
	3rd	3.3.2 Materials for ballast 3.4 Fixtures for Broad gauge
	4th	3.4.1 Connection of rails to rail-fishplate, fish bolts 3.4.2 Connection of rails to sleepers
5th	1st	3.4.1 Connection of rails to rail-fishplate, fish bolts 3.4.2 Connection of rails to sleepers
	2nd	**4.0 Geometric for Broad gauge** 4.1 Typical cross – sections of single & double broad gauge railway track in cutting and embankment

	3rd	4.1 Typical cross – sections of single & double broad gauge railway track in cutting and embankment
	4th	4.2 Permanent & temporary land width
6th	1st	4.2 Permanent & temporary land width
	2nd	4.3 Gradients for drainage
	3rd	4.3 Gradients for drainage
	4th	4.3 Gradients for drainage
		4.4 Super elevation – necessity & limiting valued
7th	1st	4.4 Super elevation – necessity & limiting valued
	2nd	4.4 Super elevation – necessity & limiting valued
	3rd	**5.0 Points and crossings,** 5.1 Definition, necessity of Points and crossings
	4th	5.1 Definition, necessity of Points and crossings
8th	1st	5.2 Types of points & crossings with tie diagrams
	2nd	5.2 Types of points & crossings with tie diagrams
	3rd	**6.0 Laying & maintenance of track,** 6.1 Methods of Laying & maintenance of track
	4th	6.1 Methods of Laying & maintenance of track
9th	1st	6.2 Details of a permanent way inspector
	2nd	6.2 Details of a permanent way inspector
	3rd	**Section – B: BRIDGES**
	4th	**1 Introductions of bridges,** 1.1 Definitions 1.2 Components of a bridge
10th	1st	1.3 Classification of bridges 1.4 Requirements of an ideal bridge
	2nd	**2.0 Bridge Site investigation, hydrology & planning,** 2.1 Selection of bridge site , Bridge alignments
	3rd	2.2 Determination of flood discharge
	4th	2.2 Determination of flood discharge
11th	1st	2.3 Waterway & economic span
	2nd	2.4 Afflux, clearance & free board
	3rd	**3.0 Bridge foundation,** 3.1 Scour depth minimum depth of foundation

	4th	3.1 Scour depth minimum depth of foundation
12th	1st	3.2 Types of bridge, foundations – spread foundation, pile foundation
	2nd	3.2 Types of bridge, foundations – spread foundation, pile foundation
	3rd	pile foundation- pile driving, well foundation – sinking of wells, caission foundation
	4th	pile foundation- pile driving, well foundation – sinking of wells, caission foundation
13th	1st	3.3 Coffer dams
	2nd	3.3 Coffer dams
	3rd	**4.0 Bridge substructure and approaches,** 4.1 Types of piers
	4th	4.2 Types of abutments,
14th	1st	4.3 Types of wing walls
	2nd	4.3 Types of wing walls
	3rd	4.4 Approaches
	4th	**5. Culvert & cause ways:** 5.1 types of culverts - brief description
15th	1st	5.1 types of culverts - brief description
	2nd	5.1 types of culverts - brief description
	3rd	5.2 Types of causeways - brief description
	4th	5.2 Types of causeways - brief description

A. Gupteswar Patra (G.F)

19/09/2025

Govt. Polytechnic Berhampur
Lesson plan 2025-26 (Winter)

Discipline :-	Semester :-	Name of the teaching Faculty :
CIVIL ENGINEERING	FIFTH(W) 2025-26	SIBANI SAHU

SUBJECT:- WATER SUPPLY AND WASTE WATER ENGINEERING (Th-4)	NO. Of CLASSES ALLOTED FOR WEEK	SEMESTER FROM :- FROM 14/07/2025 TO 15/11/2025
WEEK	**DAY**	**THEORY**
1ST	1st	1.1 - Necessity of treated water supply. Per capita demand, variation in demand and factors affecting demand.
	2nd	1.2 - Analysis of water –physical, chemical ,bacteriological.
	3rd	1.3 – Water quality standards for different uses.
	4th	1.4 - Impurities in water – types & Harmful effects.
	5th	1.5 - . Methods of forecasting population, Numericals.
2ND	1st	1.6- Surface sources – Lake, stream, river .
	2nd	1.7 - Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well.
	3rd	1.8 - Yield from well- method s of determination, Numericals.
	4th	1.9 - 4 Intakes – types, descriptions.
	5th	2.0 - Pumps for conveyance & distribution .
3RD	1st	types, selection, installation.
	2nd	2.1 – Pipe materials – necessity, suitability, merits & demerits.
	3rd	2.2– Pipe joints – necessity, types of joints, suitability.
	4th	methods of jointing Laying of pipes – method.
	5th	2.3 – CLASS TEST (01)
4TH	1st	2.4 -Aims and objectives of sanitary engineering. Definition of terms related to sanitary engineering.
	2nd	2.5 - Systems of collection of wastes– Conservancy.
	3rd	2.6 – Water Carriage System – features, comparison, suitability.ASSIGNMENT 01
	4th	2.7 - Quantity of sanitary sewage – domestic & industrial sewage, variation in sewage flow.
	5th	2.8 - numerical problem on computation quantity of sanitary sewage.
5TH	1st	2.9 - Computation of size of sewer, application of Chazy's formula..
	2nd	3.0 -Limiting velocities of flow : self-cleaning and scouring.
	3rd	3,1- General importance, strength of sewage.
	4th	3.2 - Characteristics of sewage-physical, chemical & biological.
	5th	3.3- Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD.
6TH	1st	3.4 - Types of system-separate, combined, partially separate , features, comparison between the types, suitability.

	2nd	3.5 - Shapes of sewer – rectangular, circular, avoid-features, suitability.
	3rd	3.6 Laying of sewer-setting out sewer alignment.
	4th	3.7 - Flow diagram of conventional water treatment system.
	5th	3.8 -Treatment process i.e Aeration ; Necessity
7TH	1st	3.9 – CLASS TEST (02) . Plain Sedimentation : Necessity.
	2nd	4.0 - working principles, Sedimentation tanks – types, essential features, operation & maintenance.
	3rd	4.1 - Sedimentation with coagulation: Necessity, principles of coagulation.
	4th	4.2- types of coagulants, Flash Mixer, Flocculator, Clarifier.
	5th	4.3 Filtration : Necessity, principles, types of filters.
8TH	1st	4.4- Disinfection : Necessity, methods of disinfection .
	2nd	4.5 - Chlorination – free and combined chlorine demand and types. ASSIGNMENT 02
	3rd	4.6 Softening of water – Necessity, Methods of softening.
	4th	4.7 – General requirements .
	5th	4.8 – CLASS TEST (03) types of distribution system-gravity, direct and combined.
9TH	1st	4.9 - Methods of supply – intermittent and continuous.
	2nd	5.0 - Distribution system layout – types, comparison, suitability.
	3rd	5.1 - Valves-types, features, uses.
	4th	5.2 - purpose-sluice valves, check valves, air valves.
	5th	5.3 scour valves, Fire hydrants, Water meters.
10TH	1st	5.4 Manholes and Lamp holes – types, features, location, function.
	2nd	5.5 - Inlets, Grease & oil trap – features, location, function.
	3rd	5.6 Storm regulator, inverted siphon – features, location, function.
	4th	5.7- Disposal on land – sewage farming, sewage application and dosing.
	5th	5.8 sewage sickness-causes and remedies.
11TH	1st	5.9 - Disposal by dilution – standards for disposal in different types of water bodies.
	2nd	6.0 - self purification of stream.
	3rd	6.1 Method of connection from water mains to building supply.
	4th	6.2 - General layout of plumbing arrangement for water supply in single storied.
	5th	6.3 multi-storied building as per I.S. code..
12TH	1st	6.4 – CLASS TEST (04) Principles of treatment.
	2nd	6.5 - flow diagram of conventional treatment.
	3rd	6.6 - Primary treatment – necessity.
	4th	6.7 -principles, essential features, functions.
	5th	6.8 -Secondary treatment – necessity, principles.
13TH	1st	6.9 -essential features, functions.
	2nd	7.0- Requirements of building drainage.

Sibani Sahu
10.09.2025 (Guest Faculty, civil)

	3rd	7.1 -layout of lavatory blocks in residential buildings, layout of building drainage.
	4th	7.2 -Principles of treatment.
	5th	7.3 Plumbing arrangement of single storied.
14TH	1st	7.4 -multi storied building as per I.S. code practice.
	2nd	7.5 -Sanitary fixtures – features.
	3rd	7.6function, and maintenance and fixing of the fixtures .
	4th	7.7- water closets, flushing cisterns, urinals.
	5th	7.8 -inspection chambers, traps.
15TH	1st	7.9- antisyphonage pipe.
	2nd	8.0- Numerical practice.
	3rd	8.1 - Revision of water supply chapters.
	4th	8.2 -Revision of sanitary engineering.
	5th	8.3 - Assignment work.

Sabani Sahu
Guest Faculty
(Civil)

LESSON PLAN ESTIMATION & COST EVALUATION – II (TH-5) GOVT. POLYTECHNIC, BERHAMPUR

Discipline: Civil Engineering	Semester: 5YH	Name of the Teaching Faculty: **Narasingh Mahanty**
Subject- .ESTIMATION & COST EVALUATION – II	No. of days/ per week class allotted: 4	Semester From Date :14/7/25 to Date: 18/11/25 No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
1st	1st 2nd 3rd 4th	**UNIT-1 Detailed estimate of culverts and bridges** Detailed estimate of a RCC slab culvert with right angled wing wall
2ND	1st 2nd 3rd 4th	**UNIT-1 Detailed estimate of culverts and bridges** Detailed estimate of a RCC slab culvert with right angled wing wall EXAMPLE -2
3rd	1st 2nd 3rd 4th	Bar bending schedule of RCC Slab
4th	1st 2nd 3rd 4th	Detailed estimate of Hume pipe culvert with Right angled wing wall
5th	1st 2nd 3rd 4th	Detailed estimate of Hume pipe culvert with splayed angled wing wall
6th	1st 2nd 3rd 4th	**UNIT-2 Estimate of irrigation structures** Detailed estimate of simple type of vertical fall to given specification ,
7th	1st 2nd 3rd 4th	Detailed estimate of drainage siphon to given specification.
8th	1st 2nd 3rd 4th	**UNIT-3 Detailed estimate of roads** Detail estimate of a water bound macadam road

9th	1st	Detailed estimate of a flexible pavement in cutting / filling
	2nd	
	3rd	Detailed estimate of septic tank and soak pit for 50 users
	4th	
10th	1st	**UNIT-4 Miscellaneous estimates**
	2nd	Tube well,
	3rd	Piles and Pile cap
	4th	
11th	1st	Isolated footings
	2nd	
	3rd	combined footings
	4th	**UNIT-5 PWD Accounts works**
		Works
12th	1st	Classification of work-original, major, petty, repair work, annual repair, special repair, quadrantal repair.
	2nd	Concept of Method of execution of works through the contractors and department,
	3rd	contract and agreement, work order,
	4th	types of contract, piece work agreement.
13th	1st	Explanation of various terms Administrative approval, technical sanction,
	2nd	tender, preparation of notice inviting tender, quotations,
	3rd	earnest money, E-tendering, security deposit,
	4th	advance payment, intermediate payment, final payment, running bill, final bill,
14th	1st	regular and temporary establishment,
	2nd	cash, major & subhead of account, temporary advance (imprest money),supervision charges
	3rd	Measurement book use & maintenance
	4th	procedure of marking entries of measurement of work and supply of materials, labour employed standard measurement books and common irregularity
15th	1st	Labour & labour report, method of labour payment, use of forms and necessity of Submission
	2nd	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
	3rd	Building BYLAWS and REGULATORY Bodies, Development authorities, types and their levels, RERA etc.
	4th	Revision and Previous Year Question Discussion

Narasingh Mahanty
15.9.25