

## LESSON PLAN

- 1) **Subject Code:** Th.1
- 2) **Subject Title:** Entrepreneurship and Management & Smart Technology
- 3) **Semester:** 5<sup>th</sup> 4) **Branch:** Civil & Mech.
- 5) **Faculty:** Jitendra Kumar Das
- 6) **No. of Classes / Week:** 3
- 7) **Pre Requisite for the Subject:** NIL / YES, If YES, give details:
- 8) **Text Book to be referred by students:**

| Sl No. | Book                                               | Author    | Publication          | % of Questions Asked | Year (Edition) | Whether available in Library |
|--------|----------------------------------------------------|-----------|----------------------|----------------------|----------------|------------------------------|
| i      | Entrepreneurship and Management & Smart Technology | B. BADHAI | Dhanpat Rai and Sons | 90                   | 2007           | Yes                          |

### 9) Course Coverage Schedule

| Ch. No. | Name of the Chapter                                              | Course to be Covered                                                                                                                           | No of periods Required | Total Class for Chapter/ Week (From-To) | Remark |
|---------|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------|--------|
| 01      | ENTREPRENEURSHIP                                                 | 1.1 Concept / Meaning of Entrepreneurship                                                                                                      | 01                     | 05<br>Week-(1-2)                        |        |
|         |                                                                  | 1.2 Need of Entrepreneurship                                                                                                                   | 01                     |                                         |        |
|         |                                                                  | 1.3 Characteristics, Qualities and Types of entrepreneur, Functions                                                                            | 01                     |                                         |        |
|         |                                                                  | 1.4 Barriers in entrepreneurship                                                                                                               | 01                     |                                         |        |
|         |                                                                  | 1.5 Entrepreneurs vrs. Manager                                                                                                                 | 01                     |                                         |        |
|         |                                                                  | 1.6 Forms of Business Ownership: Sole proprietorship, partnership forms and others                                                             | 01                     |                                         |        |
| 02      | MARKET SURVEY AND OPPORTUNITY IDENTIFICATION (BUSINESS PLANNING) | 1.7 Types of Industries, Concept of Start-ups                                                                                                  | 01                     | 03<br>Week-(2-3)                        |        |
|         |                                                                  | 1.8 Entrepreneurial support agencies at National, State, District Level (Sources): DIC, NSIC, OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc. | 01                     |                                         |        |
|         |                                                                  | 1.9 Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks                                                         | 01                     |                                         |        |
|         |                                                                  | <b>1001 Topic End</b>                                                                                                                          |                        |                                         |        |
|         |                                                                  | 2.1 Business Planning                                                                                                                          | 01                     |                                         |        |
| 03      | PROJECT REPORT PREPARATION                                       | 2.2 SSI, Ancillary Units, Tiny Units, Service sector Units                                                                                     | 01                     | 02<br>Week-(3-4)                        |        |
|         |                                                                  | 2.3 Time schedule Plan, Agencies to be contacted for Project Implementation                                                                    | 01                     |                                         |        |
|         |                                                                  | 2.4 Assessment of Demand and supply and Potential areas of Growth                                                                              | 01                     |                                         |        |
|         |                                                                  | 2.5 Identifying Business Opportunity                                                                                                           | 01                     |                                         |        |
| 04      | MANAGEMENT PRINCIPLES                                            | 2.6 Final Product selection                                                                                                                    | 01                     | 03<br>Week-(4-5)                        |        |
|         |                                                                  | <b>1002 Topic End</b>                                                                                                                          |                        |                                         |        |
|         |                                                                  | 3.1 Preliminary project report                                                                                                                 | 01                     |                                         |        |
|         |                                                                  | 3.2 Detailed project report, Techno economic Feasibility                                                                                       | 01                     |                                         |        |
| 05      | FUNCTIONAL AREAS OF MANAGEMENT                                   | 3.3 Project Viability                                                                                                                          | 01                     | 06<br>Week-(5-6-7)                      |        |
|         |                                                                  | <b>1003 Topic End</b>                                                                                                                          |                        |                                         |        |
|         |                                                                  | 4.1 Definitions of management                                                                                                                  | 01                     |                                         |        |
|         |                                                                  | 4.2 Principles of management                                                                                                                   | 01                     |                                         |        |
|         |                                                                  | 4.3 Functions of management (planning, organising, staffing, directing and controlling etc.)                                                   | 01                     |                                         |        |
|         |                                                                  | 4.4 Level of Management in an Organisation                                                                                                     | 01                     |                                         |        |
|         |                                                                  | <b>1004 Topic End</b>                                                                                                                          |                        |                                         |        |
|         |                                                                  | 5.1 Production management                                                                                                                      | 01                     |                                         |        |
|         |                                                                  | 5.1.1 Functions, Activities                                                                                                                    |                        |                                         |        |
|         |                                                                  | 5.1.2 Productivity                                                                                                                             |                        |                                         |        |
|         |                                                                  | 5.1.3 Quality control                                                                                                                          |                        |                                         |        |
|         |                                                                  | 5.1.4 Production Planning and control                                                                                                          |                        |                                         |        |
|         |                                                                  | 5.2 Inventory Management                                                                                                                       | 01                     |                                         |        |
|         |                                                                  | 5.2.1 Need for Inventory management                                                                                                            |                        |                                         |        |

|                                               |                           |                                                                                                                                                           |    |                  |  |
|-----------------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------|--|
|                                               |                           | 5.2.2 Models/Techniques of Inventory management                                                                                                           |    |                  |  |
|                                               |                           | 5.3 Financial Management                                                                                                                                  | 01 |                  |  |
|                                               |                           | 5.3.1 Functions of Financial management                                                                                                                   |    |                  |  |
|                                               |                           | 5.3.2 Management of Working capital                                                                                                                       |    |                  |  |
|                                               |                           | 5.3.3 Costing (only concept)                                                                                                                              |    |                  |  |
|                                               |                           | 5.3.4 Break even Analysis                                                                                                                                 | 01 |                  |  |
|                                               |                           | 5.3.5 Brief idea about Accounting Terminologies: Book Keeping, Journal entry, Petty Cash book, P&L Accounts, Balance Sheets(only Concepts)                |    |                  |  |
|                                               |                           | 5.4 Marketing Management                                                                                                                                  | 01 |                  |  |
|                                               |                           | 5.4.1 Concept of Marketing and Marketing Management                                                                                                       |    |                  |  |
|                                               |                           | 5.4.2 Marketing Techniques (only concepts)                                                                                                                |    |                  |  |
|                                               |                           | 5.4.3 Concept of 4P s (Price, Place, Product, Promotion)                                                                                                  |    |                  |  |
|                                               |                           | 5.5 Human Resource Management                                                                                                                             | 01 |                  |  |
|                                               |                           | 5.5.1 Functions of Personnel Management                                                                                                                   |    |                  |  |
|                                               |                           | 5.5.2 Manpower Planning, Recruitment, Sources of manpower, Selection process, Method of Testing, Methods of Training& Development, Payment of Wages       |    |                  |  |
|                                               |                           | <b>1005 Topic End</b>                                                                                                                                     |    |                  |  |
| 06                                            | LEADERSHIP AND MOTIVATION | 6.1 Leadership                                                                                                                                            | 01 | 03<br>Week-(7-8) |  |
|                                               |                           | 6.1.1 Definition and Need/Importance                                                                                                                      |    |                  |  |
|                                               |                           | 6.1.2 Qualities and functions of a leader                                                                                                                 |    |                  |  |
|                                               |                           | 6.1.3 Manager Vs Leader                                                                                                                                   |    |                  |  |
|                                               |                           | 6.1.4 Style of Leadership (Autocratic, Democratic, Participative)                                                                                         | 01 |                  |  |
|                                               |                           | 6.2 Motivation                                                                                                                                            |    |                  |  |
|                                               |                           | 6.2.1 Definition and characteristics                                                                                                                      |    |                  |  |
|                                               |                           | 6.2.2 Importance of motivation                                                                                                                            | 01 |                  |  |
|                                               |                           | 6.2.3 Factors affecting motivation                                                                                                                        |    |                  |  |
|                                               |                           | 6.2.4 Theories of motivation (Maslow)                                                                                                                     |    |                  |  |
| 6.2.5 Methods of Improving Motivation         |                           |                                                                                                                                                           |    |                  |  |
| 6.2.6 Importance of Communication in Business | 01                        |                                                                                                                                                           |    |                  |  |
| 6.2.7 Types and Barriers of Communication     |                           |                                                                                                                                                           |    |                  |  |
|                                               |                           | <b>1006 Topic End</b>                                                                                                                                     |    |                  |  |
| 07                                            | WORK CULTURE, TQM& SAFETY | 7.1 Human relationship and Performance in Organization                                                                                                    | 01 | 02<br>Week-8     |  |
|                                               |                           | 7.2 Relations with Peers, Superiors and Subordinates                                                                                                      |    |                  |  |
|                                               |                           | 7.3 TQM concepts: Quality Policy, Quality Management, Quality system                                                                                      | 01 |                  |  |
|                                               |                           | 7.4 Accidents and Safety, Cause, preventive measures, General Safety Rules, Personal Protection Equipment(PPE)                                            |    |                  |  |
|                                               |                           | <b>1007 Topic End</b>                                                                                                                                     |    |                  |  |
| 08                                            | LEGISLATION               | 8.1 Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights                                                                                    | 01 | 02<br>Week -9    |  |
|                                               |                           | 8.2 Features of Factories Act 1948 with Amendment (only salient points) c)                                                                                | 01 |                  |  |
|                                               |                           | 8.3 Features of Payment of Wages Act 1936(only salient points)                                                                                            |    |                  |  |
|                                               |                           | <b>1008 Topic End</b>                                                                                                                                     |    |                  |  |
| 09                                            | SMART TECHNOLOGY          | 9.1 Concept of IOT, How IOT works                                                                                                                         | 01 | 04<br>Week(9-10) |  |
|                                               |                           | 9.2 Components of IOT, Characteristics of IOT, Categories of IOT                                                                                          | 01 |                  |  |
|                                               |                           | 9.3 Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc | 02 |                  |  |
|                                               |                           | <b>1009 Topic End</b>                                                                                                                                     |    |                  |  |

J.K. Das  
Faculty

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HOD

B. S. S.  
29/07/23  
Principal

## LESSON PLAN

- 1) Subject Code: Th2
- 2) Subject Title: STRUCTURAL DESIGN- II
- 3) Semester: 5th
- 4) Branch: CIVIL ENGG.
- 5) Faculty: Amrita Mallick
- 6) No. of Classes / Week: 3Th. Cl./week, 1Pr. Cl./week
- 7) On completion of the course, a student will be able to
  - i. Design simple steel structure such as tension members, compression members and simple beams.
  - ii. Design timber structural elements
  - iii. Design staircase, footings by limit method of design.
  - iv. Draw the details of a steel roof truss.
  - v. Draw the reinforcement details of underground RCC water tank and RCC footings.
  - vi. Use standards and design codes.
- 8) Text Book to be referred by students:

| Sl No. | Book                                        | Author            | Publication           | % of Questions Asked | Year (Edition)         | Whether available in Library |
|--------|---------------------------------------------|-------------------|-----------------------|----------------------|------------------------|------------------------------|
| i      | Elements of Steel , Timber & Masonry Design | Samal & Panigrahi | Kalyani Pbln          | 60%                  | 1 <sup>st</sup> (2012) | YES                          |
| ii     | Design of Steel Structures                  | B.N.Duggal        | McGraw Hill Education | 30%                  | 3 <sup>rd</sup> (2012) | YES                          |

### 9) Course Coverage Schedule:

| Ch. No. | Name of Chapter                            | Course to be Covered                                                                                                                                                                                      | No of periods Required | Total Class for Chapter/ Week (From-To) | Remarks |
|---------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------|---------|
| 01      | Introduction                               | 1.1 Common steel structures, Advantages & disadvantages of steel structures.<br>1.2 Types of steel, properties of structural steel.<br>1.3 Rolled steel sections, special considerations in steel design. | 1                      | 2 Week(1)                               |         |
|         |                                            | 1.4 Loads and load combinations.<br>1.5 Structural analysis and design philosophy.<br>1.6 Brief review of Principles of Limit State design.<br><b>1001 TOPIC END</b>                                      | 1                      |                                         |         |
| 02      | Structural Steel Fasteners and Connections | 2.1 Bolted Connections                                                                                                                                                                                    | 1                      | 10+2(P) Week(1-4)                       |         |
|         |                                            | 2.1.1 Classification of bolts, advantages and disadvantages of bolted connections.                                                                                                                        |                        |                                         |         |
|         |                                            | 2.1.2 Different terminology, spacing and edge distance of bolt holes.                                                                                                                                     | 1                      |                                         |         |
|         |                                            | 2.1.3 Types of bolted connections.                                                                                                                                                                        | 1                      |                                         |         |
|         |                                            | 2.1.4 Types of action of fasteners, assumptions and principles of design.                                                                                                                                 | 1                      |                                         |         |
|         |                                            | 2.1.5 Strength of plates in a joint, strength of bearing type bolts (shear capacity&                                                                                                                      | 1                      |                                         |         |



|    |                                     |                                                                                                                                                                              |        |                      |  |
|----|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------|--|
|    |                                     | bearing capacity), reduction factors, and shear capacity of HSFG bolts.                                                                                                      |        |                      |  |
|    |                                     | 2.1.6 Analysis & design of Joints using bearing type and HSFG bolts (except eccentric load and prying forces)                                                                | 1+1(P) |                      |  |
|    |                                     | 2.1.7 Efficiency of a joint.                                                                                                                                                 | 1      |                      |  |
|    |                                     | 2.2 Welded Connections:                                                                                                                                                      | 1      |                      |  |
|    |                                     | 2.2.1 Advantages and Disadvantages of welded connection                                                                                                                      |        |                      |  |
|    |                                     | 2.2.2 Types of welded joints and specifications for welding                                                                                                                  | 1      |                      |  |
|    |                                     | 2.2.3 Design stresses in welds.                                                                                                                                              | 1+1(P) |                      |  |
|    |                                     | 2.2.4 Strength of welded joints                                                                                                                                              |        |                      |  |
|    |                                     | <b>1002 TOPIC END</b>                                                                                                                                                        |        |                      |  |
| 03 | Design of Steel tension Members     | 3.1 Common shapes of tension members.                                                                                                                                        | 2+1(P) | 4+2(P)<br>Week(4-5)  |  |
|    |                                     | 3.2 Maximum values of effective slenderness ratio.                                                                                                                           |        |                      |  |
|    |                                     | 3.4 Analysis and Design of tension members.( Considering strength only and concept of block shear failure.)                                                                  | 2+1(P) |                      |  |
|    |                                     | <b>1003 TOPIC END</b>                                                                                                                                                        |        |                      |  |
| 04 | Design of Steel Compression members | 4.1 Common shapes of compression members.                                                                                                                                    | 1      | 7+1(P)<br>Week(6-7)  |  |
|    |                                     | 4.2 Buckling class of cross sections, slenderness ratio                                                                                                                      | 1      |                      |  |
|    |                                     | 4.3 Design compressive stress and strength of compression members.                                                                                                           | 1+1(P) |                      |  |
|    |                                     | 4.4 Analysis and Design of compression members (axial load only).                                                                                                            | 4      |                      |  |
|    |                                     | <b>1004 TOPIC END</b>                                                                                                                                                        |        |                      |  |
| 05 | Design of Steel beams               | 5.1 Common cross sections and their classification.                                                                                                                          | 1      | 3+2(P)<br>Week(8-9)  |  |
|    |                                     | 5.2 Deflection limits, web buckling and web crippling.                                                                                                                       | 1+1(P) |                      |  |
|    |                                     | 5.3 Design of laterally supported beams against bending and shear.                                                                                                           | 1+1(P) |                      |  |
|    |                                     | <b>1005 TOPIC END</b>                                                                                                                                                        |        |                      |  |
| 06 | Design of Tubular Steel Structures  | 6.1 Round Tubular Sections, Permissible Stresses                                                                                                                             | 1+1(P) | 2+2(P)<br>Week(9-10) |  |
|    |                                     | 6.2 Tubular Compression & Tension Members                                                                                                                                    |        |                      |  |
|    |                                     | 6.3 Joints in Tubular trusses                                                                                                                                                | 1+1(P) |                      |  |
|    |                                     | <b>1006 TOPIC END</b>                                                                                                                                                        |        |                      |  |
| 07 | Design of Masonry Structures        | 7.1 Design considerations for Masonry walls & Columns, Load Bearing & Non-Load Bearing walls, Permissible stresses, Slenderness Ratio, Effective Length, Height & Thickness. | 2+1(P) | 2+1(P)<br>Week(10)   |  |
|    |                                     | <b>1007 TOPIC END</b>                                                                                                                                                        |        |                      |  |

Faculty

HOD

Principal

## LESSON PLAN

- 1) Subject Code: Th3.
- 2) Subject Title: Railway & Bridge Engg.
- 3) Semester: 5TH
- 4) Branch: CIVIL ENGG.
- 5) Faculty: Subhasmita Swain
- 6) No. of Classes / Week: 4/ WEEK
- 7) On completion of the course, a student will be able to
  - i. Explain railway terminology
  - ii. Comprehend the track components and relate to the material or geometric aspects that can be used for these
  - iii. Describe methods of laying and maintaining the track
  - iv. State the requirements for an ideal bridge and describe types of foundation and substructures
  - v. Classify the bridges and identify the components
  - vi. Select the bridge sites in context of hydrologic requirements
- 8) Text Book to be referred by students:

| Sl No. | Book                               | Author                 | Publication              | % of Questions Asked | Year (Edition) | Whether available in Library |
|--------|------------------------------------|------------------------|--------------------------|----------------------|----------------|------------------------------|
| i      | A Text book of Railway Engineering | S.C.Sexena & S.P.Arora | Dhanpat Rai Publications | 55                   | 2006 7th       | YES                          |
| ii     | Bridge Engineering                 | S.P. Bindra            | Dhanpat Rai Publications | 40                   | 2007 9th       | YES                          |

### 9) Course Coverage Schedule:

| Ch. No. | Name of Chapter | Course to be Covered                                                                                                                                                                                                                                         | No of periods Required | Total Class for Chapter/ Week (From-To) | Remarks |
|---------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------|---------|
| 1       | Introduction    | 1.1 Railway terminology<br>1.2 Advantages of railways<br>1.3 Classification of Indian Railways<br>1001 TOPIC END                                                                                                                                             | 1                      | 1 Week(1)                               |         |
| 2       | Permanent way   | 2.1 Definition and components of a permanent way<br>2.2 Concept of gauge, different gauges prevalent in India, suitability of these gauges under different conditions<br>1002 TOPIC END                                                                      | 1<br>1                 | 2 Week(1)                               |         |
| 3       | Track materials | 3.1 Rails<br>3.1.1 Functions and requirement of rails<br>3.1.2 Types of rail sections, length of rails<br>3.1.3 Rail joints – types, requirement of an ideal joint<br>3.1.4 Purpose of welding of rails & its advantages<br>3.1.5 Creep- definition, cause & | 1<br>1<br>1<br>1<br>1  | 11 Week(1-4)                            |         |

|                      |                                                 |                                                                                                     |   |                |  |
|----------------------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------|---|----------------|--|
|                      |                                                 | prevention                                                                                          |   |                |  |
|                      |                                                 | 3.2 Sleepers                                                                                        | 1 |                |  |
|                      |                                                 | 3.2.1 Definition, function & requirements of sleepers                                               |   |                |  |
|                      |                                                 | 3.2.2 Classification of sleepers                                                                    |   |                |  |
|                      |                                                 | 3.2.3 Advantages & disadvantages of different types of sleepers                                     | 1 |                |  |
|                      |                                                 | 3.3 Ballast                                                                                         | 1 |                |  |
|                      |                                                 | 3.3.1 Functions & requirements of ballast                                                           |   |                |  |
|                      |                                                 | 3.3.2 Materials for ballast                                                                         |   |                |  |
|                      |                                                 | 3.4 Fixtures for Broad gauge                                                                        | 1 |                |  |
|                      |                                                 | 3.4.1 Connection of rails to rail-fishplate, fish bolts                                             | 1 |                |  |
|                      |                                                 | 3.4.2 Connection of rails to sleepers                                                               | 1 |                |  |
|                      |                                                 | 1003 TOPIC END                                                                                      | 1 |                |  |
| 4                    | Geometric for broad gauge                       | 4.1 Typical cross – sections of single & double broad gauge railway track in cutting and embankment | 2 | 5<br>Week(4-5) |  |
|                      |                                                 | 4.2 Permanent & temporary land width                                                                | 1 |                |  |
|                      |                                                 | 4.3 Gradients for drainage                                                                          | 1 |                |  |
|                      |                                                 | 4.4 Super elevation – necessity & limiting valued                                                   | 1 |                |  |
|                      |                                                 | 1004 TOPIC END                                                                                      |   |                |  |
| 5                    | Points and crossings                            | 5.1 Definition, necessity of Points and crossings                                                   | 2 | 5<br>Week(5-6) |  |
|                      |                                                 | 5.2 Types of points & crossings with tie diagrams                                                   | 2 |                |  |
|                      |                                                 | 1005 TOPIC END                                                                                      | 1 |                |  |
| 6                    | Laying & maintenance of track                   | 6.1 Methods of Laying & maintenance of track                                                        | 1 | 2<br>Week(7)   |  |
|                      |                                                 | 6.2 Duties of a permanent way inspector                                                             | 1 |                |  |
|                      |                                                 | 1006 TOPIC END                                                                                      |   |                |  |
| Section – B: BRIDGES |                                                 |                                                                                                     |   |                |  |
| 7                    | Introduction to bridges                         | 1.1 Definitions                                                                                     | 1 | 2<br>Week(7)   |  |
|                      |                                                 | 1.2 Components of a bridge                                                                          |   |                |  |
|                      |                                                 | 1.3 Classification of bridges                                                                       |   |                |  |
|                      |                                                 | 1.4 Requirements of an ideal bridge                                                                 | 1 |                |  |
|                      |                                                 | 1007 TOPIC END                                                                                      |   |                |  |
| 8                    | Bridge site investigation, hydrology & planning | 2.1 Selection of bridge site, Alignment,                                                            | 1 | 3<br>Week(8)   |  |
|                      |                                                 | 2.2 Determination of Flood Discharge                                                                |   |                |  |
|                      |                                                 | 2.3 Waterway & economic span                                                                        | 1 |                |  |
|                      |                                                 | 2.4 Afflux, clearance & free board                                                                  |   |                |  |
|                      |                                                 | 1008 TOPIC END                                                                                      | 1 |                |  |
| 9                    | Bridge foundation                               | 3.1 Scour depth minimum depth of foundation                                                         | 1 | 5<br>Week(8-9) |  |
|                      |                                                 | 3.2 Types of bridge foundations – spread foundation, pile foundation-well                           | 2 |                |  |



|    |                                          |                                                      |   |               |  |
|----|------------------------------------------|------------------------------------------------------|---|---------------|--|
|    |                                          | foundation – sinking of wells,<br>caisson foundation |   |               |  |
|    |                                          | 3.3 Cofferdams                                       | 1 |               |  |
|    |                                          | 1009 TOPIC END                                       | 1 |               |  |
| 10 | Bridge<br>substructure and<br>approaches | 4.1 Types of piers                                   | 1 | 2<br>Week(10) |  |
|    |                                          | 4.2 Types of abutments                               |   |               |  |
|    |                                          | 4.3 Types of wing walls                              | 1 |               |  |
|    |                                          | 4.4 Approaches                                       |   |               |  |
|    |                                          | 1010 TOPIC END                                       |   |               |  |
| 11 | Culvert &<br>Cause Ways                  | 5.1 Types of culverts – brief<br>description         | 1 | 2<br>Week(10) |  |
|    |                                          | 5.2 Types of causeways – brief<br>description        | 1 |               |  |
|    |                                          | 1011 TOPIC END                                       |   |               |  |

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## LESSON PLAN

- 1) Subject Code: Th-4
- 2) Subject Title: WS & WWE
- 3) Semester: 5<sup>th</sup>
- 4) Branch: Civil Engineering
- 5) Faculty: Rutuparna Mohapatra
- 6) No. of Classes / Week: 4/week
- 7) On completion of the course, a student will be able to
  - i. To determine the water demand in terms of quantity and quality
  - ii. To Describe the water sources, conveyance and distribution system
  - iii. To realize the necessity of treatment and purpose of different water treatment processes
  - iv. To determine the terminology relating to sanitary engineering and compute quantity & quality of sewage
  - v. To describe the sewerage system and its components stating the purposes.
  - vi. To determine the necessity and method of sewage treatment and disposal
- 8) Text Book to be referred by students:

| Sl No. | Book                                               | Author     | Publication              | % of Questions Asked | Year (Edition)                | Whether available in Library |
|--------|----------------------------------------------------|------------|--------------------------|----------------------|-------------------------------|------------------------------|
| I      | Text book on water supply and sanitary engineering | G.S.Birdie | Dhanpat Rai Publications | 60%                  | 9 <sup>th</sup> edition-2011  | Yes                          |
| II     | Water Supply Engineering                           | S.K.Garg   | Khanna Publishers        | 30%                  | 20 <sup>th</sup> edition-2011 | Yes                          |

### 9) Course Coverage Schedule:

| Ch. No.                       | Name of Chapter                                             | Course to be Covered                                                              | No of periods Required | Total Class for Chapter/ Week (From-To) | Remarks |
|-------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------|-----------------------------------------|---------|
| <b>PART :A (WATER SUPPLY)</b> |                                                             |                                                                                   |                        |                                         |         |
| 1.                            | Introduction to Water Supply, Quantity and Quality of water | 1.1 Necessity of treated water supply                                             | 1                      | 5 Week(1- 2)                            |         |
|                               |                                                             | 1.2 Per capita demand, variation in demand and factors affecting demand           |                        |                                         |         |
|                               |                                                             | 1.3 Methods of forecasting population, Numerical problems using different methods | 1                      |                                         |         |
|                               |                                                             | 1.4 Impurities in water – organic and inorganic, Harmful effects of impurities    | 1                      |                                         |         |
|                               |                                                             | 1.5 Analysis of water –physical, chemical and bacteriological                     | 1                      |                                         |         |
|                               |                                                             | 1.6 Water quality standards for different uses                                    | 1                      |                                         |         |
|                               |                                                             | <b>1001 Topic End</b>                                                             |                        |                                         |         |
| 2.                            | Sources and Conveyance of water                             | 2.1 Surface sources – Lake, stream, river and impounded reservoir                 | 1                      | 4 Week (2-3)                            |         |



|    |                    |                                                                                                                                                                                                                     |   |              |  |
|----|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------|--|
|    |                    | 2.2 Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well                                                                                                        |   |              |  |
|    |                    | 2.3 Yield from well- method s of determination, Numerical problems using yield formulae ( deduction excluded)                                                                                                       | 1 |              |  |
|    |                    | 2.4 Intakes – types, description of river intake, reservoir intake, canal intake                                                                                                                                    | 1 |              |  |
|    |                    | 2.5 Pumps for conveyance & distribution – types, selection, installation.                                                                                                                                           |   |              |  |
|    |                    | 2.6 Pipe materials – necessity, suitability, merits & demerits of each type                                                                                                                                         |   |              |  |
|    |                    | 2.7 Pipe joints – necessity, types of joints, suitability, methods of jointing<br>Laying of pipes – method                                                                                                          | 1 |              |  |
|    |                    | <b>1002 Topic End</b>                                                                                                                                                                                               |   |              |  |
| 3. | Treatment of water | 3.1 Flow diagram of conventional water treatment system                                                                                                                                                             | 1 | 8 Week (3-5) |  |
|    |                    | 3.2 Treatment process / units :                                                                                                                                                                                     |   |              |  |
|    |                    | 3.2.1 Aeration ; Necessity                                                                                                                                                                                          | 2 |              |  |
|    |                    | 3.2.2 Plain Sedimentation : Necessity, working principles, Sedimentation tanks – types, essential features, operation & maintenance                                                                                 |   |              |  |
|    |                    | 3.2.3 Sedimentation with coagulation: Necessity, principles of coagulation, types of coagulants, Flash Mixer, Flocculator, Clarifier (Definition and concept only)                                                  | 1 |              |  |
|    |                    | 3.2.4 Filtration : Necessity, principles, types of filters<br>Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential features                                                                          | 1 |              |  |
|    |                    | 3.2.5 Disinfection : Necessity, methods of disinfection<br>Chlorination – free and combined chlorine demand, available chlorine, residual chlorine, pre-chlorination, break point chlorination, super- chlorination | 1 |              |  |
|    |                    | 3.2.6 Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchang e method (Concept Only)                                                                                              | 1 |              |  |
|    |                    | <b>1003 Topic End</b>                                                                                                                                                                                               | 1 |              |  |

|                                    |                                                             |                                                                                                                                                         |   |             |  |
|------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------|--|
| 4.                                 | Distribution system and Appurtenance in distribution system | 4.1 General requirements, types of distribution system-gravity, direct and combined                                                                     | 1 | 3<br>Week 5 |  |
|                                    |                                                             | 4.2 Methods of supply – intermittent and continuous                                                                                                     | 1 |             |  |
|                                    |                                                             | 4.3 Distribution system layout – types, comparison, suitability                                                                                         |   |             |  |
|                                    |                                                             | 4.4 Valves-types, features, uses, purpose-sluice valves, check valves, air valves, scour valves, Fire hydrants, Water meters                            | 1 |             |  |
|                                    |                                                             | 1004 Topic End                                                                                                                                          |   |             |  |
| 5.                                 | W/s plumbing in building                                    | 5.1 Method of connection from water mains to building supply                                                                                            | 1 | 2<br>Week 6 |  |
|                                    |                                                             | 5.2 General layout of plumbing arrangement for water supply in single storied and multi-storied building as per I.S. code.                              | 1 |             |  |
|                                    |                                                             | 1005 Topic End                                                                                                                                          |   |             |  |
| PART B: (WASTE WATER ENGINEERING ) |                                                             |                                                                                                                                                         |   |             |  |
| 6.                                 | Introduction                                                | 6.1 Aims and objectives of sanitary engineering                                                                                                         | 1 | 2<br>Week 6 |  |
|                                    |                                                             | 6.2 Definition of terms related to sanitary engineering                                                                                                 |   |             |  |
|                                    |                                                             | 6.3 Systems of collection of wastes– Conservancy and Water Carriage System – features, comparison, suitability                                          | 1 |             |  |
|                                    |                                                             | 1006 Topic End                                                                                                                                          |   |             |  |
| 7.                                 | Quantity and Quality of sewage                              | 7.1 Quantity of sanitary sewage – domestic & industrial sewage, variation in sewage flow, numerical problem on computation quantity of sanitary sewage. | 1 | 4<br>Week 7 |  |
|                                    |                                                             | 7.2 Computation of size of sewer, application of Chazy’s formula, Limiting velocities of flow : self-cleaning and scouring                              | 1 |             |  |
|                                    |                                                             | 7.3 General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological                                                   | 1 |             |  |
|                                    |                                                             | 7.4 Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD                                                                      | 1 |             |  |
|                                    |                                                             | 1007 Topic End                                                                                                                                          |   |             |  |
|                                    |                                                             |                                                                                                                                                         |   |             |  |
| 8.                                 | Sewerage system                                             | 8.1 Types of system-separate, combined, partially separate , features, comparison between the types, suitability                                        | 1 | 3<br>Week 8 |  |
|                                    |                                                             | 8.2 Shapes of sewer – rectangular, circular, avoid-features, suitability                                                                                | 1 |             |  |
|                                    |                                                             | 8.3 Laying of sewer-setting out sewer alignment                                                                                                         |   |             |  |
|                                    |                                                             | 1008 Topic End                                                                                                                                          | 1 |             |  |

|     |                                         |                                                                                                                                                                                      |   |               |  |
|-----|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------|--|
| 9.  | Sewer appurtenances and Sewage Disposal | 9.1 Manholes and Lamp holes – types, features, location, function                                                                                                                    | 1 | 4 Week (8-9)  |  |
|     |                                         | 9.2 Inlets, Grease & oil trap – features, location, function                                                                                                                         | 1 |               |  |
|     |                                         | 9.3 Storm regulator, inverted siphon – features, location, function                                                                                                                  |   |               |  |
|     |                                         | 9.4 Disposal on land – sewage farming, sewage application and dosing,                                                                                                                | 1 |               |  |
|     |                                         | 9.5 Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream                                                                    | 1 |               |  |
|     |                                         | <b>1009 Topic End</b>                                                                                                                                                                |   |               |  |
| 10. | Sewage treatment                        | 10.1 Principles of treatment, flow diagram of conventional treatment                                                                                                                 | 1 | 3 Week (9-10) |  |
|     |                                         | 10.2 Primary treatment – necessity, principles, essential features, functions                                                                                                        | 1 |               |  |
|     |                                         | 10.3 Secondary treatment – necessity, principles, essential features, functions                                                                                                      | 1 |               |  |
|     |                                         | <b>1010 Topic End</b>                                                                                                                                                                |   |               |  |
| 11. | Sanitary plumbing for building          | 11.1 Requirements of building drainage, layout of lavatory blocks in residential buildings, layout of building drainage                                                              | 1 | 2 Week 10     |  |
|     |                                         | 11.2 Plumbing arrangement of single storied & multi storied building as per I.S. code practice                                                                                       |   |               |  |
|     |                                         | 11.3 Sanitary fixtures – features, function, and maintenance and fixing of the fixtures – water closets, flushing cisterns, urinals, inspection chambers, traps, anti-syphonage pipe | 1 |               |  |
|     |                                         | <b>1011 Topic End</b>                                                                                                                                                                |   |               |  |

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## LESSON PLAN

- 1) Subject Code: TH 5
- 2) Subject Title: Estimation & Cost Evaluation
- 3) Semester: 5<sup>TH</sup>
- 4) Branch: Civil Engg.
- 5) Faculty: Dipika Samal
- 6) No. of Classes / Week: 4 Th. Cl./Week, 1Pr. Cl./Week
- 7) On completion of the course, a student will be able to
  - i. Create detailed estimate of culverts and bridges
  - ii. Prepare estimates of irrigation structures
  - iii. Prepare estimates of a macadam road and a national highway in cutting and filling
  - iv. Prepare detailed estimates for septic tank and soak pits
  - v. Prepare detailed estimates of miscellaneous works
  - vi. Comprehend the management practices in Public Works Department
  - vii. Interpret the building by laws furnished by regulatory bodies
- 8) Text Book to be referred by students:

| Sl No. | Book                                                                | Author         | Publication         | % of Questions Asked | Year (Edition) | Whether available in Library |
|--------|---------------------------------------------------------------------|----------------|---------------------|----------------------|----------------|------------------------------|
| i      | Estimating, Costing, specification & Valuation in Civil Engineering | M.Chakraborty. | Published by author | 60%                  | 2010 23rd      | YES                          |
| ii     | Estimating & Costing                                                | B.N.Dutta      | UBSPD               | 30%                  | 2012 27th      | YES                          |

### 9) Course Coverage Schedule:

| Ch. No. | Name of Chapter                           | Course to be Covered                                                                               | No of periods Required | Total Class for Chapter/ Week (From-To) | Remarks |
|---------|-------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------|---------|
| 1       | Detailed estimate of culverts and bridges | 1.1 Detailed estimate of a RCC slab culvert with right angled wing walls with bar bending schedule | 4                      | 10 +3(P)<br>Week (1-3)                  |         |
|         |                                           | 1.2 RCC Hume pipe culvert with splayed angled wing wall                                            | 5+2P                   |                                         |         |
|         |                                           | 1001 TOPIC END                                                                                     | 1+1P                   |                                         |         |
| 2       | Estimate of irrigation structures         | 2.1 Detailed estimate of simple type of vertical fall to given specification                       | 5                      | 10+3(P)<br>Week (3-6)                   |         |
|         |                                           | 2.2 Detailed estimate of drainage siphon to given specification.                                   | 4+2P                   |                                         |         |
|         |                                           | 1002 TOPIC END                                                                                     | 1+1P                   |                                         |         |
| 3       | Detailed estimate of roads                | 3.1 Detail estimate of a water bound macadam road                                                  | 2                      | 7 +2(P)<br>Week (6-7)                   |         |
|         |                                           | 3.2 Detailed estimate of a flexible pavement in cutting / filling                                  | 2                      |                                         |         |
|         |                                           | 3.2 Detailed estimate of septic tank and soak pit for 50 users                                     | 2+1P                   |                                         |         |
|         |                                           | 1003 TOPIC END                                                                                     | 1+1P                   |                                         |         |
| 4       | Detailed estimates                        | 4.1 Tube well, Piles and Pile cap, Isolated and combined footings.                                 | 6                      | 7                                       |         |

|   |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                      |                                  |  |
|---|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------|--|
|   | of<br>miscellaneous<br>works | 1004 TOPIC END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1                                                                    | Week (8-9)                       |  |
| 5 | PWD<br>accounts<br>works     | <p>5.1 Works</p> <p>5.1.1 Classification of work-original, major, petty, repair work, annual repair, special repair, quadrantal repair.</p> <p>5.1.2 Concept of Method of execution of works through the contractors and department, contract and agreement, work order, types of contract, piece work agreement.</p> <p>5.2 Accounts of works</p> <p>5.2.1 Explanation of various terms Administrative approval, technical sanction, tender, preparation of notice inviting tender, quotations, earnest money, E-tendering, security deposit, advance payment, intermediate payment, final payment, running bill, final bill, regular and temporary establishment, cash, major &amp; subhead of account, temporary advance (imprest money), supervision charges, suspense account, debit, credit, book transfer, voucher and related accounts .</p> <p>5.2.2 Measurement book use &amp; maintenance, procedure of marking entries of measurement of work and supply of materials, labour employed, standard measurement books and common irregularity</p> <p>5.2.3 Muster roll : Its preparation &amp; use for making payment of pay &amp; wages</p> <p>5.2.4 Acquittance Roll : Its preparation &amp; use for making payment of pay &amp; wages</p> <p>5.2.5 Labour &amp; labour report, method of labour payment, use of forms and necessity of Submission</p> <p>5.2.6 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</p> <p>5.3 Building BYLAWS and REGULATORY Bodies, Development authorities, types and their levels, RERA etc.</p> <p>1005 TOPIC END</p> | <p>1</p> <p>1+1P</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1+1P</p> | <p>6+2(P)</p> <p>Week (9-10)</p> |  |

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