

**MATS School of Engineering & I.T**

**MATS University**

**Raipur**



**Syllabus Scheme**

**(5<sup>th</sup> Semester)**

**For**

**DIPLOMA PROGRAMME**

**IN**

**CIVIL ENGINEERING**

**Subject Code For DIPLOMA PROGRAMME IN CIVIL ENGINEERING**

**5<sup>th</sup> Semester (Civil)**

<b>S.No.</b>	<b>Subject Code</b>	<b>Subject Name</b>
<b>THEORY</b>		
<b>1</b>	<b>DP-520</b>	Irrigation engineering
<b>2</b>	<b>DP-521</b>	R.C.C design
<b>3</b>	<b>DP-522</b>	Quantity surveying & costing
<b>4</b>	<b>DP-523</b>	Entrepreneurship development
<b>5</b>	<b>DP-524</b>	Railways & Bridges
<b>PRACTICAL</b>		
<b>6</b>	<b>DP-525</b>	Auto-Cad Lab
<b>7</b>	<b>DP-526</b>	Vocational Training Evaluation
<b>8</b>	<b>DP-527</b>	Minor Project
<b>9</b>	<b>DP-528</b>	Construction Technology Lab
<b>10</b>	<b>DP-529</b>	Quantity Surveying & Costing-I Lab



**MATS School of Engineering & I.T**  
**MATS University, Raipur**  
**Diploma in Civil Engineering**



**V<sup>th</sup> Semester**

Sr. No.	Course code	SUBJECT	Periods per week			Evaluation Scheme		Total Credits
			L	T	P	IM	ESE	
<b>THEORY</b>								
1	DP-520	Irrigation engineering	4	0	0	30	70	4
2	DP-521	R.C.C design	3	1	0	30	70	4
3	DP-522	Quantity surveying & costing	4	0	0	30	70	4
4	DP-523	Entrepreneurship development	3	0	0	30	70	3
5	DP-524	Railways & Bridges	4	0	0	30	70	3
<b>PRACTICAL</b>								
6	DP-525	Auto-Cad Lab	-	-	2	20	30	1
7	DP-526	Vocational Training Evaluation	-	-	2	20	30	1
8	DP-527	Minor Project	-	-	2	20	30	1
9	DP-528	Construction Technology Lab	-	-	2	20	30	1
10	DP-529	Quantity Surveying & Costing-I Lab	-	-	2	20	30	1
<b>TOTAL</b>			<b>18</b>	<b>1</b>	<b>10</b>	<b>250</b>	<b>500</b>	<b>23</b>

**L-Lecturer, P-Practical, ESE- End Semester Examination, IM-Internal Marks, T-Tutorial**

**FIFTH SEMESTER**  
**SUBJECT: IRRIGATION ENGG**

**SUBJECT CODE: DP-520**

**Unit – 1 INTRODUCTION**

Necessity of irrigation, Importance of irrigation, Benefits of irrigation, Ill effects of irrigation, Methods of irrigation

**HYDROLOGY**

Definitions, Hydrological cycles, Rainfall, Runoff, Flood discharge

**Unit –2 WATER REQUIREMENTS OF CROPS**

Function of water, various crops of area, Crop season, Delta, Duty, Crop rotation.

**SURVEY FOR IRRIGATION PROJECT**

Importance of survey, Various type of survey, Reasonability and feasibility of projects

**Unit – 3 STORAGE WORKS**

Components of storage works, Various zone of storages, Various types of dams and their suitability, Construction materials and procedures, Foundation treatment.

**Unit –4 DIVERSION WORKS**

Components of diversion work, Types of diversion work, Functions and suitability of diversion work, Types of Weirs

**Unit –5 CANAL WORKS**

Components of canal work, Types of canal, Alignment, Design of canal, Different structures in canal network, Canal lining

**LIFT IRRIGATION SCHEMES**

Importance of lift irrigation, Suitability, Advantages and limitations

**Name of Reference Books:**

Irrigation Engineering and Hydraulic Structures – S.K. Garg (Khanna Publications)

Irrigation Engineering – B.C. Punmia (Laxmi Publications)

Irrigation, Water Resources and Water Power Engineering – Dr. P.N. Modi (Standard Book House)

**FIFTH SEMESTER**  
**SUBJECT: RCC DESIGN**  
**SUBJECT CODE: DP-521**

**Unit –1** **INTRODUCTION,**

S.I. Units, Meaning of R.C.C., Purpose of reinforcement., Materials of reinforcement, Steel as a reinforcing material, Type of steel used for reinforcement mild steel, Tor steel, Different mixes of concrete to be used for R.C.C. work, Use of I.S: 456-2000 and I.S: 875-1984 for designing R.C.C. structures.

**LIMIT STATE METHOD,** Limit state of collapse, Limit state of serviceability, Characteristic strength of materials, Characteristic load, Partial safety factors, Design values, stress-strain curve for concrete and steel.

**Unit –2** **LIMIT STATE OF COLLAPSE “FLEXURE”,**

Assumptions in limit state of collapse for flexure, Stress block parameters, Neutral axis, neutral axis depth, Max. Depth of N A, balanced, under reinforced section, Ultimate moment of resistance  $M_u$ , Limiting moment of resistance-  $M_{u\text{lim}}$ , factored Moment, Max percentage of tensile steel for singly reinforced section, Design of sections for flexure – singly reinforced rectangular beam, Doubly reinforced rectangular beam, Flanged beam.

**Unit – 3** **LIMIT STATE OF COLLAPSE “SHEAR”,**

Nominal shear stress, Design shear strength of concrete with and without-reinforcement, Min shear reinforcement, Design of shear reinforcement

**DEVELOP LENGTH & ANCHORAGE LENGTH,** Concept and necessity of development length, Value of design bond stress, Overlap length, Necessity of Hook and bend.

**Unit – 4** **LIMIT STATE OF SERVICEABILITY,**

Deflection, Control of deflection, Span by depth ratio, Cracks, limiting width of crack, Control of cracking.

**Unit –5** **DESIGN OF SLABS,**

Design of one way slab, roof slab, Sunshade, Balconies, Design and drafting of one way simply supported slab, One way continuous slab – design and drafting of three span continuous Slab, Two way slab – design and drafting simply supported slab and Corners held down

**Name of Reference Books:**

Design of Steel Structures – Duggal S.K. (Tata McGraw Hill)

Design of Steel Structures (Vol. - I & II) – Ram Chandra (Standard Book House, New Delhi)

Design of Steel Structures – Dayaratnam (Wheeler Publishing, New Delhi)

**FIFTH SEMESTER**  
**SUBJECT: QUALITY SURVEYING & COSTING**  
**SUBJECT CODE: DP-522**

**Unit – 1 : INTRODUCTION,**

Purpose of estimate and its importance to the field situations., **APPROXIMATE ESTIMATE**, Approximate method of Stage-I estimate, Service unit method, Plinth area method, Cubic content method, Approximate methods for water supply, sanitary and electrical installations, Different civil engineering structure like; bridge, culvert, road, dams, over head tanks etc.

**Unit – 2 : TAKING OUT QUANTITIES,**

Units of measurements, different items of work required in estimating building Works, Accuracy in measurement and calculating quantities of long and short wall Method, Centerline method, Standard conversion used in measurements, Taking out quantities from working drawing of buildings, Taking out quantities of existing buildings and buildings during construction.

**Unit –3 : USE OF SCHEDULE OF RATES,**

Information available in schedule of rates with specialization of particular item such as:, Labour rates, Material rates, Transportation rates

**ANALYSIS OF RATES**, Purpose of rates analysis, Task artisan per day, Materials required for major items, Labour required for major items, Analysis of major items of work

**Unit – 4 : DETAILED ESTIMATE OF BUILDINGS,**

Pre-requisite for stage II estimates or detailed estimate, Preparation of abstract from quantity sheets, Percentage provision to be made in stage II estimate for some item, Classification of estimates, Original work, Special repair work, Addition/Alternation work, Revised estimate, Annual repairs, Final estimate, Preparation of detailed estimate for:, Small building, Small building with pitched roof, Shop cum residential multi-storied building

**Unit –5 : EARTHWORK ESTIMATE,**

Calculation of area of cross section for given cross sections, Fully cutting section, Partly cutting and partly embankment section, Fully embankment section, Calculation of earth work by using Prismoidal formula, Trapezoidal formula, lead and lift, Estimate of earth work for 1 K.M. road, Using sealing coat as macadam, Using sealing coat as bitumen

**Name of Reference Books:**

Estimating and Costing in Civil Engineering – B.N. Dutta (UBS Publishers, New Delhi)  
Estimating and Costing and specifications – M. Chakrabarty (UBS Publishers, New Delhi)

**FIFTH SEMESTER**  
**SUBJECT: ENTREPRENEURSHIP DEVELOPMENT**  
**SUBJECT CODE: DP-523**

**Unit I**

Innovation: innovation- an abstract concept; creativity, innovation and imagination; types of innovation -classified according to products, processes or business organizations.

**Unit II**

Entrepreneurship: who is an entrepreneur? Entrepreneurship- A state of Mind, Emergence of entrepreneur; Role of Entrepreneur; A Doer not a Dreamer- Characteristics of an entrepreneur; Factors affecting entrepreneurial growth – Social, cultural, personality factors, psychological and Social Factors. Impact of Entrepreneurship for sustainable development.

**Unit III**

Difference between entrepreneur and entrepreneurship, Difference between entrepreneur and intrapreneur, Common Entrepreneurial competencies/Traits; Entrepreneurship stimulants, Obstacles inhibiting Entrepreneurship; Types of entrepreneurs, Functions of an entrepreneur.

**Unit IV**

Identification of Business Opportunities: Introduction, Sources of Business of Product Ideas, Steps in Identification of Business opportunity and its SWOT Analysis.

**UNIT-V**

Techno-Economic Feasibility of the project: Introduction, Techno- Economic feasibility of the Project, Feasibility Report, Considerations while preparing a Feasibility Report, Proforma of Feasibility Report, Role of Institutions and entrepreneurship.

**Text and Reference Books:**

1. Competing through Innovation-Bellon & Whittington, Prentice Hall of India
2. A Guide to Entrepreneurship – David Oates- JAICO Publishing House.
3. Entrepreneurship- Rober D Hisrich, Peters, Shepherd- TMH
4. Entrepreneurship in Action- Coulter, Prentice Hall of India
5. Entrepreneurship Management and Development – Ajith Kumar, HPH
6. Fundamentals of entrepreneurship- Mohanty, PHI
7. Patterns of Entrepreneurship- Jack M Kaplan, Wiley, student Edition.

**FIFTH SEMESTER**  
**SUBJECT: RAILWAY & BRIDGES**  
**SUBJECT CODE: DP-524**

**Railway**

**Unit I**

**INTRODUCTION:**

Brief history of railways ,Role of railways in transportation, its advantages ,Comparison of railways and highway transportation, Classification of Indian railways ,Classification of railway line based on speed criteria , Railway terminology

**Unit II**

**PERMANENT WAY**

Permanent way and its components ,Requirements of ideal permanent way ,Gauges in railway track ,Selection of gauges ,Uniformity of gauges ,Necessity of adopting different gauges Demerits of adopting different gauges ,Railway track crosssections ,Cross section in cutting and filling ,Single line double line drainage in railway tracks and yards ,Coning of wheels.

**RAILWAY TRACK**

Ballast ,Functions of ballast, requirement of good ballast, different materials ,used as ballast, size and section of ballast, scissors method of packing ballast, renewal of ballast and quantity required ,Sleepers , Functions of sleepers, requirements of good sleeper, types of sleepers, their advantages and disadvantages, comparison, of wooden metal and

concrete sleepers, spacing of sleepers and sleeper density, adzing of sleepers, bridge sleepers, stacking of sleepers. Rails ,Functions of rails, requirement of rails, types of rail sections, DH BH

and FF rails, their standard nomenclature, and comparison, length of ,rails wear of rails, their causes and remedial measures, rail failures, welding of rail joints, purpose of welding, methods of welding and its advantages, length of welded rails, creep of rails, indications of creep, theories of creep, effects of creep, measurement of creep, prevention of creep.

**Unit III**

**RAIL FIXTURES AND FASTENINGS**

Purpose and types of fixtures and fastenings ,fishplates, requirements, sections and failures of fishplates, Spikes, types, uses, characteristics of good spikes ,Chairs for BH and DH rails, cast iron chairs, slide chairs, keys ,Bearing joints and staggered joints.



## **GEOMETRICS**

Necessity of geometric design of a railway track ,Degree of curve ,Gradient and grade compensation ,Ruling gradient, momentum gradient, pusher gradient, gradient in station yards ,Grade compensation on curves ,Widening of gauge on curves ,Extra clearance on curves ,Super elevation or cant ,Objects of providing super elevation ,Relationship between super elevation, gauge, speed, radius of curve and ,average speed ,Limits of super elevation ,Cant deficiency ,Negative cant ,Types of curves- transition curves, necessity of providing transition curves, ,types and length of transition curves ,Curve indicator ,Check rails- purpose and necessity of providing check rails on curves.

## **POINTS AND CROSSINGS:**

Necessity of points and crossings , Functions ,Components of turnouts- Left hand turnout , right hand turnout ,Working of turnout ,Points or switches , Type of switches ,Crossings- types of crossings and crossing number, crossing used in Indian railways ,Combinations of points and crossings.

**SIGNALLING AND INTERLOCKING:** Objects ,Engineering principles ,Classification of signals , Requirements of signaling,Types of signal ,Electronic system of signaling Control system ,Interlocking principles of interlocking.

## **BRIDGES**

### **Unit IV INTRODUCTION**

Difference between bridge and culvert, Components of a bridge ,Various terminologies used in bridges ,Main classification of bridges ,Requirements of an ideal bridge  
Identification of bridge

### **SITE INVESTIGATION AND HYDRAULICS**

Selection of bridge site ,Characteristics of an ideal bridge site ,Bridge alignment and collection of bridge design data ,Determination of flood discharge water way ,Bridges 113 ,Economic span ,Scour depth ,Afflux standard valves of clearance and free board as per IRC

### **SUBSTRUCTURE AND SUPER STRUCTURE**

Types of bridge super structure ,Bridge floorings and their selection ,Bridge piers ,Abutments ,Wing walls ,Approaches ,Bridge bearings and joints in bridges

**Unit V CONSTRUCTION AND MAINTENANCE OF BRIDGES** Erection of steel girder and truss bridges ,Erecting of RCC bridges and suspension bridges ,Maintenance method

**TOPICS FOR VISITS AND REPORTS** Through packing ,Shovel Packing ,Track maintenance ,Systematic overhauling ,Lifting of track ,Lowering of track ,Counteraction, measurement and

adjustment of creep ,Organization tools and equipments for maintenance Maintenance of points and crossings, Maintenance of level crossing ,Maintenance of proper drainage ,Maintenance of gauge ,Maintenance of track components, Any other item suggested by teacher guide ,Welding of rails.

**Text and Reference Books:**

1. Text book of railway engineering-R.B.Deshpandey United Book corp. pons
2. Railway engineering-N.K.Vaswani Roorkee publishing house
3. Text book of railways-R.C.Rangwale Charter publishing house, Anand. W.R.
4. Text book of railway engineering-S.C.Saxena & SP Arora Dhanpal Rai an Sons

**FIFTH SEMESTER**  
**SUBJECT: AUTOCAD LAB**  
**SUBJECT CODE: DP-525**

**LIST OF PRACTICALS/TUTORIALS:**

1. Introduction to Auto CAD drafting package.
2. To draw section and elevation of fully glazed, half glazed, half glazed and half paneled doors and windows.
3. To draw the plan and section of a fully furnished bathroom.
4. To draw the plan and section of a fully furnished kitchen.
5. To draw the line plan of a primary school building.
6. To draw the line plan of a hostel building.
7. To draw the line plan of a hospital building.
8. To draw the line plan of a single storey residential building.
9. To draw the ground floor plan of a residential building.
10. To draw the section for the above plan showing maximum details.
11. To draw the corresponding front elevation of the above residential building.
12. To draw the cross section of a wall and it's foundation.
13. To draw the section and elevation of flush shutter, paneled shutter doors and windows.
14. To draw the foundation details of internal and external walls.

**FIFTH SEMESTER**  
**SUBJECT: CONSTRUCTION TECHNOLOGY LAB**  
**SUBJECT CODE: DP-528**

LIST OF PRACTICALS / TUTORIALS:

1. Testing of concrete for workability
2. Testing of concrete for compressive strength
3. Layout of a room with verandah.
4. Layout of a residential building.
5. Layout of a framed structure.
6. Planning and layout of a staircase

SKETCHES TO BE PREPARED:

1. Various types of foundations.
2. Various types of brick bonds and masonry finishing.
3. Various types of doors and window.
4. Various types of stairs
5. Various types of scaffoldings.
6. Sketches knots and scaffolding.

VISIT TO SITE WHERE:

1. Different types of foundation work in progress.

2. Masonry works in progress.
3. Fabrication work is in progress.
4. Slab casting is in progress.
5. Flooring work is in progress.
- a) Finished/completed building.

**FIFTH SEMESTER**  
**SUBJECT: QUANTITY SURVEYING & COSTING-I LAB**  
**SUBJECT CODE: DP-529**

LIST OF PRACTICALS / TUTORIALS:

1. Workout the quantities of all items of work for a single storied reside
2. building with flat roof
3. Workout the quantities of all items of work for a single storied reside
4. building with pitched roof

Workout the quantities of all items of work for a shop cum residential

6. double storied building
  - a. Rate analysis for:
7. Brick masonry

Excavation in foundation

Cement concrete

Cement mortar

Flooring

Woodwork.

Estimate of earth work for different sections

b. Estimate of road of 1 K.M. length for pavement surface

W.B.M.

Bitumen

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