



# MOTHERHOOD UNIVERSITY

Roorkee-Dehradun Road, Village Karoundi Post Bhagwanpur, Tehsil-Roorkee, Utrakhand

## **SIXTH SEMESTER**

## **CIVIL ENGINEERING**



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Sr. No.	Subject Code	Subject Name	Effective Teaching			Credits	Evaluation Scheme		
			L	T	P		Internal Assessment	External Assessment	Total Marks
			Hours/week						
<b>THEORY</b>									
1	MUPCE601N	Steel Structure Design	4	-	-	3	25	75	100
2	MUPCE602N	Earthquake Resistant Building Construction	3	-	-	4	25	75	100
3	MUPCE603N	Construction Management Accounts & Entrepreneurship Development	3	-	-	4	25	75	100
4	MUPCE604N	Disaster Management	2	-	-	4	25	75	100
5	MUPCE605N	Repair and Rehabilitation of Buildings	2	-	-	4	25	75	100
6	MUPCE606N	Employability Skills	2	-	-	2	25	75	100
<b>PRACTICAL/PROJECT</b>									
6	MUPCE657N	Structural Drawing	-	-	6	5	25	75	100
7	MUPCE 658N	Major Project Work	-	-	8	5	25	125	150
8	MUPCE 659N	Survey Camp	-	-	2	3	25	75	100
9	MUPGP 651N	General Proficiency #	-	-	2	1	25	-	25
10	MUPGP 652N	Industrial Exposure (Assessment at University level)+	-	-	2	1	25	-	25
<b>TOTAL</b>			<b>16</b>	<b>-</b>	<b>20</b>	<b>36</b>	<b>275</b>	<b>725</b>	<b>1000</b>



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<b>MUPCE -601N</b>	<b>STEEL STRUCTURE DESIGN</b>	<b>4L:0T:2P</b>	<b>3 CREDITS</b>
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## Course Objectives

**The objectives of the course is:**

- To learn about the different types of connection
- To learn about erection of different structures using steel.
- To learn about compression members
- To learn about tension member

## Course Outcomes

<b>At the end of the Course, Student will be able:</b>		<b>Bloom's Level</b>
<b>CO1</b>	To understand about assumptions in the theory of riveted joints	<b>K1</b>
<b>CO2</b>	To understand about analysis and design of single and double angle section tension members and their riveted and welded connections with gusset plate as per IS: 800	<b>K2</b>
<b>CO3</b>	To understand about analysis and design of single and double angle sections compression members (struts) and their riveted and welded connections with gusset plate as per IS:800	<b>K2</b>
<b>CO4</b>	To understand about analysis and design of single section simply supported laterally restrained steel beams and columns	<b>K2</b>
<b>CO5</b>	To understand about design of brick column and wall foundations.	<b>K2</b>

**K1 – Remember K2- Understand K3-Apply K4-Analyze K5 – Evaluate K6 – Create**



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## STEEL STRUCTURE DESIGN

### Syllabus

Subject Code: MUPCE-601N

L	T	P
4	-	-

### RATIONALE

This Subject is an applied Engineering Subject. Diploma holders in Civil Engineering Will be required to supervise steel construction and fabrication. He may also be required to design simple structural elements, make changes in design depending upon availability of materials. This subject thus deals with elementary design principles as per BIS code of practice IS: 800

### DETAILED CONTENTS

#### Structural Steel and Sections:

Properties of structural steel as per IS Code Designation of structural steel sections as per IS handbook and IS: 800- 2007

#### 1. Riveted Connections

Types of rivets, permissible stresses in rivets, types of riveted joints, specifications for riveted joints as per IS 800. Failure of a riveted joint. Assumptions in the theory of riveted joints. Strength and efficiency of a riveted joint. Design of riveted joints for axially loaded members.

#### 2. Welded connections

Types of welds and welded joints, advantages and disadvantages of welded joints design of fillet and butt weld. Plug and slot welds (Descriptive No numerical on plug and slot welds)

#### 3. Tension Members

Analysis and design of single and double angle section tension members and their riveted and welded connections with gusset plate as per IS: 800

#### 4. Compression Members

Analysis and design of single and double angle sections compression members (struts) and their riveted and welded connections with gusset plate as per BIS: 800



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## 5. Roof Trusses

Form of trusses, pitch of roof truss, spacing of trusses, spacing of purlin, connection between purlin and roof covering. Connection between purlin and principal rafter (no design, only concept)

## 6. Columns

Concept of buckling of columns, effective length and slenderness ratio, permissible stresses in compression as per IS: 800 for different end conditions. Analysis and Design of axially loaded single section steel column

## 7. Beams

Analysis and design of single section simply supported laterally restrained steel beams.

## 8. Fabrication and Erection

Steel Structures like trusses, columns and girders  
Masonry structures – Design of brick column and wall foundations

### **Important Note:**

**Use of IS: 800 and Steel Tables are permitted in examination.**

## **INSTRUCTIONAL STRATEGY**

Teachers are expected to give simple problems for designing various steel structural members. For creating comprehension of the subject, teachers may prepare tutorial sheets, which may be given to the students for solving. It would be advantageous if students are taken at construction site to show fabrication and erection of steel structures. IS: 800 may be referred along with code for relevant clauses.



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## **RECOMMENDED BOOKS**

1. Duggal SK, "Design of Steel Structures" by Standard Publishers, Delhi
2. Birinder Singh, "Steel Structures Design and Drawing", Kaption Publishing House, Ludhiana
3. Ram Chandra, "Design of Steel Structures", Standard Publishers, Delhi
4. LS Negi, "Design of Steel Structure" Tata McGraw Hill, New Delhi
5. S. Ramamurthan, "Design of Steel Structures".



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<b>MUPCE -602N</b>	<b>EARTHQUAKE RESISTANT BUILDING CONSTRUCTION</b>	<b>3L:0T:0P</b>	<b>4 Credits</b>
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## Course Objectives

**The objectives of the course is:**

- To learn about different zones of earthquake for understanding of seismic zones
- To learn about different construction method for earthquake zones.
- To learn about different seismic zones
- To learn about intensity of earthquakes

## Course Outcomes

<b>At the end of the Course, Student will be able:</b>		<b>Bloom's Level</b>
<b>CO1</b>	To understand about General features of tectonic of seismic regions	<b>K2</b>
<b>CO2</b>	To understand about Mode of failure (Out-of-plane failure, in-plane failure, Diaphragm failure, Connection failure, Non-structural components failure)	<b>K2</b>
<b>CO3</b>	To understand about Special construction method, tips and precautions to be observed while planning	<b>K2</b>
<b>CO4</b>	To understand about earthquake codes	<b>K2</b>
<b>CO5</b>	To understand about Ductile detailing concept and general applications potentials	<b>K4</b>

**K1 – Remember K2- Understand K3-Apply K4-Analyze K5 – Evaluate K6 – Create**



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## EARTHQUAKE RESISTANT BUILDING CONSTRUCTION

### Syllabus

Subject Code: MUPCE-602N

L	T	P
3	-	-

### RATIONAL

Diploma holders in civil engineering have to supervise construction of various earthquake resistant buildings. Therefore, the students should have requisite knowledge regarding terminology of earthquake and the precautions to be taken while constructing earthquake resistant buildings

### DETAILED CONTENTS

#### 1. Elements of Engineering Seismology

General features of tectonic of seismic regions. Causes of earthquakes, Seismic waves, earthquake size (magnitude and intensity), Epicenter, Seismograph, Classification of earthquakes, Seismic zoning map of India, Static and Dynamic Loading, Fundamental period.

#### 2. Seismic Behavior of Traditionally-Built Constructions of India

Performance of building during earthquakes and Mode of failure (Out-of-plane failure, in-plane failure, Diaphragm failure, Connection failure, Non-structural components failure)

3. Special construction method, tips and precautions to be observed while planning, designing and construction of earthquake resistant building.
4. Introduction to IS: 4326, IS: 13828, IS: 1893(Part 1), 154326 and IS: 13920 (Latest)
5. Seismic Provision of Strengthening and Retrofitting Measures for Traditionally-Built Constructions, Brick and RCC Structures
6. Provision of reinforcement detailing in masonry and RC constructions





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7. Steel Building seismic design and detailing of steel building.
8. Ductile detailing concept and general applications potentials

## **RECOMMENDED BOOKS:**

1. Elements of Earthquake Engineering by Jai Krishnan and AR Chandrasekaran; Sarita Parkashan, Meerut.
2. Manual Published by Earthquake Engineering department, IIT Roorkee / IIT Kanpur
3. IS 13920, IS: 13827, IS: 13828, IS 1893, IS 4326 (latest edition)
4. Singh, Harbhajan "Earthquake Resistant Building Construction" Abhishek Publishers, Chandigarh



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<b>MUPCE-603N</b>	<b>CONSTRUCTION MANAGEMENT ACCOUNTS &amp; ENTREPRENEURSHIP DEVELOPMENT</b>	<b>3L:0T:0P</b>	<b>4 Credits</b>
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## Course Objectives

The objectives of the course is:

- To learn about management
- To learn about entrepreneurship development
- To learn about different types of organization
- To learn about importance of construction planning

## Course Outcomes

<b>At the end of the Course, Student will be able:</b>		<b>Bloom's Level</b>
<b>CO1</b>	To understand Significance of construction management and planning	<b>K2</b>
<b>CO2</b>	To understand types of organizations and organizing different equipments	<b>K2</b>
<b>CO3</b>	To understand Control of process and Inspection and Quality Control	<b>K3</b>
<b>CO4</b>	To understand Accidents and Safety in Construction	<b>K4</b>
<b>CO5</b>	To understand meaning & importance of entrepreneurship and development	<b>K2</b>

**K1 – Remember K2- Understand K3-Apply K4-Analyze K5 – Evaluate K6 – Create**



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## CONSTRUCTION MANAGEMENT ACCOUNTS AND ENTREPRENEURSHIP DEVELOPMENT

### Syllabus

Subject Code: MUPCE-603N

L	T	P
3	-	-

### RATIONALEC

This is an applied civil engineering subject. The subject aims at imparting basic knowledge about construction planning and management, site organization, construction labor, control of work progress, inspection and quality control, accidents and safety and accounts.

### DETAILED CONTENTS THEORY

#### CONSTRUCTION MANAGEMENT

##### 1. Introduction

Significance of construction management

Main objectives of construction management and overview of the subject

Functions of construction management, planning, organizing, staffing, and directing, controlling and coordinating, meaning of each of these with respect to construction job.

Classification of construction into light, heavy and industrial construction

Stages in construction from conception to completion.

The construction team: owner, engineer, architect and contractors, their functions and inter-relationship

##### 2. Construction Planning

Importance of construction planning

Stages of construction planning

- Pre-tender stage
- Contract stage

Scheduling construction works by bar charts

- Definition of activity, identification of activities



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- Preparation of bar charts for simple construction work
- Preparation of schedules for labor, materials, machinery and finances for small works
- Limitations of bar charts

Scheduling by network techniques

- Introduction to network techniques; PERT and CPM, differences between PERT and CPM terminology

### 3. Organization

Types of organizations: Line, line and staff, functional and their characteristics

### 4. Site Organization

Principle of storing and stacking materials at site

Location of equipment

Preparation of actual job layout for a building

Organizing labor at site

### 5. Construction Labor

- Conditions of construction workers in India, wages paid to workers
- Important provisions of the following Acts:
  - Labor Welfare Fund Act 1936 (as amended)
  - Payment of Wages Act 1936 (as amended)
  - Minimum Wages Act 1948 (as amended)

### 6. Control of Progress

Methods of recording progress

Analysis of progress

Taking corrective actions keeping head office informed

Cost time optimization for simple jobs - Direct and indirect cost, variation with time, cost optimization

### 7. Inspection and Quality Control

Need for inspection and quality control

Principles of inspection

Stages of inspection and quality control for

- Earth work
- Masonry



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- RCC
- Sanitary and water supply services

## 8. Accidents and Safety in Construction

Accidents – causes and remedies

Project report preparation, provisional registration and plan of acquiring finance from proper source (financing agencies).

## INSTRUCTIONAL STRATEGY

This is highly practice-based course and efforts should be made to relate process of teaching with direct experiences at work sites. Participation of students should be encouraged in imparting knowledge about this subject. To achieve this objective the students should be taken to different work sites for clear conception of particular topics, such as site organization, inspection of works at various stages of construction and working of earth moving equipment.

## RECOMMENDED BOOKS

1. Harpal Singh, "Construction Management and Accounts", Tata McGraw Hill Publishing Company., New Delhi
2. Peurifoy, RL, "Construction Planning, Equipment and Methods", McGraw Hill, Tokyo
3. Singh, Harbhajan “ Construction Project Management” Abhishek Publishers, Chandigarh
4. Verma, Mahesh; "Construction Equipment and its Planning and Application
5. Dharwadker, PP; "Management in Construction Industry", Oxford and IBH Publishing Company, New Delhi



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<b>MUPCE-604N</b>	<b>DISASTER MANAGEMENT</b>	<b>2L:0T:0P</b>	<b>4 Credits</b>
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## Course Objectives

**The objectives of the course is:**

- To learn about remedial methods of disaster management.
- Role of Government, International and NGO Bodies
- To learn about safety measures
- To learn about risk factors

## Course Outcomes

<b>At the end of the Course, Student will be able:</b>	<b>Bloom's Level</b>
<b>CO1</b> To understand about disaster management	<b>K2</b>
<b>CO2</b> To understand the process of risk and vulnerability Analysis	<b>K4</b>
<b>CO3</b> To understand the process of Early Warnings and Safety Measures of Disaster.	<b>K3</b>
<b>CO4</b> To understand the process of Post Disaster effects and Remedial Measures.	<b>K2</b>

**K1 – Remember K2- Understand K3-Apply K4-Analyze K5 – Evaluate K6 – Create**



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## DISASTER MANAGEMENT

### Syllabus

Subject Code: MUPCE-604N

L	T	P
2	-	-

### RATIONALE

The course is intended to provide a general concept in the dimensions of disasters caused by nature beyond the human control as well as the disasters and environmental hazards induced by human activities with emphasis on disaster preparedness, response and recovery.

### DETAILED CONTENTS

#### 1. Introduction

- Natural Disaster: (Flood, Cyclone, Earthquakes, Landslides etc)
- Man-made Disaster: Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea, Rail & Road), Structural failures (Building and Bridges, War & Terrorism etc. Bridge),
- Causes, effects and practical examples for all disasters.

#### 2. Risk and Vulnerability Analysis

- Risk : concept and analysis
- Risk Reduction
- Vulnerability : concept and analysis, Strategic Development for Vulnerability

#### 3. Reduction Disaster Preparedness and Response

##### Preparedness -

- Disaster Preparedness: Concept and Nature
- Disaster Preparedness Plan
- Prediction, Early Warnings and Safety Measures of Disaster.
- Role of Information, Education, Communication, and Training
- Role of Government, International and NGO Bodies.
- Role of IT in Disaster Preparedness
- Role of Engineers on Disaster Management.



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## **Response-**

- a) Disaster Response : Introduction
- b) Disaster Response Plan
- c) Communication, Participation, and Activation of Emergency Preparedness Plan
- d) Search, Rescue, Evacuation and Logistic Management
- e) Role of Government, International and NGO Bodies
- f) Psychological Response and Management (Trauma, Stress, Rumor and Panic)
- g) Relief and Recovery
- h) Medical Health Response to Different Disasters

## **4. Rehabilitation, Reconstruction and Recovery**

- a) Reconstruction and Rehabilitation as a Means of Development.
- b) Damage Assessment
- c) Post Disaster effects and Remedial Measures.
- d) Creation of Long-term Job Opportunities and Livelihood Options,
- g) Disaster Resistant House Construction
- h) Sanitation and Hygiene
- i) Education and Awareness,
- j) Dealing with Victims' Psychology,
- k) Long-term Counter Disaster Planning
- l) Role of Educational Institute.

## **RECOMMENDED BOOKS**

- 1 Dr. Mrinalini Pandey Disaster Management Wiley India Pvt. Ltd.
- 2 Tushar Bhattacharya Disaster Science and Management Mc Graw Hill Education(India) Pvt. Ltd.
- 3 Jagbir Singh Disaster Management : Future K W Publishers Pvt. Ltd. Challenges and Opportunities
- 4 J. P. Singhal Disaster Management Laxmi Publications.
- 5 Shailesh Shukla, Shamna Biodiversity, Environment and Unique Publications Hussain Disaster Management.





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<b>MUPCE-605N</b>	<b>Repair &amp; Rehabilitation of Buildings</b>	<b>2L:0T:0P</b>	<b>4 Credits</b>
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## Course Objectives

The objectives of the course is:

- Importance and significance of repair and rehabilitation of buildings
- Remedial Measures for Building Defects.
- To learn about techniques of repair
- To learn about main causes of defects

## Course Outcomes

<b>At the end of the Course, Student will be able:</b>		<b>Bloom's Level</b>
<b>CO1</b>	To understand about Importance and significance of repair and rehabilitation of buildings	<b>K2</b>
<b>CO2</b>	To understand about effects of various agencies of deterioration on various building materials i.e. bricks, timber, concrete, paints, metals, plastics, stones	<b>K2</b>
<b>CO3</b>	To understand about Main causes of building defects in various building elements, Foundations, basements and DPC.	<b>K4</b>
<b>CO4</b>	To understand about compatibility aspects of repair materials	<b>K2</b>
<b>CO5</b>	To understand about surface preparation techniques for repair	<b>K2</b>

**K1 – Remember K2- Understand K3-Apply K4-Analyze K5 – Evaluate K6 – Create**



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## REPAIR AND REHABILITATION OF BUILDINGS

### Syllabus

Subject Code: MUPCE-605N

L	T	P
2	-	-

### RATIONALE

One of the major concerns of a civil engineer is to take care of the building works, already constructed, in order to keep these buildings in utmost workable conditions. Usually it is being felt that the buildings deteriorate faster for want of care and proper maintenance. The buildings usually have a shabby appearance due to cracks, leakage from the roofs and sanitary/water supply fittings. Thus the need for teaching the subject in proper perspective has arisen making students aware of importance of repair and rehabilitation of buildings.

### DETAILED CONTENTS

#### 1. Need for Rehabilitation

Importance and significance of repair and rehabilitation of buildings

Meaning of rehabilitation

Objectives of rehabilitation

Factors influencing the repair and rehabilitation

#### 2. Agencies Causing Deterioration (Sources, Causes, Effects)

Definition of deterioration/decay

Factors causing deterioration, their classification

Human factors causing deterioration

Chemical factors causing deterioration

Environmental conditions causing deterioration

Miscellaneous factors

Effects of various agencies of deterioration on various building materials i.e.

Bricks, timber, concrete, paints, metals, plastics, stones



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## **Investigation and Diagnosis of Defects**

Systematic approach/procedure of investigation

Sequence of detailed steps for diagnosis of building defects/problems

List non-destructive and other tests on structural elements and materials to evaluate the condition of the building and study of three most commonly used tests.

## **3. Defects and their root causes**

Define defects in buildings, Classification of defects

Main causes of building defects in various building elements

Foundations, basements and DPC Walls Column and Beams Roof and Terraces

Joinery Decorative and protective finishes Services Defects caused by dampness

## **4. Materials for Repair, maintenance and protection**

Compatibility aspects of repair materials

State application of following materials in repairs: Anti corrosion coatings

Adhesives/bonding aids Repair mortars curing compounds Joints sealants

Water proofing systems for roofs Protective coatings.

## **5. Remedial Measures for Building Defects**

Preventive maintenance considerations Surface preparation techniques for repair  
Crack repair methods Epoxy injection grooving and sealing Stitching

Adding reinforcement and grouting Flexible sealing by sealant

Repair of surface defects of concrete Bug holes.

Form tie holes Honey comb and larger voids Repair of corrosion in RCC elements.

Steps in repairing, Prevention of corrosion in reinforcement, Material placement technique with sketches pneumatically applied (The gunite techniques) Open top placement Pouring

From the top to repair bottom face Birds mouth Dry packing Form and pump replaced Joints against leakage Efflorescence removal waterproofing of wet areas and roofs Water proofing of wet areas.

Water proofing of flat RCC roofs various water proofing systems and their characteristics

Repair of joints in buildings Types of sealing joints with different types of sealants

Techniques for repair of joints Repair of overhead and underground water tanks.



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## **INSTRUCTIONAL STRATEGY**

This is very important course and efforts should be made to find damaged/defective work spots and students should be asked to think about rectifying/finding solution to the problem. Visits to work site, where repair and rehabilitation activities are in progress can be very useful to students. The students will also prepare a project report based upon the available water proofing materials, sealant, special concrete for repair and adhesives and other repair material available in the market.

## **RECOMMENDED BOOKS**

1. Gahlot P.S. and Sanjay Sharma, "Building Defects and Maintenance Management", CBS Publishers, New Delhi
2. Nayak, BS, "Maintenance Engineering for Civil Engineers", Khanna Publishers, Delhi
3. Ransom, WH "Building Failures - Diagnosis and Avoidance", Publishing E and F.N. Span
4. Hutchinson, BD; et al, "Maintenance and Repair of Buildings", Published by Newness – Butterworth



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<b>MUPCE-606N</b>	<b>EMPLOYABILITY SKILLS</b>	<b>2L:0T:0P</b>	<b>2 Credits</b>
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## Course Objectives

The objectives of the course is:

- Problem-solving.
- Communication skills.
- Adaptability.

## Course Outcome

<b>At the end of the Course, Student will be able:</b>		<b>Bloom's Level</b>
<b>CO1</b>	To understand Relation between engineering profession, society and environment	<b>K2</b>
<b>CO2</b>	To understand how communication skill is important	<b>K2</b>
<b>CO3</b>	To understand Interview technique in personal interview	<b>K3</b>
<b>CO4</b>	To understand Self awareness Stress Management Conflict resolution	<b>K2</b>
<b>CO5</b>	To understand basic rules, laws and norms to be adhered by engineers during their working	<b>K2</b>

**K1 -Remember K2- Understand K3-Apply K4-Analyze K5 – Evaluate K6 – Create**



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## EMPLOYABILITY SKILLS

L	T	P
2	-	-

**Subject Code: MUPCE -606N**

### RATIONALE

Diploma holders are required to not only possess subject related knowledge but also soft skills to get good jobs and to rise steadily at their workplace. This subject is included to develop employability skills amongst the students.

### DETAILED CONTENTS

#### Unit I:

- Technical Education & Industrial scenario.
- Competency required of an engineer.

#### Unit II:

- Professional Engineer desirable values and ethics and their development.
- Relation between engineering profession, society and environment

#### Unit III:

##### Effective Communication

- Reading & Active Listening Skills
- Speaking
- Writing
- Presentation Technique/Seminar
- Group discussion

#### Unit IV:

##### Managing project

- Leadership
- Motivation
- Time management
- Resource management
- Interpersonal relationship

#### Unit V:

##### Preparing for Employment

- Searching for job/job hunting
- Resume & CV Writing



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- Interview technique in personal interview telephonic interview, panel
- Interview, group interview, video conferencing

## Unit VI:

### Self Management

- Self awareness
- Stress Management
- Conflict resolution

## Unit VII:

- Creativity, Innovation and Intellectual property right
- Concept and need in present time for an engineer

## Unit VIII:

### Rules & Ethics

- Basic rules, laws and norms to be adhered by engineers during their working

## LIST OF PRACTICAS

- Steps how to effectively write different types of Letters.
- Steps to make a Presentation in Power Point.
- Steps to make a Resume more effective.
- Steps to conduct Telephonic/On-line Interview (Through skype/Google Hangout).
- Study of Different Techniques of Stress Management.
- Study of Rules & Ethical practices to be followed at Workplace.

## RECOMMENDED BOOKS

- Employability skills by Kapil Dev, Vishnu P. Singh Asian Pub. New Delhi
- Employability skills for Diploma students by Dr. S.K. Singh, Vayu Education, New Delhi



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## STRUCTURAL DRAWINGS

**Subject Code: MUPCE-657N**

<b>L</b>	<b>T</b>	<b>P</b>
-	-	<b>8</b>

### RATIONALE

Diploma holders in Civil Engineering are required to supervise the construction of RC and steel structures. Thus one should be able to read and interpret structural drawings of RC and steel structures. The competence to read and interpret structural drawings is best learnt by being able to draw these drawings. Hence there is a need to have a subject devoted to preparation of structural drawings.

### DETAILED CONTENTS

#### PART A

#### Drawing Exercises

##### 1. RC Structures:

Reinforcement details from the given data for the following structural elements with bar bending schedules

- (i) Drawing No. 1: RC Slabs - One way slab and two way slab.
- (ii) Drawing No.2 : Beams - Singly and doubly reinforced rectangular beams and Cantilever beam (All beams with vertical stirrups)
- (iii) Drawing No.3 : Columns and Footings – Square, Rectangular and Circular Columns with lateral ties and their isolated sloped column footings.
- (iv) Drawing No. 4 : Portal Frame – Three bay two storey RC portal frame with blow up of column beam junctions.
- (v) Drawing No.5: Dog legged stairs for single storey building
- (vi) Drawing No.6 : Draw at least one sheet using CAD software





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## PART B

### 2. Steel Structures:

Structural drawing from given data for following steel structural elements.

- (i) Drawing No. 1: Roof Truss – Drawing of Fink Roof Truss with details of joints, fixing details of purlins and roof sheets.
- (ii) Drawing No.2: Column and Column Bases - Drawing of splicing of steel columns. Drawings of slab base, gusseted base and grillage base for single section steel columns.
- (iii) Drawing No.3 : Column Beam Connections
  - (a) Sealed and Framed Beam to Beam Connections
  - (b) Sealed and Framed beam o Column Connections
- (iv) Drawing No. 4 : Plate Girder  
Plan and Elevation of Plate Girder with details at supports and connection of stiffness, flange angles and cover plate with web highlighting curtailment of plates.
- (v) Drawing No. 5 : Draw at least one sheet using CAD software

### RECOMMENDED BOOKS

1. Loyal JS “Civil Engineering Drawing”, Satya Parkashan, New Delhi
2. Chandel RP “ Civil Engineering Drawings”
3. Kumar; NS “ Civil Engineering Drawing “ IPH, New Delhi
4. Malik RS and Meo GA, “Civil Engineering Drawing” Asian Publishing House, New Delhi
5. Singh, Birinder “RCC Design and Drawing” Kaption Publishing House, New Delhi.
6. Singh, Birinder “Steel Structures Design and Drawing”, Kaption Publishing House, New Delhi
7. Singh, Harbhajan, “Structural Drawings”, Abhishek Publishers, Chandigarh
8. B.V. Sikka, Civil Engineering Drawing.



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## MAJOR PROJECT WORK

L	T	P
-	-	8

**Subject Code: MUPCE-658N**

As far as possible students should be given live project problems with a view to:

- i) Develop understanding regarding the size and scale of operations and nature of field work in which students are going to play their role after completing the courses of study.
- ii) Develop understanding of subject based knowledge given in the classroom in the context of its application at work places.
- iii) Provide firsthand experience to develop confidence amongst the students to enable them to use and apply classroom based knowledge and skills to solve practical problems of the world of work.
- iv) Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

For the fulfillment of above objectives, polytechnics may establish close linkage with 8-10 relevant organization for providing such an experience. It is necessary that each organization is visited well in advance by respective teachers and activities to be performed by students are well defined. The chosen activities should be such which are of curricular interest to students and of professional value to industrial/field organizations. Each teacher is expected to supervise and guide 5 - 6 students.

Effort should be made to identify actual field problems to be given as project work to the students. Project selected should not be too complex which is beyond the comprehension level of the students. The placement of the students for such a practical cum project work should match with the competency profile and interest of students. Students may be assessed both by industry and polytechnic faculty. The suggested performance criterion is given below:

- |   |    |
|---|----|
| a) Punctuality and regularity                     | 10 |
| b) Initiative in learning/working at site         | 10 |
| c) Level/proficiency of practical skills acquired | 10 |
| d) Sense of responsibility                        | 10 |
| e) Self expression/Communication skills           | 10 |
| f) Interpersonal skills                           | 10 |
| g) Report writing skills                          | 20 |
| h) Viva voce                                      | 20 |



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**Some of suggested projects are given below:** These are only guidelines; teacher may take any project related to Civil Engineering depending upon the availability of projects. Preference should be given to practical oriented projects.

According to the need of the polytechnic, the following major projects are suggested:

1. Construction of a small concrete road consisting of following activities
  - Survey and preparation of site plan
  - Preparation of drawings i.e. L-Section and X-Section
  - Estimating earth work
  - Preparation of sub grade with stone ballast
  - Laying of concrete
  - Testing of slump, casting of cubes and testing
  - Material estimating and costing with specifications
  - Technical report writing
2. Water Supply system for a one or two villages
  - Surveying
  - Design of water requirements and water distribution system
  - Preparation of drawing of overhead tank
  - Material estimating and costing
  - Specifications
  - Technical report writing
3. Construction of seating benches in polytechnic campus
4. Welding of angle iron and Expanded metal jail to prepare fencing in polytechnic campus
5. Construction of toilets and baths for a shopping complex in a township
6. Construction of bridle path 4 kms long
7. Construction of shopping complex by detailing of RCC drawings, estimating and costing of material
8. Rainwater harvesting
  - Assessment of catchment's area
  - Intensity of rainfall
  - Collection of water



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- Soak pit design
  - Supply of water
  - Monitoring during rainy season
9. Design and construction of septic tank with soak pit for 100 users
  10. Preparing plumbing detailed drawings of a two storey building and material estimate and costing
  11. Planning and design of sports stadium in a township or cluster of villages
  12. Design of small residential building including structural members, specifications, estimating and costing of materials, report writing and municipal drawings for water supply and sewerage system
  13. Concrete Mix Design
  14. Construction of concrete cubes by mixing appropriate quantity of fly ash with fibers
    - (i) the fibers like polypropylene, carbon, steel etc. can be used
    - (ii) Students will show the comparison between concrete mixed with fibres verses the quality controlled concrete.
  15. Estimation and designing of Highway Road
    - (i) Recognizance survey of proposed road
    - (ii) To take L- section and cross sections
    - (iii) Fixing of grades
    - (iv) Estimation of cutting and filling of earth mass
    - (v) Plane tabling survey of proposed road
    - (vi) Estimation of proposed road
  16. Designing a small height gravity dam
    - (i) Constructing of catchment area
    - (ii) Calculating the reservoir capacity
    - (iii) Designing of gravity dam by taking into account various forces
  17. Designing of Ferro-cement water tank and toilet. Testing of the ferro-cement products in civil engineering labs.

**Note:** The projects undertaken should be field oriented



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## SURVEY CAMP

**Subject Code: MUPCE-659N**

**10 Days Duration**

### **Purpose**

- a) Making the students conversant with the camp life
- b) Providing an opportunity to the students to develop team spirit
- c) Training the students to communicate with the local population
- d) To impart in tensile training in the use of all surveying instruments via Theodolite, Dumpy level, Compass, tachometer etc.
- e) To train the students to appreciate practical difficulties in surveying on the field
- f). To train the students for self management

### **Task:**

Preparation of topographical plan of a given area. The survey camp will be organized for duration of 10 days time span. The students may be assigned an undulated area of about 1.5 to 2.00 sq.km. With level difference of 15m consisting of good number of physical features such as buildings, roads, bridges, culverts, railway tracks, electriclines etc. They are required to prepare the topographic map of above areas showing various features along with contours using suitable contour intervals. They will marka road alignment of given gradient connecting any two stations on the map consisting some horizontal and vertical curves and will prepare estimate of earthwork and submit the detailed technical report indicating therein practical difficulties faced during surveying for the features like ridge, line, valley lines, saddle cliffs etc.

The students should be divided in the groups consisting of 5-7 in numbers. They are required to submit the Report of work done, during survey camp, which will be dully examined, while awarding the internal assessment.

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## General Proficiency

**Subject Code: MUPCE-651N**

<b>L</b>	<b>T</b>	<b>P</b>
-	-	<b>2</b>

- # General Proficiency will comprise of various co-curricular activities like games, hobby clubs, seminars, declamation contests, extension lectures, NCC, NSS and cultural activities, elementary mathematics, GS & G.K etc.



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## Industrial Exposure

L	T	P
-	-	1

**Subject Code: MUPCE-652N**

**+ Industrial visit compulsory to minimum 02 Industry or Department.**

Internal assessment and external assessment have been provided in the study and evaluation scheme of V Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well understanding of application of knowledge and skills learnt in real life situations. The formative and summative evaluation may comprise of weight age to performance in testing, general behavior, quality of report and presentation during viva-voce examination. It is recommended that such evaluations may be carried out by a team comprising of concerned HOD, teachers and representative from industry, if any. The components of evaluation will include the following.

Punctuality and regularity	15%
Initiative in learning new things	15%
Relationship with workers	15%