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Book No. 26

**M. P. BOARD OF TECHNICAL EDUCATION,
BHOPAL**



DIPLOMA COURSE
IN
CONSTRUCTION TECHNOLOGY
&
MANAGEMENT

- CTM -601 -FABRICATION AND ERECTION.
603 -MARKETING MANAGEMENT.
607 -COMPUTER AIDED DESIGN.
608 -ADVANCED STRUCTURAL DESIGN & DRAFTING.

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M.P. BOARD OF TECHNICAL EDUCATION
BHOPAL

DIPLOMA COURSE IN CONSTRUCTION TECHNOLOGY & MANAGEMENT

CTM 601 FABRICATION AND ERECTION

DIPLOMA COURSE IN CONSTRUCTION TECHNOLOGY & MANAGEMENT

CTM 601 FABRICATION AND ERECTION

RATIONALE

The Diploma programme in Construction Technology and Management has an emphasis on entrepreneurship. The passouts are expected to be self employed. With this end in view. The course content of "FABRICATION AND ERECTION" has been drafted. The topics of this course are so selected that they are helpful for the diplomate to become an entrepreneur. In addition to theory in the class room, a lot of emphasis has been placed on practicals and field visits. During field visits they will get an idea of the equipments used and processes in Fabrication and Erection.

A topic on safety and Hazards has also been included.

MADHYA PRADESH BOARD OF TECHNICAL EDUCATION, BHOPAL

Programme : Diploma in Construction
 Technology and Management.
 Course : FABRICATION AND ERECTION
 Course Code No. : CTM 601
 Prerequisite : CTM 508 (SDDII- Steel)

SCHEME OF STUDIES

S. No.	Topics	H O U R S		
		Theory	Practicle	Total
1.	Introduction	6	-	6
2.	Types of structure	4	-	4
3.	Welded Joints	6	05	11
4.	Fabrication	10	10	20
5.	Handling Equipment	6	-	6
6.	Erection of Structure	6	-	6
7.	Safety and Hazards	4	-	4
8.	Costing of Eabricated structure.	6	-	6
9.	Field Visits	-	17	17
T O T A L -		48	32	80
Credit - 4				

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SCHEME OF EXAMINATION

Course Code No.	Hours Per Week		Credits	Sessional Marks		Progressive Assessment		Board Paper No.	Practical/Viva				
	Theo.	Prac.		Term work	Lab work	I	II		Du-Th. marks	No Du Th. marks			
CTM 601	3	2	4	20	20	10	10	1	3	100	1	3	50

MADHYA PRADESH BOARD OF TECHNICAL EDUCATION, BHOPAL

Programme : DIPLOMA IN CONSTRUCTION TECHNOLOGY AND MANAGEMENT

Course : FABRICATION AND ERECTION

Course Code No.: CTM 601

Prerequisite : CTM 508 (SDD II - STEEL)

C O N T E N T S

Topic 1 :- INTRODUCTION:- Permissible stresses in structural Steel of different grades as per I.S.I. Various standard Sections used in Steel Structures and their properties different types of connections for fabrication works, namely, riveted, bolted, welded and pin connections. Types of rivets based on shape and size of steel sections, weld, rivets and bolts for structural purpose. (only introduction to riveting, bolting. Emphasis on Welding only).

Topic 2 :- TYPES OF STRUCTURES:- Sketches of various types of structural system such as beam, girder, column, truss, portals, industrial bent, plate girder and column bases. Uses of various structures in different situations.

- Topic 3 :- WELDED JOINTS :- Equipments and materials for welding Welding process, Weld defects, causes and remedial measures. Bracing of welding, protection of fabricated material against corrosion and erosion. Sandblasting safety during welding operation.

- Topic 4 :- FABRICATION:- Fabrication process, steps for fabrication marking and template making, layout, prefabrication operation. Straightening methods (manual, machine, hot straightening), marking, cutting, bending, drilling, punching, joint preparation. Introduction to stress relieving after fabrication.

Fabrication of steel grills, joints for steel truss. Equipments to include shearing machine, press brakes, bending machine, Angle cutting machine.

- Topic 5 :- HANDLING EQUIPMENT:- Equipments used in fabrication shop such as jack, pulley, blocks, jib crane, mobile crane, power crane, manually propelled stacker, guy derricks.

- Topic 6 :- ERECTION OF FABRICATED STRUCTURE:- Advance planning Sequential despatch and transporting, erection, field operation procedure, receiving and unloading, sorting for erection, moving to the site, aligning, erecting and fastening.

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Erection equipment - stiffening derricks, guy derricks, specialized unit, erection tools and materials- manila ropes, wire rope, hoisting chains, slings.

Topic 7 :- SAFETY AND HAZARDS IN FABRICATION AND ERECTION:-

Identify unsafe acts and conditions in erection, precaution while working at height, safety rules to be followed while using crane, winches and pulley blocks, safety precautions for welding process preventive measures to avoid accidents such as fall, slip, slide etc. Hazards in fabrication work like fire, noise, electric shock etc. safety appliances. Reference to relevant T.S. Codes on safety. First Aid Box for preliminary treatment.

Topic 8 :- COSTING OF FABRICATED STRUCTURE:- Measurement and quantity of materials, component of costing material, labour and overhead charges cost control and analysis.

Rate Analysis for welding.

Topic 9 :- FIELD VISITS:- The students will visit the site where fabrication work, erection work, and testing of welded joints by non-destructive testing is going on. The students will prepare the report of each visit. This will be treated as a part of laboratory work. Viva will be based on this report.

MADHYA PRADESH BOARD OF TECHNICAL EDUCATION, BHOPAL

Programme : DIPLOMA IN CONSTRUCTION TECHNOLOGY AND MANAGEMENT

Course : FABRICATION AND ERECTION

Course Code : CTM 601

No.

LIST OF PRACTICALS/SKETCHES

1. Dimensioned detailed sketches of joints of steel beam with steel column, steel truss.
2. Preparing a simple welded joints (Fillet Weld)
3. Exercise of erection with the help of pulley block.
4. Field Visits:- Visits may be arranged to site where fabrication and erection work is in progress. During field visits, demonstration of testing of welded joints by non-destructive testing may be arranged.
5. Shifting heavy column or girder and raising and erecting without help of crane.
6. Mini Project:- A mini project may include fabrication of a door or window or steel truss and full proposal including materials required, costing and erecting may be made. The mini project should be useful for some practical purpose (To be used in polytechnic or outside).

MADHYA PRADESH BOARD OF TECHNICAL EDUCATION, BHOPAL

PROGRAMME : DIPLOMA IN CONSTRUCTION TECHNOLOGY
AND MANAGEMENT.

COURSE : FABRICATION AND ERECTION

COURSE CODE : CTM 601
NO.

LIST OF REFERENCE BOOKS

- | | | |
|----|--|---|
| 1. | Design of Steel Structures | J.L.Sharma
Satya Prakash
New Delhi-110 003 |
| 2. | Materials Handling Equipments | N. Rudenko
Envee Publisheses
New Delhi |
| 3. | Design of Steel Structures | Arya and Ajmani
Nemchand and Bros.
Boorkee (U.P.) |
| 4. | Hand book of Heavy
Construction | Havers and Stubbs
Mcgraw Hills. |
| 5. | Building Construction
Handbook | Merritt F-5
Mc Graw Hills, |
| 6. | Workshop Technology | Hajra Choudhary
(Asia Publication) |
| 7. | Technician Fabrication
and welding | Cooper K.J.Greenwood
(Cassel) |
| 8. | Basic Fabrication
and Welding Engineer. | Smith F - J.M.
Longman |

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DIPLOMA COURSE IN CONSTRUCTION TECHNOLOGY & MANAGEMENT

CTM 603 MARKETING MANAGEMENT

RATIONALE

The Diploma programme in construction Technology and Management has an emphasis on Entrepreneurship. The passouts are expected to be self employed. Marketing Management is closely linked to Entrepreneurship. The content for the Course has been so selected that they are relevant to a small entrepreneur. While treating the content of the course this aspect has to be constantly kept in mind and aspects of marketing management of big industrial houses need not be emphasized as it may not be relevant to a small entrepreneur.

MARKETING MANAGEMENT

CTM 603

SCHEME OF STUDIES

S. No.	Topic	Theory	Pract./TVT	Total
1.	Importance and Role of marketing	4	-	4
2.	Marketing System and Environment	4	3	7
3.	Marketing Mix	4	3	7
4.	Market Segmentation and Market targeting	4	4	8
5.	Marketing planning	4	6	10
6.	Customer Behaviour	4	3	7
7.	Sales Forecasting	4	3	7
8.	Managing the Product/Service	4	4	8
9.	Managing Distribution	4	3	7
10.	Pricing for service & product	4	3	7
11.	Marketing Strategy	4	-	4
12.	Industrial Policies and procedures	4	-	4
TOTAL		48	32	80

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SCHEME OF EXAMINATION

CTM 603 MARKETING MANAGEMENT

PRE-REQUISITE CTM 403

Hours/ Week		Cred- its	Sessionals		Progress- ive Asse- ssment		Board Exam. Paper	Exam. Th. Dura. Mark	Prac./Viva		
Th.	Pr.		Term work	Lab work	I	II			Pra- ti- cal	Du.	Mar- ks
3	2	4	20	--	10	10	1	3Hrs. 100	-	-	-

DIPLOMA COURSE IN CONSTRUCTION TECHNOLOGY & MANAGEMENT

CTM 603 MARKETING MANAGEMENT

CONTENT OUTLINE

Topic 1 : IMPORTANCE AND ROLE OF MARKETING:-

Introduction to marketing, Various definitions of marketing, core concept of marketing, need want chain, five concepts of marketing - production, products, sales, marketing and societal concepts. Role of marketing and marketing management with special reference to industry.

Topic 2 : MARKETING SYSTEM AND ENVIRONMENT :-

Marketing Systems for small scale civil engineering product/Services, consumer marketing, marketing channels used, intermediaries, competitors, facilitating institutions.

Demographic environment, economic environment Political environment, physical environment, technological environment, social and cultural environment competitive environment and micro and macro environment.

Topic 3 : MARKETING MIX:-

Four P's of marketing - Product, price place and promotion, Behaviour/Environmental Variables of marketing, interation between marketing mix and environmental variables, Assembling and managing marketing mix.

Topic 4 : MARKET SEGMENTATION AND MARKET TARGETING:-

Need of market Segmentation relevant to Civil engineering entrepreneur, methods of market Segmentation, basis of segmenting consumer and industrial markets, developing consumer segment profile, requirement of effective segmentation, evaluation of market segment, selection of target segement, product positioning in target market.

Topic 5 : MARKETING PLANNING :-

Importance of marketing planning, steps involved in marketing planning process, setting marketing objectives, formulating marketing strategy, developing functional plan.

Topic 6 : CUSTOMER BEHAVIOUR:-

Modes of consumer behaviour, major factors influencing consumer behaviour - cultural, social, personal, psychological, Buying Decision process. In consumer marke industrial market, reseller market and government market.

Topic 7 : SALES FORECASTING :-

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Importance of sales forecasting relevant to small entrepreneur, sales forecasting methods, expert Opinion, delphi, Sales force opinion, market share market survey method.

Topic 8 : MANAGING THE PRODUCT/SERVICE :-

Define product, types of product, tangible in Development of new product, Stages in new product development, estimating demand and pricing strategy concept of product life cycle, stages in production life cycle and matching marketing strategy to be used.

Topic 9 : MANAGING DISTRIBUTION :-

Importance of physical distribution, management of transportation, ware housing and inventories, role of intermediaries, designing distribution channel.

Topic 10: PRICING FOR SERVICE AND PRODUCT :-

Importance of pricing, factors influencing pricing, pricing objectives, pricing methods - cost based, demand based, competition based, product line pricing tender pricing, affordability, based pricing, differentiated pricing, pricing procedure.

Topic 11 : MARKETING STRATEGY :- 26/18

(a) ADVERTISING MANAGEMENT :-

Importance of advertising, definition of advertisement decision areas in advertising, advertising budget, deciding copy, deciding media, commonly used media in India Evaluating advertising effectiveness.

(b) SALES PROMOTION :-

Importance of Sales promotion, tools and techniques of sales promotion, coupons premiums, free offer, price off, contests, organising the sales, promotion campaigns.

(c) SALES MANAGEMENT :-

Determining personal selling, objectives, formulating sales policies, determining sales force size, designing sales territories, fixing sales quota, managing sales force, compensation plan, training sales force, motivation and supervision of sales.

(d) MARKETING RESEARCH :-

Importance and meaning of marketing research, definitions, functions of marketing research, main steps involved in marketing research, data collections, sampling, techniques of marketing research, market survey.

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Topic 12 : INDUSTRIAL POLICIES AND PROCEDURES :-

National Policies, State Policies, Departmental procedures, Agencies, involved in setting up an enterprise, environmental aspects.

LIST OF PRACTICALS

Students can select a product/service from civil industry which he is aspiring to start after completion of diploma course. He can perform all the practicals with reference to his selected product. Following practicals may be conducted.

1. Market survey to assess consumer demand for your product.
2. Market channel survey to assess demand for your product.
3. Conduct survey to assess the effectiveness of marketing channel.
4. Segment the market for your product and develop strategy to position product in target market.
5. Develop profile of a target market.
6. Forecast demand of your product for next five years.
7. Develop advertising plan for your product.
8. Develop a functional marketing plan for your product.

LIST OF REFERENCE

<u>S. No.</u>	<u>TITLE</u>	<u>AUTHOR</u>	<u>PUBLISHER</u>
1.	Principles of Marketing.	Philip Kotler	Prentice-Hall(I) Ltd.
2.	Marketing : A managerial introduction	J.C.Gandhi	Tata Mc.Graw-Hill
3.	Modern Marketing Management	R.S.Davar	Progressive Corporation Pvt.Ltd.
4.	Fundamentals of Modern Marketing	Candiff, Still & Govoni	Prentice Hill (I) Ltd.
5.	Marketing Management	Philip Kotler	Prentice Hill (I) Ltd.
6.	Fundamentals of Marketing	William Stanton	Mc.Graw Hill.
7.	Sales Management	Candiff, Still & Govoni.	Prentice Hill (I) Ltd.
8.	Marketing	Subhash C.Mehta	Tata-Mc.Graw-Hill
9.	Marketing Management: Cases and Concepts.	Dholakia,Khurana	Macmillan(India)
10.	Industrial Marketing	Alexander, Cross & Still	D.B.Taraporewala Pvt.Ltd.
11.	Salesmanship	Charles Kirkpatrick	-do-
12.	Salesmanship and Publicity	R.S.Daver	Progressive Corpn. Pvt. Ltd.
13.	Marketing Research:	Boyd, Westfall & Stasch	All India Traveller Book Seller, Delhi
14.	Marketing Research,	Luck, Water, Taylor and Rubin	Prentice Hall(I) Ltd.
15.	Multinational Marketing Management	Warren Keegan	Prentice Hall(I) Ltd.

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|-----|---|---------------------------|------------------------|
| 16. | International Marketing | Rajan Saxena & M.C.Kapoor | Prentice Hall (I) Ltd. |
| 17. | Textbook of Marketing Management | S.Rangnath | S.Chand & Co. Ltd. |
| 18. | Modern Marketing Mgt. | Geofrey Francis | -do- |
| 19. | Export Marketing & International Business | S.Krishna | -do- |
| 20. | Export strategy in India | Kalipada Deb | -do- |
| 21. | International Marketing. | Majaro | -do- |

DIPLOMA COURSE IN CONSTRUCTION TECHNOLOGY & MANAGEMENTCTIM 607 COMPUTER AIDED DESIGNRATIONALE

Computer based approaches are replacing traditional methods of drafting and designing. Latest computer hard wares, have made drafting and designing more accurate and faster. Plot scribers, plotters and degitizers are some such examples. Different softwares are continuously made available to assist in design and derafting.

Autocad has proved to be a highly effective software for engineering design and drafting. Thus a course on computer aided design has become highly desirable at the diversified level in the Diploma Course in construction Technology and Management.

It may however be stated that in this curriculum emphasis is placed on designing for planning of a structure rather structural analysis and design.

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MADHYA PRADESH BOARD OF TECHNICAL EDUCATION, BHOPAL

DIPLOMA COURSE IN CONSTRUCTION TECHNOLOGY AND MANAGEMENT

CTIM 607 COMPUTER AIDED DESIGN

PRE REQUISITES : 301

LIST OF TOPICS

S. No.	Details	No. of Hours		
		L	P	Total
1.	Graphics through Basic	12	6	18
2.	Hardware	04	-	04
3.	Software	14	10	24
4.	Civil Engineering application	14	08	22
5.	Projects	04	08	12
T O T A L		48	32	80

SCHEME OF EXAMINATION

Hours/ week Th. Pr.	Cred- its	Sessional		Progress- ive Asse- ssment		Board Paper	Exam Th. Dur. Ma.	Pra.Exam.				
		T.W.	L.W.	I	II			Pr.	Du.	Hr.		
3	2	4	20	20	10	10	1	3Hrs.	100	1	3	50 Hrs.

DIPLOMA COURSE IN CONSTRUCTION TECHNOLOGY AND MANAGEMENT

CTIM 607 COMPUTER AIDED DESIGN

COURSE CONTENTS

Topic 1 : GRAPHICS THROUGH BASIC :

Use of Computer language in computer graphics and CAD, Graphic Statements in Q-Basic, Preparation of simple programs, Computer Graphics terminology, Graphics Software, some geometrical models to the given specifications.

Topic 2 : HARD WARE :

Stand alone CAD System and CAD Work Station, input and output devices of CAD Systems, resolution of System Components, computer Graphic Hardware.

Topic 3 : Softwares

3.1 Autocad:

Utility of AUTO CAD, various commands associated with AUTO CADE, Concept of layer block and attribute features of Auto CAD Release IL mesh, D View, Paper space.

3.2 Lotus 1-2-3

Report generation, types of files, commands to prepare spread sheets and graphics - Global, FORMAT label, Column, row width, Copy MOVE, Insert, Print Formula and Functions, Grapas and their printing.

3.3 Word Star

Use WORDSTAR for report generation word processing, capabilities of word processing software - file creation, file editing, file printing, Moving, understanding, capitalising,

Topic 4 : CIVIL ENGINEERING APPLICATIONS :

Manual solutions of identified simple engineering problems and estimation, say, a residential building, procedures for using relating software, preparation of reports for the problem using WORDSTAR, LOTUS 1-2-3, AUTOCAD AS PER requirements.

Topic 5 : PROJECT WORK :

Manual solution of a small civil engineering construction such as a residential building Water tank, Retaining Wall, Truss etc. AUTO CAD to

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prepare the design drawing and estimating prepare the report with the help of word processing/LOTUS 1-2-3.

LIST OF PRACTICALS

1. Preparing a small program using Q-BASIC Version-4 (limited Commands)
2. Preparing a small program using Q-BASIC V-4 (other commands to be added)
3. Constructing models like circle, square, conics, Curves using Graphic Commands of Q BASIC V-4.
4. Constructing the following diagrams using graphic commands of Q BASIC V-4.
 - a) Plan, elevation, sections of building elements furniture detailing etc.
 - b) Sections of beams and columns of steel.
 - c) Tresses
 - d) and SF diagrams.
5. Using auto cad commands to generate different geometrical designs.

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7. Using WORDSTAR 2000 for writing reports and generating documents.
8. Using civil engineering software like ISDS/STAAD-III to find the solution to a given problem.

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LIST OF BOOKS/MANUALS

1. Manuals of BASIC, Q BASIC Version - IV
2. Manuals of AUTOCAD
3. Manuals of LOTUS 1-2-3
4. Manuals of D BASE - III
5. Manuals of WORDSTAR - 2000

BOOKS

1.	<u>Title</u>	<u>Author</u>	<u>Publisher</u>	<u>Approx. Cost</u>
1.	The illustrated AUTOCAD Book	Tom Berghauser Paul L.Schlieve	SKM Enterprises, New Delhi	Rs.90/-
2.	Understanding Computer Graphics	Judy Tatchell Les Howarth	Usborne Computer Books	£27.25
3.	Word Processing Essential concepts	Morilyn Popyk	Mc Graw-Hill	\$ 14.5
4.	1-2-3 The Complete Reference	Mary Campbell	Osborne Mc Graw Hill	\$ 22.9
5.	Computer Aided Drafting & Design	Donald D. Voisinet	Mc Graw Hill New Delhi	Rs. 30/-
6.	Engineering Graphics and Application	David I Cook	Holt saunders International	\$ 15.9

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LIST OF DEMONSTRATIONS

1. Demonstration of minimum four ready made programs in Q BASIC for illustrating the graphic potential of the language.
2. Functioning of the various hardwares of CAD Systems
3. Use of AUTO CAD (few ready made programs)
4. Use of LOTUS 1-2-3 Package.
5. Use of WORDSTAR 2000 package.
6. Solving four Civil Engineering problems using Software/ Programmes generated for the purpose.

NOTE:-

About 8 Practical hours may be utilised for the above demonstrations.

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LIST OF EQUIPMENT

1. IBM PC-AT 80 386 SX with high resolution monochrome monitor.

- Memory -
- i) RAM 2 MB (Expandable to 4 MB)
 - ii) Hard Disk 40 MB winchester Drive with controller.
 - iii) Floppy Disk Drive (5 $\frac{1}{4}$) with controller (1.2 MB)
 - iv) VGA Monitor 14"
 - v) 80387 coprocessors.

Keyboard + ASCIT Standard.

Printer - Dot Matrix Printer. 132 column, with 300 CPS

Operating System - DOS/UNIX

- 2. Graphic Plotter : A1 Size Single pen plotter
- 3. Digitizing Pad : A3/A4 Size
- 4. Mouse
- 5. Light Pen

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DIPLOMA COURSE IN CONSTRUCTION TECHNOLOGY AND MANAGEMENT

CTM 608 ADVANCED STRUCTURAL DESIGN & DRAFTING

RATIONALE

Students who take this course of Advanced Structural Design and Drafting will have already studied the course CTM 507 Structural Design and Drawing I (R.C.C.) and CTM 508 Structural Design and Drawing II (Steel). The topics in R.C.C. and steel included in the course are those that are not studied earlier. In addition, it is considered that a technician who becomes an entrepreneur will have to be conversant with designing with the help of Design Handbooks. Hence, emphasis has been placed to solving problems both in R.C.C and steel with the help of Design Handbook.

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PROGRAMME : DIPLOMA IN CONSTRUCTION TECHNOLOGY AND MANAGEMENT.

COURSE : ADVANCED STRUCTURAL DESIGN AND DRAFTING

COURSE CODE NO. : CTM 608

PREREQUISITE : CTM 507 AND CTM 508

SCHEME OF STUDIES

Topic No.	Name of Topic	HOURS		Total
		Theory	Practical	
<u>R.C.C.</u>				
1.	Cantilever Retaining Wall	4	3	7
2.	Water Tank	4	3	7
3.	Design of Two storeyed Framed Structure	16	10	26
<u>STEEL</u>				
4.	Welded Connections	6	3	9
5.	Beam Column	6	3	9
6.	Plate girder	12	10	22
TOTAL HOURS		48	32	80
CREDIT =				04

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SCHEME OF EXAMINATION

Hours/ week		Cred- its	Sessionals		Progre- ssive Assess- ment		Board Paper	Exam Dur.	Th. Mar- kas	Prac./Viva		
Th.	Pra.		T.W.	L.W.	I	II				Pr.	Dr.	Mar- ks
3	2	4	20	20	10	10	1	4	100	1	3	50

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PROGRAMME ; DIPLOMA IN CONSTRUCTION TECHNOLOGY AND
MANAGEMENT
NAME OF COURSE : ADVANCED STRUCTURAL DESIGN AND DRAFTING
COURSE CODE NO : CTM 608
PREREQUISITE : CTM 507 AND CTM 508

COURSE CONTENTS

Note:- All the designs in R.C.C. and Steel will be made by reference to design tables/aids.

1. RETAINING WALLS :- Earth pressure, Angle of repose - Minimum depth of fountation stability of retaining walls R.C.C. retaining walls- Contilever retaining walls - Design Principles - Wall proportions - Joints - wall components - Details of reinforcement (Surcharge excluded for design of retaining walls)

2. WATER TANKS :- Classification according to location i.e. below on or above ground level - Basis of Design Permissible stresses in concrete and Steel - Joints in tanks - flexible joints - joints of bottom slabs of tanks - Joints between wall and floor - Tanks resting on ground circular tank on ground with flexible joint between wall and base slabs.

3. DESIGN OF TWO STOREYED FRAMED BUILDINGS :- Design of two-storeyed R.C.C. framed building - The design will be made for all R.C.C. members by reference to Design Handbook using formula and tables and charts given in the handbook. Methods of analysis (Theory) need not be covered and emphasis be given on the use of the Design Handbook.

STEEL

Welded Connection :- Eccentric connections - Beam End Connections Direct web fillet welded connection, Direct Web Butt Welded Connection, Double Plate Web Connection, Double Angle Web Connection, Unstiffened Seat Connection, Stiffened Seat Connection Moment Resistant Connection - Behaviour of Welded Connection, Problems.

Beam Columns :- Introduction - Bending about one Axis, Bending about Both Axes, Moment Resistant Column Bases, Attached Base Plate with initially tensioned bolts, Attached Base with untensioned bolts, Unattached Bases, Base Plate Details, Column Splices, Problem.

Plate Girders :- Introduction, Design of Web, Design of Flanges, Curtailment of Flange Plates, Connecting Rivets, Intermediate Vertical Stiffness, Horizontal Stiffness, Bearing, Stiffness, Web Splice, Flange Splice, Weight and Economic Depth of Plate Girders, Welded Plate Girders.

Tubular Structures :- Two end supported simple trusses and Cantilever Trusses.

REFERENCE BOOK

- 1. Design Aids to IS : 456 - 1978 - I.S.I.
- 2. Handbook of Reinforced Concrete Design to IS: 456-1978 (S.I. Units) by S.R.Karve.
Publishing Pune Vidyarthi Griha Prakashan
1786, Sadashiv Peth, Pune - 411 030
- 3. Design of Reinforced Concrete Structures by S.Ramamrutham and R. Narayan
Published by Dhanpath Rai & Sons.
- 4. Concrete Structured by Vajirani & Ratwani - Khanna Publishes, Delhi.

REFERENCE BOOKS/CODES/HANDBOOKS

STEEL

- 1. Code of Practice for use of structural steel in General Building Construction I.S. 800
- 2. I.S.I. Handbook for Structural Engineers.
1- Structural Steel Section - ISI
- 3. I.S.I. Handbook for Structural Engineers.
2- Steel beam and Plate Girders.
- 4. Steel Structures & Timber Structures Vol.III by Vazirani & Ratwani - Khanna Publishers.
- 5. Design of Steel & Timber Structures by S. Ramamrutham - Dhanpath Rai & Sons.
- 6. Design of Steel Structures by Anand S. Arya and J.L. Ajmani Nemchand and Bros. Roorkee (U.P.)

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LIST OF DRAWING SHEETS/SKETCHES

NAME OF COURSE : ADVANCED STRUCTURAL DESIGN AND DRAFTING

One drawing sheet for each of the topics in R.C.C. and Steel will be prepared. Design based on Design Handbook will accompany the drawing sheets.