Scheme of Teaching and Examination for
IV Semester DIPLOMA in CIVIL ENGINEERING

THEORY

Sl. No.	SUBJECTS	SUBJEC CODE	TEACHING SCHEME		EXAMINATION SCHEME					
			Periods per Week	Periods in one Session	Hours of Exam.	Terminal Exam. (A) Marks	Final Exam. (B) Marks	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
1	Surveying-II	15401	6	60	3	20	80	100	26	36
2	Quantity Surveying & Costing - I	15402	6	60	4	20	80	100	26	36
3	Construction Technology -I	15403	6	60	3	20	80	100	26	36
4	Civil Engineering drawing & drafting	15404	12	120	4	20	80	100	26	36
5	Engineering Economics & Accounts	15405	6	50	3	20	80	100	26	36
		Total :-	36					500		

PRACTICAL

SL. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME					
			Periods per Week	Periods in one Session	Hours of Exam.	Marks Internal Exam. (A)	Marks External Exam. (B)	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
6	Field Survey	15406	18 days Continuous		4	10	40	50	16	21
7	Construction Practice -I	15407	6	60	4	10	40	50	16	21
		Total :-	6					100		

SESSIONAL

SL. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME			
			Periods per Week	Periods in One Session	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject
8	Field Survey	15408	_	_	20	30	50	25
9	Civil Engg. Drawing	15409	_	_	40	60	100	50
		Total :-					150	

Total Periods per Week	42	Total Marks	750

SURVEYING – II

Subject Code 15401	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale:

The primary job of civil engineering technician is survey work. It is to be carried out for any civil engineering project before any planning & construction can be taken. Hence a thorough knowledge of the methods of surveying & leveling as well as that of plotting is must for any technician. Technicians must also possess skill in the handling of survey instrument for proficiency in carrying out survey work. Therefore the subject is of paramount importance & must necessarily form the base of Civil Engineering curriculum.

Objective:

The student will be made conversant with the various instruments & appliance used in surveying. He will be taught chain survey, plane table survey, compass survey and triangulation survey and would be introduced to the modern survey methods.

S.No.	Topics	Periods
01	Theodolite Surveying	(15)
02	Curves	(15)
03	Tacheometry	(10)
04	Contouring	(14)
05	Modern Surveying	(06)
		(60)

CONTENTS:

TOPIC: 01 – THEODOLITE SURVEYING: **[14]**

Fundamental axes of a theodolite & their relation. Temporary Adjustments. Face left. Face Right & concept of transiting. Measurement of horizontal & vertical Angles, prolonging a line. Travers survey with a Theodolite, Computation by rectangular coordinates. Balancing a traverse by Gale''s traverse table, solution of simple problems on omitted measurements. Errors in theodolite survey & precautions for minimization.

TOPIC: 02 – CURVES: **[15]**

Need & benefits of its provision, Elements of Circular curves, Degree & Radius of curve & their relation. Problems on simple curves, compound curves, reverse curves & vertical curves. Definition & requirements of transition curves. Length of transition curve: Layout of circular curve with chain & tape and with theodolite.

TOPIC: 03 – TACHEMETRY: **[10]**

Principle of tacheometry; Instruments used in tacheometry; Methods of techeometry; determination of Stadia constants; Tacheometric surveying with line of collimation (i) horizontal (ii) inclined with level staff held vertical.

TOPIC: 04 – Contouring: **[15]**

Concept & definition of contour line; contour interval & horizontal equivalent; factors governing contour interval, characteristics of contours; Methods of contouring; Interpolation of contours; Use of contours maps; drawing L section & cross-section from contour maps; Tracing contour gradient for alignment of roads etc; finding volume of earth-work & capacity of reservoir from contour map.

TOPIC: 05 – MODERN SURVEYING: **[06]**

(a) Aerial Surveying & Ground Photogrammetry; Elementary knowledge of both with the basic principles involved especially of stereoscopic vision. Advantages of aerial surveying over conventional methods.

Book Recommended:

Text Books

1. Surveying & leveling, Vol. II - Kanethar & Kulkarni
2. Surveying, Vol. II - Dr. B. C. Punami
3. Surveying, Vol. II - D. Clark
4. Photogrammetry - F. H. Moffitt
5. Air Photography Applied to Surveys - C. A. Mart

QUANTITIY SURVEYING & COSTING-I

Subject Code 15402	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale:

In order to find out the quantities of materials and its cost from the detailed drawing of any structure and find out different material required & cost involved as per drawing.

Objective:

Calculation of detailed quantities of materials and working out their costs is the major objective of a junior engineer technician. The students must be able to arrange the materials as per the detailed drawings need.

S.No.	Topics	Periods
01	Procedure of Estimating	(05)
02	Calculation of quantities	(06)
03	Building Estimates	(16)
04	Estimate of Roofs	(14)
05	Earth Work	(14)
06	Application of Computer Programming	(05)
	Total :	**(60)**

CONTENTS:

TOPIC: 01 – PROCEDURE OF ESTIMATING: **[05]**

01.01 Definition
01.02 Requirements of an estimate.
01.03 Methods of estimating
01.04 Units of measurements.
01.05 Units of Payment of different items of work.
01.06 Systems for Preparation of an estimate.

TOPIC: 02 – CALCULATION OF QUANTITIES: **[06]**

02.01 General Principles.
02.02 Methods of working of quantities for different items of work.
02.03 Centre Line and Long Short Wall method.

TOPIC: 03 – BUILDING ESTIMATES: **[16]**

03.01 Estimate of a single room building with Verandah.
03.02 Estimate of a two/three roomed building.
03.03 Estimate of an building and a Primary health center.
03.04 Estimate of double buildings.

TOPIC: 04 – BUILDING ESTIMATES: **[14]**

04.01 Estimate of simple buildings with sloping roofs.
04.02 Hipped/gabled/Lean-to-roof with different roofing materials.
04.03 Estimate of King Post and Queen Post Roof Trueses.
04.04 Estimate of Workshop building of an industry or an institution.

TOPIC: 05 – EARTHWORK: **[14]**

05.01 Earthwork Computations.
05.02 Lead and Lift.
05.03 Methods of Calculating earthwork.
05.04 Earthwork of a Road. Canal and embankment party in cuttings and filling, using trapezoidal and prismoidal formula.

TOPIC: 06 – APPLICATION OF COMPUTER PROGRAMMING: **[05]**

06.01 Application of computer programming on a simple estimate.

Book Recommended:

Text Books

1. Estimating & Costing - B.N. Dutta
2. Estimating & Costing - G.S. Birdi
3. Estimating & Costing - M. Chakraborti

CONSTRUCTION TECHNOLOGY - I

Subject Code 15403	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale:

One of the basic responsibilities of a Civil Engineering is to construct a cost effective, strong, durable and hygienic building. Construction of a building requires knowledge of such foundations, walls, lintels, beam, roof slabe, stairs, drainage and plumbering etc. and constructions details of various elements. Hence this subject has been introduced.

Objective:

The student will be taught the simpler aspects of design practices, detailing & counter claim matters of various elements involved in a building sector such as foundation, beams, roof, terrace, woodwork, painting, so that he can take up the construction of a building independently and with confidence as per given drawings specification.

S.No.	Topics	Periods
01	General	(02)
02	Foundation	(12)
03	Masonary	(14)
04	Floor & Floor Finish	(06)
05	Finishing works	(06)
06	Lintels & Arches	(03)
07	Doors & Windows	(05)
08	Stairs	(06)
09	Roofs	(06)
	Total :	**(60)**

CONTENTS:

[02]

TOPIC: 01 – GENERAL:

01.01 Definition & Classification of buildings.
01.02 General principles of site selection for different types of building.
01.03 Various Building Terminologies.

TOPIC: 02 – FOUNDATION: **[12]**

02.01 Definition, purpose, failure & Remedies.
02.02 Soil Investigation, Bearing Capacity of soil, Testing of Bearing Capacity, Improvement of Bearing Capacity.
02.03.01 Different type of foundations and their details, suitability of different type.
02.03.02 Piles, Type and their details, pile driving.
02.04 Methods of excavation, shoring and dewatering including foundation in water logged area.

TOPIC: 03 – MASONARY: **[14]**

03.01 Introduction, Definition of different terms used in brick masonary and stone masonary, Mortar.
03.02 Classification of stone masonary Requirement of good stone masonary, Dressing of stones, joints of stone masonary, lifting appliances.
03.03 Bonds in brick work, Types, Comparion Bonds in ½ brick, 1 brick, 1½ bricks & 2 bricks wall, junctions & pillars of different sizes, Requirements of good brick masonary.
03.04 Composite masonary, combination of stones & brick stone & cement concrete, cement concrete masonary, Glass block masonary.
03.05 Partition walls, types, cavity walls, Position of cavity wall tie.

TOPIC: 04 – FLOOR & FLOOR FINISHES: **[06]**

04.01 Introduction, requirement of good floors, types & their details of construction, dodo & skirting.
04.02 Upper floors, types & their details.

TOPIC: 05 – FINISHING WORKS: **[06]**

05.01 Plaster, properties of good plaster, preparation of surface, methods of plastering, types Rendering, stucco. Defects of plaster.

05.02 Painting, preparation of surface, types.

05.03 White washing, Colour washing, distemper, washing with snow-cem Painting.

[03]

TOPIC: 06 – LINTELS & ARCHES:

06.01 Lintels-Purpose, bearing & thickness, various materials used for lintels such as brick, stone timber, R. C. C. steel girder etc.

06.02 Arches-Introduction, terms used in arch, types shape & materials used.

TOPIC: 07 – DOORS & WINDOWS: **[05]**

07.01 Doors-Location, function, door frames, various types of doors & their details.

07.02 Windows-Location, function, types fan-light special types of Windows, metal Window, fittings.

TOPIC: 08 – STAIRS: **[06]**

08.01 Location, function, various terms used, requirement of good stair, types, material used.

08.02 Planning of stairs.

TOPIC: 09 – ROOFS: **[06]**

09.01 Necessity, pitched & flat roof, terms used in roofs

09.02 Pitched roofs-type of truss, wooden & steel roof covering materials.

09.03 Flat roof-pros & cons, R.C.C. roof, tiled roof wooden roofs, flag stone roof, different types of terrace such as Madras, Punjab, M.P. & Maharastra etc.

Books Recommended:

1. Building Construction - Sushil Kumar
2. भवन निर्माण टेक्नोलॉजी - वी. एल. गुप्ता
3. भवन निर्माण तकनीकी - गुरू चरण सिंह
4. Building Technology - S.C. Rangwala
5. Building Construction - Ahuja

Reference Books

1. Handbook of Building Engineering - N. B. D. Delhi
2. Indian Standard Codes (Relevant) -

CIVIL ENGINEERING DRAWING & DRAFTING

Subject Code 15404	Theory			No of Period in one session : 120		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	12	-	-	Internal Exam.	:	20

Rationale:

The language of an Engineer is drawing. He should prepare sketches and drawing to suit all communications. He should be able to understand the drawings and carry out work accordingly. He should be able to communicate with the workmen engaged in the Civil constructions works on the basis of the working drawings. Hence this paper has been intended.

Objective:

The student should be taught to express & communicate through the language of drawings. He would be taught to draw the drawings for buildings. Culvers, bridges etc. and made able to write the specifications of the items involved wherever necessary. The topics to be covered include details of buildings, doors & windows, lintels, arches, stairs & cases, roof & trusses, foundation, culverts and bridges.

S.No.	Topics	Periods
01	Buildings	(30)
02	Doors and windows	(15)
03	Lintel and Arches	(15)
04	Stair & Stair cases	(15)
05	Roof and Roof trusses	(15)
06	Foundation	(09)
07	Culvert	(21)
		(120)

CONTENTS:

[30]

TOPIC: 01 – BUILDINGS:

01.01 Plan, Elevation & Section of a single storey building with flat roof.
01.02 Plan, Elevation & Section of a single storey building with inclined roof.
01.03 Plan, Elevation & Section of a double storeyed building with flat roof (ground floor) and inclined roof (1st floor).
01.04 Plan, Elevation & Section of a Godown showing main walls in brick masonary and inclined roof supported over tubular roof truss (Span 15 metres).

Note: The inclined roof should show the slope of the roof covering details of hip end. Gable and valley rafters, Jack rafters etc.

TOPIC: 02 – DOOR AND WINDOWS: **[15]**

Sectional Plan, front Elevation & longitudinal section of the following
02.01 Ledged and braced door and windows.
02.02 Fully Paneled door and window.
02.03 Glazed door and windows.
02.04 Flush door.

TOPIC: 03 – LINTEL AND ARCHES : **[15]**

03.01 Longitudinal and Cross Section of R. B. Lintel.
03.02 Longitudinal and Cross Section of R. C. C. Lintel.
03.03 Sectional Elevation of Semi Circular, segmental, Elliptical and Equilateral Arches.

TOPIC: 04 – STAIR AND STAIR CASES : **[15]**

04.01 Plan and Cross Section of Dog legged stair.
04.02 Plan and Cross Section of open well stair.
04.03 Plan and Cross Section of Cantilever stair.

Note: The landings should be half and quarter space.

[15]

TOPIC: 05 – ROOF AND ROOF TRUSSES:

05.01 Sectional Elevation of flat top roof.
05.02 Sectional Elevation of Couple roof.
05.03 Sectional Elevation of Couple close roof.
05.04 Sectional Elevation of King Post truss.
05.05 Sectional Elevation of Queen Post truss.
05.06 Elevation of tubular North Light truss.

Note: Fixing of Roof materials i.e. A.C. Sheets, G.C.I. Sheets. Tiles etc. should also be shown in the above drawings.

[09]

TOPIC: 06 – FOUNDATION:

06.01 Foundation Plan and Section of Stepped foundation under load bearing structures.

[21]

TOPIC: 07 – CULVERTS :

07.01 Sectional Plan, half Elevation and Cross Section of Arch Culvert.
07.02 Sectional Plan, half Elevation and Cross Section of Pipe Culvert.
07.03 Sectional Plan, half Elevation and Cross Section of R.C.C. Slab Culvert.

Note: The wings walls to be at right angles to the abutments.

Book Recommended:

Text Books

1. Civil Engg. Drawing - D.N.Bose
2. A text book of Building Drawing - Sah & Kale
3. Civil Engg. Drawing - B.N.Verma
4. Civil Engg. Drawing Published - T.T.T.I.Bhopal
5. Civil Engg. Drawing - Gurucharan Singh & S.C. Sharma
6. Civil Engg. Drawing - Mallik & Meo.
7. I. S. Code 696 & 962.

ENGINEERING ECONOMICS & ACCOUNTS

Subject Code 15405	Theory			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale:

The engineering profession is called upon to reduce or create infrastructures for production of good services. Besides the engineering and technological aspects involved in the production or creation of facilities, the profession interalia gets involved in the interplay of various elements of economics. Accounting and audit, the cost analysis of input materials.

Labour and services over a period of time require in depth concept of procurement of commodities. Escalation of prices. Their dependencies on economic indices & functions. Demand, cost & cost classifications. Pricing & profit elements. The end price of the product will include the profit part. The project of a welfare state will generally have benefits which have benefits which have to be evaluated in terms of economic returns. And in between the profession has to ensure the cost of planning. Budgeting, financing procuring. Price escalation/depreciation contractual obligations, accounting and audit.

Hence the necessity of introducing this paper on Engineering Economics & Accounts.

S.No.	Topics	Periods
01	Engineering Economics.	(25)
02	Accounts	(25)
	Total:	**(50)**

CONTENTS:

TOPIC: 01 – ENGINEERING ECONOMICS: **[25]**

01.01 Cost concept and classification:
Actual Cost, Opportunity Cost, Fixed Cost, Variable Cost, Average Cost, Marginal Cost, Total Cost, Cost-output relation.

01.02 Certain basic terms in economic study:
Wants, Demand, Demand Determinants:Utility, Gross National Product (GNP), Gross Domestic Product (GDP), National Income.

01.03 Pricing:
Pricing under perfect competition, Balance of Payment, Concept, Types, Causes and measure to correct it. Break even analysis concept and application, Unemployment: Concept, Causes and measre to solve unemployment.

TOPIC: 02 – ACCOUNTS: **[25]**

02 Introduction

02.01 Introduction to commercial & Govt. Systems of book keeping (not details only principles) Administrative structure of works organization. Administrative approval. Technical sanction. Expenditure. (financial) sanction. Appropriation. Orators of conveniement bills Vouchers. Payment, cost book.

02.02 Estimates. Register of Sanctioal Estimates. Register of works. Revised of works. Revised Estimates. Revised sanotion, Muster roll-payment to labours & arrear wages, worked charged establishment, fixed charged register measurement books. Standard Measurement Books.

02.03 Advance. Advance to contractors, several advance, Advance payment. Advances to subordinates permanents advance or imprest, Temporary Advance.

Books Recommended:

Text Books

Engg. Economics Part I - S. K. Nandi Chatterjee & Co. Ltd. Calcutta.

FIELD SURVEY

Subject Code 15406	Practical			No of Period in one session :		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	40
	18 days continuous			Internal Exam.	:	10

Rationale:

Survey is the prime work of a technician. No work/no project work can start without survey marks and etc. Main persons responsible in the chain of technician are the Junior Engineers. In other words, we can say that technicians are the back bone of any project work because of the fact that the whole of project depends upon the survey results.

Objective:

Seeing the duties of Junior Engineer, the field survey practical will help students to carry out the actual survey work to be done in field as regular practice work. This will build self confidence towards survey works in student.

CONTENTS

01 Traversing by transit theodolite consisting of at least five sides, preparation of Gale's Traverse table, plotting of traverse by independent co-ordinates. Details to be filed in the plane tabling.
02 Contouring of an area by square methods – sides of square may be approximately 150 m.
03 Contouring of an area 200 m x 200 m by spot levelling method.
04 Longitudinal section by tacheometry for approximately kilometer distance.
05 Setting out of a simple curve with given data by.
   (a) Offset form Long chord method.
   (b) Rankine's method of deflection angle.

Books Recommended:

Text Books

1. Surveying & Leveling, Vol. II - T.P. Kumhka
2. Surveying, Vol. II -
3. Surveying, Vol. II - D. Clave

CONSTRUCTION PRACTICE - I

Subject Code 15407	Practical			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	40
	6	-	-	Internal Exam.	:	10

Rationale:

An important job function of a Civil Engineering technician is to supervise construction of various Civil Engineering structures. So, the construction practice is very important for Civil Engineers. They have to use the knowledge of construction very widely and frequently in his world of work.

Objective:

The Construction practice will help a student in building a self confidence towards actual construction work.

S.No.	Topics	Periods
01	Work Study	(06)
02	Construction Practice	(54)
	Total:	**(60)**

CONTENTS:

TOPIC: 01 – WORK STUDY: **(06)**

Many visits should be arranged to the construction site nearby the institution to acquaint students with site condition, use of various equipment and various construction techniques and to study different components of building including sub structure and super structure.

Study of reinforcement used in different members, details of concrete section. At construction sites, the following should be demonstrated:

(a) Spread foundation, under reamed pile foundation raft foundation.
(b) D.P.C. over plinth.
(c) Scarfolding for construction of super structures.
(d) Form work and shuttering for lintel, slab, beam & column.
(e) Bending & binding of reinforcement & fabrication.
(f) Details of water supply and sanitary fittings.

Students shall prepare a journal containing, reports on these visits.

TOPIC: 02 – CONSTRUCTION PRACTICE: **[54]**

02.01	Making sketches and learning use of various tools and appliances for Civil Engineering works.	(06)
02.02	Preparing foundation plan for load bearing and framed structure construction.	(06)
02.03	Layout of a building having a plinth area of 50 to 60 m^2.	(06)
02.04	Preparation of mortar, brick masonary in English and Flemish bond for walls, pillars & junctions.	(15)
02.05	Preparation of Cement concrete manually and by machine and its laying.	(03)
02.06	Plastering and pointing of well.	(09)
02.07	Flooring – Preparation of sub surface, brick that soling, brick on edge soling in Herring bond pattern, Indian Patent stone flooring.	(09)

Books Recommended:

Text Books

1. Building Construction - Sushil Kumar
2. भवन निर्माण टेक्नोलॉजी - वी. एल. गुप्ता
3. भवन निर्माण तकनीकी - गुरू चरण सिंह
4. Building Technology - S. C. Rangwala
5. Building Construction - Ahuja
6. Building Construction - J. Jag, Sushil Kumar, K. L Roy

FIELD SURVEY

Subject Code 15408	Sessional			No of Period in one session :		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	30
	-	-	-	Internal Exam.	:	20

Rationale:

This field survey work is the primary work of a civil technician without which no project work can be taken up during field survey works, a technician will be able to handle the different survey instruments which he is expected to do in service period. A junior engineer is fully responsible for all types of survey works in field. Hence he must be able to conduct all types of survey works successfully in the field.

Objective:

A student will be able to perform the survey works in the field with the given set of instruments will also be able to identify the errors of the instruments with which he is working. He will also learn to rectify some of the instrument errors personally and then conduct the survey works correctly.

CONTENTS

01 Traversing by transit theodolite consisting of at least five sides, preparation of Gale's Traverse table, plotting of traverse by independent co-ordinates. Detail to be filed in the plane tabling.

02 Contouring of an area by square methods – sides of square may be approximately 150 m.

03 Contouring of an area 200 m X 200 m by spot leveling method.

04 Longitudinal section by tacheometry for approximately kilometer distance.

05 Setting out of a simple curve with given data by,

(a) Offset form Long chord method.

(b) Ranking's method of deflection angle.

Books Recommended:

Text Books

1. Survey and leveling, Vol. II - T. P. Kanetdar
2. Surveying, Vol. II - A. Punmics

CIVIL ENGINEERING DRAWING

Subject Code 15409	Sessional			No of Period in one session :		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	60
	-	-	-	Internal Exam.	:	40

Rationale:

As we all know that Drawing is the language of a technician. Hence in order to make a technician master of Civil Engineering Drawing, He should be able to prepare detailed drawing of civil engineering structures which he will come across during in service.

Objective:

The detailed Drawing prepared in class should be neatly drawn on drawing sheets and should be preserved on drawing sheets as life time record. He may refer their drawings; whenever some compulsion arises in understanding similar drawing,

S.No.	Topics
01	Plan, Elevation and Section of a single storey Residential Building having three main rooms, kitchen, bath, store and verandah with flat roof, showing details of stepped foundation.
02	Plan, Elevation and Section of a double storeyed public building with flat roof.
03	Plan, Elevation and Section of a single storey residential building with inclined roof. (Varandah lean to roof and other rooms couple roof).
04	Plan, Elevation and Section of a double storeyed building with Ground floor having flat roof and first floor having inclined roof.
05	Plan, Elevation and Section of a Godown Building 50 metre long, 15 metre wide with inclined roof supported over Tubular Tures.
06	Sectional Elevation of the following showing details of Rafters and purlins. (a) King Post Truss (b) Queen Post Truss (c) North light Tubular Roof Truss, Enlarged details of important joints should also be shown.
07	Sectional Plan, longitudinal section and Front Elevation of ledged and Braced. Fully paneled and Glazed doors & windows & Flush door.
08	Plan, half Elevation and half cross section of a single span R.C.C. slab culvert. Masonary Arched Culvert and Pipe Culvert.

Books Recommended:

Text Books

1.	Civil Engg. Drawing	-	D. N. Bose
2.	A text book of Building Drawing	-	Sah & Kale
3.	Civil Engg. Drawing	-	B. N. Verma
4.	Civil Engg. Drawing Published	-	T.T.T.I. Bhopal
5.	Civil Engg. Drawing	-	Gurucharan Singh & S. C. Sharma
6.	Civil Engg. Drawing	-	Mallik & Meo.
7.	I. S. Code 696 & 962.	-	