

**DARBHANGA COLLEGE OF ENGINEERING, DARBHANGA**



**COURSE FILE OF  
CONTRACT SPECIFICATION AND ESTIMATION  
(011828 P)**



**Faculty Name:**

**MR. AKASH**

**ASSISTANT PROFESSOR,  
DEPARTMENT OF CIVIL ENGINEERING**



**विज्ञान एवं प्रावैधिकी विभाग**  
Department of Science and Technology  
Government of Bihar

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## **DARBHANGA COLLEGE OF ENGINEERING, DARBHANGA**

### **DEPARTMENT OF CIVIL ENGINEERING**

#### **Vision :**

Department of Civil Engineering is striving to become a premier academic centre for quality Education, Entrepreneurship and Research in different areas of civil engineering with a strong social commitment.

#### **Mission:**

1. To produce highly competent and technologically capable professionals by collaboration with relevant industries.
2. To motivate graduates towards innovation and research in the field of civil engineering.
3. To provide quality education in undergraduate levels with strong emphasis on professional's ethics and social commitment.

### **Program Educational Objectives (PEOs):**

- **PEO 1:** To prepare our graduates to have successful careers in design and analysis of various Civil Engineering structures and also motivate them to pursue higher studies and research in the relevant fields.
- **PEO 2:** To prepare our graduates as a good cognizance of Societal, Environmental and Ethical issues and have effective communication skills.
- **PEO 3:** To develop awareness of contemporary professionals issues and encourage them to support the Engineering profession through contribution in professional's societies and/or Educational Institutions.

### **Program Specific Outcomes (PSOs):**

The PSOs of Civil engineering programme supported by the curriculum are given below.

- **PSO 1:** To function as design consultants in the relevant industry for the design of civil engineering structures using modern software tool.
- **PSO 2:** To develop knowledge in some specific technical areas of civil engineering; Structural, Geotechnical, Transportation, Earthquake and Environmental engineering.

## **Program Outcomes (POs):**

Program Outcomes (POs) describe what students are expected to know and be able to do by the time of graduation to accomplish Program Educational Objectives (PEOs). The Program Outcomes for Civil Engineering students are:

**PO 1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex civil engineering problems.

**PO 2: Problem analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO 3: Design/development of solutions:** Design solutions for complex civil engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO 4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions in the field of civil engineering.

**PO 5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex civil engineering activities with an understanding of the limitations.

**PO 6: The Engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO 7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO 8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO 9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO 10: Communication:** Communicate effectively on complex engineering activities with the civil engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO 11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO 12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## **Department of Civil Engineering**

**B.Tech 8<sup>th</sup> semester**

**Course – Contracts Specification & Estimation**

**Course Code – 011828 P**

### **Course Description**

This course is designed to preparing an estimate; understand the specification of civil structure as well as its process of tendering, awarding and completion within the Civil Engineering curriculum. Students will explore the provision of specification and requirement of materials in the construction of civil structure.

### **Course Objective**

1. To estimate the actual consumption of quantities, estimated cost and stipulated time for completion of work of construction, and maintenance, repairing work?
2. To prepare estimates, specification, tender documents, contract documents, agreement paper, execution and its completion etc.
3. Understand the need to use a logical and systematic procedure to ensure that the most accurate cost prediction possible is arrived.

**Prerequisites:** Building Science, Building Drawing

### **Course Outcomes :-**

At the end of this course, the students will be able to

**CO1:** Understand the different types of contract and tender.

**CO2:** Prepare a detailed estimate of given specification of a building by different methods.

**CO3:** Prepare measurement book for making payment of a project during work

## CO-PO MAPPING

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Correction Level: 1- Slight (low), 2 – moderate (Medium), 3- Substantial (Strong)

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	-	1	-	3	3	1	3	3	-	2
CO2	3	3	-	-	2	3	2	3	3	-	3	3	1	3
CO3	2	2	1	-	-	2	-	3	3	-	3	3	-	1



## **B. Tech. VIII Semester (Civil)**

### **CE 011828 Contract specification and estimation**

L	T	P/D	Credit	Full Marks	:	50
0	0	3	2	Viva voce (Internal)	:	20
				Viva voce (External)	:	30

#### **UNIT-I**

**Contracts:** Types, item rate contract, Percentage rate contract, Contract for supply of materials, Lump-sum contract. Labour rate contract, Negotiated contract and Piece work agreement.

#### **UNIT-II**

**Tenders:** Earnest money, Work order, Informal tender, Security deposit, Liquidated damages, Contract Documents, Awarding and termination of contract, Maintenance period of contract, Refund of security deposit.

#### **UNIT-III**

**Measurement and Payment:** Intermediate and running payment. Final payment, Measurement completed work, Measurement book, Loss of measurement book.

#### **UNIT-IV**

**Specifications:** Introduction, Object of specification, Types, General specification of buildings.

#### **Books:**

1. Estimating and Costing in Civil Engineering by B. N. Dutta, UBSPD.
2. Construction planning and Management by Dr. U.K. Shrivastava, Galgotia publications Pvt. Ltd.

Darbhanga College of Engineering, Darbhanga

WEF:13/01/2020

8th Semester

DAY	Dept.	09:00-10:00 (1)	10:00-11:00 (2)	11:00-12:00 (3)	12:00-1:00 (4)	01:00-02:00	2:00-3:00 (5)	3:00-4:00 (6)	4:00-5:00 (7)
MONDAY	EE (S12)	DEC	MCT	PSD	PMIR	L U N C H	PSD/Project		
	CSE (S4)	PMIR [NA]	DM [SK]	W.Comm.	IS [PP]		PROJECT SEMINAR		
	ME (S10)	Remedial	IP	MSD	MIS		MSD LAB		
	CE (S11)	PROJECT		APM			PROJECT		
TUESDAY	EE (S12)	MCT	DEC	PMIR	PSD		Project/PSD		
	CSE (S4)	PMIR [NA]	DM [SK]	W.Comm.	IS [PP]		PROJECT SEMINAR		
	ME (S10)		IP	SD	MSD		PROJECT (MK/PK)		
	CE (S11)	PROJECT		PCS	IRRIGATION		TPS	PROJECT	
WEDNESDAY	EE (S12)	PMIR	MCT	DEC	PSD		Seminar/Project		
	CSE (S4)	PMIR [NA]	DM [SK]	W.Comm.	IS [PP]		I&I	PROJECT SEMINAR	
	ME (S10)	Remedial	SD	IP	MIS		PROJECT		
	CE (S11)		PCS	IRRIGATION	CPM		E & C LAB		
THURSDAY	EE (S12)	PSD	PMIR	MCT	Remedial		Project/Seminar		
	CSE (S4)	PROJECT SEMINAR			E- Commerce		I&I	PROJECT SEMINAR	
	ME (S10)	Remedial	MSD	SD	IP (T)	PROJECT (CPS/MR)			
	CE (S11)	TPS		CPM	PCS	APM	PROJECT		
FRIDAY	EE (S12)	PSD	MCT	DEC	Remedial	Project/Seminar			
	CSE (S4)	PROJECT SEMINAR			E- Commerce	I&I	PROJECT SEMINAR		
	ME (S10)	MIS	SD (T)	Remedial	IP (T)	PROJECT (PS/NP)			
	CE (S11)	E & C LAB			CPM	IRRIGATION	PROJECT		
SATURDAY	EE (S12)	Project				Project			
	CSE (S4)	PROJECT SEMINAR			E- Commerce	DM LAB			
	ME (S10)	Remedial	SD (T)	MSD (AM)	Remedial	PROJECT (PS/NP)			
	CE (S11)	PROJECT				PROJECT			

Sl.No.	Electrical and Electronics Engineering		Sl.No.	Computer Science and Engineering	
1	DEC	Mr. Deepak Singh	1	DM	Mr. Sunil Kumar Sahu
2	MCT	Mr. Sanjay Kumar	2	E-Commerce	Mr. Dharendra Kumar
3	PMIR	Mr. Akhil Md KK	3	IS	Mrs. Punam Prabha
4	PSD	Mr. Tabish Shanu	4	W.Comm.	Dr. Ravi Ranjan
5	Seminar	Mr. Tabish Shanu/ Dr. R. Ranjan	5	PMIR	NA
6	Project	Mr. Ravi Kumar/All faculty	6	I&I	Mr. Akhlesh Kumar
			7	Project	All Faculties
Sl.No.	Mechanical Engineering		Sl.No.	Civil Engineering	
1	IP	Mr. Mukesh Kumar	1	IE	Mr. Loknath kumar
2	SD	Mr. Vishnu Singh	2	TPS	Mr. Prashant Kumar
3	MSD	Dr. Md. Asjad Mokhtar	3	CS&E	Mr. Akash
4	MIS	Mr. Ajeet Kumar Gupta	4	CPM	Mr. Ahsan Rabbani
5	Project	All Faculties	5	PSC	Mr. Ravi Ranjan Kumar
			6	APM	Mr. Prashant Kumar
			7	Project	All Faculties

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HOD C-EE  
CPS/IPS  
10/01/20

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10/01/2020

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10/01/2020

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10/01/2020

Co-Ordinator  
(Mr. Ravi Kumar)

Time Table Incharge  
(Dr. A K Choudhary)

PRINCIPAL  
(Dr. Achintya)

**List of Student of B.Tech (Civil) 2014-2018**

<b>S.No.</b>	<b>Name</b>	<b>Class Roll No</b>	<b>Registration Number</b>
1	ADITI	16-C-01	16101111043
2	SAIMA FIRDAUS	16-C-02	16101111055
3	KIRTHI	16-C-03	16101111005
4	POOJA KUMARI	16-C-04	16101111033
5	SHIKHA	16-C-05	16101111009
6	SOPHIA KHATOON	16-C-07	16101111042
7	AJAZ AHMAD	16-C-09	16101111032
8	AMAR KUMAR	16-C-10	16101111016
9	AMIT RAJ	16-C-11	16101111029
10	PRINCE KUMAR	16-C-12	16101111024
11	VINEET KUMAR	16-C-14	16101111003
12	RAKESH KUMAR	16-C-15	16101111030
13	SHUDHANSHU SHEKHAR JHA	16-C-16	16101111008
14	DILIP KUMAR	16-C-18	16101111049
15	RAJEEV RANJAN	16-C-19	16101111041
16	VIKRAM BHARTI	16-C-20	16101111037
17	RAMESH KUMAR SAH	16-C-21	16101111050
18	RAJVANSHI KUMAR SINGH	16-C-22	16101111045
19	MITESH KUMAR MITESH	16-C-24	16101111006
20	SUNIL KUMAR	16-C-26	16101111035
21	RAHUL KUMAR	16-C-27	16101111018
22	SAURAV KUMAR SHANU	16-C-28	16101111017
23	UMANG BHARDWAJ	16-C-29	16101111051
24	HEMANT KUMAR	16-C-30	16101111028
25	RUPAK RAJ	16-C-31	16101111021
26	NEERAJ KUMAR	16-C-32	16101111025
27	ABHISHEK KUMAR SHUKLA	16-C-33	16101111019
28	CHANDRAMANI KUMAR	16-C-34	16101111039
29	SANTOSH KUMAR	16-C-36	16101111023
30	ANKESH KUMAR	16-C-37	16101111007
31	RAM RATAN KUMAR	16-C-38	16101111058
32	AMIT KUMAR	16-C-40	16101111040
33	MOTI LAL MANJHI	16-C-41	16101111011
34	KESHAV KUMAR	16-C-43	16101111012
35	SUDHIR KUMAR	16-C-44	16101111047
36	DIPESH KUMAR	16-C-46	16101111038

<b>S.No.</b>	<b>Name</b>	<b>Class Roll No</b>	<b>Registration Number</b>
37	PRABHAT RANJAN	16-C-47	16101111026
38	SHIVAMVEER KUMAR	16-C-48	16101111034
39	MD SALIK ANWAR	16-C-49	16101111053
40	PREMRANJAN KUMAR	16-C-50	16101111014
41	MD ZAKI AHMAD	16-C-51	16101111027
42	VISHAL RAJ	16-C-52	16101111002
43	RAJNISH KUMAR	16-C-54	16101111015
44	KUMARI PRIYANSHU	16-C-56	16101111010
45	BHUDEV BHASKAR	16-C-57	16101111046
46	NARENDRA KUMAR	16-C-58	16101111020
47	SHANKAR RAM	16-C-59	16101111059
48	DURGESH KUMAR	16-C-60	16101111056
49	RAUSHAN KUMAR	16-C-61	16101111054
50	MUSAFIR KUMAR	16-C-62	16101111031
51	RAHUL RAVI	16-C-63	16101111022
52	CHANDAN KUMAR	16-C-64	16101111013
53	ATISH DEEPANKAR	16-C-65	16101111036
54	RISHI KUMAR	16-C-66	16101111004
55	CHANDRESH KUMAR	16-C-67	16101111048
56	KANHAIYA KUMAR YADAV	16-C-68	16101111001
57	PRIYADARSHI KUMAR	16-C-69	16101111044
58	ADARSH ANAND	17-LE-C-01	17101111904
59	SACHIN KUMAR	17-LE-C-02	17101111907
60	SANATAN KUMAR JHA	17-LE-C-03	17101111906
61	RAHUL KUMAR	17-LE-C-04	17101111902
62	PANKAJ KUMAR SAH	17-LE-C-05	17101111901
63	ANKESH KUMAR	17-LE-C-06	17101111903
64	BIBEKANAND KUMAR	17-LE-C-07	17101111909
65	MRITYUNJAY KUMAR	17-LE-C-08	17101111908
66	JAI KUMAR	17-LE-C-09	17101111912
67	PINKEE KUMARI	17-LE-C-10	17101111911
68	KUMAR SUMAN SAURABH	17-LE-C-11	17101111910
69	PRATEEK KUMAR	17-LE-C-12	17101111905

<b>Institute/College Name:</b>	Darbhanga College of Engineering
<b>Program Name:</b>	B.Tech (Civil engg., 8 <sup>th</sup> semester)
<b>Course Code:</b>	011828
<b>Course Name:</b>	Contract, Specification & Estimation
<b>Lecture/Tutorial(per week):</b>	3/0
<b>Course Credits:</b>	2
<b>Course Co-coordinator Name:</b>	Mr. Akash

### 1. Scope and Objective of Course

#### Scope:

This course is designed to preparing an estimate; understand the specification of civil structure as well as its process of tendering, awarding and completion within the Civil Engineering curriculum. Students will explore the provision of specification and requirement of materials in the construction of civil structure.

#### Objective:

- To estimate the actual consumption of quantities, estimated cost and stipulated time for completion of work of construction, and maintenance, repairing work?
- To prepare estimates, specification, tender documents, contract documents, agreement paper, execution and its completion etc.
- Understand the need to use a logical and systematic procedure to ensure that the most accurate cost prediction possible is arrived.

#### Course Outcomes:

At the end of this course, the students will be able to

- **CO1:** Understand the different types of contract and tender.
- **CO2:** Prepare a detailed estimate of given specification of a building by different methods.
- **CO3:** Prepare measurement book for making payment of a project during work

### 2. Text books/Reference Book:

- TB1. Estimating and Costing in Civil Engineering by B. N. Dutta, UBSPD.
- TB2. Construction planning and Management by Dr. U.K.Shrivastava, Galgotia publications Pvt. Ltd.

### **3. Other readings and relevant websites**

<b>SI. No.</b>	<b>Link of journals, Magazines, websites and Research papers</b>
1.	<a href="http://nptel.ac.in/courses/105103093/14">http://nptel.ac.in/courses/105103093/14</a>
2.	<a href="https://www.youtube.com/watch?v=yhMPodo0oU0">https://www.youtube.com/watch?v=yhMPodo0oU0</a>
3.	<a href="https://www.youtube.com/watch?v=r8hRpnO9il8">https://www.youtube.com/watch?v=r8hRpnO9il8</a>
4.	<a href="https://www.youtube.com/watch?v=UUJMN9OKX2c">https://www.youtube.com/watch?v=UUJMN9OKX2c</a>
5.	<a href="https://www.youtube.com/watch?v=4x4oRRwJb3s">https://www.youtube.com/watch?v=4x4oRRwJb3s</a>
6.	<a href="https://www.youtube.com/watch?v=vurarO8Fcg4&amp;t=761s">https://www.youtube.com/watch?v=vurarO8Fcg4&amp;t=761s</a>

### **4. Sessional/Practical plans**

<b>SI. No.</b>	<b>Sessional/Practical</b>
1.	Detailed estimate for the single room building including foundation.
2.	Detailed estimate for the Double roomed Building including foundation.
3.	Calculation of the quantity of steel required for an RCC column with footing Shown in figure. Also, prepare bar binding schedule for the column.
4.	Detailed estimate of a RCC Rectangular Beam including centering and shuttering and steel reinforcement? Also prepare a schedule of bars.
5.	Detailed Estimate of a Building by center line method.
6.	Detailed estimate of Building using long wall and short wall method.
7.	Prepare an estimate of RCC top road with GSB and WBM as a sub base, provides Edge and A brick flat soling in both side of road.
8.	Standard specifications for the items in the construction of class 'A'(First Class) residential building
9.	General specifications for the construction of modern road
10.	Calculation of requirement of materials/ quantities in different specification of cement plaster, cement concrete, reinforced cement concrete

## 5. Syllabus:

- **Contracts:** Types, item rate contract, Percentage rate contract, Contract for supply of materials, Lump-sum contract. Labour rate contract, Negotiated contract and Piece work agreement.
- **Tenders:** Earnest money. Work order, Informal tender, Security deposit, Liquidated damages, Contract Documents, Awarding and termination of contract, Maintenance period of contract, Refund of security deposit.
- **Measurement and Payment:** Intermediate and running payment. Final payment, Measurement completed work, Measurement book, Loss of measurement book.
- **Specifications:** Introduction, Object of specification, Types, General specification of buildings.
- **Specification of Materials:** Bricks, Cement, Sand, Water, Lime and Reinforcement, Quantity surveying and estimating, Analysis of rates. The evaluation will be based upon submission of a partial or complete estimate of a project.

## 6. **Evaluation and Examination Blue Print:**

Internal assessment is done through quiz tests, presentations, assignments and project work. Two sets of question papers are asked from each faculty and out of these two, without the knowledge of faculty, one question paper is chosen for the concerned examination. The components of evaluations along with their weightage followed by the University is given below

External Viva-voce      60%

Internal Viva-voce      40%

<u>Designation</u>	<u>Name</u>	<u>Signature</u>
Course Coordinator	Mr. Akash	
H.O.D	Mr. Shyam Sundar Choudhary	
Principal	Dr. Achintya	
Date	13.01.2020	

<b>Institute / School Name :</b>	Darbhanga College of Engineering, Darbhanga		
<b>Program Name</b>	<b>B.Tech.</b>		
<b>Course Code</b>	011828		
<b>Course Name</b>	Contract Specification & Estimation		
<b>Lecture / Tutorial (per week):</b>	3/0	<b>Course Credits</b>	2
<b>Course Coordinator Name</b>	Mr. Akash		

### LECTURE PLAN

<b>Lecture No.</b>	<b>Date of Lecture</b>	<b>Sessional/Practical</b>	<b><u>Text Books/Reference books/ Reading Materials</u></b>
1.		Detailed estimate for the single room building including foundation.	TB1
2.		Detailed estimate for the Double roomed Building including foundation.	TB1
3.		Calculation of the quantity of steel required for an RCC column with footing Shown in figure. Also, prepare bar binding schedule for the column.	TB1
4.		Detailed estimate of a RCC Rectangular Beam including centering and shuttering and steel reinforcement? Also prepare a schedule of bars.	TB1
5.		Detailed Estimate of a Building by center line method.	TB1
6.		Detailed estimate of Building using long wall and short wall method.	TB1
7.		Prepare an estimate of RCC top road with GSB and WBM as a sub base, provides Edge and A brick flat soling in both side of road.	TB1
8.		Standard specifications for the items in the construction of class 'A'(First Class) residential building	TB1
9.		General specifications for the construction of modern road	TB1
10.		Calculation of requirement of materials/ quantities in different specification of cement plaster, cement concrete, reinforced cement concrete	TB1



# **DARBHANGA COLLEGE OF ENGINEERING, DARBHANGA**

## **(Department of Civil Engineering)**

### **Subject: Contract Specification & Estimation ASSIGNMENT 1**

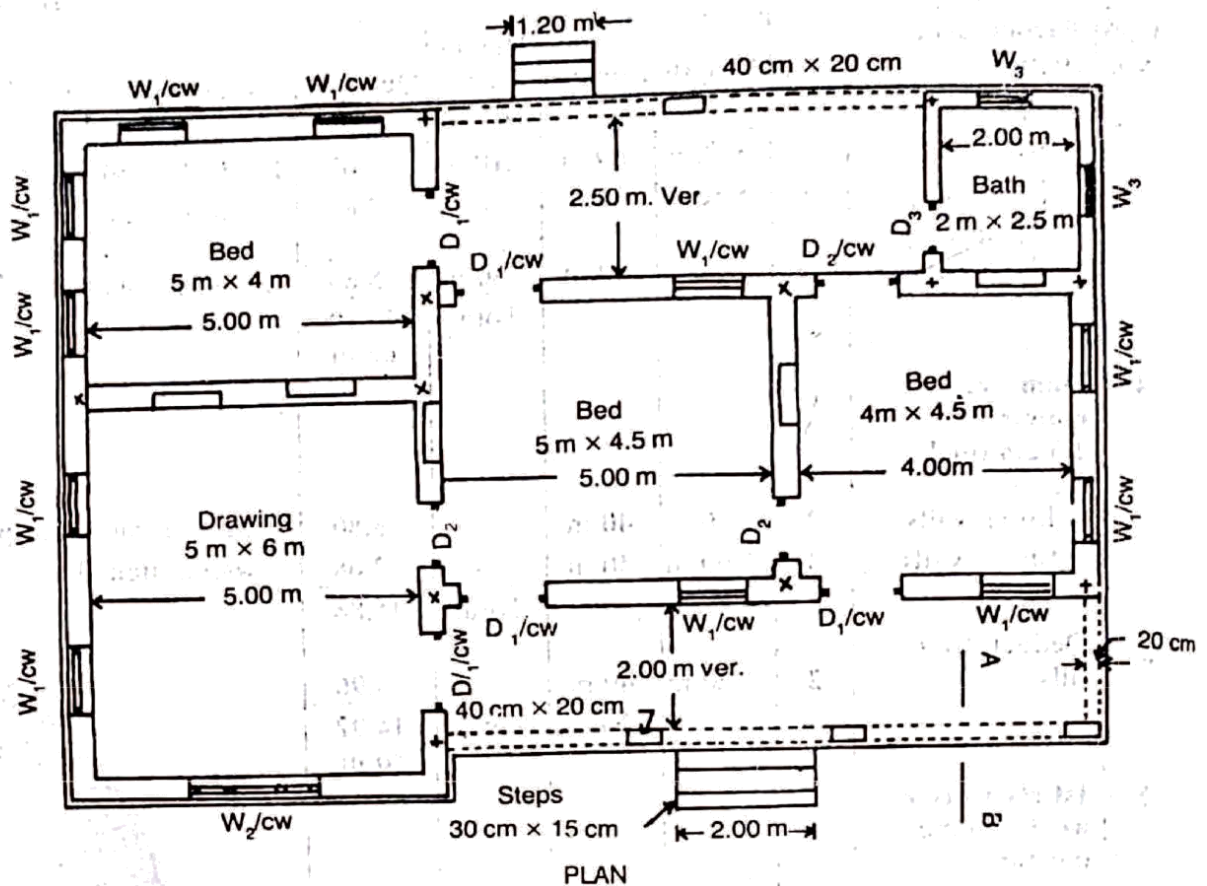
1. What is contract? What are different types of contracts? Explain.
2. Enumerate the different methods of building estimate. Differentiate separate or individual wall method and Centre line method.
3. Write Short Note on:
  - (a.) Earnest Money
  - (b.) Work order
  - (c.) Security deposit
  - (d.) Liquidated damages
4. What do mean by specification? Explain the general specification for First, Second and Third class buildings.
5. Compute the requirement of different kind of materials in following specification of work:
  - (a.) Brick work of cement mortar (1:6)
  - (b.) Cement Concrete of Grade M 20
  - (c.) Cement Concrete of Grade M 15
  - (d.) Cement Concrete of Grade M 10
  - (e.) Cement Concrete of Grade M 7.5
  - (f.) Cement Concrete of Grade M 5

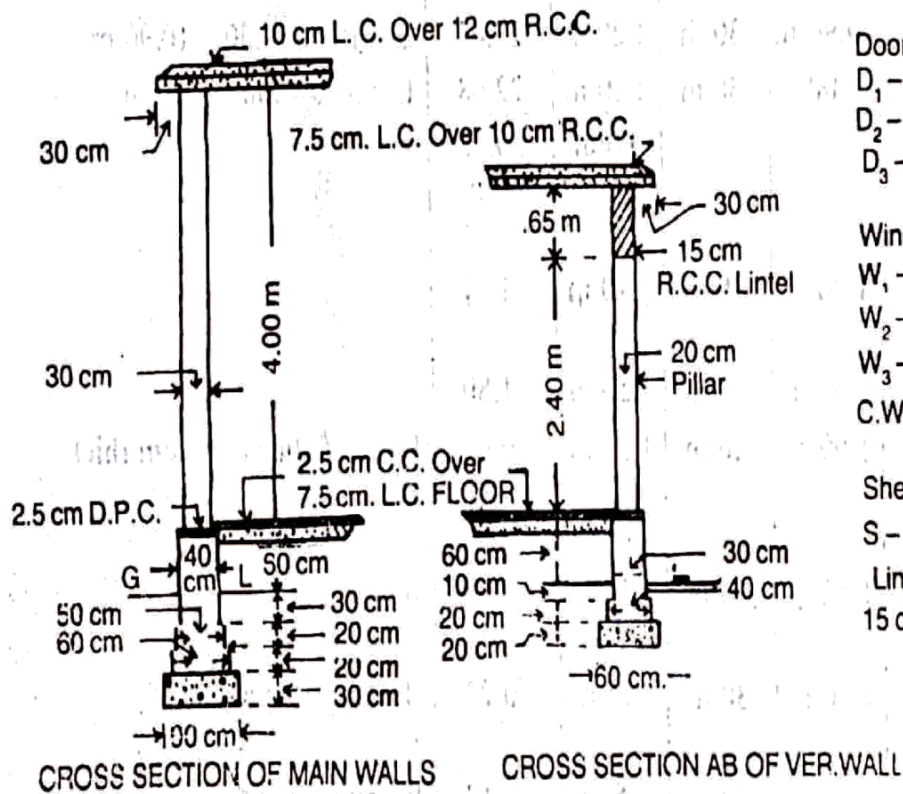
# DARBHANGA COLLEGE OF ENGINEERING, DARBHANGA

## (Department of Civil Engineering)

### Subject: Contract Specification & Estimation ASSIGNMENT 2

1. The plan and sectional elevation of a building are given below. Estimate the quantities of the following items of work of the building by centre line method:-
  - (a.) Earth work in excavation in foundation
  - (b.) Cement concrete in foundation
  - (c.) First class brick work in cement mortar (1:6) in foundation and plinth
  - (d.) 25 mm damp proof course and
  - (e.) First class in brick work in cement mortar (1:6) in superstructure



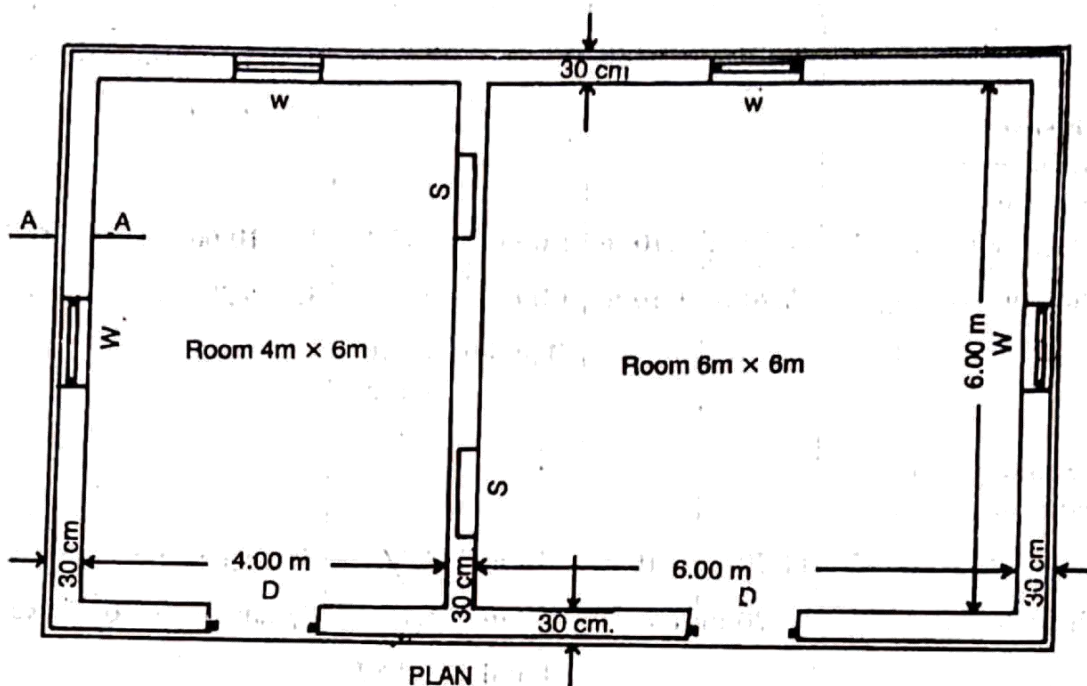


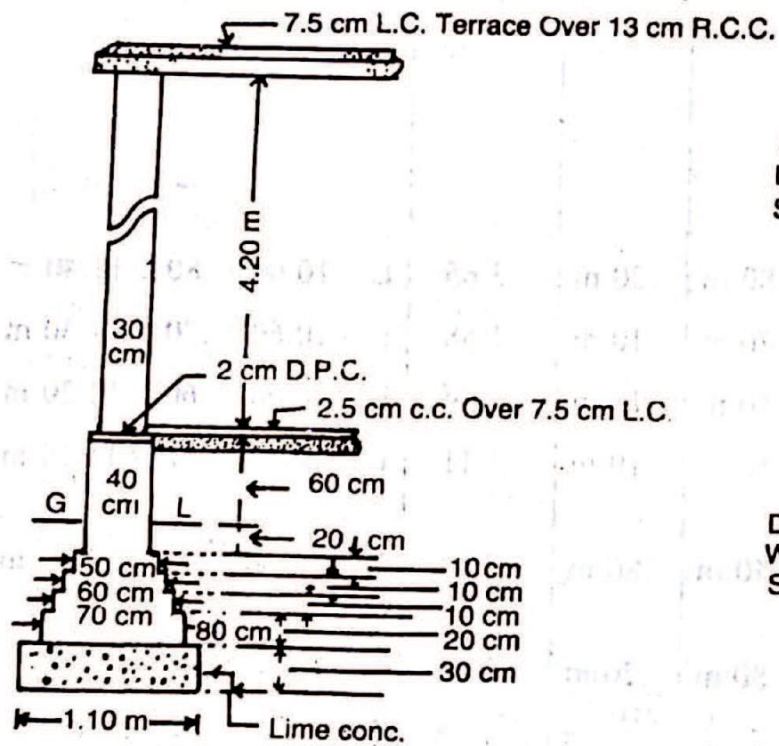
Doors:-  
 $D_1 - 120 \text{ cm} \times 210 \text{ cm} (1.20 \text{ m} \times 2.10 \text{ m})$   
 $D_2 - 100 \text{ cm} \times 200 \text{ cm} (1.00 \text{ m} \times 2.00 \text{ m})$   
 $D_3 - 75 \text{ cm} \times 180 \text{ cm} (.75 \text{ m} \times 1.80 \text{ m})$

Windows:-  
 $W_1 - 100 \text{ cm} \times 150 \text{ cm} (1.00 \text{ m} \times 1.50 \text{ m})$   
 $W_2 - 200 \text{ cm} \times 150 \text{ cm} (2.00 \text{ m} \times 1.50 \text{ m})$   
 $W_3 - 75 \text{ cm} \times 120 \text{ cm} (.75 \text{ m} \times 1.20 \text{ m})$   
 C.W. -  $75 \text{ cm} \times 60 \text{ cm} (.75 \text{ m} \times .60 \text{ m})$

Shelves:-  
 $S - 100 \text{ cm} \times 150 \text{ cm} (1.00 \text{ m} \times 1.50 \text{ m})$   
 Lintel Over Doors, Windows Etc.  
 15 cm R.B.

2. Estimate the quantities of the following item of a two roomed building from the plan and section by separate and individual wall method.





All Walls are of same section  
 Lintels over Doors, Windows and  
 Shelves are 15 cm thick R.B.

Doors D-1.20 m × 2.10 m  
 Windows W-1.00 × 1.50 m  
 Shelves S-1.00 m × 1.50 m

CROSS SECTION OF WALL ON AA.

- (a.) Earth work in excavation in foundation
- (b.) Cement concrete in foundation
- (c.) First class brick work in cement mortar (1:6) in foundation and plinth
- (d.) 25 mm damp proof course and
- (e.) First class in brick work in cement mortar (1:6) in superstructure