

Ref No:

SRI KRISHNA INSTITUTE OF TECHNOLOGY , BANGALORE-90



## LABORATORY PLAN

Academic Year 2019-20

Program:	B E – Civil Engineering
Semester :	3
Course Code:	18CVL37
Course Title:	computer aided building planning and drwaing
Credit / L-T-P:	04/ 1-0-3
Total Contact Hours:	50
Course Plan Author:	MOHAN K T

## Academic Evaluation and Monitoring Cell

#29, Hesaragatta Main Road, Chimney Hills  
 Chikkabanavara Post Bangalore-560090  
 PH-080-23721477/23721315  
[www.Skit.org](http://www.Skit.org), Email: skitprinci1@gmail.com

## INSTRUCTIONS TO TEACHERS

- Classroom / Lab activity shall be started after taking attendance.
- Attendance shall only be signed in the classroom by students.
- Three hours attendance should be given to each Lab.
- Use only Blue or Black Pen to fill the attendance.
- Attendance shall be updated on-line & status discussed in DUGC.
- No attendance should be added to late comers.
- Modification of any attendance, over writings, etc is strictly prohibited.
- Updated register is to be brought to every academic review meeting as per the COE.

## Table of Contents

computer aided building planning and drwaing.....	1
A. LABORATORY INFORMATION.....	4
1. Laboratory Overview.....	4
2. Laboratory Content.....	4
3. Laboratory Material.....	4
4. Laboratory Prerequisites:.....	5
5. Content for Placement, Profession, HE and GATE.....	5
B. Laboratory Instructions.....	5
1. General Instructions.....	5
2. Laboratory Specific Instructions.....	6
C. OBE PARAMETERS.....	6
1. Laboratory Outcomes.....	6
2. Laboratory Applications.....	7
3. Mapping And Justification.....	7
4. Articulation Matrix.....	8
5. Curricular Gap and Experiments.....	8
6. Experiments Beyond Syllabus.....	9
D. COURSE ASSESSMENT.....	9
1. Laboratory Coverage.....	9
2. Continuous Internal Assessment (CIA).....	10
E. EXPERIMENTS.....	11
Experiment 01 : Detailing of RC Beams.....	11
Experiment 02 : Detailing of RC Slabs.....	11
Experiment 03 : Detailing of RC Staircase.....	12
Experiment 04 : Preparing detailed working drawing of Lintel and chajja.....	13
Experiment 05 :cross section of pavement.....	14
Experiment 06 : Preparing detailed working drawing of Septic Tank and sedimentation Tank.....	15
Experiment 07 : Layout plan of Rainwater recharging and harvesting system.....	15
Experiment 08 : Cross sectional details of a road for a Residential area with provision for all services.....	16
Experiment 09 : Single and Double story residential building.....	17
Experiment 10 : Detailing of steel roof truss.....	18
Experiment 11 : hostel building.....	18
Experiment 12 : hospital building.....	19
F. Content to Experiment Outcomes.....	20
1. TLPA Parameters.....	20
2. Concepts and Outcomes:.....	21

Note : Remove "Table of Content" before including in CP Book  
 Each Laboratory Plan shall be printed and made into a book with cover page  
 Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

## A. LABORATORY INFORMATION

### 1. Laboratory Overview

Degree:	B. E	Program:	CIVIL
Year / Semester :	2/ 3 <sup>RD</sup>	Academic Year:	2019-20
Course Title:	Computer aided building planning and drawing	Course Code:	18CVL37
Credit / L-T-P:	04/ 1-0-3	SEE Duration:	180 Minutes
Total Contact Hours:	50 Hrs	SEE Marks:	60
CIA Marks:	40	Assignment	05
Lab. Plan Author:	MOHAN K T	Sign	Dt :
Checked By:	Shivaprasad D G	Sign	Dt :

### 2. Laboratory Content

Expt.	Title of the Experiments	Lab Hours	Concept	Blooms Level
1	Cross section of Foundation, masonry wall, RCC columns with isolated & combined footings.	03	Detailing	L6
2	Different types of bonds in brick masonry	03	Detailing	L6
3	Different types of staircases – Dog legged, Open we ll	03	Detailing	L6
4	Lintel and chajja	03	Detailing	L6
5	RCC slabs and beams	03	Detailing	L6
6	Cross section of a pavement	03	Detailing	L6
7	Septic Tank and sedimentation Tank	03	Detailing	L6
8	Layout plan of Rainwater recharging and harvesting system	03	Detailing	L6
9	Cross sectional details of a road for a Residential area with provision for all services	03	Detailing	L6
10	Steel truss (connections Bolted)	06	Detailing	L6
11	Single and Double story residential building	06	Detailing	L6
12	Hostel building	06	Detailing	L6
13	Hospital building	06	Detailing	L6
14	School building	03	Detailing	L6

### 3. Laboratory Material

Books & other material as recommended by university (A, B) and additional resources used by Laboratory teacher (C).

Expt.	Details	Expt. in book	Availability
<b>A</b>	<b>Text books (Title, Authors, Edition, Publisher, Year.)</b>	-	-
1-14	MG Shah, CM Kale, SY Patki, " <b>Building drawing with an integrated approach to Built Environment Drawing</b> ", Tata Mc Graw Hill Publishing co. Ltd., New Delhi	1-14	In Lib
1-14	Gurucharan Singh, " <b>Building Construction</b> ", Standard Publishers, & distributors, New Delhi.	11-14	In Lib
<b>B</b>	<b>Reference books (Title, Authors, Edition, Publisher, Year.)</b>	-	-
1-14	Time Saver Standard by Dodge F. W., F. W. Dodge Corp.,	1-14	In Lib
1-14	IS: 962-1989 (Code of practice for architectural and building drawing)	1-14	Not Available
	<b>National Building Code</b> , BIS, New Delhi.		
<b>C</b>	<b>Concept Videos or Simulation for Understanding</b>	-	-
C1	<a href="https://www.youtube.com/watch?v=trYCVxps8So">https://www.youtube.com/watch?v=trYCVxps8So</a>		
C2	<a href="https://www.youtube.com/results?search_query=DIFFERENT+BONDING+IN+BRICK+MASONRY">https://www.youtube.com/results?search_query=DIFFERENT+BONDING+IN+BRICK+MASONRY</a>		
C3	<a href="https://www.youtube.com/results?search_query=DETAILING+OF+FOOTING+IN+AUTOCAD">https://www.youtube.com/results?search_query=DETAILING+OF+FOOTING+IN+AUTOCAD</a>		
C4	<a href="https://www.youtube.com/results?search_query=DETAILING+OF+STAIR+CASE+IN+AUTOCAD">https://www.youtube.com/results?search_query=DETAILING+OF+STAIR+CASE+IN+AUTOCAD</a>		
C5	<a href="https://www.youtube.com/watch?v=Pl4RjRr3NBs">https://www.youtube.com/watch?v=Pl4RjRr3NBs</a>		

C6	<a href="https://www.youtube.com/watch?v=2khej9AcuME">https://www.youtube.com/watch?v=2khej9AcuME</a>		
C7	<a href="https://www.youtube.com/watch?v=HNlcWjgJKPk">https://www.youtube.com/watch?v=HNlcWjgJKPk</a>		
C8	<a href="https://www.youtube.com/watch?v=EkQrjo_HNM4">https://www.youtube.com/watch?v=EkQrjo_HNM4</a>		
C9	<a href="https://www.youtube.com/watch?v=b60uoyRWaUA">https://www.youtube.com/watch?v=b60uoyRWaUA</a>		
C10	<a href="https://www.youtube.com/watch?v=EOKkFSFfwBU">https://www.youtube.com/watch?v=EOKkFSFfwBU</a>		
C11	<a href="https://www.youtube.com/watch?v=ay8sNeYJtS8">https://www.youtube.com/watch?v=ay8sNeYJtS8</a>		
C12	<a href="https://www.youtube.com/watch?v=15bXbg2Ku_k">https://www.youtube.com/watch?v=15bXbg2Ku_k</a>		
C13	<a href="https://www.youtube.com/watch?v=nib02vEKT2M">https://www.youtube.com/watch?v=nib02vEKT2M</a>		
C14	<a href="https://www.youtube.com/watch?v=plESAwwLcUM">https://www.youtube.com/watch?v=plESAwwLcUM</a>		
<b>D</b>	<b>Software Tools for Design</b>	-	-
	Auto cad		
<b>E</b>	<b>Recent Developments for Research</b>	-	-
<b>F</b>	<b>Others (Web, Video, Simulation, Notes etc.)</b>	-	-

#### 4. Laboratory Prerequisites:

Refer to GL01. If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

Students must have learnt the following Courses / Topics with described Content . . .

Expt.	Lab. Code	Lab. Name	Topic / Description	Sem	Remarks	Blooms Level
-	-	-	-	-	-	-
-	-	-	-	-	-	-

#### 5. Content for Placement, Profession, HE and GATE

The content is not included in this course, but required to meet industry & profession requirements and help students for Placement, GATE, Higher Education, Entrepreneurship, etc. Identifying Area / Content requires experts consultation in the area.

Topics included are like, a. Advanced Topics, b. Recent Developments, c. Certificate Courses, d. Course Projects, e. New Software Tools, f. GATE Topics, g. NPTEL Videos, h. Swayam videos etc.

Expt.	Topic / Description	Area	Remarks	Blooms Level
1	Detailing	Entrepreneurship		Application L6
3				
3				
5				
-				

## B. Laboratory Instructions

### 1. General Instructions

SNo	Instructions	Remarks
1	Observation book and Lab record are compulsory.	
2	Students should report to the concerned lab as per the time table.	
3	After completion of the drawing, certification of the concerned staff in-charge in the observation book is necessary.	
4	Student should bring a notebook of 100 pages and should note the important shortcut of auto cad tools.	
5	The record of observations along with the detailed drawing in the Immediate last session should be submitted and certified by staff member	

	in-charge.	
6	Should attempt all drawing/ assignments given in the list session wise.	
7	It is responsibility to create a separate directory to store all the files, so that nobody else can read or copy.	
8	Completed lab assignments should be submitted in the form of a Lab Record in which you have to write the procedure along with drawings and results for various RCC structural members.	

## 2. Laboratory Specific Instructions

SNo	Specific Instructions	Remarks
1	Start computer	
2	Open Auto Cad	
3	Select new file.	
4	Set Units and Limits	
5	Save the program with Acad file.	
6	Detail given question.	

## C. OBE PARAMETERS

### 1. Laboratory Outcomes

Expt.	Lab Code #	COs / Experiment Outcome	Teach. Hours	Concept	Instr Method	Assessment Method	Blooms' Level
-	-	<b>At the end of the experiment, the student should be able to . . .</b>	-	-	-	-	-
1	18CVL37.1	Preparing detailed working drawing of Cross section of Foundation, masonry wall, RCC columns with isolated & combined footings	03	Detailing	Demonstrate	Assignment	L6
2	18CVL37.2	Preparing detailed working drawing of Different types of bonds in brick masonry	03	Detailing	Demonstrate	Assignment	L6
3	18CVL37.3	Preparing detailed working drawing of Different types of staircases – Dog legged, Open well	03	Detailing	Demonstrate	Assignment and Slip Test	L6
4	18CVL37.4	Preparing detailed working drawing of Lintel and chajja	03	Detailing	Demonstrate	Assignment	L6
5	18CVL37.5	Preparing detailed working drawing of Cross section of a pavement	03	Detailing	Demonstrate	Assignment	L6
6	18CVL37.6	Preparing detailed working drawing of Septic Tank and sedimentation Tank	03	Detailing	Demonstrate	Assignment	L6
7	18CVL37.7	Layout plan of Rainwater recharging and harvesting system	03	Detailing	Tutorial	Assignment	L6
8	18CVL37.8	Cross sectional details of a road for a Residential area with provision for all services	03	Detailing	Demonstrate	Assignment and Slip Test	L6
9	18CVL37.9	Steel truss (connections Bolted)	03	Detailing	Demonstrate	Assignment	L6
10	18CVL37.10	Single and Double story residential building	06	Detailing	Demonstrate	Assignment	L6
11	18CVL37.11	Hostel building	06	Detailing	Demonstrate	Assignment	L6
12	18CVL37.12	Hospital building.	06	Detailing	Demonstrate	Assignment	L6

13	18CVL37.13	School building	06	Detailing	Demonstrate	Assignment	L6
<b>Total</b>			<b>50</b>	-	-	-	-

Note: Identify a max of 2 Concepts per unit. Write 1 CO per concept.

## 2. Laboratory Applications

Expt.	Application Area	CO	Level
1	Design of simply supported, cantilever and continuous beams.	CO1	L6
2	Design of one way, two way and one way continuous slabs.	CO2	L6
3	Design of doglegged staircase.	CO3	L6
4	Design of cantilever retaining wall.	CO4	L6
5	Design of counter fort retaining wall.	CO5	L6
6	Design of circular and rectangular water tank.	CO6	L6
7	Creating connections for beam to beam beam to column by bolted and welded connections.	CO7	L6
8	Creating lacing and battens for built up columns.	CO8	L6
9	Creating gusseted bases and column bases for bolted and welded connections.	CO9	L6
10	Design of roof truss for both bolted and welded type.	CO10	L6
11	Creating beams with bolted and welded.	CO11	L6
12	Design of gantry girder for steel structural members.	CO12	L6

Note: Write 1 or 2 applications per CO.

## 3. Mapping And Justification

CO – PO Mapping with mapping Level along with justification for each CO-PO pair.

To attain competency required (as defined in POs) in a specified area and the knowledge & ability required to accomplish it.

Expt.	Mapping	Mapping Level	Justification for each CO-PO pair	Level
-	<b>CO</b>	<b>PO</b>	<b>'Area': 'Competency' and 'Knowledge' for specified 'Accomplishment'</b>	-
1	CO1	PO1	L2 Knowledge on Engineering fundamentals required	L2
1	CO1	PO2	L3 Problem analysis is required	L3
1	CO1	PO5	L6 Preparing drawing is required	L6
2	CO2	PO1	L2 Knowledge on Engineering fundamentals required	L2
2	CO2	PO2	L3 Problem analysis is required	L3
2	CO2	PO5	L6 Preparing drawing is required	L6
3	CO3	PO1	L2 Knowledge on Engineering fundamentals required	L2
3	CO3	PO2	L3 Problem analysis is required	L3
3	CO3	PO5	L6 Preparing drawing is required	L6
4	CO4	PO1	L2 Knowledge on Engineering fundamentals required	L2
4	CO4	PO2	L3 Problem analysis is required	L3
4	CO4	PO5	L6 Preparing drawing is required	L6
5	CO5	PO1	L2 Knowledge on Engineering fundamentals required	L2
5	CO5	PO2	L3 Problem analysis is required	L3
5	CO5	PO5	L6 Preparing drawing is required	L6
6	CO6	PO1	L2 Knowledge on Engineering fundamentals required	L2
6	CO6	PO2	L3 Problem analysis is required	L3
6	CO6	PO5	L2 Knowledge on Engineering fundamentals required	L2
7	CO7	PO1	L3 Problem analysis is required	L3
7	CO7	PO2	L6 Preparing drawing is required	L6
7	CO7	PO5	L2 Knowledge on Engineering fundamentals required	L2
8	CO8	PO1	L3 Problem analysis is required	L3
8	CO8	PO2	L2 Knowledge on Engineering fundamentals required	L2
8	CO8	PO5	L3 Problem analysis is required	L3
9	CO9	PO1	L6 Preparing drawing is required	L6
9	CO9	PO2	L2 Knowledge on Engineering fundamentals required	L2

9	CO9	PO5	L3	Problem analysis is required	L3
10	CO10	PO1	L2	Knowledge on Engineering fundamentals required	L2
10	CO10	PO2	L3	Problem analysis is required	L3
10	CO10	PO5	L6	Prepaing drawing is required	L6
11	CO11	PO1	L2	Knowledge on Engineering fundamentals required	L2
11	CO11	PO2	L3	Problem analysis is required	L3
11	CO11	PO5	L6	Prepaing drawing is required	L6
12	CO12	PO1	L2	Knowledge on Engineering fundamentals required	L2
12	CO12	PO2	L3	Problem analysis is required	L3
12	CO12	PO5	L6	Prepaing drawing is required	L6

4. Articulation Matrix

CO – PO Mapping with mapping level for each CO-PO pair, with course average attainment.

Expt.	CO.#	Experiment Outcomes At the end of the experiment student should be able to ...	Program Outcomes												Level			
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		PS O1	PS O2	PS O3
1	18CVL37.1	Preparing detailed working drawing of Cross section of Foundation, masonry wall, RCC columns with isolated & combined footings	2	3	-	-	3	-	-	-	-	-	-	-	-	-	-	L6
1	18CVL37.2	Preparing detailed working drawing of Different types of bonds in brick masonry	2	3	-	-	3	-	-	-	-	-	-	-	-	-	-	L6
2	18CVL37.3	Preparing detailed working drawing of Different types of staircases – Dog legged, Open well	2	3	-	-	3	-	-	-	-	-	-	-	-	-	-	L6
2	18CVL37.4	Preparing detailed working drawing of Lintel and chajja	2	3	-	-	3	-	-	-	-	-	-	-	-	-	-	L6
3	18CVL37.5	Preparing detailed working drawing of Cross section of a pavement	2	3	-	-	3	-	-	-	-	-	-	-	-	-	-	L6
3	18CVL37.6	Preparing detailed working drawing of Septic Tank and sedimentation Tank	2	3	-	-	3	-	-	-	-	-	-	-	-	-	-	L6
4	18CVL37.7	Layout plan of Rainwater recharging and harvesting system	2	3	-	-	3	-	-	-	-	-	-	-	-	-	-	L6
4	18CVL37.8	Cross sectional details of a road for a Residential area with provision for all services	2	3	-	-	3	-	-	-	-	-	-	-	-	-	-	L6
5	18CVL37.9	Steel truss (connections Bolted)	2	3	-	-	3	-	-	-	-	-	-	-	-	-	-	L6
5	18CVL37.10	Single and Double story residential building	2	3	-	-	3	-	-	-	-	-	-	-	-	-	-	L6
5	18CVL37.11	Hostel building	2	3	-	-	3	-	-	-	-	-	-	-	-	-	-	L6
5	18CVL37.12	Hospital building.	2	3	-	-	3	-	-	-	-	-	-	-	-	-	-	L6
5	18CVL37.13	School building	2	3	-	-	3	-	-	-	-	-	-	-	-	-	-	L6
-	<b>18CVL37</b>	<b>Average attainment (1, 2, or 3)</b>	<b>2</b>	<b>3</b>			<b>3</b>											<b>-</b>
-	PO, PSO	1.Engineering Knowledge; 2.Problem Analysis; 3.Design / Development of Solutions; 4.Conduct Investigations of Complex Problems; 5.Modern Tool Usage; 6.The Engineer and Society; 7.Environment and Sustainability; 8.Ethics; 9.Individual and Teamwork; 10.Communication; 11.Project Management and Finance; 12.Life-long Learning; S1.Software Engineering; S2.Data Base Management; S3.Web Design																



## 5. Curricular Gap and Experiments

Topics & contents not covered (from A.4), but essential for the course to address POs and PSOs.

Expt	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					

Note: Write Gap topics from A.4 and add others also.

## 6. Experiments Beyond Syllabus

Topics & contents required (from A.5) not addressed, but help students for Placement, GATE, Higher Education, Entrepreneurship, etc.

Expt	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

## D. COURSE ASSESSMENT

### 1. Laboratory Coverage

Assessment of learning outcomes for Internal and end semester evaluation. Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

Unit	Title	Teaching Hours	No. of question in Exam								CO	Levels
			CIA-1	CIA-2	CIA-3	Asg-1	Asg-2	Asg-3	SEE			
1	Preparing detailed working drawing of Cross section of Foundation, masonry wall, RCC columns with isolated & combined footings	03	1	-	-	-	-	-	-	1	CO1	L6
2	Preparing detailed working drawing of Different types of bonds in brick masonry	03	1	-	-	-	-	-	-	1	CO2	L6
3	Preparing detailed working drawing of Different types of staircases – Dog legged, Open well	03	1	-	-	-	-	-	-	1	CO3	L6
4	Preparing detailed working drawing of Lintel and chajja	03	1	-	-	-	-	-	-	1	CO4	L6

## LABORATORY PLAN - CAY 2019-20

5	Preparing detailed working drawing of Cross section of a pavement	03	1	-	-	-	-	-	1	CO5	L6
6	Preparing detailed working drawing of Septic Tank and sedimentation Tank	03	1	-	-	-	-	-	1	CO6	L6
7	Layout plan of Rainwater recharging and harvesting system	03	1	-	-	-	-	-	1	CO7	L6
8	Cross sectional details of a road for a Residential area with provision for all services	03	-	1	-	-	-	-	1	CO8	L6
9	Steel truss (connections Bolted)	03	-	1	-	-	-	-	1	CO9	L6
10	Single and Double story residential building	06	-	1	-	-	-	-	1	CO10	L6
11	Hostel building	06	-	1	-	-	-	-	1	CO11	L6
12	Hospital building.	06	-	1	-	-	-	-	1	CO12	L6
13	School building	06	-	1	-	-	-	-	1	CO13	L6
-	<b>Total</b>	<b>50</b>	<b>7</b>	<b>8</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>20</b>	<b>-</b>	<b>L6</b>

## 2. Continuous Internal Assessment (CIA)

Assessment of learning outcomes for Internal exams. Blooms Level in last column shall match with A.2.

Evaluation	Weightage in Marks	CO	Levels
CIA Exam – 1	15	CO1, CO2, CO3, CO4	L5, L6
CIA Exam – 2	-	CO5, CO6, CO7,	L5, L6
CIA Exam – 3	-	CO8, CO9,CO10,CO11,CO12	L5, L6
Assignment - 1	05	CO1, CO2, CO3, CO4	L5, L6
Assignment - 2	-	CO5, CO6, CO7, CO8,	L5, L6
Assignment - 3	-	CO9,CO10,CO11,CO12	L5, L6
Seminar - 1	-		-
Seminar - 2	-		-
Seminar - 3	-		-
Other Activities – define – Slip test		CO1 to Co12	L5, L6
<b>Final CIA Marks</b>	<b>20</b>	<b>-</b>	<b>-</b>

SNo	Description	Marks
1	Observation and Weekly Laboratory Activities	10 Marks
2	Record Writing	10 Marks for each Exp
3	Internal Exam Assessment	20 Marks
4	Internal Assessment	20 Marks
5	SEE	80 Marks
-	<b>Total</b>	<b>100 Marks</b>

## E. EXPERIMENTS

### Experiment 01 : Detailing of RC Beams

-	Experiment No.:	1	Marks	Date Planned	Date Conducted
1	Title	Preparing detailed working drawing of Cross section of Foundation, masonry wall, RCC columns with isolated & combined footings			
2	Course Outcomes	Prepare detailed working drawing of Cross section of Foundation, masonry wall, RCC columns with isolated & combined footings			
3	Aim	Drawing of footings			
4	Material / Equipment Required	Lab Manual			
5	Theory, Formula, Principle, Concept	Basic knowledge of design of footings			
6	Procedure, Program, Activity, Algorithm, Pseudo Code	<ul style="list-style-type: none"> <li>The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.</li> <li>By using units command, we set the types as decimal, precision as 0.0000 and units to scale as millimeters.</li> <li>Ortho is switched off as the drawing requires use of inclined line also along with horizontal and vertical lines.</li> <li>By using the line command, the outline of the required drawing is drawn.</li> <li>By using the trim command, the extra lines are trimmed.</li> <li>Lines are extended using extend command wherever necessary.</li> <li>Donut option is used to represent the c/s of reinforcements.</li> <li>Offset command is used to get lines at regular distance.</li> <li>Hatching is done using hatch command.</li> <li>Dimensions are provided and text command is also used for labeling the drawing.</li> </ul>			
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph				
8	Observation Table, Look-up Table, Output				
9	Sample Calculations				
10	Graphs, Outputs				
11	Results & Analysis				
12	Application Areas	Design of beams			
13	Remarks				
14	Faculty Signature with Date				

### Experiment 02 : Detailing of RC Slabs

-	Experiment No.:	1	Marks		Date Planned		Date Conducted	
1	Title	Detailing of one way, two way and one-way continuous slabs						
2	Course Outcomes	Prepare detailed working drawing of one way, two way and one-way continuous slabs.						
3	Aim	Detailing of reinforced concrete slabs						
4	Material Equipment Required	/Lab Manual						
5	Theory, Formula, Principle, Concept	Basic knowledge of design of slabs						
6	Procedure, Program, Activity, Algorithm, Pseudo Code	<ul style="list-style-type: none"> <li>The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.</li> <li>By using units command, we set the types as decimal, precision as 0.0000 and units to scale as millimeters.</li> <li>Ortho is switched off as the drawing requires use of inclined line also along with horizontal and vertical lines.</li> <li>By using the line command, the outline of the required drawing is drawn.</li> <li>By using the trim command, the extra lines are trimmed.</li> <li>Lines are extended using extend command wherever necessary.</li> <li>Donut option is used to represent the c/s of reinforcements.</li> <li>Offset command is used to get lines at regular distance.</li> <li>Hatching is done using hatch command.</li> <li>Dimensions are provided and text command is also used for labeling the drawing.</li> </ul>						
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph							
8	Observation Table, Look-up Table, Output							
9	Sample Calculations							
10	Graphs, Outputs							
11	Results & Analysis							
12	Application Areas	Design of slabs						
13	Remarks							
14	Faculty Signature with Date							

### Experiment 03 : Detailing of RC Staircase

-	Experiment No.:	1	Marks		Date Planned		Date Conducted	
1	Title	Detailing of doglegged and openwell staircase						
2	Course Outcomes	Prepare detailed working drawing of staircase						
3	Aim	Detailing of staircase						
4	Material Equipment Required	/Lab Manual						
5	Theory, Formula, Principle, Concept	Basic knowledge of design of staircase						
6	Procedure, Program, Activity,	<ul style="list-style-type: none"> <li>The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our</li> </ul>						

	Algorithm, Pseudo Code	<p>requirements.</p> <ul style="list-style-type: none"> <li>By using units command, we set the types as decimal, precision as 0.0000 and units to scale as millimeters.</li> <li>Ortho is switched off as the drawing requires use of inclined line also along with horizontal and vertical lines.</li> <li>By using the line command, the outline of the required drawing is drawn.</li> <li>By using the trim command, the extra lines are trimmed.</li> <li>Lines are extended using extend command wherever necessary.</li> <li>Donut option is used to represent the c/s of reinforcements.</li> <li>Offset command is used to get lines at regular distance.</li> <li>Hatching is done using hatch command.</li> <li>Dimensions are provided and text command is also used for labeling the drawing.</li> </ul>
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	
8	Observation Table, Look-up Table, Output	
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Design of staircase
13	Remarks	
14	Faculty Signature with Date	

#### Experiment 04 : Preparing detailed working drawing of Lintel and chajja

-	Experiment No.:	1	Marks	Date Planned	Date Conducted
1	Title	drawing of Lintel and chajja			
2	Course Outcomes	Prepare detailed working drawing Preparing detailed working drawing of Lintel and chajja			
3	Aim	Detailing of Lintel and chajja			
4	Material Equipment Required	/Lab Manual			
5	Theory, Formula, Principle, Concept	Basic knowledge of Lintel and chajja			
6	Procedure, Program, Activity, Algorithm, Pseudo Code	<ul style="list-style-type: none"> <li>The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.</li> <li>By using units command, we set the types as decimal, precision as 0.0000 and units to scale as millimeters.</li> <li>Ortho is switched off as the drawing requires use of inclined line also along with horizontal and vertical lines.</li> <li>By using the line command, the outline of the required drawing is drawn.</li> <li>By using the trim command, the extra lines are trimmed.</li> <li>Lines are extended using extend command wherever necessary.</li> <li>Donut option is used to represent the c/s of reinforcements.</li> <li>Offset command is used to get lines at regular distance.</li> <li>Hatching is done using hatch command.</li> <li>Dimensions are provided and text command is also used for labeling the drawing.</li> </ul>			

7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	
8	Observation Table, Look-up Table, Output	
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Design of retaining wall
13	Remarks	
14	Faculty Signature with Date	

### Experiment 05 :cross section of pavement

-	Experiment No.:	1	Marks	Date Planned	Date Conducted
1	Title	Preparing drawing of Cross section of a pavement			
2	Course Outcomes	Preparing detailed working drawing of Cross section of a pavement			
3	Aim	drawing of Cross section of a pavement			
4	Material Equipment Required	/Lab Manual			
5	Theory, Formula, Principle, Concept	Basic knowledge of pavement			
6	Procedure, Program, Activity, Algorithm, Pseudo Code	<ul style="list-style-type: none"> <li>The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.</li> <li>By using units command, we set the types as decimal, precision as 0.0000 and units to scale as millimeters.</li> <li>Ortho is switched off as the drawing requires use of inclined line also along with horizontal and vertical lines.</li> <li>By using the line command, the outline of the required drawing is drawn.</li> <li>By using the trim command, the extra lines are trimmed.</li> <li>Lines are extended using extend command wherever necessary.</li> <li>Donut option is used to represent the c/s of reinforcements.</li> <li>Offset command is used to get lines at regular distance.</li> <li>Hatching is done using hatch command.</li> <li>Dimensions are provided and text command is also used for labeling the drawing.</li> </ul>			
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph				
8	Observation Table, Look-up Table, Output				
9	Sample Calculations				
10	Graphs, Outputs				
11	Results & Analysis				
12	Application Areas	Road construction			
13	Remarks				
14	Faculty Signature with Date				

**Experiment 06 : Preparing detailed working drawing of Septic Tank and sedimentation Tank**

-	Experiment No.:	1	Marks		Date Planned		Date Conducted	
1	Title	drawing of Septic Tank and sedimentation Tank Preparing detailed working drawing of Septic Tank and sedimentation Tank						
2	Course Outcomes	Preparing detailed working drawing of Septic Tank and sedimentation Tank						
3	Aim	drawing of Septic Tank and sedimentation Tank						
4	Material Equipment Required	/ Lab Manual						
5	Theory, Formula, Principle, Concept	Basic knowledge of design of water tank						
6	Procedure, Program, Activity, Algorithm, Pseudo Code	<ul style="list-style-type: none"> <li>The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.</li> <li>By using units command, we set the types as decimal, precision as 0.0000 and units to scale as millimeters.</li> <li>Ortho is switched off as the drawing requires use of inclined line also along with horizontal and vertical lines.</li> <li>By using the line command, the outline of the required drawing is drawn.</li> <li>By using the trim command, the extra lines are trimmed.</li> <li>Lines are extended using extend command wherever necessary.</li> <li>Donut option is used to represent the c/s of reinforcements.</li> <li>Offset command is used to get lines at regular distance.</li> <li>Hatching is done using hatch command.</li> <li>Dimensions are provided and text command is also used for labeling the drawing.</li> </ul>						
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph							
8	Observation Table, Look-up Table, Output							
9	Sample Calculations							
10	Graphs, Outputs							
11	Results & Analysis							
12	Application Areas	Sewage disposal						
13	Remarks							
14	Faculty Signature with Date							

**Experiment 07 : Layout plan of Rainwater recharging and harvesting system**

-	Experiment No.:	1	Marks		Date Planned		Date Conducted	
1	Title	Layout plan of Rainwater recharging and harvesting system						
2	Course Outcomes	Prepare detailed working drawing of Layout plan of Rainwater recharging and harvesting system						
3	Aim	Layout plan of Rainwater recharging and harvesting system						
4	Material Equipment Required	/ Lab Manual						
5	Theory, Formula,	Basic knowledge of Rainwater recharging and harvesting system						

	Principle, Concept	
6	Procedure, Program, Activity, Algorithm, Pseudo Code	<ul style="list-style-type: none"> <li>The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.</li> <li>By using units command, we set the types as decimal, precision as 0.0000 and units to scale as millimeters.</li> <li>Ortho is switched off as the drawing requires use of inclined line also along with horizontal and vertical lines.</li> <li>By using the line command, the outline of the required drawing is drawn.</li> <li>By using the trim command, the extra lines are trimmed.</li> <li>Lines are extended using extend command wherever necessary.</li> <li>Donut option is used to represent the c/s of reinforcements.</li> <li>Offset command is used to get lines at regular distance.</li> <li>Hatching is done using hatch command.</li> <li>Dimensions are provided and text command is also used for labeling the drawing.</li> </ul>
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	
8	Observation Table, Look-up Table, Output	
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Rainwater recharging and harvesting system
13	Remarks	
14	Faculty Signature with Date	

### Experiment 08 : Cross sectional details of a road for a Residential area with provision for all services

-	Experiment No.:	1	Marks	Date Planned	Date Conducted
1	Title	Cross sectional details of a road for a Residential area with provision for all services			
2	Course Outcomes	Prepare detailed working drawing of Cross sectional details of a road for a Residential area with provision for all services Cross sectional details of a road for a Residential area with provision for all services			
3	Aim	Cross sectional details of a road for a Residential area with provision for all services			
4	Material Equipment Required	/Lab Manual			
5	Theory, Formula, Principle, Concept	Basic knowledge Cross sectional details of a road			
6	Procedure, Program, Activity, Algorithm, Pseudo Code	<ul style="list-style-type: none"> <li>The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.</li> <li>By using units command, we set the types as decimal, precision as 0.0000 and units to scale as millimeters.</li> <li>Ortho is switched off as the drawing requires use of inclined line also along with horizontal and vertical lines.</li> <li>By using the line command, the outline of the required drawing is drawn.</li> <li>By using the trim command, the extra lines are trimmed.</li> <li>Lines are extended using extend command wherever necessary.</li> </ul>			



		<ul style="list-style-type: none"> <li>• Donut option is used to represent the c/s of reinforcements.</li> <li>• Offset command is used to get lines at regular distance.</li> <li>• Hatching is done using hatch command.</li> <li>• Dimensions are provided and text command is also used for labeling the drawing.</li> </ul>
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	
8	Observation Table, Look-up Table, Output	
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Cross sectional details of a road
13	Remarks	
14	Faculty Signature with Date	

### Experiment 09 : Single and Double story residential building

-	Experiment No.:	1	Marks	Date Planned	Date Conducted	
1	Title	Plan elevation & section of Single and Double story residential building				
2	Course Outcomes	Plan elevation & section Single and Double story residential building				
3	Aim	Drawings of Single and Double story residential building				
4	Material Equipment Required	/ Lab Manual				
5	Theory, Formula, Principle, Concept	Basic knowledge of residential buildings				
6	Procedure, Program, Activity, Algorithm, Pseudo Code	<ul style="list-style-type: none"> <li>• The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.</li> <li>• By using units command, we set the types as decimal, precision as 0.0000 and units to scale as millimeters.</li> <li>• Ortho is switched off as the drawing requires use of inclined line also along with horizontal and vertical lines.</li> <li>• By using the line command, the outline of the required drawing is drawn.</li> <li>• By using the trim command, the extra lines are trimmed.</li> <li>• Lines are extended using extend command wherever necessary.</li> <li>• Donut option is used to represent the c/s of reinforcements.</li> <li>• Offset command is used to get lines at regular distance.</li> <li>• Hatching is done using hatch command.</li> <li>• Dimensions are provided and text command is also used for labeling the drawing.</li> </ul>				
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph					
8	Observation Table, Look-up Table, Output					
9	Sample					

	Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Drawing of Single and Double story residential building
13	Remarks	
14	Faculty Signature with Date	

### Experiment 10 : Detailing of steel roof truss

-	Experiment No.:	1	Marks	Date Planned	Date Conducted	
1	Title	Detailing of roof truss for bolted connections.				
2	Course Outcomes	Prepare detailed working drawing of roof truss.				
3	Aim	Detailing of roof truss for bolted connections.				
4	Material Equipment Required	/Lab Manual				
5	Theory, Formula, Principle, Concept	Basic knowledge of design of roof truss.				
6	Procedure, Program, Activity, Algorithm, Pseudo Code	<ul style="list-style-type: none"> <li>The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.</li> <li>By using units command, we set the types as decimal, precision as 0.0000 and units to scale as millimeters.</li> <li>Ortho is switched off as the drawing requires use of inclined line also along with horizontal and vertical lines.</li> <li>By using the line command, the outline of the required drawing is drawn.</li> <li>By using the trim command, the extra lines are trimmed.</li> <li>Lines are extended using extend command wherever necessary.</li> <li>Donut option is used to represent the c/s of reinforcements.</li> <li>Offset command is used to get lines at regular distance.</li> <li>Hatching is done using hatch command.</li> <li>Dimensions are provided and text command is also used for labeling the drawing.</li> </ul>				
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph					
8	Observation Table, Look-up Table, Output					
9	Sample Calculations					
10	Graphs, Outputs					
11	Results & Analysis					
12	Application Areas	Design of roof truss in steel structural members				
13	Remarks					
14	Faculty Signature with Date					

### Experiment 11 : hostel building

-	Experiment No.:	1	Marks	Date Planned	Date Conducted	
1	Title	Plan elevation & section of hostel building				
2	Course Outcomes	Prepare detailed working drawing of Plan elevation & section of hostel building				
3	Aim	Plan elevation & section of hostel building				

4	Material Equipment Required	/Lab Manual
5	Theory, Formula, Principle, Concept	Basic knowledge of hostel building
6	Procedure, Program, Activity, Algorithm, Pseudo Code	<ul style="list-style-type: none"> <li>The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.</li> <li>By using units command, we set the types as decimal, precision as 0.0000 and units to scale as millimeters.</li> <li>Ortho is switched off as the drawing requires use of inclined line also along with horizontal and vertical lines.</li> <li>By using the line command, the outline of the required drawing is drawn.</li> <li>By using the trim command, the extra lines are trimmed.</li> <li>Lines are extended using extend command wherever necessary.</li> <li>Donut option is used to represent the c/s of reinforcements.</li> <li>Offset command is used to get lines at regular distance.</li> <li>Hatching is done using hatch command.</li> <li>Dimensions are provided and text command is also used for labeling the drawing.</li> </ul>
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	
8	Observation Table, Look-up Table, Output	
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Plan elevation & section of hostel building
13	Remarks	
14	Faculty Signature with Date	

### Experiment 12 : hospital building

-	Experiment No.:	1	Marks	Date Planned	Date Conducted	
1	Title	Detailing of gantry girder				
2	Course Outcomes	Plan elevation & section of hostel building				
3	Aim	Drawings of hostel building				
4	Material Equipment Required	/Lab Manual				
5	Theory, Formula, Principle, Concept	Basic knowledge of plan elevation section				
6	Procedure, Program, Activity, Algorithm, Pseudo Code	<ul style="list-style-type: none"> <li>The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.</li> <li>By using units command, we set the types as decimal, precision as 0.0000 and units to scale as millimeters.</li> <li>Ortho is switched off as the drawing requires use of inclined line also along with horizontal and vertical lines.</li> <li>By using the line command, the outline of the required drawing is drawn.</li> <li>By using the trim command, the extra lines are trimmed.</li> <li>Lines are extended using extend command wherever necessary.</li> </ul>				

		<ul style="list-style-type: none"> <li>• Donut option is used to represent the c/s of reinforcements.</li> <li>• Offset command is used to get lines at regular distance.</li> <li>• Hatching is done using hatch command.</li> <li>• Dimensions are provided and text command is also used for labeling the drawing.</li> </ul>
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	
8	Observation Table, Look-up Table, Output	
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Plan elevation & section of hostel building
13	Remarks	
14	Faculty Signature with Date	

## F. Content to Experiment Outcomes

### 1. TLPA Parameters

**Table 1: TLPA**

Expt-#	Course Content or Syllabus (Split module content into 2 parts which have similar concepts)	Content Teaching Hours	Blooms' Learning Levels for Content	Final Blooms' Level	Identified Action Verbs for Learning	Instruction on Methods for Learning	Assessment Methods to Measure Learning
<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>
1	Preparing detailed working drawing of Cross section of Foundation, masonry wall, RCC columns with isolated & combined footings	3	-L4 -L6	L6	Detailing	Lecture	Assignment
2	Preparing detailed working drawing of Different types of bonds in brick masonry	3	-L4 -L6	L6	Detailing	Lecture	Assignment
3	Preparing detailed working drawing of Different types of staircases – Dog legged, Open well	3	-L4 -L6	L6	Detailing	Lecture	Assignment
4	Preparing detailed working drawing of Lintel and chajja	3	-L4 -L6	L6	Detailing	Lecture	Assignment
5	Preparing detailed working drawing of Cross section of a pavement	3	-L4 -L6	L6	Detailing	Lecture	Assignment
6	Preparing detailed working drawing of Septic Tank and sedimentation Tank	3	-L4 -L6	L6	Detailing	Lecture	Assignment
7	Layout plan of Rainwater recharging and harvesting system	3	-L4 -L6	L6	Detailing	Lecture	Assignment
8	Cross sectional details of a road for a Residential area with provision for all services	3	-L4 -L6	L6	Detailing	Lecture	Assignment
9	Steel truss (connections Bolted)	3	-L4 -L6	L6	Detailing	Lecture	Assignment
10	Single and Double story residential building	3	-L4 -L6	L6	Detailing	Lecture	Assignment
11	Hostel building	3	-L4	L6	Detailing	Lecture	Assignment

			-L6				
12	Hospital building.	3	-L4 -L6	L6	Detailing	Lecture	Assignment
13	School building	3	-L4 -L6	L6	Detailing	Lecture	Assignment

## 2. Concepts and Outcomes:

**Table 2: Concept to Outcome – 15CV54**

Expt - #	Learning or Outcome from study of the Content or Syllabus	Identified Concepts from Content	Final Concept	Concept Justification (What all Learning Happened from the study of Content / Syllabus. A short word for learning or outcome)	CO Components (1.Action Verb, 2.Knowledge, 3.Condition / Methodology, 4.Benchmark)	Course Outcome  <b>Student Should be able to ...</b>
<i>A</i>	<i>I</i>	<i>J</i>	<i>K</i>	<i>L</i>	<i>M</i>	<i>N</i>
1	-	Detailing	Detailing	Rcc components.	-Detailing -Drafting in autocad	Preparing detailed working drawing of Cross section of Foundation, masonry wall, RCC columns with isolated & combined footings
2	-	Detailing	Detailing	Brick bonding.	Detailing -Drafting in autocad	Preparing detailed working drawing of Different types of bonds in brick masonry
3	-	Detailing	Detailing	staircase	Detailing -Drafting in autocad	Preparing detailed working drawing of Different types of staircases - Dog legged, Open well
4	-	Detailing	Detailing	Lintel and Chajja	Detailing -Drafting in autocad	Preparing detailed working drawing of Lintel and chajja
5	-	Detailing	Detailing	Beam and slabs.	Detailing -Drafting in autocad	Preparing detailed working drawing of Cross section of a pavement
6	-	Detailing	Detailing	Pavement	Detailing -Drafting in autocad	Preparing detailed working drawing of Septic Tank and sedimentation Tank
7	-	Detailing	Detailing	Septic tank	Detailing -Drafting in autocad	Layout plan of Rainwater recharging and harvesting system
8	-	Detailing	Detailing	Rain water harvesting.	Detailing -Drafting in autocad	Cross sectional details of a road for a Residential area with provision for all services
9	-	Detailing	Detailing	Steel truss	Detailing -Drafting in autocad	Steel truss (connections Bolted)
10		Detailing	Detailing	Residential building	Detailing -Drafting in autocad	Single and Double story residential

						building
11		Detailing	Detailing	Hostel building	Detailing -Drafting in autocad	Hostel building
12		Detailing	Detailing	Hospital building	Detailing -Drafting in autocad	Hospital building.
13		Detailing	Detailing	School building	Detailing -Drafting in autocad	School building