


**Government of Karnataka**  
**Department of Technical Education**  
**Board of Technical Examinations, Bengaluru**

	Course Title: <b>COMPUTER APPLICATION LAB</b>		
	Credits (L:T:P) : <b>0:2:4</b>	Total Contact Hours: <b>78</b>	Course Code: <b>15CE64P</b>
	Type of Course: <b>Practical</b>	Credit : <b>03</b>	Core/ Elective: <b>Core</b>
CIE- 25 Marks		SEE- 50 Marks	

**Pre-requisites:** Knowledge of drafting software and RCC.

**Course Objective:** Students are expected to prepare RCC and Steel structural drawings as per IS standards using drafting software.

**Course Outcomes:**

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

Course Outcome		Experiments linked	CL	Linked PO	Teaching Hrs
CO1	Drawing and detailing of different RCC structural elements	1,2,3,4,5,6,7, 8,9,10	R/U/Ap/C	1,2,3,4,5, 6,7,8,9,10	36
CO2	Drawing and detailing of different Steel structures	11,12,13, 14,15	R/U/Ap/C	1,2,3,4,5, 7,8,9,10	18
CO3	Develop programs on M.S. EXCEL for quantity estimation of structures.	16,17,18,19	R/U/Ap/C	1,2,3,4,5, 8,9,10	21
CO4	Identify and know available open source software for civil engineering applications	20	R/U	1,2,9,10	03
CO5	Manage suggested activity in teams and able to correlate the concept of drafting with ready structures		R/U/Ap/C	1,2,3,4,5,6,7, 8,9,10	*
<b>Total sessions</b>					<b>78</b>

**Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation**



## Programme Outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and Practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
<b>COMPUTER APPLICATION LAB</b>	3	3	3	3	3	3	3	3	3	3
<p><b>Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.</b></p> <p>Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.</p> <p>If <math>\geq 40\%</math> of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3</p> <p>If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2</p> <p>If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1</p> <p>If <math>&lt; 5\%</math> of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.</p>										

## COURSE CONTENT

UNIT	EXERCISES	HOURS
1	Drawing and Detailing of RCC structural elements	36
2	Drawing and Detailing of structural steel elements	18
3	Quantity Surveying using spread sheet	21
4	Demonstration of Free open source software	03
5	Suggested Activities	-
<b>Total</b>		<b>78</b>



## COURSE CONTENT:

UNIT	EXERCISES		HOURS
1	<b>RCC STRUCTURES</b>		
	Exercise 1	Introduction to detailing of RCC structural elements as per IS:456-2000 and SP-34. Detailing of steel structures as per IS:800-2007 and SP-6(1).	6
	<b>Drawing and Detailing of structural elements for given design data using CAD</b>		
	Exercise 3	Doubly reinforced beam	3
	Exercise 4	T-beam	3
	Exercise 5	Lintel with chejja	3
	Exercise 6	One way slab and Two way slab	6
	Exercise 7	One way continuous slab	3
	Exercise 8	RCC column with isolated footing (Rectangular only)	3
	Exercise 9	Dog-legged with waist slab and Folded plate staircase	6
	Exercise 10	Cantilever Retaining wall	3
<b>NOTE: Preparing bar bending schedule using MS-excel for any one of the above Exercise</b>			
2	<b>STEEL STRUCTURES</b>		
	<b>Drawing and Detailing of structural steel elements for given data using CAD</b>		
	Exercise 11	Steel truss details with bolted/welded connection.	6
	Exercise 12	Beam to beam simple connection	3
	Exercise 13	Beam to column simple connection	3
	Exercise 14	Column with slab base	3
	Exercise 15	Column with gusseted base	3
3	<b>For given drawing prepare estimation using spread sheet (No drafting)</b>		
	Exercise 16	Manhole	6
	Exercise 17	Septic Tank	3
	Exercise 18	Slab culvert	6
	Exercise 19	Simple Weir	6
4	Exercise 20	Demo on any one of Building Information Module software like RIVET Architecture, ECHO SIM, STAAD PRO, ETAB and GIS (Free open source software)	3
5	<b>Suggested Activities</b>		-
<b>Total</b>			<b>78</b>

**Course Delivery:** The course will be delivered through lectures, Demonstration, Drafting and design software.



### SUGGESTED ACTIVITIES



The topic should be related to the course in order to enhance his knowledge, practical skill, lifelong learning, communication and modern tool usage.

1. Prepare spreadsheet of design of RCC elements
2. Analyse the elements of structures using available open source software
3. Draw and detail of RCC elements using available open source software
4. Drafting & Detailing of reinforcement for Truss using CAD
5. Drafting & Detailing of reinforcement for Slab bridge using CAD
6. Create a Solid Model of beam using CAD
7. Use of Structural Analysis software (Open source software), design a Simply supported beams with UDL and Cantilever beam with UDL.
8. Prepare a quantity surveying in estimation of Tank sluice using spread sheet
9. Prepare a quantity surveying in estimation of Septic Tank using spread sheet
10. Deflection and Stresses in beams using analysis software
11. Concrete mix design and mathematical calculations using CAD
12. Development of Excel sheet for design of Singly Reinforced Beam
13. Linking all the constructional activities using project management software
14. Digitization of existing topo sheet or any map using GIS.

**NOTE:**

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good**4**, Exemplary**5**)
2. Reports should be made available along with bluebooks to IA verification officer



### Example of model of rubrics / criteria for assessing student activity

Dimension	Students score				
	(Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory <b>1</b> , Developing <b>2</b> , Satisfactory <b>3</b> , Good <b>4</b> , Exemplary <b>5</b>				
1.Organisation	1				
2.Fulfill team's roles	4				
3.Conclusion	3				
4.Conversions	5				
<b>Total</b>	13				
Average=(Total /4)	3.25=4				
<b>Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students</b>					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

### Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes	
	Direct Assessment method	CIE	IA	Students	Twice test (average of two tests)	Test 1	10	Blue books
					Test 2	CO3,CO4		
						Record	10	Index sheets
			Suggested Activity		05	Reports	CO5	
SEE		End Exam	End of the course		50	Answer scripts at BTE	CO1,CO2,CO3	
Indirect Assessment	Student Feedback on course		Students	Middle of the course	---	Feedback forms	CO1 Delivery of course	
	End of Course Survey			End of the course	---	Questionnaires	CO1 to CO5 Effectiveness of Delivery of instructions & Assessment Methods	

\*CIE – Continuous Internal Evaluation

\*SEE – Semester End Examination

### Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.



Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	30
2	Applying the knowledge acquired from the course	60
3	Analysis	0
4	Synthesis ( Creating new knowledge)	10
5	Evaluation	0

SI No	Scheme of evaluation for End Examination	Marks
1	Drawing and detailing of any one structural element.(RCC or Structural steel)	
	a) Prepare Drawing and detailing manually for the given data	10
	b) Draw the same using CAD	20
2	Estimation of any one given drawing in unit 3	10
3	Viva-voce	05
4	Record & Suggested activity report	05
<b>Total</b>		<b>50</b>

**Note :** Record & Report on suggested activities are mandatory during SEE.



### TEXT BOOKS

1. IS 456:2000 code of practice for plain & reinforced concrete.
2. SP 16 : Design Aid for reinforced concrete
3. SP 34: Hand book on Concrete Reinforcement and detailing (1987)
4. IS 13920: Ductile detailing of RC structures
5. IS 800 - 2007: Code of Practice for General construction in steel
6. SP(6) 1: Hand book for structural steel sections
7. Hand book on Concrete Reinforcement and Detailing by MG. SHAHA.
8. Detailing of RCC structures by SAWHNY.
9. Details of Steel Structure by SAWHNY.

### E-links

1. [https://www.youtube.com/watch?v=IW\\_cbyxHISU](https://www.youtube.com/watch?v=IW_cbyxHISU)
2. <http://www.comp-engineering.com/ETABManE.htm>

### Equipment List:

1. Computers with Latest Configuration. (One Computer per student in practical session.)
2. Any latest licensed Computer Aided Drafting Software.
3. Plotter of size A2/A3
4. LCD Projector
5. UPS 5KVA

