C-18 CURRICULUM

DIPLOMA IN ARCHITECTURAL ASSISTANTSHIP

STATE BOARD OF TECHNICAL EDUCATION & TRAINING

TELANGANA, HYDERABAD

V SEMESTER

DIPLOMA IN ARCHITECTURAL ASSISTANTSHIP
DIPLOMA IN ARCHITECTURAL ASSISTANTSHIP, (C -18)
SCHEME OF TEACHING AND EXAMINATION

FIFTH SEMESTER

S. NO.	SUBJECT CODE	SUBJECT NAME	Instruction periods per week			Total Periods per semester	Credits	Continuous Internal Evaluation			Semester End Examination		Total Marks	Min marks (Internal +End Exam)
			L	T	P			Mid Sem I	Mid SemII	Sesionals	Max marks	Min marks		
		THEORY SUBJECTS												
1	18 AA-501 C	REINFORCED CONCRETE STRUCTURES	2.4	1.6	0	60	3	20	20	20	40	15	100	35
2	18 AA-502 C	ENTREPRENEURSHIP AND PROJECT MANAGEMENT	2.4	1.6	0	60	3	20	20	20	40	15	100	35
3	18 AA-503 C	BUILDING SERVICES	2.4	1.6	0	60	3	20	20	20	40	15	100	35
4	18 AA-504 C	INTERNATIONAL ARCHITECTS	2.4	1.6	0	60	3	20	20	20	40	15	100	35
		DRAWING SUBJECTS												
5	18 AA-505D	INTERIOR DESIGN	1	0	3	60	1.5	20	20	20	40	20	100	50
		PRACTICAL SUBJECTS												
6	18 AA-506 P	DESIGN PRACTICE LAB	1	0	2	45	1.5	20	20	20	40	20	100	50
7	18 AA-507 P	ADVANCED CAD LAB PRACTICE	1	0	2	45	1.5	20	20	20	40	20	100	50
8	18 AA-508 P	WORKING DRAWINGS LAB PRACTICE	1	0	2	45	1.5	20	20	20	40	20	100	50
9	18 AA-509 P	PROGRAMMING IN C LAB PRACTICE	1	0	2	45	1.5	20	20	20	40	20	100	50
10	18 AA-510 P	PROJECT WORK	0	0	6	90	4.5	Seminar1 (20)	Seminar2 (20)	20	40	20	100	50
		TOTAL	17	8	17	630	**25**	200	200	200	400	180	1000	390

Department of Technical Education

State Board of Technical Education &Training (TS)

Course Title:	**Reinforced Concrete Structures (Common with Civil)**	Course Code :	**18AA-501C**
Semester:	**V Semester**	Course Group :	**Core**
Teaching Scheme inPeriods(L:T:P):	**45:15:0**	Credits :	**3**
Methodology :	**Lecture+Assignments**	Total Contact Periods :	**60 Periods**
CIE :	**60 Marks**	SEE :	**40 Marks**

This course is common for DCE

Pre requisites

This course requires the knowledge of Building materials and Construction practice, Engineering Mechanics and Strength of Materials

Course Outcomes

Upon the completion of the course, the student shall be able to

CO1	Illustrate the basic concepts of RCC design by limit state, identify grades of concrete and steel and calculate the loads acting on the structure
CO2	Analyse and Design a rectangular beam
CO3	Design a slab considering boundary conditions
CO4	Calculate strength of a flanged section as per code
CO5	Calculate the design moments and forces in continuous beams and slabs as per codal provisions and show the reinforcement details as per SP-34
CO6	Design a short column and footing according to codal provisions

Course Content and Blue Print of Marks for SEE

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<tr><td>1</td><td>Introduction to R.C.C and Philosophy of Limit State design</td><td>08</td><td rowspan="6">Q4</td><td colspan="2" rowspan="2">Q1</td><td rowspan="2">Q9(a)</td><td rowspan="2">Q13(a)</td></tr>
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<tr><td>6</td><td>Design of columns and footings</td><td>12</td><td>Q7,Q8</td><td>Q10(b), Q12(a), Q12(b)</td><td>Q13(b), Q16(a), Q16(b)</td></tr>
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Course Contents

UNIT 1: Introduction to R.C.C and Philosophy of Limit State design

Duration: 08Periods(L: 6– T:2).

1.1 Introduction to R.C.C

1.2 Codes of practice of R.C.C design

1.3 Nominal Mix – Design Mix – differences.

1.4 Loads to be adopted in R.C.C. design.

1.5 Properties of Concrete

1.6 Methods of designing R.CElements

1.7 Strength and serviceability limit states, characteristic strength of materials and characteristic loads and partial safety factors.

1.8 Design strength of materials and design loads.

1.9 Assumptions made in the limit state design.

1.10 Stress-strain diagram of singly reinforced RCC beam.

UNIT 2: Analysis and design of Rectangular beams Duration: 12Periods(L:9 – T:3)

2.1 Depth of neutral axis, lever arm.

2.2 Moment of resistance of singly reinforced Rectangular section

2.3 Critical percentage of steel.

2.4 Calculation of moment of resistance of the given section and design of singly reinforced rectangular beam for the given load as per IS 456-2000.

2.5 Doubly reinforced sections - necessity, use.

2.6 Calculation of neutral axis and moment of resistance for the given section and grades of concrete and steel.

2.7 Shear in singly reinforced beams

2.8 Methods of providing shear reinforcement-vertical stirrups - combination of vertical stirrups and bent up bars.

2.9 Code provisions for spacing of stirrups and minimum shear reinforcement (no derivation of equations).

2.10 Development of bond stress in reinforcing bars.

2.11 Design bond stress - development length – bond and anchorage concepts and their importance.

2.12 Curtailment of tension reinforcement-codal provisions.

2.13 Simple problems on development length.

2.14 Design of simply supported singly reinforced rectangular beam for flexure including shear and check for deflection using stiffness criteria - Use of design aids (SP-16).

UNIT 3: Design of slabs **Duration: 12Periods(L:9.0 – T:3.0)**

3.1 Slabs as structural and functional members

3.2 One way and two way slabs

3.3 Minimum reinforcement and maximum spacing of reinforcement – concrete cover - stiffness criterion- stiffness ratios for simply supported, cantilever and continuous slabs.

3.4 One way and two way slabs with various end conditions as per I.S:456 code.

3.5 Design of one-way slab for flexure and shear for the given grades of concrete, steel, span and loading.

3.6 Check for deflection using simplified approach of stiffness criteria.

3.7 Design of two-way slabs with different end conditions,

3.8 Design of torsion reinforcement for the restrained slabs – Deflection check using stiffness criteria - Use of design aids (SP-16).

UNIT 4:Analysis of T-beam **Duration: 08Periods(L:6.0 – T:2.0)**

4.1 Conditions needed for design of a beam as T-Section–advantages Code provisions for effective flange width - three cases of tee beams.

4.2 Neutral axis, lever arm and moment of resistance for under reinforced, balanced sections using the equations given in the code (no derivations).

4.3 Calculation of the moment of resistance of T- section using the equations given in the code – Use of design aids(SP16).

UNIT 5:Principles of design of Continuous beams, Slabs and stairs

Duration: 08Periods(L:6.0– T:2.0)

5.1 Behavior of continuous members and advantages of continuous beams and slabs.

5.2 Determination of B.M and S.F of continuous beams and slabs of minimum three spans using BM & SF coefficients given in the code-Use of design aids(SP-16).

5.3 Detailing of reinforcement in a continuous beam of three spans.

5.4 Classify the stairs based on the structural behavior or support condition.

5.5 Detailing of reinforcement in stairs spanning longitudinally.

UNIT 6: Design of columns and footings **Duration: 12Periods(L:9.0 – T:3.0)**

6.1 Definition of column – Difference between Column and Pedestal.

6.2 Types of columns (Long and Short) - effective length for different end conditions.

6.3 Code provisions for design of columns- square, rectangular and circular columns with lateral ties and helical reinforcement

6.4 Determination of Load carrying capacity of short column- square, rectangular, circular, helically reinforced column subjected to axial load only.

6.5 Design of short square, rectangular columns

6.6 Design of circular columns using helical reinforcement and lateral ties

6.7 Footings - Need for footings

6.8 Footings under isolated columns – loads on footings

6.9 Code provisions for design of footings - size of footings for given bearing capacity

6.10 Procedure of checking the footing for one-way shear, two-way shear, bearing stress and for development length.

6.11 Design of an isolated square footing of uniform thickness under a square/rectangular/circular column for flexure only.

Recommended Books

1. I.S:456- 2000
2. I.S:875-1987
3. "Concrete Technology" by A.R.Santhakumar, Oxford university press
4. "Properties of Concrete" by A.M. Neville, Pearson Education
5. "CONCRETE TECHNOLOGY Theory and practice" by M.S ShettyS. Chand & Co. Ltd., New Delhi
6. "Reinforced Concrete Design" by S UnnikrishnaPillai&DevdasMenonTata McGraw-Hill Publishing Co. Ltd. New Delhi
7. "REINFORCED CONCRETE Mechanics and Design" by James G. MacGregor and James K. Wight, Pearson Prentice hall
8. "Design of Concrete Structures" by Arthur H. Nilson, David Brown and Charles W. Dolan, Tata McGraw-Hill Publishing Co. Ltd. New Delhi
9. "Limit State Design of Reinforced Concrete" by P.C. VarghesePrentice-Hall of India Pvt. Ltd. New Delhi
10. Limit State Design of R.C.C Structures by Ashok K. JainNemchand brothers, Roorkee.
11. Structural Engineering(RCC) by Ramamrutham.
12. Structural Engineering (RCC) by Vazirani and Ratwani.
13. Reinforced Concrete Structures by I.C.Syal and A.K.Goyal
14. Structural Design & Drawing by N. Krishna Raju, Universities press

15. Reinforced Concrete Design by S.N. SinhaTata McGraw-Hill Publishing Co. Ltd. New Delhi
16. SP:34 - Handbook on concrete reinforcement and detailing

Suggested E-learning references

1. http://nptel.ac.in
2. https://www.youtube.com/watch?v=Grv09rIAPQM
3. https://freevideolectures.com/Course/2686/Design-of-Reinforced-Concrete-Structures

Suggested Learning Outcomes

After completion of the course, the student shall be able to

1.1 Differentiate Plain Cement Concrete and Reinforced Cement Concrete.
1.2 State the necessity of reinforcement in plain concrete
1.3 State the advantages and disadvantages of R.C.C.
1.4 Identify the material used in R.C.C. and their function in R.C.C.
1.5 State the different codes used
1.6 List the Loads to be considered in the design of R.C. elements.
1.7 State the different methods of designing R.C. elements.
1.8 State the different grades of concrete
1.9 Differentiate the nominal mix concrete and design mix concrete.
1.10 State the equations of tensile strength and modulus of elasticity of concrete as per IS 456 – 2000.
1.11 Calculate the properties of concrete: Poisson's ratio, creep, shrinkage, workability and unit weight, Compressive Strength/Grade of Concrete, Tensile Strength
1.12 State the different types of steel as per IS 456 – 2000.
1.13 State the modulus of elasticity and unit weight of steel.
1.14 Define Limit State and State different limit states.
1.15 Distinguish 'strength' and 'serviceability' limit states
1.16 State the different IS: 456 – 2000 code provisions for Limit state method of design.
1.17 Define the 'characteristic strength' of materials and 'characteristic loads'
1.18 Explain the role of partial safety factors in limit state design.
1.19 Define 'Design strength of materials' and 'Design loads'
1.20 State the assumptions made in the limit state design.

1.21 Draw the Stress diagram, strain diagram for a singly reinforced rectangular beam indicating appropriate stress and strain values in compression zone and tension zone of the beam,

1.22 Calculate the depth of rectangular and parabolic stress blocks.

2.1 Calculate the total compressive force and total tensile force resisted by the singly reinforced rectangular beam.

2.2 Calculate the depth of neutral axis from the equilibrium condition

2.3 Define lever arm and write the equation for lever arm for a singly reinforced rectangular beam.

2.4 Define critical or balanced section, under reinforced section and over reinforced section.

2.5 Explain - why the over reinforced sections are not recommended?

2.6 Calculate the maximum depth of neutral axis, limiting value of moment of resistance with respect to concrete and steel and limiting percentage of steel.

2.7 State the general design requirements for beams in limit state design as per IS 456 – 2000(Effective span, limiting stiffness, minimum tension reinforcement, maximum tension reinforcement, maximum compression reinforcement, spacing of main bars, Cover to reinforcement, side face reinforcement.)

2.8 Calculate the depth of neutral axis for a given section and decides the section is balanced or under reinforced or over reinforced and accordingly calculates the moment of resistance for the respective case.

2.9 Calculate the area of steel for a given beam with given cross section and loading.

2.10 Explain the effect of shear on beam.

2.11 Explain the shear stress distribution across a homogeneous section and reinforced concrete section with sketches.

2.12 Calculate the design shear strength and maximum shear stress in different grades of concrete as per IS 456 – 2000.

2.13 State the necessity of shear reinforcement and different forms of shear reinforcement provided in beams

2.14 Show the critical section for shear.

2.15 Calculate the shear strength of concrete, shear resistance of vertical stirrups, shear resistance of bent up bars as per IS 456 – 2000.

2.16 Calculate the minimum shear reinforcement and maximum spacing of shear reinforcement as per IS 456 – 2000.

2.17 Calculate the nominal shear stress, shear resisted by bent up bars and spacing of vertical stirrups.

2.18 Design the shear reinforcement for beams.

2.19 State the situations which require doubly reinforced beams.

2.20 Determine the moment of resistance for a given doubly reinforced section (given d'/d – f_{sc} values)

2.21 Calculate the allowable working load on singly reinforced and doubly reinforced beam for the given span.

2.22 Calculate the development length of bars in compression, tension,

2.23 Sketch the detailing of reinforcement as per SP-34 showing the curtailment position for main tension bars. State the importance of anchorage values of reinforcement.

2.24 Design a singly reinforced simply supported rectangular beams for the given grades of materials, span and loading, for flexure including shear design with the curtailment of reinforcements and check for the deflection using simplified approach of the code.

3.1 Distinguish oneway slabs and twoway slabs.

3.2 List the types of slabs based on support condition.

3.3 State the general design requirements of slabs as per IS 456 – 2000.

3.4 State the functions of distribution steel in slabs.

3.5 Sketch the general reinforcement details for a a) oneway slab simply supported on two parallel sides and b) oneway slab simply supported on four sides. c) two way simply supported slab d) one-way continuous slab, e) cantilever slab continuous over a support and f) slab cantilevering from the top of a beam.

3.6 Mark the edge strip and middle strip of a twoway slab.

3.7 Sketch the general reinforcement details for a continuous two way slab for its edge strip and middle strip using straight bars and bent up bars.

3.8 Design one-way slab for given grades of materials, loads and span for flexure and including shear check, check for deflection using stiffness criteria.

3.9 Sketch Load distribution in two-way slabs. Design two-way slab with different end conditions for flexure including shear using B.M and S.F coefficients. Provide torsional reinforcement in the restrained slabs. Check the deflection using simplified approach of stiffness criteria.

4.1 Distinguish a T- beam and L- beam.

4.2 List the advantages of a T- beam.

4.3 State the formula for effective width of flange of a T- beam and L- beam as per IS 456 – 2000.

4.4 Calculate the effective width of flange of an isolated T- beam as per IS 456 – 2000.

4.5 Describe the three cases of determining Neutral axis of T-beams with sketches and notations.

4.6 Calculate the depth of neutral axis and moment of resistance of the given Tee section using the expressions given in the code.

4.7 Calculate the minimum and maximum reinforcement in T- beams as per 456 – 2000.

5.1 Explain the behavior of continuous slabs and beams subjected to loading.

5.2 List the advantages of continuous beams or slabs.

5.3 Draw the line diagram of a continuous slab or beam and indicate the bending moment and shear force values at salient points as per IS 456 – 2000.

5.4 Show the position of sagging (+ve) and hogging (-ve) bending moments along the continuous beam or slab.

5.5 Sketch the general reinforcement details for a continuous beam or slab.

5.6 Calculates the B.M and S.F of continuous beams and slabs (Minimum of three spans) at critical sections using B.M and S.F coefficients given in the code.

5.7 Classify the stairs based on the structural behavior or support condition.

5.8 Sketch the detailing of reinforcement in stairs spanning longitudinally (Dog legged staircase).

6.1 Define a column/ compression member

6.2 Differentiate column, strut, pedestal, post

6.3 State the necessity of providing reinforcement in column.

6.4 Explain the behavior of column under loading

6.5 Define and calculate the effective length of column for different end conditions as per theory and as per code.

6.6 Classify the columns based on type of reinforcement, loading and slenderness ratio.

6.7 Calculate the slenderness limits for column to avoid buckling of column.

6.8 Calculate minimum eccentricity of column.

6.9 Calculate the load carrying capacity of a short column with lateral ties and with helical reinforcement as per IS 456 – 2000.

6.10 Differentiate between short and long columns and understand their failure behavior.

6.11 State the design requirements of columns as per IS 456 – 2000.

6.12 Designs a Short Square, rectangular, circular column with lateral ties and helical reinforcement (subjected to axial load only).

6.13 Define Footing and States different types of Footings (Square/ Rectangular Isolated footings of Uniform/Tapered sections).

6.14 Calculate the minimum depth of foundation using Rankine's formula.

6.15 State the code provisions for the design of R.C.C footings.

6.16 Explain the procedure of checking the footing for one-way shear, two-way shear, bearing stress and for development length.

6.17 Design of an isolated square footing of uniform thickness under a rectangular/square/circular column for flexure only.

Note: Students may be encouraged to use design aid SP-16, SP-34 and SP-23 for design of slabs, beams for general practice. I.S.456 – 2000 is allowed in the Examination

Suggested Student Activities

1. Visit to nearby multi-storeyed building/Apartment etc and collect the structural details.
2. Design the structural elements-Beams, slabs and columns for residential building (One and Two story building).
3. Prepare a case study of failure of structures due to wrong design, use of poor quality of materials and faulty construction methods.
4. Understand the concept of formwork for different types of buildings and collect information about stripping times for forms for different conditions.
5. Collect the IS codes related to Design of RCC structures, make a report and present it
6. Tech fest/Srujana
7. Paper/Poster presentation
8. Quiz
9. Group discussion
10. Surprise Test

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	1	3	3	2			1			2	1,2,4,7,10
CO2	2	2			2		1		3	3	1,2,5,7,9,10
CO3	1	3			2		1		2	2	1,2,5,7,9,10
CO4		3					1			2	2,7,10
CO5		3		2			1			3	2,4,7,10
CO6	1	3		2	3		1		3	3	1,2,4,5,7,9,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments		5
Seminars		5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
Total Marks						20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

Unit No	Questions to be set for SEE				
	R			U	A
I	Q4	Q1		Q9(a)	Q13(a)
II					
III		Q2		Q10(a)	Q14(a)
IV					
V		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
VI			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total Questions	8			8	8

State Board of Technical Education and Training, Telangana
Model Question paper
DAA V semester Mid Semester-I Examination

Corse Code:18AA-501C **Duration:1 Hour**
Course Name: Reinforced Concrete Structures **Max.Marks:20 Marks**

PART-A

Answer **all** questions, Each Question carries **one**mark **4x1 = 4 Marks**

1. Define design strength of material and deign load.
2. Find modulus of elasticity of concrete as per IS 456-2000 for M30 concrete.
3. List various forms of shear reinforcement in beams.
4. Define development length.

PART-B

Answer **two** questions. Each question carries **three** marks **2x 3 = 6 Marks**

5(a) Explain how the maximum strength of concrete in outermost fiber of compression istaken as $0.446f_{ck.}$

(OR)

5 (b) Explain limit state of collapse and serviceability conditions.

6(a)Find the limiting moment of resistance of a singly reinforced beam of size 200 x400mm, use M20 grade concrete and Fe415 steel, effective cover toreinforcement is 25mm.

(OR)

6 (b)Calculate the spacing of two legged 8mm stirrups as per min. shear reinforcement for a beam 350mm wide and 500mm overall depth of Fe415 steel.

PART-C

Answer **two** questions. Each question carries **five** marks **2x 5 = 10 Marks**

7(a) Explain the stress bock diagram for RC beam indicating values.

(OR)

7(b) Draw the stress- strain diagram for concrete ,mild steel bars and cold deformed bars.

8(a) A Singly reinforced RC beam simply supported over an effective span of 4m,carries a udl of 10 KN/m over entire span. Design the beam using M20 grade concrete and Fe415

(OR)

8(b)Singly reinforced rectangular beam 300 X 600 mm effective depth carries a uniformlydistributed load of 40 KN/m including its self-weight over simply supported span of 6 mand is reinforced with 6 bars of 20 mm diameter of which 2 bars are curtailed near thesupport. Design the shear reinforcement. Use M20 grade concrete and Fe 415 bars.

State Board of Technical Education and Training,Telangana
Model Question paper
DAA V semester Mid Semester-II Examination

Corse Code:18AA-501C **Duration:1 Hour**
Course Name: Reinforced Concrete Structures **Max.Marks:20 Marks**

PART-A

Answer **all** questions, Each Question carries **one** mark **4x1 = 4 Marks**

1) Distinguish between one way and two way slabs.
2) Write the codal provisions for maximum spacing of bars in slabs.
3) List the advantages of T beams.
4) State the conditions needed to design a beam as a T-Beam.

PART-B

Answer **two** questions. Each question carries **three** marks **2x 3 = 6 Marks**

5 (a) How do you check for shear and deflection in design of slabs?

(OR)

5 (b) Draw the cross section of a cantilever slab (sunshade) and show the reinforcement details.

6(a) What are the advantages of T-beams ? Give the equations for the effective flangewidth of isolated T and L beams.

(OR)

6(b)Find effective flange width of a T beam with the following details. Effective span =5.5m, centre to centre distance of adjacent panels = 4m, Breadth of web = 300mm,thickness of slab = 120mm.

PART-C

Answer **two** questions. Each question carries **five** marks **2x 5 = 10 Marks**

7 a) Design a simply supported RCC slab for a verandah of clear dimensions 3 X 9 m. widthof supports is 230mm. Superimposed load is 3 KN/Sq.m and weight of finishes is 1.0 KN/Sq.m. Use M 25 concrete and HYSD bars of Fe 415 grade.

(OR)

7 b)Design a simply supported RC slab for a room of clear size 4 X 3.5 m. superimposedload is 2 KN/Sq.m and weight of finishes is 1.0 KN/Sq.m. The corners of slab are notheld down. Width of supports is 230mm. Use M25 grade concrete and Fe 415 steel.

8 a) A T beam of effective flange width 750 mm, thickness of slab 120mm, width of rib250mm, and effective depth 450mm is reinforced with 3500 Sq.mm of tension steel. Calculate the moment of resistance of the section. M20 grade concrete are Fe415 bars are used.

(OR)

8 b)A T beam of effective flange width 800 mm, thickness of slab 90 mm, width of rib230mm, and effective depth 400mm is reinforced with 5 numbers of 20mm diameterbars. Calculate the moment of resistance of the section. M20 grade concrete are Fe250bars are used.

State Board of Technical Education and Training, Telangana
Model Question paper
DAA V Semester
Semester End Examination

Corse Code: 18AA-501C **Duration:2 Hours**
Course Name: Reinforced Concrete Structures **Max.Marks:40 Marks**

PART-A

Answer **all** questions. Each question carries **one** mark. **8 x 1= 8 Marks**

1) Define characteristic compressive strength of concrete.
2) Write the code provisions for maximum spacing of bars in slabs.
3) How do you calculate minimum eccentricity in design of columns?
4) Define development length.
5) State the formula to calculate effective span in case of a continuous beam.
6) State the advantages of a continuous beam.
7) What are the specifications for lateral ties in a column?
8) State the formula for calculating minimum depth of foundation using Rankine's formula

PART – B

*Answer **all** questions . Each question carries **three** marks* **4x 3 M = 12M**

9(a)Calculate the limiting percentage of tension reinforcement if M20 concrete and Fe 415 steel are used.

(OR)

9(b) Draw the line diagram of a continuous beam and indicate salient points with bending moment equations as per code at those locations.

10(a) Draw the cross section and stress diagrams for three cases of a T beam.

(OR)

10(b) List any six codal provisions for longitudinal reinforcement in design of columns.

11(a) Find effective flange width of a T beam with the following details. Effective span = 5.5m,centre to centre distance of adjacent panels = 4m, Breadth of web = 300mm, thickness ofslab = 120mm.

(OR)

11(b) A continuous RCC rectangular beam of size 250 X 500mm overall is supported on300 X 300mm masonry columns at clear intervals of 3 m. Calculate the effective spans.

12(a) A short axially loaded column of size 300 X 350 mm is reinforced with 8 bars of 20mm diameter Fe 415 grade steel. Concrete is M 30 grade. Calculate the load carrying capacityof column.

(OR)

12(b) List and explain the steps for design of isolated square footing.

PART – C

*Answer **all** questions. Each question carries **five** marks*

4x 5 M = 20 M

13 (a) A singly reinforced rectangular section of size 230 X 450mm effective is reinforced with4 numbers of 16mm diameter bars in tension. Factored shear force at the section is 120 KN.State whether shear reinforcement is required or not. Concrete is M20 grade.

(OR)

13 (b) Calculate the maximum bending moment at support next to end support for a continuousbeam as per IS 456-2000. Size of beam is 300X500mm overall, effective span = 4m, imposedload (not fixed) = 10KN/m, , imposed load (fixed) = 15KN/m excluding self weight, effective cover = 40mm.

14 (a) A T beam of effective flange width 800 mm, thickness of slab 90 mm, width of rib 230mm andeffective depth 400mm is reinforced with 5 numbers of 20mm diameter bars. Calculate the moment of resistance of the section. M20 grade concrete are Fe250 bars are used.

(OR)

14 (b) Design a short Reinforced Concrete rectangular column with one side as 300mm to carry an axial load of 2000 KN. Use M25 concrete and Fe 415 steel.

15 (a) Draw the detailing of reinforcement for a continuous slab with cranking of main bars.

(OR)

15 (b) Calculate the maximum shear force at end support for a continuous beam as per IS 456-2000.Size of beam is 300X600mm overall, effective span = 4m, imposed load (not fixed) = 10KN/m,imposed load (fixed) = 12KN/m excluding self weight, effective cover = 40mm.

16 (a) Design a circular column of diameter 400 mm, with lateral ties. Unsupported length ofcolumnis 3m, and is subjected to a working load if 1200 KN. The column is effectively held inpositionat both ends but not restrained against rotation Use M25 concrete and Fe 415 steel.

(OR)

16 (b) A RC Column of size 300mm X 300mm carries a load of 750 KN. The safe bearing capacity ofsoil is 200 KN/$m^{2.}$ Design an isolated square column footing of uniform thickness. Use M25 grade concrete and Fe 415 grade steel. Check forshear, development length and bearing pressure are not required.

ENTREPRENEURSHIP & PROJECT MANAGEMENT

Course Title:	Entrepreneurship & Project Management	Course Code :	**18AA-502C**
Semester:	**V Semester**	Course Group :	**Core**
Teaching Scheme in Hrs(L:T:P):	**3:1:0**	Credits :	**3**
Type of Course :	**Lecture+Assignments**	Total Contact Hours :	**60**
CIE :	**60 Marks**	SEE :	**40 Marks**

Pre requisites

This course requires the basic knowledge of various stages of building construction, building materials and estimation.

Course Outcomes

Course Outcomes	
CO1 :	Know the role of industry in economic development
CO2 :	Understand the philosophy of organization structure of an industry
CO3:	Outline the concept of entrepreneurship
CO4 :	Differentiate and integrate production, planning and control; Role of materials and importance of financial management
CO5 :	Know the procedure for calling tenders and award of contracts
CO6 :	Know the principles of quality assurance and Indian standards on quality systems

Time Schedule		
Unit No	**Unit Name**	**Hour**
1	Principles and Functions of Management	10
	Organization Structure	
2	Role of Entrepreneurship	10
3	Production Management & Network Diagrams	10
4	Material Management	10
	Financial Management	
	Human resource Management	
5	Tenders & contracts	10
6	Total Quality Management	10
	International Organization for Standardization ISO 9000	
	Total	60

Course Contents

Unit1: Principles and functions of Management

1.1 Introduction, Role of industry in economic development
1.2 Different types of ownership industries- Private, Joint, and Public sector
1.3 Form of ownership organization: Private - sole, partnership, Joint sector- company, co-operative
1.4 Advantages and disadvantages of sole proprietorship, and partnership
1.5 Functions of Management
1.6 Principles of Management
1.7 Definition, types of organization- line or military organization, functional or staff organization,
1.8 Advantages and disadvantages of line and functional organizations
1.9 Meaning of the term departmentalization
1.10 Organizational structure of an Architect's office, an engineering department of government– principle of specialization and principle of co ordination

Unit2: Role of Entrepreneurship

2.1 Introduction,
2.2 Entrepreneur definition and concept
2.3 Role of entrepreneurship,
2.4 Profile of an entrepreneur
2.5 Risks and rewards of an entrepreneur
2.6 Promotional agencies at State and Central level:

2.7 Central govt. agencies- NSIC,IDBI, IFCI, ICICI, IVC
2.8 State govt. agencies- TIDC, TSSIDC, TSIIC, TSTC,
2.9 Know about Telangana State Industrial policy- TS-IPASS; T-IDEA

Unit3: Productioon Management & Network diagrams

3.1 Introduction
3.2 Differentiate and integrate Production, planning and control
3.3 Scheduling- meaning of the term, methods.
3.4 Network diagrams- Critical path method,terminology
3.5 Formation and basic rules of network
3.6 Problems on CPM.

Unit4: Material Management

4.1Role of materials in industry
4.2 Materials management- definition,
4.3 Materials purchasing, handling, supply and storage
4.4 Register of suppliers and manufacturers
4.4 Need for mechanization- mechanical handling equipment types.
4.5 Optimum utilization of plant and equipment
4.6 Importance of financial management
4.7 Project financing- types of capital (long term and short term, PWD Procedure for works)
4.8Definition ofhumanresourcemanagement
4.9 Elements of human resourcemanagement

Unit5: Tenders and Contracts

5.1 PWD Procedure for works
5.2 Classification of works
5.3 Contract, Tender, Tender notice,
5.4 Earnest money, Security Money
5.5 Different methods of carrying out of works-
5.6 Methods of carrying out works- daily labor, piece work agreement, contract system
5.7 Types of contracts- lumpsum, schedule contract or item rate contract
5.8 Know the documents attached to a contract document

Unit 6 : Total Quality Management

6.1 Definition of TQM
6.2 Elements of TQM
6.3 Meaning and definition of quality, quality system, quality policy, quality Management,
quality control and quality assurance.
6.4 Elements of quality systems
6.5 Comprehend the need of ISO.
6.6 Necessity of International standards.
6.7 Indian standards on quality systems, their equivalent ISO 9000 series and their constituents. and construction.
6.8 Drawbacks of ISO 9000 standards
6.9 Beneficiaries of ISO standards

Specific Learning Outcomes

1.0 Principles and functions of Management

1.1 Know the role of industry in economic development.

1.2 Know the types of partnerships

1.3 Know the functions and principles of management

1.4 Understand the philosophy and types of organizational structure.

2.0 Role of Entrepreneurship

2.1 Outline the concept of entrepreneurship.
2.2 define the word entrepreneurship
2.3 Determine the role of entrepreneurship.
2.4 To know the promotional agencies at state and central level.
2.5 Describe the profile of an entrepreneur.

3.0 Production management and Network diagrams

3.1Differentiate and integrate production, planning and control
3.2Explain scheduling methods
3.3 Draw CPM networks
3.4 Identify the critical path method.

4.0 Material Management

4.1 Explain the role of materials in industry
4.2 Know the material handling methods.
4.3 know the different mechanical handling devices.
4.4 Explain the importance of financial management.
4.5 Explain the methods of project financing.
4.6 To understand the elements of human resource management.

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5.0 Tenders and Contracts

5.1 To know the different types of works and the procedure to carry out the work

5.2 Necessity of calling for a tender.

5.3 know the types of contract and procedure to award a contract.

6.0 Total quality Management

6.1understand the concept of quality
6.2 Know the quality systems
6.3 know Indian standards on quality systems
6.4 List the beneficiaries of ISO 9000.

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Suggested Student Activities

1. Quiz
2. Seminars
3. Group Discussions
4. Guest lectures

SKILL UP GRADATION PROJECTS

1. Visit any nearby construction site & interact with the construction team regarding type ofStructure & its organization structure.
2. Visit any contractor and interact about the present tendering process (e-tendering) and award of contract.
3. Collection of tender notices published in newspapers for various items of projects (at least 5).Write salient features of them.
4. Prepare a planning schedule for the nearby on going construction activity with the help of available open source project management software.
5. Visit any nearby ARCHITECT /PWD/TSHB office or any construction company, collect the documents (BOQ, M B, Tender, SR,) related to the project and prepare report on it.
6. Collect quality management standards pertaining to ISO 9001, ISO 14001 & OHSAS 18001 & prepare a report.
7. Collect the details required for getting a consultant license from corporation and prepare areport on it
8. Collect safety procedures (Do's and Dont's) of each and every construction activities.
9. Collect or prepare the various stages of inspection and quality control for construction Activities.

NOTE:

1. Guest lecturers to be arranged by inviting Architects from industry.
2. Students should select topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5.
3. Students should mandatorily submit a written report and make a power point presentation on the topic. The task should not be repeated among students.
4. Report will be evaluated by the faculty as per rubrics.

Recommended Books

1. Entrepreneurship by	N. Sreenivaslulu
2. Total quality management by	T.T.T.I. Hyderabad.
3 .Entrepreneurship by	T.T.T.I. Chandigarh.
4. Construction management by	N. Sreenivaslu
5. Management in construction and Industry- Oxford Book House Publishing Co. Pvt. Ltd.	P.P Dharwadhker,
6. Construction Management and Accounts- Khanna Publishers.	V.N Vazirani& S.P Chandola,
7 .Construction planning and Management- GalgotiaPublications Pvt. Ltd, .New Delhi	U.K.Shrivastava,
8.Construction Management and Accounts - Tata McGraw Hill Publishing Co. Ltd.	Harpal Singh,
9.Estimating& Costing in Civil Engineering –	BN Dutta

Suggested E learning Resources.:

a. http://www.cranefieldacademy.com/short-courses/managing-entrepreneurial-project/
b. https://www.udemy.com/project-management-leadership-management-entrepreneurship/
c. https://pmglobalinstitute.com//index.php/training-courses/executive-education/101-project-management-for-entrepreneurs
d. https://talentedge.in/entrepreneurship-courses/
e. https://www.acs.edu.au/courses/entrepreneurship-363.aspx
f. https://www.coursera.org/browse/business/leadership-and-management

CO/PO MAPPING MATRIX

	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering tools	Engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Lifelong learning	
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapped POs
CO1	x				x						1 5
CO2	x	x						x	x		1 2 8 9
CO3					x		x				5 7
CO4					x		x	x	x		5 7 8 9
CO5		x						x			2 8
CO6		x				x	x			x	2 6 7 10

<table>
<tr><td colspan="8">EXAMINATION PATTERN</td></tr>
<tr><td colspan="8">MID SEM - I EXAM (Duration of Exam: 1 Hour)</td></tr>
<tr><td colspan="2"></td><td colspan="2">PART A</td><td>PART B</td><td>PART C</td><td>Total Marks</td></tr>
<tr><td colspan="2">Marks/Question</td><td colspan="2">1 Mark each</td><td>3 Marks each</td><td>5 Marks each</td><td rowspan="2">20 Marks</td></tr>
<tr><td colspan="2">No. of Questions</td><td colspan="2">4 Questions</td><td>2/4 Questions</td><td>2/4 Questions</td></tr>
<tr><td>S.No.</td><td>Unit No.</td><td colspan="2">R</td><td>U</td><td>A</td><td>Remarks</td></tr>
<tr><td>1</td><td>UNIT I</td><td colspan="2">1,2</td><td>5(a) or 5 (b)</td><td>7(a) or 7(b)</td><td rowspan="2"></td></tr>
<tr><td>2</td><td>UNIT II</td><td colspan="2">3,4</td><td>6(a) or 6(b)</td><td>8(a) or 8(b)</td></tr>
<tr><td colspan="2">Total Questions</td><td colspan="2">4</td><td>4</td><td>4</td><td></td></tr>
<tr><td colspan="2">Total Marks</td><td colspan="2">4</td><td>6</td><td>10</td><td>20 Marks</td></tr>
<tr><td colspan="8">MID SEM - II EXAM (Duration of Exam :1 Hour)</td></tr>
<tr><td>1</td><td>UNIT III</td><td colspan="2">1,2</td><td>5(a) or 5 (b)</td><td>7(a) or 7(b)</td><td rowspan="2"></td></tr>
<tr><td>2</td><td>UNIT IV</td><td colspan="2">3,4</td><td>6(a) or 6(b)</td><td>8(a) or 8(b)</td></tr>
<tr><td colspan="2">Total Questions</td><td colspan="2">4</td><td>4</td><td>4</td><td></td></tr>
<tr><td colspan="2">Total Marks</td><td colspan="2">4</td><td>6</td><td>10</td><td>20 Marks</td></tr>
<tr><td colspan="8"></td></tr>
<tr><td colspan="8">SEMESTER END EXAMINATION (Duration of Exam: 2 Hours)</td></tr>
<tr><td colspan="2"></td><td colspan="2">PART A</td><td>PART B</td><td>PART C</td><td>Total Marks</td></tr>
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<tr><td>1</td><td>UNIT I</td><td rowspan="6">4</td><td rowspan="2">1</td><td rowspan="2">9(a)</td><td rowspan="2">13(a)</td><td rowspan="8"></td></tr>
<tr><td>2</td><td>UNIT II</td></tr>
<tr><td>3</td><td>UNIT III</td><td rowspan="2">2</td><td rowspan="2">10(a)</td><td rowspan="2">14(a)</td></tr>
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<tr><td rowspan="3">5</td><td rowspan="3">UNIT V</td><td rowspan="6">3</td><td rowspan="3">5,6</td><td>9(b)</td><td>13(b)</td></tr>
<tr><td>11(a)</td><td>15(a)</td></tr>
<tr><td>11(b)</td><td>15(b)</td></tr>
<tr><td rowspan="3">6</td><td rowspan="3">UNIT VI</td><td rowspan="3">7,8</td><td>10(b)</td><td>14(b)</td></tr>
<tr><td>12(a)</td><td>16(a)</td></tr>
<tr><td>12(b)</td><td>16(b)</td></tr>
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<tr><td colspan="2">Total Marks</td><td colspan="2">8</td><td>12</td><td>20</td><td>40 Marks</td></tr>
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For theory subjects 18AA - 101 -105, 201-205, 301 -305, 401- 405, 501-504, 601-603

MODEL QUESTION PAPER

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING
BOARD DIPLOMA MID SEM - i EXAMINATION (C-18)
C18-AA-502C, ENTREPRENEURSHIP AND PROJECT MANAGEMENT

Time : 1 hour Max Marks: 20

Part A 4x1=4marks

Instructions: 1.Answer all questions .
2.Each question carries one mark

L What are the different types of ownership industries?

1. Define organization
2. Name two entrepreneur promotional agencies at state level.
3. What is the meaning of entrepreneurship.

Part B 2x3=6marks

Instructions: 1.Answer the following questions .
2.Each question carries three marks

5.a) What is a joint sector company?
OR
b)Write briefly about ‘ sole proprietorship’

6.a) Define the term ‘entrepreneur’
OR
b) Brief ‘TS –IPASS’

Part C 2x5=10marks

Instructions: 1.Answer the following questions .
2.Each question carries three marks

7.a) Explain the’ functions of management’
OR
b) what are the’ principles of management’

8.a)Explain the concept of Entrepreneurship.
OR
b) What is the profile of an entrepreneur?

MODEL QUESTION PAPER
STATE BOARD OF TECHNICAL EDUCATION AND TRAINING
BOARD DIPLOMA MID SEM- II EXAMINATION (C-18)
C18-AA-502C, ENTREPRENEURSHIP AND PROJECT MANAGEMENT

Time : 1 hour Max Marks: 20

Part A 4x1=4marks

Instructions: 1.Answer all questions .
2.Each question carries one mark.

1. what are the methods of scheduling?
2. Define critical path method.
3. List out the stages of materials management.
4. Define management

Part B 2x3=6marks

Instructions: 1.Answer the following questions .
2.Each question carries three marks.

5. a) Define scheduling
   OR
   b. what is a critical path method.

6.a) What is the need of mechanization.
   OR
   b) Write the elements of human resource management.

Part C 2x5=10marks

Instructions: 1.Answer the following questions .
2.Each question carries five marks.

7a) Write the basic rules of network.
   OR
7b. Findout the following for a project whose activities and their duration are given in the table below:

Activity	1-2	1-3	1-4	3-4	2-5	3-5	4-5
Duration (in days)	10	7	11	9	12	9	12

i. Prepare a network diagram
ii. Find critical path and project completion time.
iii. Prepare a time schedule and indicate total float.

8.a)Explain the role of materials in industry.
   OR
   b) Explain the methods of materials handling.

MODEL QUESTION PAPER

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING.
BOARD DIPLOMA END- SEMESTER EXAMINATION, (C18)
C18-AA-502C, ENTREPRENEURSHIP AND PROJECT MANAGEMENT

Time: 2 hours Max marks: 40

Part A 8x1=8 marks

Instructions: 1.Answer all questions .
2.Each question carries one mark.

1.What are the different forms of ownership organizations?
2.Define critical path method

3.Define TQM
4.What are the different types of ownership industries?

5. What is the meaning of a contract.
6. Classify works.
7.What are the elements of TQM.
8. Define 'quality system'

Part B 4x3=12 marks

Instructions: 1.Answer the following questions .
2.Each question carries three marks.

9.a)what is a functional organization?
OR
b) What is the role of industry in economic development.

10. a) What are the advantages of scheduling?

OR

b) What are the elements of quality systems?

11. a) Write short notes on tender notice.
OR
b) who are the beneficiaries of ISO

12. a) Define quality assurance
OR
b) what is the necessity of international standards/

Part C 4x5=20 marks

Instructions: 1.Answer the following questions .
2.Each question carries five marks

13. a) Define organization .Draw the organizational structure of an Architect's office.
OR
b) Detail out the PWD procedure for calling tenders and awarding a contract.
14. a) Differentiate production, planning and control.

OR
b).Explain the Indian standards on quality Systems, ISO standards and their constituents.
15. a) Differentiate earnest money and security money deposit.
OR
b) What are the documents to be attached to a contract document
16. a) What are the drawbacks of ISO 9000 series
OR
b) What are the benefits accrued to a company with ISO 9000

Course Title	**BUILDING SERVICES**	Course Code	**18AA-503C**
Semester	**V**	Course group	**Core**
Teaching scheme in Hrs (L:T:P)	**3:1:0**	Credits	**3**
Type of Course	**Lecture +Assignments**	Total Contact Hours	**60**
CIE	**60 marks**	SEE	**40 marks**

Pre requisites

This course requires the basic knowledge of building services and amenities.

Course Outcomes

CO1 :	Able to identify and describe different types of water supply systems and engineering
CO2 :	To know the alternate methods of solar heating, passive solar systems
CO3 :	Able to draw plans and elevations of plumbing diagrams showing piping systems of waste disposal by gravity drainage.
CO4 :	Knowaboutsafety and security systems
CO5 :	Able to prepare an electrical plan showing data on the type and location of all switches, fixtures and controls of a small residence.
CO6:	To know the human comfort conditions and plan for air conditioning systems.

Time Schedule

Unit No	Unit Name	Hour
1	Water supply engineering	16
2	Solar planning	4
3	Sanitary engineering	16
4	Safety and security systems	4
5	Electrical engineering	14
6	Air conditioning	6
	Total	60

Course Contents

1 Water Supply Engineering

1.1 Sources of Water:

1.1.1 Main Source / Water Cycle.
1.1.2 Surface Sources
1.1.3 Sub-Surfaces Sources
1.1.4 Methods of water harvesting
1.1.5 Water Re-cycling methods.

1.2 Water supply requirements:

1.2.1 Quantity of water required per capita under Domestic use
1.2.2 Variation in quantity of water consumption due to various seasons
1.2.3 Fire demand

1.3 Quality of water and purification

1.3.1 Quality of water:
1.3.2 Source of water, impurities in surface and under ground waters

1.3.3 Purification of water

1.3.4 Plain sedimentation and sedimentation by coagulation, filtration, slow and rapid sand filters, chlorination, taste and odour control, removal of hardness

1.4 Distribution of Water:

1.4.1 General requirements for the supply of wholesome water
1.4.2 Methods of distribution - Gravity system, Pumping system, Combined system
1.4.3 Layouts for water distribution- Dead end layout, Grid iron layout. Radial lay out, Circular lay out.

2. Solar Planning

2.1 Need and importance of passive solar system

2.2 Passive solar methods- direct –indirect gain method, orientation, integration of structure with landform, room locations, overhang protection, vegetation, building materials, etc.

2.3 Solar water heaters, solar heaters, solar cookers and solar panels
2.4 Introduction to green buildings

3. Sanitary Engineering:

3.1 Importance of Sanitation in view of public health.
3.2 Terminology
3.3 Types of refuses from a town or city.
3.4 Sewage disposal methods
i. Conservancy system
ii. Water carriage system
iii. Separate system
iv. Partially separate system
v. Combined system

3.5 Septic Tank Design, Construction, operation of Septic tank soak-pit (effluent disposal from a septic tank
3.6 Draw a sanitary layout for an independent house
3.7 Rain water drainage from a house.
3.8 Sanitary Fixtures in Domestic building - WC(Indian, Orissa pan, European, combination commode), Bidet,Wash basin, Sink, Bath tub, Urinal pans of men & women.
3.9 Garbage disposal from a residence- composting methods.

4. Safety and Security systems

1.1 Definition and need of the subject
1.2 Fire protection systems
1.3 Different types of security systems-

5. Electrical engineering

5.1 House wiring systems

5.1.1 Introduction

5.1.2 Terminology-cable, conduit , circuit breaker, cut out, earthing system

5.1.3 Definition of wiring system, a sketch for a typical house wiring

5.1.4 Electrical energy distribution system- distribution board, loop in system

5.3 Lamps and lamp circuits

5.3.1 Types of lamps- incandescent, fluorescent, mercury, neon, sodium vapour
5.3.2 Energy saving lamps- CFL, LED lamps

5.4 Electrical layout

5.5.1 Electrical layout for a single bed room unit.

5.5.2 Electrical symbols

6. Air conditioning

6.1 Definition and need
6.2 Classification of air conditioners and types used for Domestic buildings.

SPECIFIC LEARNING OUTCOMES

1.0 Water supply engineering

Understand the need and importance of Water Supply engineering

1.1 List and describe the quality and impurities present in various sources of water (surface and underground)

1.2 Explain water harvesting and water recycling methods.

1.3 Know the per capita requirements & calculate the quantity of water required per household.

1.4 List and explain the variations in per capita demand for different uses of buildings
1.5 List the various impurities present in water and describe the bad effects they cause on human health.
1.6 List and describe the principles underlying the operation of water treatment units for drinking purpose
1.7 List and describe the various processes in purification of water
1.8 Explain and define the terminology in distribution of water
1.9 List and describe the various distribution methods and layouts
1.10 Draw a water cold and hot water supply layout for a domestic building.

2.0 Solar planning

2.1 To know passive solar energy concept in buildings
2.2 Passive solar design principles and list the passive solar methods
2.2 List and describe the solar energy utilities like solar water heaters, solar heaters, solar cookers and solar panels.
2.3 Introduction to green buildings

3.0 Sanitary engineering

3.1 Define and describe the technical terminology associated with sanitary engineering.
3.2 Describe the importance of sanitation in view of public health.
3.3 List and explain the various solid waste disposal methods.
3.4 List and describe the various liquid waste disposal methods
3.5 Draw a sanitary layout for a domestic building
3.6 know about roof drainage
3.7 know the method of composting

4.0 Safety and security systems

4.1 Describe the importance of security systems in present world.
4.2 Fire detection systems
4.2 List and describe the different security systems from alarm systems to access control systems
Eg. Integrated room control, Chilled ceiling, room controller, Room surveillance, Access control.

5.0 Electrical engineering

5.1 Explain with the importance of electrification in domestic buildings
5.2 Explain with sketches the types of wiring methods and applicability
5.3 Explain to draw various symbols for electrical fixtures as per NBC only.

6.0 Air Conditioning

6.1 Describe the need for air conditioning.
6.2 Explain the classification of Air conditioners

Suggested Student Activities

1. Quiz
2. Seminar
3. Group Discussions
4. Site Visits

Skill Upgradation Projects:

1. To make a visit to a water supply plant and to study in detail about the treatment process involved in supplying treated water. Students must also prepare a detail reportalong with photographs
2. To visit a Building construction site to study on water supply and drainage system along with photo documentation of various stages of works involved
3. To study on rural sanitation systems and to prepare report on functioning of leachpits and septic tanks
4. To visit a public building to study on lighting systems employed and prepare a report on lighting systems adopted by highlighting the purpose of each lighting system

Note:

1. The course will be delivered through lectures and power point presentations/Video
2. Teachers can encourage the students to take up case studies and prepare reports of the same.

REFERENCE BOOKS:

1. Public Health Engineering by Rangawala
2. Water supply & Sanitary Engineering by Duggal
3. Environmental Engineering by N. Srinivasulu
4. Water supply & Sanitary Engineering by G.S. Birdi
5. Building construction by B.C. Punnmia
6. Building construction by Bindra&Arrora.
7. Environmental Engineering by N.Ramachandraiah

Suggested E learning Resources.

E-lessons

1) https://www.cibse.org/building-services/what-is-building-services
2) http://www.understandconstruction.com/building-services.html
3) https://www.slideshare.net/SiddharthKhanna11/history-lecture-1
4) https://www.wsp.com/en-GL/services/mechanical-electrical-and-plumbing
5) https://www.buildings.com/article-details/articleid/.../fire-protection-system-design
6) https://en.wikipedia.org/wiki/Fire_protection
7) https://www.siemens.be/cmc/upload/cms/docs/sbt/security_solutions_en.pdf

CO-PO Mapping

CO	COURSE OUTCOME	CL	Linked PO
CO1	Able to identify and describe different types of water supply systems and engineering	U/A	1,2,5,6,7,10
CO2	To know the alternate methods of solar heating, passive solar systems	U/A	2,5,6,7,10
CO3	Able to draw plans and elevations of plumbing diagrams showing piping systems of waste	R/U/A	2,5,6,7,10

	disposal by gravity drainage.		
CO4	Know about safety and security systems	U/A	1,4
CO5	Able to prepare an electrical plan showing data on the type and location of all switches, fixtures and controls of a small residence.	R/U/A	1,2,4,5,6
CO6	To know the human comfort conditions and plan for air conditioning systems.	U/A	2,6

CO-PO MATRIX

	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering tools	Engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Lifelong learning	
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	Mapping POs
CO1	x	x			x	x	x			x	1,2,5,6,7,10
CO2		x			x	x	x			x	2,5,6,7,10
CO3		x			x	x	x			x	2,5,6,7,10
CO4	x			x							1,4
CO5	x	x		x	x	x					1,2,4,5,6
CO6		x				x					2,6

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<tr><td>11(a)</td><td>15(a)</td></tr>
<tr><td>11(b)</td><td>15(b)</td></tr>
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</table>

For theory subjects 18AA - 101 -105, 201-205, 301 -305, 401- 405, 501-504, 601-603

BOARD DIPLOMA EXAMINATION, (C-18)
DAA-FIFTH SEMESTER EXAMINATION
18 AA-503 C BUILDING SERVICES

Time: **2 hours** Total Marks**: 40**

PART – A 8x01=08marks

Instructions: (1) Answer **ALL** questions
each question carry 1 marks

1. Write about of Main Source of water?
2. What is anoverhead tank
3. What are the Characteristics of Quality of water?
4. What are methods of distribution of water ?
5. What is the solar energy ?
6. What are the security systems used in buildings?
7. What are the Systems of wiring in building
8. Define Air conditioner.

PART-B 4x3=12marks

Instructions: (1) Answer **all** questions.
Each question carries 3 marks.

9. (A) What are Sources of surface water?
   or
   (B)What is Fire demand?
10. (A) What is Dead end layout?
    or
    (B) Describe the various processes in purification of water
11. (A) Write about passive solar methods
    or
    (B) Write about the different security systems?
12. (A) Write the process of Electrical energy distribution systems.
    or
    (B) Write about classification of Air conditioners

PART-C **4x5=20marks**

Instructions: (1) Answer **all** questions.
Each question carries 5 marks.

13. (A) What are Infiltration Galleries
    or
    (b) Write about Quantity of water required per capita under Domestic use
14. (a) Draw a water cold and hot water supply layout
    or
    (B) Describe the solar energy utilities
15. (A)Write about the roof drainage?
    or
    (B) Explain the Fire detection systems
16. (A) What are draw various symbols for electrical fixtures
    or
    (B) What are the need for air conditioning.?

Model Questions:

Part-A Each question carries one mark.

Define water harvesting?
2. List out any four methods solid waste management?
3. Define quality of water?
4. Define any one method of water distribution?
5. Explain the importance of sanitation?
6. Draw any four symbols of electrical fixtures.
7.. What are the classifications of air conditioners?
8 . Define air conditioning.
9.. List out any four electrical energy consuming devices.
10. List out any four types of air conditioning systems available in the market?
11.Define solar panel.
12. List out any four impurities in water.
13. Define security systems.
14. Define quality of water.
15. List out methods of water distribution methods.
16. Define the need of passive solar planning.
17. Define solid waste management.
18. What are electrical energy consuming devices?
19. Draw any four symbols of electrical fixtures.
20. Explain any one solar energy utility.

Part-B Each question carries three marks.

1. Explain in detail the water recycling methods?
2. Explain any two solid disposal methods?

3. Draw a sanitary layout for a domestic building.
4. Explain with sketches the types of wiring methods?
5. Explain the classification of air conditioning?

6. Explain the importance of electrification in domestic buildings.

7. Explain solid waste disposable methods.
8. Draw a sanitary layout for a domestic building.
9. Describe the importance of security systems in the present world.

10. Explain the various processes of water purification.
11. Describe solar cookers, solar heaters in detail.
12. Draw a conceptual layout of air conditioning

Part-C Each question carries five marks

1. List and explain various sewer appurtenances?
2. Explain and define the terminology of distribution of water?
3. Explain the various processes in purification of water?
4. Draw the conceptual layout of air conditioning.
5. Describe the electrical energy distribution systems.
6. Describe in detail the need of air conditioning.

7. Describe the electrical energy distribution systems.
8. Explain the concept of earth sheltered homes.
9. Explain various water distribution systems with diagrams.
10. Explain with sketches the types of wiring in any one method.

11. What is the need and importance of solar planning?
12. List and explain various sewer appurtenance

INTERNATIONAL ARCHITECTS

Course Title	**INTERNATIONAL ARCHITECTS**	Course Code	**18AA-504C**
Semester	**V**	Course group	**Core**
Teaching scheme in Hrs (L:T:P)	**3:1:0**	Credits	**3**
Type of Course	**Lecture +Assignments**	Total Contact Hours	**60**
CIE	**60 marks**	SEE	**40 marks**

Pre requisites

This course requires the basic knowledge of materials and methods of construction.

Time Schedule		
Unit No	**Unit Name**	**Hour**
1	Frank Lloyd Right	10
2	Le-Corbusier	10
3	Walter Gropius	10
4	LudwigMies Vander Rohe	10
5	Alvar Aalto	10
6	Ero - Saarinen	10
	Total	60

Course Outcomes

CO1	Biography, philosophy and design theories of International Architects.
CO2	Important styles of architecture by the International Architects.
CO3	Important residential buildings designed by International Architects.
CO4	Important public and institutional buildings designed by International Architects.

COURSE CONTENTS

UNIT-I

FRANK LLYOD WRIGHT

1.1 Biography and philosophy .
1.2 Organic Architecture.
1.3 Falling water, Pennsylvania.
1.4 The Imperial Hotel
1.5 Solomon R Guggenheim museum.
1.6 The Robie House, Chicago, Illinois.

Unit 2:

LE-CORBUSIER

2.1Biography and philosophy .
2.2 Five Point theory of Architecture.
2.3 Modular theory.
2.4 Villa Savoy, France .
2.5 Unite D Habitation, Marseille, France.
2.6 Chandigarh planning.

Unit 3:

WALTER GROPIUS

3.1 Biography and Philosophy.
3.2 Curtain wall Concept.
3.3 The Fagus Factory.
3.4 Bauhaus School .
3.5 The Gropius house, Lincoin, Massachusetts.
3.6 The Harward Graduate Center , Cambridge, Mass.

Unit4:

LUDWING MIES VAN DER ROHE

4.1 Biographand philosophy .
4.2 Traditional to modernism concept.
4.3 Dr Edith Farns Worth HOUSE, Plano , Illinois.
4.5 Master plan of Illinois Institute of Technology.

Unit 5:

ALVAR AALTO

5.1 Biography and philosophy.
5.2 Classicism to Modernism concept.
5.3 Baker House.
5.4 Alvar Aalto studio , Helsinki.

Unit 6:

Ero – Sarrienen

6.1 Biography and philosophy .
6.2 Sarienen Gateway St. Louis.
6.3 Dullas International airport.
6.4 The Miller House, Columbus, Indiana.

Specific Learning Outcomes

1. FRANK LLOYD WRIGHT

Biography, philosophy and design theory.
Residential, public and Institutional projects.

2. LE-CORBUSIER

Biography, philosophy and design theory.
Residential, Public and Institutional projects.

3. WALTER GROPIUS

Biography,philosophy and design theory.
Residential, public and institutional buildings.

4. LUDWING MIES VAN DER ROHE

Biography ,philosphy and design theory.
Residential, public and Institutional buildings.

5. ALVAR AALTO

Biography,philosophy and design theory.
Residential, public and institutional buildings.

6 ERO-SARRIENEN

Biography ,phylosphy and design theories
Residential, public and institutional buildings.

SUGGESTED STUDENT ACTIVITIES

Separate sketch should be maintained and submitted
Plan and elevations of the following and view wherever it is required.
1.The Robiehouse
2. Imperial hotel
3.Falling water
4.Solomon R Guggenheim museum
5.Villa Savoy
6.United D Habitation
7.Chandigarh planning.
8. Fagus factory
9. Bauhaus School
10. Gropius house
11.Dr Edith Farns worth house.
12. Baker house
13. Alvar Aalto studio.
14. Sarienen's gateway Arch in St. Louis
15. Dullas International airport, The Miller house.

Skill Upgradation Projects

1. Students should maintain a sketch book
2. Visit modern buildings and make an analysis of their architectural Features, analyze and prepare a power point presentation on it.

Recommended Books:

1. Modern Architecture since 1900 by Curtis. J.R. Williams.
2. The Language of Post Modern Architecture by Jencks, Charles.
3. History of Architecture by Fergusen.

Suggested E learning Resources.:

1) WWW.Digi.Libraries .com
2) WWW.all-art .com
3) WWW. International Architects.com

CO-PO Mapping Matrix

	COURSE OUTCOME	CL	Linked PO
CO1	Biography , philosophy and design theories of International Architects	R/U	1,2,,3,4,5,6, 8,9,10
CO2	Important styles of Architecture of International Architects	R/U/A	1,2,,3,4,5,6, 8,9,10
CO3	Important residential buildings designed by International Architects.	R/U/A	1,2,,3,4,5,6, 8,9,10
CO4	Important public and Institutional buildings designed by International Architects.	R/U/A	1,2,,3,4,5,6, 8,9,10

CO /PO mapping

	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering tools	Engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Lifelong learning	
Course	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapped POs
CO1											
CO2											
CO3											
CO4											

Note: Students should maintain a sketch book. Assignments and tests.

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<tr><td rowspan="3">5</td><td rowspan="3">UNIT V</td><td rowspan="5">3</td><td>9(b)</td><td>13(b)</td></tr>
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For theory subjects 18AA - 101 -105, 201-205, 301 -305, 401- 405, 501-504, 601-603

Model Questions:
INTERNATIONAL ARCHITECTS

Part-A Each question carries one mark.

1. Write the biography of Walter Gropius.
2. Write the curtain wall concept.
3. Write the philosophy of Walter Gropius.
4. Write the biography of Mies van der Rohe.
5. Write the philosophy of Mies van der Rohe.
6. Write the biography of Frank Lloyd W right.
7.Write the phylosiphy of Frank Lloyd Wright.
8. Write the modular theory of Le-Corbusier.
9. Write the biography of Le- Corbusier.
10. Write the phylosiphy of Le- Corbusier.
11.List the works done by Frank Lloyd Wright.
12. Write the philosophy of Le-Corbusier.
13. Write the biography of Le- Corbusier.
14. Write the biography of Walter Gropius.
15. List the works of Alvar aalto.
16. Write biography of Ero-Sarrienen.
17. Write the biography of Alvar aalto.
18.Write the philosophy of Ero-Sarrienen.
19.List the works of Ero Sarrienen.

Part-B Each question carries three marks.

1. Write the organic Architecture of Frank Lloyd Wright.
2. Write five point theory of Lecorbusier.
3.Sketch Chandigrah planning.
4. Write the traditionalism to modernism concept.
5. Sketch the plan of the Fagus factory.
6. Write the philosophy of Walter Gropius.
7. Write the five point theory of Le- Corbusier.
8.Write the Curtain wall concept of Walter Gropius.
9.Write traditionalism to modernism concept of Mies vander Rohe.
10. Write classicism to modernism concept of Alvar aalto.
11. Sketch the plan of Baker house.
12. Write the philosophy of Alvar aalto.

Part-C Each question carries five marks.

1. Sketch plan and elevation of Villa Savoy, France.
2. Explain Falling water, Pennsylvania.
3.Explain the Imperial hotel atTokyo , Japan.
4. Explain Bahaus school, Dessau, Germany.
5. Explain the master plan of Illinois Institute of Technology.
6. Sketch and explain Gropius house .
7. Write the five point theory of Le- Corbusier.
8.Write the Curtain wall concept of Walter Gropius.
9.Write traditionalism to modernism concept of Mies vander Rohe.

10. Write classicism to modernism concept of Alvar aalto.
11. Sketch the plan of Baker house.
12. Write the philosophy of Alvar aalto.

INTERIOR DESIGN

Course Title	**INTERIOR DESIGN**	Course Code	**18AA-505D**
Semester	**V**	Course group	**Core**
Teaching scheme in Hrs (L:T:P)	**1:0:3**	Credits	**1.5**
Type of Course	**Lecture, studio work**	Total Contact Hours	**45**
CIE	**60 marks**	SEE	**40 marks**

Pre requisites

This course requires the basic knowledge of sketching, rendering and scaling of drawings.

Unit no.	Unit name	Hours
1	Introduction & Anthropometry	3
2	Elements of Interior Design- Standard Dimensions	9
	Building Services in Interiors	3
	Lighting Design in Interiors	
3	Design of residential Interiors - 1	9
4	Design of residential Interiors - 2	6
5	Surface treatments-Construction Techniques	3
6	Design of a Restaurant/ Hotel room design	12
	Total	45

Note:

1. Interior design is one of the core subjects of architecture, hence all other subjects like building materials and construction, specification and estimation have to be related to this subject.
2. Studio should be a in formal and workshop oriented learning experience.
3. A portfolio of works has to be done by each student, which will be evaluated for internal marks. Mark s should be based on student participation and regularity of work.
4. Atleast one problem should a time problem which should be a day long exercise.

Course contents:

1. Introduction and Anthropometry

1.1 Need of interior design, functional and aesthetic aspects, Anthropometric data of human beings for various actions

2. **Interior Elements**– different types of materials, patterns and designs for interior elements:

Flooring-
Walls
Ceilings
Doors and windows
Furniture
Lighting

Standard Dimensions

Basic standards of circulation,- spaces- furniture involving human activities in residential buildings, Public and institutional buildings.

Building Services in Interiors -

The sanitary layout and electrical layout

Lighting Design in Interiors

Importance of lighting in interiors,
Methods and types of lighting,
Lighting fixtures

Interior Accessories

3. **Design of Residential Interiors -I**

Draw an interior layout and sectional elevation of various rooms –
Drawing/living room – concept of open plan, furniture seating for 4-10 persons, TV cabinet design,
Dining room- concept of place setting, different designs for dining tables for 4-8 persons, crockery shelf design
kitchen – principles of kitchen planning guidelines, kitchen arrangements, work triangle, space for storage, space for electrical appliances

4. **Design of Residential Interiors -II**

Bed room- master and children's bed room, other spaces like dressing, wardrobe, tv viewing, etc.
Study room
Toilet- fixtures, arrangements, detail of four walls, floor slopes, dado, etc.

5. **Surface treatments-Construction Techniques**

Floors- various types of floors, carpets,
Walls- paneling, coloring,
Ceilings- false ceiling patterns,
Lighting in ceilings

6. **Design of a Restaurant/ Hotel room design**

Restaurant design for a maximum capacity of 100 seating,
A hotel room – single/double/ suite

Suggested Learning Outcomings:

1. **Introduction and Anthropometry**

1.1 Know the need of interior design in Architecture- functional aspects and aesthetics
1.2 Understand the use of anthropometric data of an adult human being.
1.3 Understand the various behavioral actions of human beings and the space requirements.

2. Interior Elements

2.1 List out the elements of Interior design
2.2 Represent the elements symbolically.

Standard Dimensions

2.3 List the various furniture pieces of different rooms of a residence
2.4 Draw the furniture pieces in plan and elevation with dimensions.
2.5 Know the principles of furniture arrangements
2.6 Know about circulation spaces and areas required for movement of people
2.7 Understand the spatial relationship, circulation patterns, and other preliminary ideas to suit the client's requirements.

Building Services in Interiors

2.8 To identify water supply and sanitary fixtures, the materials, know the layouts

Lighting Designing Interiors

2.9 To know the importance of lighting in interiors
2.10 To know the different methods of natural and artificial lighting.
2.11 To know the different types and arrangements oflighting in interiors.

Interior Accessories

3& 4 Residential Interiors

3.1 Draw an interior layout and sectional elevation of various rooms – drawing/living room, dining room, bed room, kitchen and toilet.
3.2 Draw the furniture layout of the rooms.
3.3 Prepare an electrical layout of each of the rooms.
3.4 Design and draw the details- TV unit in drawing room, crockery shelf in dining room, wardrobe in bedroom and storage cabinets in a kitchen.
4.1 Render the layout in color.

5. Surface treatments-Construction Techniques

5.1 Know the various materials used for surface treatment of interiors
5.2 Draw various patterns of design for flooring, ceiling and wall treatments.
5.3 Know the concept of color theory
5.4.1 Know the construction techniques for flooring, false ceiling and wall paneling

6. Design of a Restaurant/ Hotel room design

6.1 Know the interior layout of a star hotel room, with furniture and décor aspects
6.2 Prepare a layout of a restaurant for 100 persons seating

Student Activities :

Workshops on interior materials and construction techniques shall be conducted.

Skill upgradation

1. Visit residential buildings, study their interiorfeatures, analyze and prepare a power point presentation on it.

Reference books:

1. Interior design: an introduction to Architectural interiors – Friedmann, Arnold and others, Elsevier, New York

2. Basic Drafting for Interior designers – Miller. E. Willam, Van Nostrand Reinhold, New York

3. Interior Architecture – Kurtich, John and Eakin, Garret, Van Nostrand Reinhold, New York

CO /PO mapping

	COURSE OUTCOME	CL	Linked PO
CO1	Know the principles and elements of interior design, human dimensions and space planning	R/U	1,2,5,6
CO2	Know the importance of lighting and color in interiors	R/U/A	1,2,3,6,7
CO3	Importance of furniture and accessories.	R/U/A	1,2,4,5,6,7
CO4	To know the various surface treatments of flooring, ceiling and walls	R/U/A	1,2,5,6,7
CO5	Workout design schemes of different functional types – residential, restaurant and hotel room	R/U/A	3,4,5,6,7,8,9,
CO6	Render the layout plans and elevations of interiors	U/A	1,2,9,10

COPO Mapping Matrix

	Basic knowledge	Discipline knowledge	Experiments and	Engineering tools	Engineer and society	Environment and sustainability	Ethics	Individual and team	Communication	Lifelong learning	
Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapped POs
CO1	x	x			x	x					1,2,5,6
CO2	x	x	x			x	x				1,2,3,6,7
CO3	x	x		x	x	x	x				1,2,4,5,6,7
CO4	x	x			x	x	x				1,2,5,6,7
CO5			x	x	x	x	x	x	x		3,4,5,6,7,8,9,
CO6	x	x							x	x	1,2,9,10

EXAMINATION PATTERN				
MID SEM - I EXAM (Duration of exam : 1 -1/2Hour)				
		PART A	**PART B**	**Total Marks**
Marks/Question		4 Marks each	12 Marks	20 Marks
No. of Questions		2/2 Questions	1/1 Question	
S. No.	**Unit No.**	**U**	**A**	**Remarks**
1	UNIT I, & II	1 2	3 (12 Marks)	Plan-08 marks Sec. Elevation-04 marks
Total Questions		2	1	
Total Marks		**8**	**12**	**20 Marks**
MID SEM - II EXAM (Duration of exam : 1-1/2 Hour)				
1	UNIT III & IV	1 2	3 (12 Marks)	Plan-08 marks Sec. Elevation-04 marks
Total Questions		2	1	
Total Marks		**8**	**12**	**20 Marks**
SEMESTER END EXAMINATION (Duration of exam : 3 Hours)				
		PART A	**PART B**	**Total Marks**
Marks/Question		4 Marks each	24 Marks	40 Marks
No. of Questions		4 Questions	1/1 Question	
S.No.	**Unit No.**	**U**	**A**	**Remarks**
1	UNIT I, & II	1	-	Plan-10 marks Sec.Elevation-06 marks Detail - 04 marks Schedule of Openings- 04
2	UNIT III & IV	2,3	-	
3	UNIT V & VI	4	5 (24 Marks)	
Total Questions		4	1	
Total Marks		**16**	**24**	**40 Marks**
For subjects 18AA- 505 (A) E				

C18-AA-505C

MODEL QUESTION PAPER
STATE BOARD OF TECHNICAL EDUCATION AND TRAINING
BOARD DIPLOMA MID SEM - I EXAMINATION (C-18)
C18-AA-505C – INTERIOR DESIGN

Time : 1-1/2 hour Max. Marks: 20

Part A 2x4=8marks

Instructions: 1.Answer all questions .
2. Each question carries four marks

1. What is anthropometry?
   Sketch the following in plan and indicate the dimensions a) A 3-seat sofa b). A Dining table for 4 persons c). Kitchen sink

2. Write the importance of lighting in interiors.
   What are the different methods of lighting.

Part B 12marks

Instructions: 1.Answer the following question .

3. A) Draw a king size bed in plan and elevation indicating all the dimensions. 4 marks
   B) Explain with neat sketches the basic standards of circulation in a dining room.4 marks
   C) List out the various elements of interiors. 4 marks

C18-AA-505C

MODEL QUESTION PAPER
STATE BOARD OF TECHNICAL EDUCATION AND TRAINING
BOARD DIPLOMA MID SEM -II EXAMINATION (C-18)
C18-AA-505C – INTERIOR DESIGN

Time : 1-1/2 hour Max. Marks: 20

Part A 2x4=8marks

Instructions: 1.Answer all questions .
2. Each question carries four marks

1.Draw a wardrobe design for a 3.0 X 0.6 X 2.0m shelf of a Master bedroom.

2. Sketch and explain the concept of place setting.

   Draw two different types of dining tables for 6 persons and indicate the dimennsions.

Part B 12marks

Instructions: 1.Answer the following question.

4. The Kitchen of a residence is measuring 4.0 X 4.5m. Design an open plan kitchen with the following requirements:

a) A kitchen platform
b) Indicate the work triangle
c) Base and overhead cabinets
d) Space for appliances
e) A door leading to wash area
f) A breakfast table
g) Windows as required.

Drawings required: Scale 1:50

Layout Plan- 08 marks
Sectional .Elevation- 04 marks
Render the drawings In color pencils.

C18-AA-505C

MODEL QUESTION PAPER

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING
BOARD DIPLOMA END SEMESTER EXAMINATION (C-18)
C18-AA-505D – INTERIOR DESIGN

Time : 3 hour Max. Marks: 40

Part A 2x4=8marks

Instructions: i) Answer all questions .
i) Each question carries four marks

1. List out the various interior elements.

Sketch and indicate the dimensions of any one furniture piece of a bedroom in plan

2. Draw the furniture layout of a 6- seat dining room in plan. Indicate the dimensions of furniture and circulation areas.

3. Draw a design for a TV unit in elevation. Indicate the dimensions.

4. List out the various materials for surface treatment for floors and walls

Part B 24marks

Instructions: 1.Answer the following question .

5. A restaurant

The Telangana Tourism development corporation wants to develop high way restaurants with the following requirements. Draw alayout plan and a sectional elevation to a scale of (as per the size and scale of the problem)

1. A hall for seating 80 persons -120 sq.m

2. A cash counter - 4.5 sq.m.

3. A kitchen - 25 sq.m

4, Storage for the kitchen - 09 sq.m

5. Wash Area for the kitchen - 4.5 sq.m

6 Wash and toilets for Ladies and gents - As required

(separately)

7. Corridor spaces as required by the design

Drawings required: Scale 1:50

Layout Plan with furniture details 10 marks
Sectional .Elevation- 06 marks
Kitchen details Rendered In color pencils . 04 marks.
Schedule of Openings- 04 marks

DESIGN PRACTICE LAB

Course Title	**DESIGN PRACTICE LAB**	Course Code	**18AA-506P**
Semester	**V**	Course group	**Core**
Teaching scheme in Hrs (L:T:P)	**1:0:2**	Credits	**1.5**
Type of Course	**Lecture +Practice**	Total Contact Hours	**45**
CIE	**60 marks**	SEE	**40 marks**

TIME SCHEDULE

Sl. No	**Major Topics**	**No. of periods**
1.	Project outline & concept drawings	15
2.	Presentation drawings	21
3	Municipal drawings& brochure	09
	Total	**45**

OBJECTIVES

Upon completion of the subject the student shall be ableto

1. Design a project on Residential flats each floor consisting of 3 or 4 flats (two or three bed room flats).

   Number of floors is four, ground floor used for parking only.

   An appropriate size of the site to suit the project requirements should be given by the teacher.

2. Prepare and present the relevant drawings **using** A**utoCAD or any relevant software** comprising Residential Apartments.
3. Prepare municipal drawings
4. Workout a brochure

Learning Outcomes:

1. Project outline & conceptdrawings for a given site(Max. site area 2000 sq.m)

2. Presentation drawings for the given project

3. Municipal drawings for approval & Brochure

I.Project outline and concept drawings, the following details are to be worked out and should be submitted in the form of a report.

i. Fix the set-backs as per the bye-laws.
ii. Calculate FAR / plot coverage/ width of driveways and parking requirements.
iii. Derive the total floor areas/ area of each flat/ number of floors/ total built up area.
iv. Decide the number of flats as per the required number of single/ double/ triple bedroom flats.
v. Workout Spaces and Area requirement chart
vi. Specify the area of parking and other areas for transformers-generators-maintenance office-watchman's quarter- pump house etc.
vii. Play areas-landscaping
viii. Specifications
ix. Specify the municipal fee particulars.
x. Prepare conceptual drawings.

II. **Presentation drawings**, The following drawings should be submitted in A3 size portfolio

i. Typical floor plan with furniture lay-out
ii. Stilt floor plan showing parking details
iii. Site plan with landscape elements.
iv. Terrace floor plan
v. Location plan
vi. Specifications
vii. Perspective view (3 dimensional view) using any one rendering soft ware.

III. Municipal drawings and brochure:

i. A drawing layout is to be prepared in the format required for submission to municipal sanction for approval purpose.
ii. A Brochure either twofold or three fold is to be prepared for showing the client at the construction site.

ADVANCED CAD LAB PRACTICE

Course Title	**ADVANCED CAD LAB PRACTICE-**	Course Code	**18AA-507P**
Semester	**V**	Course group	**Core**
Teaching scheme in Hrs (L:T:P)	**1:0:2**	Credits	**1.5**
Type of Course	**Lecture +Practice**	Total Contact Hours	**45**
CIE	**60 marks**	SEE	**40 marks**

Pre requisites

This course requires the basic knowledge of Basic English at Secondary school level and concept of 3D visualization and AutoCAD

Unit No	**Unit Name**	**Hour**	**Questions to be set for SEE**	Assessment procedure
			Practical	
1	Sketch up Toolbars	9	1	1. Actual drawing in a printout is evaluated for quality of presentation- 30 marks 2. Viva to assess the correct use of commands while executing the drawing- 10 marks 3. Internal assessment is based on the portfolio of works to be submitted at the end of EACH MID semester. 4. DURATION OF MID EXAM: 1-1/2 HOURS 5. DURATION OF END EXAM : 3 HOURS
2	3D Modeling	9		
3	Editing of materials	6		
4	Interior spaces	6		
5	Sections	6		
6	Detailing, Lighting and Rendering	9		
	Total	45	1	

Course Outcomes

CO1 :	Study, apply and practice 3d software to analyze and investigate shape, form.
CO2 :	Express and communicate design solutions by exploring and practice of intensive
CO3 :	study of software and presentation through progressive scaling of a particular design
CO4 :	project (different viewpoints, 3D modeling and rendering).

Course Contents

Unit 1: Toolbars Duration: (L: T:)

Camera controls

Pan , Zoom ,orbit ,Basic tools ,Rectangle ,Circle ,Select ,pencil ,push /pull ,Groups ,Component ,Move ,Rotate , Copy ,Array , Polar array , Offset ,Paint bucket

Unit 2: Modelling Duration: (L: T:)

Walls + floor, Windows, Doors, Frames, tables, Openings, Creating materials

Unit 3: Editing of materials Duration: (L: T:)

Scale, Rotate, Edit, Modeling practice, Chair, Shelves, Accessories, Warehouse, Download models, Edit models, Groups vs components, Scale

Unit4: Interior spaces Duration: (L: T:)

Project 1: Interior Space –Bedroom

Room floor 20'X,20' ,

Walls 10'height, 9" thick

doorways 7'height ,3'width,

Window two numbers 5' height,4width or one 5'height, 8'width

Object placement

Locking to axis, Reference points

Unit 5: Sections Duration: 08 Hours (L: T:)

Sections – ,Elevations ,Floor plans Layouts , Preparing views ,Sending to layouts,Positioning ,Sizing , Moving, Copy, Using scene, Scale, Dimensions, Updating model reference, Styles in layout, Title block , Basic renders

Structures phase

Floor

Walls / store front

Doorways

Window frames

Stairs

Columns

Rails

Unit 6: Detailing, Lighting and Rendering Duration: 12 Hours (L: T:

Detailing phase, Tables, Counters, Rugs, Picture frames / posters, Light fixtures, Doors, Windows, Planters , Accessories

Lighting phase: Lights and settings, Lighting with shades, Directional lights, Ambient lights , General lights ,Accent lights , Test renders ,

Render phase, Fixing the lighting, Editing materials, VRay material effects, Camera positioning, Render settings

Presentation phase , Views , Views in SketchUP for use in Layouts , Set up layout , Image hierarchy , scale , Inserting renderings , Dimensions and labels , Title block , Presentation Tips

Recommneded Books:

1. Sketchup for dummies
2. The Sketchup Workflow for Architecture by Michael Brightman

Specific Learning Outcomes

1.0 Toolbars

1.1 Use Camera controls

1.2 Use the toolbars of Pan , Zoom ,orbit ,Basic tools ,Rectangle ,Circle ,Select ,pencil ,push /pull ,Groups ,Component ,Move ,Rotate , Copy ,Array , Polar array , Offset ,Paint bucket

2.0 3D Modeling

2.1 Create Walls + floor, Windows, Doors, Frames, tables, Openings, Creating materials

3.0 Editing of materials

3.1 Use the commands Scale, Rotate, Edit, Modeling practice, Chair, Shelves, Accessories, Warehouse, Download models, Edit models, Groups vs components, Scale

4.0 Interior spaces

4.1 Project 1: Interior Space –Bedroom
Room floor 20'X,20' ,
Walls 10'height, 9" thick
doorways 7'height ,3'width,
Window two numbers 5' height,4width or one 5'height, 8'width
Object placement
Locking to axis, Reference points

5.0 Sections

5.1 Sections – ,Elevations ,Floor plans Layouts , Preparing views ,Sending to layouts, Positioning ,Sizing , Moving, Copy, Using scene, Scale, Dimensions, Updating model reference, Styles in layout, Title block , Basic renders
Structures phase

5.2 Floor

5.3 Walls / store front

5.4 Doorways

5.5 Window frames

5.6 Stairs

5.7 Columns

5.8 Rails

6.0 Detailing, Lighting and Rendering

6.1 Detailing phase, Tables, Counters, Rugs, Picture frames / posters, Light fixtures, Doors, Windows, Planters , Accessories

6.2 Lighting phase: Lights and settings, Lighting with shades, Directional lights, Ambient lights , General lights ,Accent lights , Test renders ,

6.3 Render phase, Fixing the lighting, Editing materials, VRay material effects, Camera positioning, Render settings

6.4 Presentation phase , Views , Views in SketchUP for use in Layouts , Set up layout , Image hierarchy , scale , Inserting renderings , Dimensions and labels , Title block , Presentation Tips

Suggested Student Activities

1. Search online for materials
2. Create new material

Graded exercises:

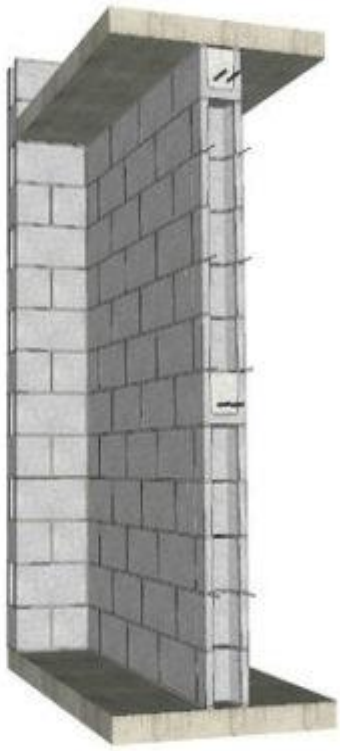
1. Basic furniture –
a) Rectangular table.
b) Three seater sofa
c) Dining table with chairs.
d) Cabinet with doors and drawers.
2. Building modelling
a) Exterior view of a residence, restaurant or any public building.
b) Living and dining room interior view showing furniture.
c) Kitchen interior view showing work centers, storage cabinets etc.
d) Bed room interior view showing cot, wardrobe and dressing unit .
e) Toilet interior views.

Suggested E learning Resources.:

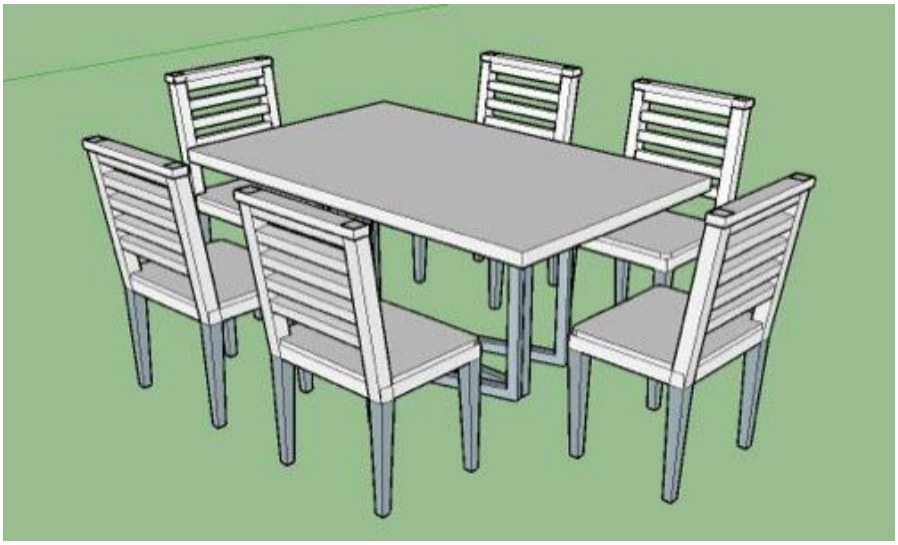
1. Youtube video "Getting started with Sketchup"
2. http://designerhacks.com/sketchup-tutorials/
3. http://www.sketchuptutorials.net/2011/10/21/sketchup-basics-tutorial-part-2-creating-your-firstbuilding/
4. http://designstudentsavvy.com/sketchup-floor-plan-tutorial/
5. http://www.sketchupartists.org/tutorials/sketchup-and-thea-render/
6. https://www.thearender.com/site/index.php/resources/tutorials/sketchup.html
7. http://www.suplugins.com/download/SUPodiumV2PLUS_Guide.pdf
8. Importing and exporting models – 3d Warehouse and CAD.

Assignments:

1. **Draw the following figure in SketchUP using relevant dimensions**



2.Draw the following figure using SketchUP using relevant dimensions.



CO-PO Mapping Matrix

	COURSE OUTCOME	CL	Linked PO
CO1	Study, apply and practice 3d software to analyze and investigate shape, form.	R/U/A	1,2,3,4,5,6,8,9,10
CO2	Express and communicate design solutions by exploring and practice of intensive study of software and presentation through progressive scaling of a particular design project (different viewpoints, 3D modeling and rendering).	R/U/A	1,2,3,4,5,6,8,9,10
CO3	study of software and presentation through progressive scaling of a particular design	R/U/A	1,2,3,4,5,6,8,9,10
CO4	project (different viewpoints, 3D modeling and rendering).	R/U/A	1,2,3,4,5,6,8,9,10

CO /PO mapping

	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering tools	Engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Lifelong learning	
Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapped POs
CO1	x	x	x	x	x	x		x	x	x	1,2,3,4,5,6,8,9,10
CO2	x	x	x	x	x	x		x	x	x	1,2,3,4,5,6,8,9,10
CO3	x	x	x	x	x	x		x	x	x	1,2,3,4,5,6,8,9,10
CO4	x	x	x	x	x	x		x	x	x	1,2,3,4,5,6,8,9,10

Note: A lab manual is to be prepared for the reference of the student. Exam questions should be given from the manual.

WORKING DRAWINGS LAB PRACTICE

Course Title	**WORKING DRAWINGS LAB PRACTICE**	Course Code	**18AA-508P**
Semester	**V**	Course group	**Core**
Teaching scheme in Hrs (L:T:P)	**1:0:2**	Credits	**1.5**
Type of Course	**Lecture +Practice**	Total Contact Hours	**45**
CIE	**60 marks**	SEE	**40 marks**

TIME SCHEDULE

Sl.no	**Major Topics**	**Periods**
1.	Introduction	03
2	Presentation Drawings	09
3.	Working drawings for structural elements.	3
4	Working drawings for architectural elements	12
5.	Working drawings for services	06
6.	Working drawings for site plan	03
7	Working drawings for detailing	09
	viva	
	Total	**45**

Note:

1. The project drawings should be prepared in AutoCAD and the report should be prepared in MS Word.
2. The final presentation should have a A3 size portfolio and a A4 size black bound report.
3. Drawings shall be prepared for a two bed room residence.

Objectives & course contents

Upon the completion of the subject student shall be ableto draw

Note: Consider Earthquake Resistant Structural design detailing wherever applicable

1.0 Introduction

1.1 To understand importance and requirements of working drawings for various stages of construction

2.0 Presentation drawings

2.1 Site plan
2.2 Floor Plans with furniture
2.3 Elevations
2.4 Sections
2.5 Schedule of openings
2.6 Door & window details

2.7 Perspective views of interior and exterior.
2.8 Kitchen/ toilet details, if any.

3.0 Working drawings for structural elements.
3.1 Centre line plan
3.2 Footing or foundation plan
3.3 Any one slab detail
3.4 staircase detail

.**Working drawings for architectural elements**
4.1 Floor plans (superstructure plans)
4.2 Terrace floor plan (for roof structures & drainage)
4.3 Elevations
4.4 Sections
4.5 Staircase details

5.0 Working drawings for services
5.1 Water supply layout.
5.2 Sanitary layout.
5.3 Electrical layout

6.0 Working drawings for site plan

6.1 Site plan indicating various site elements like parking, landscape, water supply layout, sanitary & electrical layouts, etc.

7.0 Working drawings for detailing
7.1 Door & window details
7.2 Kitchen 4 walls detailing
7.3 Toilets 4 walls detailing

REFERENCES

1) Building construction - MC Kay I, II, III and IV Volumes.
2) Building Construction - Barry – Volumes I, II, III and IV
3) Building Construction - S.C. Rangwala
4) Building Construction - N.R.R. Moorthy
5) Building Construction - Bindra&Arora.
6) **National Building code - ISI Publication.**
7) Time saver standards
8) Neufurt's Architect's Data
9) **IS code for Earthquake resistant structural detailing .**

Programming in 'C' lab Practice

Course Title :	**Programming in 'C' lab Practice**	Course Code	**18AA-509P**
Semester	**V**	Course Group	**Core**
Teaching Scheme in Periods(L:T:P)	**1:0:2**	Credits	**1.5**
Methodology	**Lecture + Practical**	Total Contact Hours :	**45Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

Knowledge of Computer Operation.

Course outcomes

Course Outcome	
CO1	Write programs using input/output statements, variables and operators
CO2	Demonstrate decision making, branching and loop statements
CO3	Construct programs on arrays and strings
CO4	Develop programs using functions, structures and unions

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

List of Programmes:

1. Input/output statements, variables and operators

1. Exercise on structure of C program
2. Exercise on Keywords and identifiers
3. Exercise on constants and variables
4. Execution of simple C program
5. Exercise on operators and expressions
6. Exercise on special operators
7. Exercise on input and output of characters
8. Exercise on formatted input and output

2. Decision making, branching and loop statements

1. Exercise on simple if statement
2. Exercise on if..else statement
3. Exercise on else..if ladder statement
4. Exercise on switch statement
5. Exercise on conditional operator
6. Exercise on while statement

7. Exercise on for statement
8. Exercise on do...while statement

3. Arrays and strings

1. Exercise on one dimensional arrays
2. Exercise on two dimensional arrays
3. Exercise on strings

4. Functions, Structures and Unions

1. Exercise on user-defined function
2. Exercise on recursion
3. Exercise on structure
4. Exercise on array of structures

REFERENCE BOOKS

1. Let Us C -- YeshwanthKanetkar BPB Publications
2. Programming in ANSI C -- E. Balaguruswamy Tata McGrawHill
3. C The complete Reference -- Schildt Tata McGraw Hill

E-learning links

1. http://www.tutorialspoint.com/cprogramming/
2. http://www.indiabix.com/online-test/c-programming Test/
3. https://fresh2refresh.com/c-programming/
4. http://www.learn-c.org/
5. https://www.javatpoint.com/c-programming-language-tutorial
6. https://www.cprogramming.com/tutorial/c-tutorial.html

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching periods
CO1	Write programs using input/output statements, variables and operators	**R, U, A**	**1,2,3,4,8,9 ,10**	**5**
CO2	Demonstrate decision making, branching and loop statements	**R, U, A**	**1,2,3,4,8,9 ,10**	**15**
CO3	Construct programs on arrays and strings	**R,U, A**	**1,2,3,4,8,9 ,10**	**10**
CO4	Develop programs using functions, structures and unions	**U, A**	**1,2,3,4,8,9 ,10**	**15**
CO5	Write programs using input/output statements, variables and operators	**R, U, A**	**1,2,3,4,8,9 ,10**	**5**
	Total Sessions			**45**

PROJECT WORK

Course Title	**Major Project**	Course Code	**18 AA -510P**
Semester	**V**	Course group	**core**
Teaching Scheme in Hrs (L:T:P)	**1:0:2**	Credit	**09**
Type of course	**Project**	Total Contact Hours	**210**
CIE	**200 marks**	SEE	**200 marks**

TIME SCHEDULE & ASSESSMENT

Sl. No	**Major Topics**	**No. of periods**
1.	Selection of Topic	06
2.	Data collection	15
3.	Case study	18
4.	Case study Analysis & Proposed project requirements	15
5.	Site selection	12
6.	Schematic proposals	30
7	Presentation drawings	30
8	Working drawings	30
9.	Report	12
10.	Model	30
11	Log book	-
	Review-1 Viva/Seminar	06
	Review-2 Viva/Seminar	06
	Final Viva/Seminar	-
	Total:	**210**

Note:

1. The project drawings should be prepared in AutoCAD and the report should be prepared in MS Word.

2. The final presentation should have a A3 size portfolio and a A4 size black bound report.

OBEJECTIVES

Upon completion of the subject the student shall be ableto select a topic for study, make literature study, visit a case study site, building and get acquainted with the spaces, analyze, prepare project requirements, and propose concept based proposals and acquire confidence to handle projects independently.

COURSE CONTENT

1) Selection of Topic

The topic should be selected from the array of topics available in design and submit a report containing aim, objectives, scope and limitations. The topic should be of sufficient scope to suit the diploma level education.

2) Data Collection

Data is to be collected from relevant standard books and case studies done earlier and prepare a report.

3) Case study

Each group of students is required to select a case study building, visit the site, get acquainted with the spaces and study the same with respect to the data already collected and prepare measured drawings and report. Site and building photographs may also be taken.

4) Case study Analysis& Proposed project requirements

Each group of students should analyze the case study at three levels i.e. at site level, building level and unit level by considering the data collected from books and data from case study and prepare an analytic report.

5) Site selection

Students should select an appropriate site to suit the proposed project requirements**.**

6) Schematic Proposals

Prepare two schematic proposals to be approved by the concerned faculty member,

7) Presentation Drawings

i) Site plan
ii) Floor Plans with furniture
iii) Elevations
iv) Sections
v) Schedule of openings
vi) Door & window details
vii) Perspective views of interior and exterior.
viii) Kitchen/ toilet details, if any.

8) Working Drawings

Structural working drawings

i) Center line plan
ii) Footing or foundation plan
iii) Any one slab detail
iv) Staircase detail

Architectural working drawings

i) Site plan
ii) Floor plans (superstructure plans)
iii) Terrace floor plan (for roof structures & drainage)
iv) Elevations
v) Sections
vi) Water Supply,
vii) Sanitary layout
viii) Electrical layout

9) Report

Each group of students has to prepare a combined report in **A4** size on the entire project work including contents 1 to 8.

10) Model

A block model is to be prepared to a suitable scale.

11) Log Book

Web links for presentation techniques
https://www.youtube.com/watch?v=RZVXiBvTu08/
https://www.youtube.com/watch?v=yEymIyLbiAI/
https://www.youtube.com/watch?v=yEymIyLbiAI/
https://www.youtube.com/watch?v=ml73GJKAYMk/
https://www.youtube.com/watch?v=8fKUN7g-WRQ/
https://www.youtube.com/watch?v=BjyGHjAwuP0/
https://www.youtube.com/watch?v=AVGGD4xP8Qc/
https://www.youtube.com/watch?v=YeKPt1oVjVE
https://www.youtube.com/watch?v=vmHoGicPQQQ

Skill Upgradation

Subject related activities:

1. Case study of existing projects
2. Market survey
3. Material survey
4. Data collection
5. Site visits
6. Group Discussions
7. Attending workshops
8. Visiting material and technology exhibitions
9. Seminars
10. Presentations
11. Outdoor sketching
12. Slip tests
13. Surprise tests
14. Time Problems
15. Desktop surveys

16. Model making
17. 3D Renderings
18. Walk through

Extra Curricular:

1. Newspaper reading
2. Debates
3. Elocution
4. Recitation
5. Dumb Charades