SEMESTER - I

Semester I

Course No.	Course Name	L – T – S –P/D	Credits	Year of Introduction
ART101	THEORY OF ARCHITECTURE I	3 – 0 – 0 – 0	3	2021

Course Objectives

- To lay the foundation of architecture as a field of study
- To develop an appropriate vocabulary in the student for understanding and expressing architectural works
- To evaluate architectural work on the basis of aesthetical and functional needs

Course Outcome

At the end of successful completion of the course students will be able –

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	To define architecture from various perspectives	Understand and Analyze
CO2	To identify and evaluate the basic elements of design and architecture	Understand, Analyze and evaluate
CO3	To analyze the various visual principles of composition	Understand and Analyze
CO4	To evaluate the relationship of form and space in architecture	Understand, Analyze and evaluate
CO5	To appreciate the importance of circulation in architecture	Understand, Analyze and evaluate

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous internal evaluation pattern:

Attendance : 4 Marks
Tests (2 numbers) : 20 Marks
Assignment/Quiz/Course project : 16 Marks

End semester examination pattern:

There will be two parts; Part A and B. Part A contains 5 questions with 1 question from each module, having 4 marks for each question. Students should answer all the questions. Part B contains 2 questions from each module, of which the student should answer any one. Each question carries 8 marks. One or two questions can have subdivisions. Some questions can be framed in such a manner to assess the student's capacity for analyzing the topics and linking it with other courses.

Syllabus

Introduction, origin and definition of Architecture – Elements of Design and Architecture – Principles of Composition – Form and Space –Circulation

Course Plan			
Module	**Contents**	**Course Outcome**	**Hours**
I	**Introduction** Origin of Architecture, Etymology of the Word 'Architecture', Definition of Architecture and Understanding Architecture as Identification of Place, Natural and Man-made form, Gestalt principles of visual perception	CO1	6
II	**Elements of Design and Architecture** Basic elements of design – point, line, plane, volume and their architectural expressions. Basic elements of Architecture Modifying elements of Architecture	CO1 CO2	9
FIRST INTERNAL TEST			
III	**Principles of Composition** Proportion and scale in architecture, Proportioning systems and their role in establishing visual relationship. Ordering principles- Axis, Symmetry, Balance, Hierarchy, Datum, Rhythm, Repetition, Pattern, Transformation,	CO2 CO3	12

	Harmony, Contrast, Unity, Dominance, Emphasis, Climax.		
IV	**Form and Space** Evolution, Transformation and Articulation of form. Geometry in Architecture. Elements defining spaces – Spatial relationships – Spatial organization – centralized, linear, radial, clustered, grid – built form and open space relationships. With architectural examples.	CO2 CO3 CO4	12
SECOND INTERNAL TEST			
V	**Circulation** Experiencing Architecture through movement in space, Relationship between architectural form and circulation – Types of circulation – Building approach and entrance, path configuration and form, pathspace relationship, orientation. With architectural examples.	CO4 CO5	6
END SEMESTER EXAMINATION			

Required Reading

- Francis D.K. Ching, 'Architecture – Form, Space and Order', Van Nostrand Reinhold Company, New York,2007.
- JohnBeverlyRobinson,'PrinciplesofArchitecturalComposition',Wentworth Press,2016
- Kurt Koffka, 'Principles Of Gestalt Psychology', Mimesis International,2014
- PramarV.S.,'Design Fundamentals in Architecture',Somaiya Publications Private Ltd., New Delhi,1973.
- Simon Unwin, 'Analysing Architecture', Routledge, London,2003.

Further Reading

- Bryan Lawson, 'The Language of Space', Architectural Press,2001.
- James C. Snyder, 'Introduction to Architecture', McGraw-Hill,1979
- K N Iengar, 'Composing Architecture', Academy of Art and Architecture, Mysore,1996.
- Leland M Roth; 'Understanding Architecture: Its Elements, History and Meaning', Craftsman House,1994.
- Wucius Wong, 'Principles of two Dimensional Design', Wiley,2009
- Wucius Wong, 'Principles of Three Dimensional Design', Wiley,2009
- Yatin Pandya, 'Elements of Space making', Mapin2007.

	Model question paper		**Total Pages: 02**
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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR

Course Code: ART 101

Course Name: THEORY OF ARCHITECTURE - I

Max. Marks: 60		Duration: 3 Hours

PART A

		All questions need to be answered. ***To be answered in a maximum of 50 words with supporting sketches.***	Marks
1		How does Unwin establish that Architecture goes beyond the design of building?	(4)
2		Enumerate and categorize the various planes in architecture.	(4)
3		Explain the relevance of Datum as a principle of composition.	(4)
4		Briefly explain the role of geometry in architecture.	(4)
5		Name and sketch three ways a building can be approached.	(4)

PART B

To be answered in a maximum of 200 words with supporting sketches.
Answer any one question from each module.

		MODULE 1	
6		"The idea of architecture as identification of place asserts the indispensable part played in architecture by the user as well as the designer". Bring out the validity of this statement with an example.	(8)
7		Differentiate between Natural form and Man-made form.	(8)
		MODULE 2	
8		Enumerate various modifying elements in Architecture. Explain in detail how light acts as a modifying element.	(8)
9		Explain how linear elements in architecture can be used to -	(8)
	i	Contain a volume	
	ii	Articulates the edges of planes and volumes	
	iii	Create texture & Pattern	
		MODULE 3	
10		Define proportion and scale.	(8)
	i	What is meant by proportioning system?	
	ii	Elaborate any two proportioning system explaining how they are effective in bringing order in architectural built form.	
11		What is meant by ordering principles in architecture? Citing a known example, identify and explain 5 principles of composition used in its built form.	(8)

		MODULE 4	
12		Citing known examples, explain any 3 spatial organizations in architecture.	(8)
13		Bring out the necessity of transforming forms in architecture.	(8)
		MODULE 5	
14		By citing a known example, bring out how the circulation pattern has impacted the architectural form.	(8)
15		Write short notes on –	(8)
	i	Path – space relationship	
	ii	Elements of circulation	
		****	

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
MAT101	MATHEMATICS	3-0-0-0	3	2021

Course Objectives:

To understand and analyze Architecture, one needs the basic knowledge of the statistical methods available for calculating the Correlation coefficient and Probability distributions and their application along with various statistical methods of hypothesis testing and linear algebra. Mathematics and its application is required as a fundamental basis for equipping Architecture students with analytical, logical and practical skills required to be acquired by them to excel in design. Data and mathematical analysis works as essential tools to make the right decision in many practical situations.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO-1	Solve system of linear equations	Understanding and Analysing
CO-2	Learn about important statistical measures of central tendency, dispersion and correlation essential for data analysis.	Understanding And Analysing
CO-3	learn about important probability distributions and important statistical tests of hypothesis based on it.	Understanding and Analysing

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous internal evaluation pattern:

Attendance : 4 Marks
Tests (2 numbers) : 20 Marks
Assignment/Quiz/Course project : 16 Marks

End semester examination pattern:

There will be two parts; Part A and B. Part A contains 5 questions with 1 question from each module, having 4marks for each question. Students should answer all the questions (5x4= 20marks). Part B contains 2 questions from each of the 5 modules, of which the student should answer any one. Each question carries 8marks (Total 5x8=40). Part B questions can have subdivisions.

Syllabus

Linear Algebra – Application of Measures of central tendency, Dispersion in statistics – Correlation coefficient – important probability distributions and statistical tests for analysis of hypothesis.

Course Plan

Module	Topic	Course outcome	No. of hours
I	**Linear algebra (Text 1: Sections 7.3, 7.4, 7.5)** Systems of linear equations, Solution by Gauss elimination, row echelon form and rank of a matrix, fundamental theorem for linear systems (homogeneous and non-homogeneous, without proof)	CO-1	8
II	**Statistics (Text 2: Sections 25.5, 25.6, 25.7, 25.8)** Measures of central tendency- Mean-median-mode, Measures of Dispersion- Mean deviation-standard deviation- variance.	CO-2	8
FIRST INTERNAL TEST			
III	**Statistics (Text 2:Sections 25.13, 25.14, 24.4, 24.5)** Correlation coefficient- Regression lines- Method of least squares- Fitting of straight line and parabola	CO-2	8
IV	**Probability distributions (Text 2: Sections 26.7, 26.8, 26.9, 26.10, 26.14, 26.15, 26.16)** Probability distributions: Random variable- probability density function- probability distribution function- properties Expectation of a random variable- Mean and variance. Probability distributions: Binomial- Poisson- Normal (without proof of mean and variance)	CO-3	10
SECOND INTERNAL TEST			

V	**Testing of hypothesis (Text 2: Sections 27.1- 27.6, 27.9-27.15)** Sampling distribution- Standard error- Testing a hypothesis- Type I and Type II errors- Level of significance. Large sample tests: Test of significance for a single mean- Test of significance for difference of means. Small sample tests: Student's t-distribution- Test of significance of a sample mean- Test of significance of difference between sample means.	CO-3	11
END SEMESTER EXAMINATION			

Text Books:

- Erwin Kreyszig, Advanced Engineering Mathematics, 10thEdition, John Wiley &Sons,2016.
- B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2017.

Reference Books

- Richard A Johnson, Probability and Statistics for Engineers(Miller and Freunds)- Prentice Hall of India, 8thEdition.
- S C Gupta and V K Kapoor , Fundamentals of Mathematical Statistics , S Chand Publications

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR

Course Code: MAT 101

Course Name: MATHEMATICS

Max. Marks: 60 | Duration: 3 Hours

PART A

Answer all questions. Each question carries 4 marks. | Marks

1		Find the rank of the matrix $\begin{bmatrix} 3 & 0 & 2 & 2 \\ -6 & 42 & 24 & 54 \\ 21 & -21 & 0 & -15 \end{bmatrix}$	(4)
2		The mean of 200 items was 50. Later on it was discovered that two items were misread as 92 and 8 instead of 192 and 88. Find out the correct mean.	(4)
3		In a partially destroyed laboratory record of an analysis of a correlation data, the following results only are legible: Variance of x=9, Regression equations: 8x-10y+66=0,40x-18y=214. What are (i) the mean values of x and y. (ii) the coefficient of correlation between x and y.	(4)
4		Suppose that X has Poisson distribution. If P(X=2) =2/3P(X=1), find P(X=0) and P(X=3).	(4)
5		A normal population has mean 6.8 and standard deviation of 1.5. A sample mean of 400 members gave a mean of 6.75. Is the difference significant?	(4)

PART B

Answer any one question from each module. Each question carries 8 marks.

MODULE 1

6		Solve the following system of equations by Gauss elimination method: 2x+2y+4z=18, x+3y+2z=13, 3x+y+3z=14.	(8)
7		For what values of λ and μ the given system of equations x+y+z=1, x+2y+3z=10, x+2y+λz=μ has (i) No solution (ii) unique solution (iii) infinite number of solution.	(8)

MODULE 2

8		Find the mode of the following data.	(8)

Marks	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45
No. of candidates	7	10	16	32	24	18	10	5	1

9		Find the mean deviation from the median of the following frequency distribution.	(8)

Marks	0-10	10-20	20-30	30-40	40-50
No. of students	5	8	15	16	6

		MODULE 3	
10		Obtain the equations of the lines of regression from the following data: X: 1 2 3 4 5 6 7 Y: 9 8 10 12 11 13 14	(8)
11		Fit a straight line to the following data. X: 1 2 3 4 5 Y: 14 27 40 55 68	(8)
		MODULE 4	
12		In a test of 2000 electric bulbs, it was found that the life of a particular make was normally distributed with an average life of 2040 hours and a standard deviation of 60 hours. Find the number of bulbs likely to burn (i) more than 2150 hours (ii) less than 1950 hours.	(8)
13		A discrete random variable X has the following probability function x: 1 2 3 4 5 6 7 F(x): k 2k 2k 3k K^2 $2k^2$ $7k^2+k$	(8)
	i	Find k	
	ii	Evaluate P(X<3) ,P(X≥6).	
		MODULE 5	
14		In a random sample of size 500, the mean is found to be 20. In another independent sample of size 400, the mean is 1.5. Could the samples have been drawn from the same population with standard deviation 4.	(8)
15		A random sample of size 25 from a normal population gives a sample mean 15 and a standard deviation 8. Test the hypothesis that the population mean is 16 at 5% level of significance.	(8)
		****	

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
AET101	THEORY OF STRUCTURES I	2-1-0-0	3	2021

Course objectives:

The goal of this course is to expose the students to the fundamental concepts of mechanics and enhance their problem-solving skills. It introduces students the sectional properties and influence of applied force systems on stationary rigid bodies. After this course, the students will be able to recognize similar problems in real world situations and respond accordingly.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO – 1	Identify the components of system of forces acting on rigid bodies	Remembering
CO – 2	Calculate the sectional properties of simple and compound plane sections	Understanding
CO – 3	Apply the conditions of equilibrium to find reactions in rigid bodies and axial forces in simple plane trusses	Applying
CO – 4	Compute the resultant of different force systems using basic principles of mechanics	Applying

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous internal evaluation pattern:

Attendance : 4 Marks
Continuous assessment tests(2numbers) : 20 Marks
Assignment/Quiz/Course project : 16 Marks

End semester examination pattern:

There will be two parts; Part A and Part B. Part A contain 5 questions from each module, having 4marks for each question. Students should answer all the questions. Part B contains 2 questions from each module, of which the student should answer anyone. Each question can have subdivisions and carries 8 marks.

Syllabus

Introduction to Engineering Mechanics – Concept of rigid body Force concepts – Various force systems – Co planar Concurrent force system, Non-Concurrent force systems; Resultant and Equilibrium – Beams, Support conditions , Load types, Computation of support reactions – Centre of gravity, Centre of mass , Centroid of composite areas – Moment of inertia, Perpendicular axis theorem, Parallel axis theorem, Polar moment of inertia- Simple plane trusses, Truss analysis – Graphical method and Method of joints.

Course plan

Module	Contents	Course outcome	No.of Hours
I	Introduction to Engineering Mechanics –Statics – Basic principles of statics – Parallelogram law, Law of action and reaction(Review) Concept of rigid body – Practical examples Force concepts – Characteristics of a force Principle of transmissibility and super position Various force systems – Practical examples Resolution of forces – Resultant of co planar concurrent force system – Methods of projections – Numerical exercise Co planar concurrent force system – Principle of resolved parts – Numerical exercise Equilibrium of concurrent forces – Laws of equilibrium – Free body diagrams – Exercises for free body diagram preparation – Numerical exercise on analysis of single body Analysis of concurrent force systems – Numerical exercises on analysis of bodies in contact	CO –1 CO –3 CO –4	8
II	Moment of a force –Review Introduction to non-concurrent force systems, Parallel force system, couple Varignon's theorem – Derivation not required Resultant of parallel forces Resultant of non-concurrent force system – Numerical exercise Introduction to beams – types of beams – Support conditions – Load types – Point load, Uniformly distributed and Varying loads – Practical examples	CO –1 CO –3 CO –4	8

Module	Contents	Course outcome	No.of Hours
	Computation of support reactions of cantilever and simply supported beams subjected to concentrated and distributed loads – Numerical exercise		
	FIRST INTERNAL EXAMINATION		
III	Centre of gravity – Centre of mass- Centroid – Concept and definition – Practical examples Centroid of thin uniform wire bend in to semi- circular arc Centroid of simple plane areas – Integration method – Numerical exercise Centroid of composite areas – Numerical exercise	CO – 2	6
IV	Moment of inertia –Concept and practical significance Parallel axis theorem Moment of inertia of basic shapes- rectangle, triangle, circle, semi-circle, quadrant of a circle – Derivation Perpendicular axis theorem, Polar moment of inertia, Radius of gyration. Moment of inertia of composite areas – Numerical exercise	CO – 2	7
	SECOND INTERNAL EXAMINATION		
V	Concept of truss – Applications – properties– Different configurations Conditions for a stable, determinate truss – Examples Assumptions in the analysis of truss – Different methods of truss analysis Analysis of cantilever and simply supported trusses – Graphical method and Method of joints	CO –1 CO –3 CO –4	7
	END SEMESTER EXAMINATION		

Text Books:

- S. Timoshenko, D. H. Young, J. V. Rao, Sukumar Pati, Engineering mechanics, Mc Graw Hill Education
- R.C. Hibbler, “Engineering Mechanics”, Pearson Education, Asia Pvt. Ltd.
- F.P.Beer & E.R.Johnston, “Vector Mechanics for Engineers”, Tata McGraw Hill

Reference Books

- Henry J., Covan, Architectural structures: An introduction to structural mechanics, Pitman Publishing

- Philip Garrison, Basic structures for engineers and architects, Wiley – Blackwell publishers
- Francis D. K. Ching, Barry S. Onouye, Douglas Zuberbuhler, Building structures illustrated, Wiley publishers
- Babu, J., Engineering Mechanics, Pearson Prentice Hall
- Benjamin J., Engineering Mechanics, Pentex Book Publishers and Distributors
- Bhavikkatti, S. S., Engineering Mechanics, New Age International Publishers
- J.L. Meriam &L.G. Kraige, "Engineering Mechanics", John Wiley and Sons
- Kumar, K. L., Engineering Mechanics, Tata McGraw Hill Publishing Company Limited
- R.K Bansal., Engineering Mechanics, Lakshmi Publications PvtLtd
- R.K Bansal., Strength of Materials, Lakshmi Publications PvtLtd
- R.S.Khurmi &N. Khurmi, Priniples of Engineering Mechanics, S. Chand Publishing
- Rajasekaran S. and Sankarasubramanian, G., Engineering Mechanics, Vikas Publishing House Private Limited
- S. Ramamrutham., Strength of Materials, Dhanpat Rai Publishing Company Pvt.

	Model question paper	Total Pages: 04
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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR

Course Code: AET 101

Course Name: THEORY OF STRUCTURES - I

Max. Marks: 60 Duration: 3 Hours

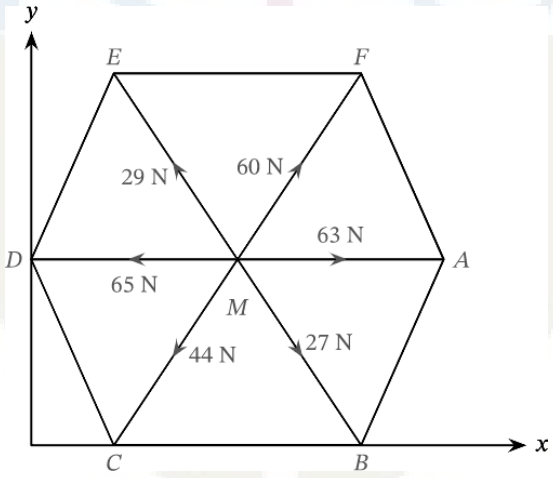
PART A

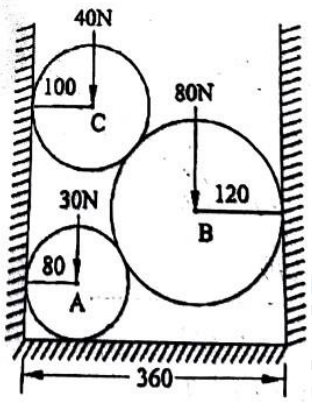
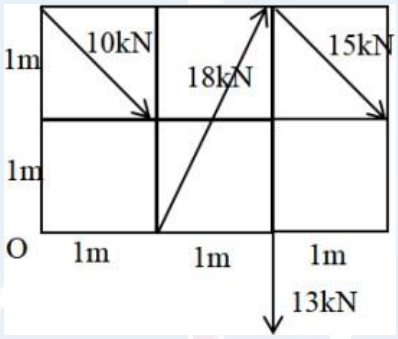
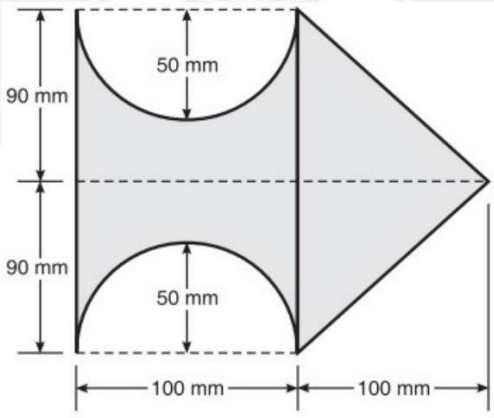
		Answer all questions, each question carries 4 marks	Marks
1		State and prove Lami's theorem.	(4)
2		Explain with neat diagrams, the different types of supports and give practical examples of each.	(4)
3		Locate the centroid of thin uniform wire into semi-circular arc using method of integration.	(4)
4		State and prove Perpendicular axis theorem.	(4)
5		List the assumptions in the analysis of truss.	(4)

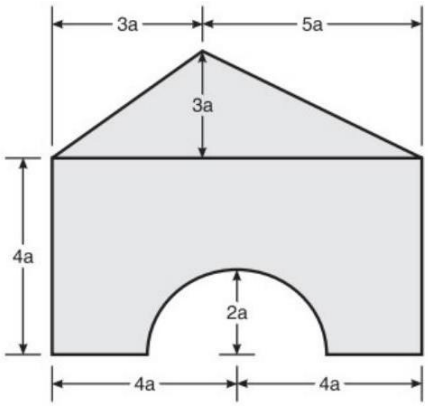
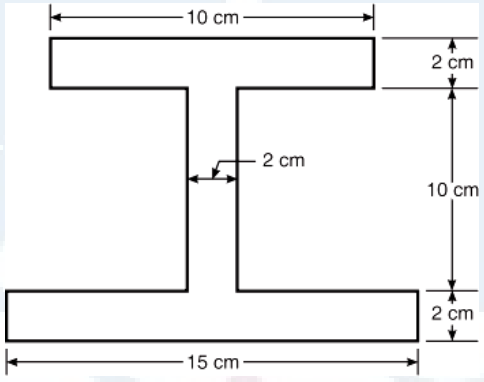
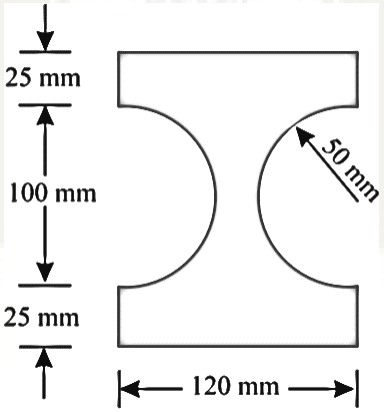
PART B

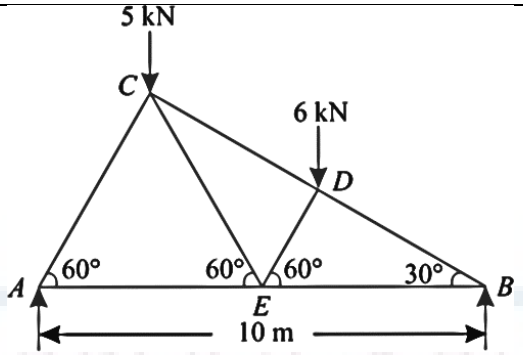
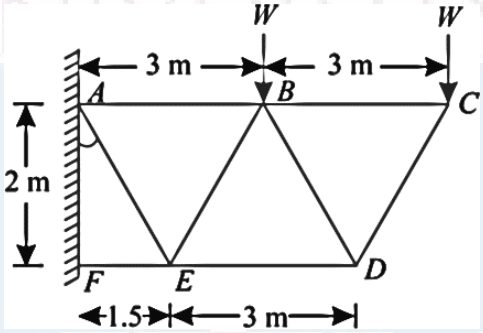
Answer any one question from each module, each carries 8 marks

MODULE 1

6		Concurrent forces of 63, 27, 44, 65, 29, 60 N are applied to the center of a regular hexagon acting towards its vertices as shown in Figure 1. Determine the magnitude and direction of the resultant.  Figure 1	(8)
7		Three cylinders are piled in a rectangular ditch as in Fig.2.Neglecting friction, determine the reaction between cylinder A and vertical wall.	(8)

		 Figure 2	
		MODULE 2	
8		Determine the resultant of the non-concurrent force system shown in Figure 3, and find its position with respect to point O.  Figure 3	(8)
9		A simply supported beam AB of span 6 m is carrying point loads 20 kN, 16 kN & 12kN at l.5 m, 3 m & 4.5 m respectively from support A. In addition, the beam carries a uniformly distributed load of 5kN/m over the entire span. Calculate reactions at supports A and B.	(8)
		MODULE 3	
10		Find the centroid of the shaded area shown in Figure.4.  Figure 4	(8)

11		Find the centroid of the shaded area shown in Figure 5 for a = 10 cm.  Figure 5	(8)
		MODULE 4	
12		Figure 6 shows the T-section of dimensions 10 ×10 × 2. Determine the moment of inertia of the section at the horizontal and vertical axes, passing through the centre of gravity of section.  Figure 6	(8)
13		Determine the moments of inertia of the section shown in Figure7 about horizontal and vertical axes passing through the centroid of the section.  Figure 7	(8)
		MODULE 5	
14		A truss of span 10 meters is loaded as shown in Figure. 8. Find the forces in all the members of the truss.	(8)

		 Figure 8	
15		A cantilever truss is loaded as shown in Figure 9. Find the value W, which would produce the force of magnitude 15 kN in the member AB.  Figure 9	(8)
		****	

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
ARD101	BASIC DESIGN AND VISUAL ARTS	0-2-8-0	10	2021

Course Objectives:

The primary objective of this course is to familiarize students with the grammar of art by involving them in a series of free hand exercises both indoor and outdoor to enhance their imaginative thinking and creativity and understand form, proportion, scale, etc. This also includes introduction to primary elements and basic principles of design, space articulation, and the use of drawing as a communication tool for design information.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO-1	To understand and gain a fundamental knowledge of art and its expression, design, its elements, and principles.	Understanding
CO-2	To acquire the ability to draw in various media and materials, to develop the power of drawing as a means of coordinating eye and hand in studio	Applying
CO-3	To judge proportion, scale, and spatial relationships, understand principles of visual composition through field observation, anthropometrics, and experiment with them.	Analysing and evaluating
CO-4	To develop ability to assemble simple spatial elements in articulated constructs or design of an object or space and visually represent them through hand-made 2D drawings and 3Dmodels.	Creating

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester jury examination duration
100	50	50	2-3 days

Continuous internal evaluation pattern:

Attendance : 5 Marks
Design Assignments/Reviews/Tests : 45 Marks

Syllabus:

Development of presentation skills, visual expression and representation, imaginative thinking and creativity through a hands on working with various mediums, materials and techniques of art through which artistic expression can be achieved – An insight into Principles of design – harmony, symmetry etc. and their application- Elements of design, and Perception of space -Design Parameters – anthropometrics – human activity and the use of space. Interrelationship of architectural space to form, structure, and materials to help students develop a visual and tacit structural understanding through models and installations – Abstraction to Design – An understanding on how abstraction aids design development.

Course Plan:

Module	Topic	Course outcome	No. of hours
I	**Drawing skills and Visual arts:** Indoor and outdoor sketching: An experience of live drawing in various contexts in pencil and pen/ink, Free- hand perspective drawing and rendering of imagined objects, in pencil and pen/ink. Perception of colour and light: Exploring Colour Schemes based on principles of Harmony and Contrast and degree of Chromatism, Exercises using different painting mediums- water colour, acrylic, oil and encaustic. Basic components of 2-dimensional and3- dimensional art, including subject, form, and content, Sculpture by casting, modelling, additive/subtractive techniques, and fabrication – materials used can include plaster, wire, clay, wood, paint, board, paper, etc.	CO-1, CO-2	30
II	**Introduction to basic elements and principles of design:** Elements of Design: Point, Line, Shape, Plane,	CO-1, CO-2	30

	Volume, Forms etc. Principles of design and their application to endow a quality to spaces and forms: unity, balance, symmetry, proportion, scale, hierarchy, rhythm, contrast, harmony, focus, figure and ground etc Exercises: 2D and 3D compositions demonstrating principles of design.		
FIRST INTERNAL TEST			
III	**Study of Forms: Solids and Voids, Planar, Fluid and Plastic Forms.** Study of linear and Planar forms using simple material like Mount Board, metal foil, boxboards, wire string, thermocol etc., Study of Solids and voids to evolve sculptural forms and spaces and explore the play of light and shade and application of color, Study of fluid and plastic forms using easily moldable materials like clay, plaster of paris etc. Study of texture and schemes of texture both applied and stimulated and their application, Analytical appraisal of building form in terms of visual character, play of light and shade, solids and voids etc.	CO-3	30
IV	**Parameters of design, anthropometrics, human activity and the use of space:** Anthropometric studies – average measurements of human body in different postures, its proportion and graphic representation, application in design of simple household and street furniture. Basic human functions and their implications for space requirements. Minimum and optimum areas for various functions.	CO-3	30
SECOND INTERNAL TEST			
V	**Abstraction to Product Design:** Studying/analysing manmade and natural forms/objects and copying or abstracting patterns and	CO-4	30

	using the same to generate design for a product like chair, lampshade, pen stand etc. Representation of ideas through sketches, diagrams, and drawings with application of line quality, thickness and intensity as appropriate to the intent.		
END SEMESTER EXAMINATION / JURY			

Reference Books

- Webb, Frank, "The Artist guide to Composition", David &Charles, U.K., 1994.
- Drawing a Creative Process", Ching Francis, Van Nostrand Reinhold, New York,1990.
- The art of drawing trees, heads, colours, mixing, drawing, landscape and painting, water colour, oil colour, etc. – The Grumbacher Library Books, New York – 1996.
- Caldwell Peter, "Pen and Ink Sketching", B.T. Bats ford Ltd., London, 1995.
- Charles Wallschlaeger & Synthia Busic Snyder, Basic Visual Concepts &Principles for artists, architects &designers, McGraw hill, USA,1992.
- Edward D.Mills – Planning the Architects Hand Book – Bitterworth, London,1985.
- Francis D.K.Ching – Architecture – Form Space and Order Van Nostrand ReinholdCo.,(Canada),1979
- Owen Cappleman &Michael Jack Kordan, Foundations in Architecture: An Annotated Anthology of beginning design projects, Van Nostrand Reinhold, New York.
- Paul Laseau, Graphic Thinking For Architects and Designers, John Wiley &Sons, New York,2001.
- Wucius Wong, 'Principles of Two-Dimensional Design', John Wiley and Sons Inc., New York,1972.

Course materials, Guidance and Evaluation methods

- Books, research papers, e-books, videos etc. to be provided to the students by the faculty and ensure that they read it, by initiating discussions.
- Students are required to develop presentation skills, visual expression and representation, imaginative thinking and creativity through a hands-on working with various mediums and materials.
- Students need to be familiarized with the various mediums and techniques of art and the grammar of art by involving them in a series of free hand exercises both indoor and outdoor to understand form, proportion, scale, etc
- Students are required to understand the elements and principles of Basic Design as the building blocks of creative design through exercises that will develop the originality, expression, skill and creative thinking.

- Involve students in a number of exercises to understand the grammar of design and visual composition.
- Enable the understanding of 3 D Composition by involving students in a number of exercises which will help generation of a form from a two dimensional / abstract idea.
- Students need to be equipped to understand the relationship between the grammar of design and architecture by involving the students in seminars/ workshops and simple exercises which will look at building form analytically.
- Each student should be encouraged to have a sketchbook with sketches of all the topics covered.

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
ARS101	BUILDING MATERIALS AND CONSTRUCTION TECHNIQUES I	1-0-0-2	3	2021

Course objectives :

The goal of this course is to expose the students to elementary building materials and their applications. It aims to familiarize students to contemporary as well as vernacular and traditional building materials. It will also introduce students to prevailing &relevant BIS specifications. After this course, the students will be able to recognize materials in the market and use them in their design visualization.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	Identify the relevant BIS specifications.	Remembering
CO2	Identify appropriate mortar mixes for various construction needs.	Understanding
CO3	Work with various building materials in the construction yard and understand their behaviour.	Applying
CO4	Use the various building materials in their design processes appropriately	Applying

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	50	50	3 hours

Continuous internal evaluation pattern:

Attendance : 5 Marks
Continuous assessment tests (2nos.) : 15 Marks
Portfolio presentation (15)/drawings (15) : 30 Marks

End semester examination pattern:

There will be three parts; Part A, B and C. Part A will contain 5 questions with 1 question from each module, having 3 marks for each question. Students should answer all the questions. Part B will contain 2 questions from each module, of which the student should answer any one. Each question carries 4 marks. Part C will have one essay question which can have subdivisions, to assess the student's capacity for analysing the topics and linking it with other subjects studied. The question carries 15marks.

Syllabus

Classification, properties and uses of Building materials; -Stone– Granite, Laterite, Slate, Marble; - Mud as a building material; - Clay – Clay as building material. Use of terracotta in construction as roofing and flooring tiles; - Brick- country bricks &factory made -properties, available sizes, use; - Structural systems using bricks; - Mortar – lime mortar, mud mortar, cement mortar.

Course plan

Module	Topic	Course outcome	No. of hours
I	**Introduction to building materials**, BIS standards Stone – Classification, Properties Characteristic features of stone and its uses Construction, Documentation and analysis of marble stone use Construction, Documentation and analysis of granite stone use Construction, Documentation and analysis of laterite stone use	CO1, CO2, CO3, CO4	9
II	**Introduction to clay as a building material**, its properties and uses. Brick as a building material including properties, sizes, types of bonds, sketches of the same to be done Terracotta as a building material, including its properties and use in flooring and roofing. Construction, Documentation and analysis of brick masonry including various bonds in walls.(one brick and 1.5 brick). Ornamental brick bonds may also be attempted.	CO1, CO2, CO3, CO4	9

Module	Topic	Course outcome	No. of hours
FIRST INTERNAL TEST			
III	**Mud as a building material**, Introduction and types of mud construction (Adobe, Wattle and Daub and Rammed earth) Stabilised Mud Blocks, Sand lime bricks as a building material, its manufacture, properties and uses. Construction, Documentation and analysis of Adobe construction. Construction , Documentation and analysis of Wattle and Daub Construction, Documentation and analysis of Rammed earth construction. Construction , Documentation and analysis of SMB and Sand Lime Bricks construction	CO1, CO2, CO3, CO4	9
IV	**Introduction to structural systems using bricks** – Arches & Vaults with drawings Discussion on Footings, T junction and cross walls using bricks Construction , Documentation and analysis of arches using Bricks. Construction , Documentation and analysis of vaults using Bricks. Construction , Documentation and analysis of footings, cross junction and T Junction using Bricks.	CO1, CO2, CO3, CO4	**9**
SECOND INTERNAL TEST			
V	**Introduction to mortars**- Proportions, water cement ratio Discussion on Mortar types, stabilised mud mortar, lime mortar, cement mortar Properties and application of mortars Comparison of mud, lime and cement mortar- advantages and disadvantages **Safe Site visit** to document mortar application and presentation through seminars	CO1, CO2, CO3, CO4	**9**
END SEMESTER EXAMINATION			

Text Book

- 1. P.C. Varghese, 'Building Materials', Prentice hall of India Pvt Ltd, New Delhi, 2005

Reference Books

- Harry Parker, 'Materials and Methods of Architectural Construction', John Wiley &Sons Canada,1958
- HLeslie Simmons, 'Construction – Principles, Material &Methods', 7th edition, John Wiley &Sons Inc., New York,2001.
- Relevant BIS codes.
- Rosen Harold J, Construction materials for Architecture, Krieger Pub Co,1992
- Doran, David; Cather, Bob; Doran, D. K; Cather, R – Construction materials reference book, Routledge,2013

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
ARS103	ARCHITECTURAL GRAPHICS AND DRAWING I	1-0-0-3	4	2021

Course Objectives:
To introduce students to the fundamentals of technical drawings.

Course Outcomes:
After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO-1	Summarise the basic principles of technical drawing	Understanding
CO-2	Draw orthographic projections of simple solids	Applying
CO-3	Draw measured drawings of small objects	Applying

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	50	50	3 hours

Continuous internal evaluation pattern:

Attendance : 5 Marks
Tests (2 numbers) : 15 Marks
Assignment/Quiz/Course project : 30 Marks

End semester examination pattern:
There should be two parts; **Part A** and **Part B**. **Part A**
Contains **four** questions.
Module 1: 1 Question (**10** Marks)
Module 2: 1 Question (**10** Marks)
Module 3: 2 Questions (**10** Marks x **2**) Answer **any three** questions

Part B
Module 4: 1 Question (**20** Marks)

Syllabus

Architectural lettering, Scales, Orthographic projection, Measured drawing.

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	**1 Architectural lettering** **2 Scales** Introduction to scales Graphical scales. Plain scales **Drawings:** 1. Architectural lettering 2. Construction of plain scales	CO1	10
II	**1 Introduction to projection** Projection, types of projections and classification of projections **2 Orthographic projections** Projections of points, lines and planes. True and apparent lengths and angles. Traces Projections of solids in simple positions and positions inclined to the reference planes **Drawings:** 1. Projection of lines 2. Projection of solids (prisms, pyramids, cylinders and cones)	CO1, CO2	22
FIRST INTERNAL TEST			
III	**1 Auxiliary projection** Projection of solids on auxiliary inclined and	CO2	16

	Auxiliary vertical planes **2 Sections of solids** Introduction to sections and relevance of sections in drawings. Sections of solids (prisms, pyramids, cylinders and cones) True shapes of sections **3 Development of surfaces** Developments of simple solids. Relevance in architectural model making. Development of a simple hipped roof. **Drawings:** 1. Auxiliary projections of solids 2. Sections of solids 3. Development of surfaces of solids 4. Development of a simple hipped roof		
IV	**1 Measured Drawing** Orthographic projection of small furniture likes tools, chairs and tables (plans, elevations and sections) Drafting techniques, graphical symbols and annotations Dimensioning, labeling and representation of materials Composing the drawing sheet **Drawings:** 1. Measured drawing of small furniture	CO3	12
SECOND INTERNAL TEST			
END SEMESTER EXAMINATION			

Reference Books

- Ching, Francis D. K., Architectural Graphics, Hoboken, New Jersey: John Wiley & Sons,2015
- Bhatt, N. D., Engineering Drawing, Anand, Charotar Publishing House,2012

Course materials, Guidance and Evaluation methods

- Emphasis should be given for making the students understand the basic concepts of projection.
- Students should be made aware of the practical Architectural applications of each topic.
- Students should be encouraged to find and solve complex problems so that their visualization skills improve.
- Importance should be given for the development of drafting and presentation skills.

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
SEL101	COMMUNICATION SKILLS AND TECHNIQUES	1-0-0-1	2	2021

Course Objectives

- To develop the communication skills of students by helping them in the areas of four skills of English Language-Listening, Speaking, Reading, and Writing.
- Help them to become confident speakers of English while dealing with their clients, suppliers, business partners and colleagues.
- Help to cultivate their analytical skills in writing especially writing resumes, letters, e-mails, proposals and reports

Syllabus

Use of language in communication, listening skills, reading skills, writing skills, Speaking skills

Expected Outcome

COURSE OUTCOME	DESCRIPTION OF COURSE OUTCOME	PRESCRIBED LEARNING LEVEL
CO1	Understanding new vocabulary and language skills in communication	Understanding, Analysing, Interpreting
CO2	To identify the listening patterns and applying listening techniques	Understanding and Applying
CO3	To analyse and interpret reading skills	Analysing and Interpreting
CO4	To create awareness in writing skills	Understanding and Applying
CO5	To train the students in the skill of speaking	Understanding and Applying

Mark distribution:

Total marks	Continuous internal evaluation marks
100	100

Continuous Internal Evaluation	
Total Marks	:100 Marks
Attendance	: 10 Marks
Presentation/Demonstration (Course work)	: 40 Marks
Report/Record	:25 Marks
Final Test &Viva voce	:25 Marks

Reference Books

- Anderson, P.V, Technical Communication, Thomson Wadsworth, Sixth Edition, New Delhi,2007.
- Evans, D, Decision maker, Cambridge University Press,1997.
- John Seely, The Oxford Guide to Writing and Speaking, Oxford University Press, New Delhi,2004.
- Prakash, P, Verbal and Non-Verbal Reasoning, Macmillan India Ltd., Second Edition, New Delhi,2004.
- Thorpe, E,and Thorpe, S, Objective English, Pearson Education, Second Edition, New Delhi,2007.
- Turton, N.D and Heaton, J.B, Dictionary of Common Errors, Addision Wesley Longman Ltd., Indian reprint1998.
- English for Engineers and Technologists (Combined edition, Vol. 1 and 2), Orient Blackswan2010.
- Meenakshi Raman and Sangeetha Sharma, Technical Communication: Principles and Practice", 2nd Edition, Oxford University Press ,2011

Course Plan			
Module	**Contents**	**Course Outcome**	**Hours**
I	**Use of language in communication:** Types of communication-objectives-verbal and non- verbal communication -effective communication and communication breakdown-significance of technical communication-technical vocabulary, vocabulary used in formal letters/e-mails/ reports etc. Reduction of speech sounds in natural speech-Phonetics, intonation in natural speech, Basic Grammar. Technology based communications-Effective email messages-slide presentations, editing skills using software-Modern day research, and search, plagiarism, piracy, patent and copyright laws.	CO1	6
II	**Listening skills:** Active and Passive listening- listening for general content and listening for specific information-listening to technical talks, TED talks, news bulletins and interviews on TV channels interview etiquette, dress code, body language-online (skype) interviews, FAQs related to job interviews.	CO2	6
FIRST INTERNAL TEST			
III	**Reading skills:** Reading comprehension-reading styles and critical analysis, reading shorter and technical articles from journals, newspapers etc. related to architecture- Skimming, scanning, Close reading, -Comprehension – Note taking – interpretation- critical reading and analysis – speed reading. Approaches to efficient reading. Tips for effective reading, Benefits of Effective reading.	CO3	6
IV	**Writing skills:** Technical writing, Differences between technical and literary style-Letter writing formal and informal- Email writing- job applications-Minute preparation, CV preparation-difference between BIO-DATA, CV and	CO4	6

	RESUME-Writing reports and Resumes-structure of a report, types of reports, references and bibliography- Creative writing exercises.		
SECOND INTERNAL TEST			
V	**Speaking skills:** Participating in group discussions, debates-Oral Presentations-expression for starting a presentation- introducing a topic-visual presentation tools- listing supporting ideas -body language and audience analysis. Voice modulation-high pitch and low pitch-public speaking skills-business presentations- Differences between GD and debate-GD strategies- activities to improve GD skills-soft skills and its relevance-Time management, psychometrics and stress management- manners and etiquette.	CO5	6
END SEMESTER EXAMINATION			

SEMESTER - II

Course No.	Course Name	L – T – S – P/D	Credits	Year of Introduction
ART102	THEORY OF ARCHITECTURE II	3 – 0 – 0 –0	3	2021

Course Objectives

- To establish the link between architecture to the historical, cultural and geographic contexts
- To understand the significance of character and style in various period
- To analyze the importance of creativity in design process
- To evaluate the philosophies, ideologies and theories of architects through their exemplary works

Course Outcome

At the end of successful completion of the course students will be able –

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	To evaluate the significance of context in architecture	Understand, Analyze and evaluate
CO2	To identify and evaluate the elements that contributes to character and style in different historical periods.	Understand, Analyze and evaluate
CO3	To appreciate the relevance of creativity in architectural design	Understand and evaluate
CO4	To analyze the various stages of design process and their significance in architecture	Understand and evaluate
CO5	To evaluate the development of architectural theories and philosophies from built examples	Understand, Analyze and evaluate

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous internal evaluation pattern:

Attendance : 4 Marks
Tests(2 numbers) : 20 Marks
Assignment/Quiz/Course project : 16 Marks

End semester examination pattern:

There will be two parts; Part A and B. Part A contains 5 questions with 1 question from each module, having 4marks for each question. Students should answer all the questions. Part B contains 2 questions from each module, of which the student should answer any one. Each question carries 8marks. One or two questions can have subdivisions. Some questions can be framed in such a manner to assess the student's capacity for analysing the topics and linking it with other courses.

Syllabus

Vernacular architectural form and analysis – Architectural Character and Style – Creativity and Meaning in Design – Design Process - Architectural inspirations, philosophies, ideologies and theories of architects

Course Plan

Module	Topic	Course outcome	No. of hours
I	**Vernacular architectural form and analysis** Importance of Context - Climate as determinant, Structure and Building materials as determinants. Socio cultural determinants – Culture, temporal and regional influences as determinant in architecture – Beliefs, Aspiration, values of the user Eg: Kerala vernacular houses, Wattle and daub construction of Assam, Toda huts, Yurt tents.	CO1	12
II	**Architectural Character and Style** Concepts of character and style. Examples from various periods in history – Prehistoric, Greek, Roman, Byzantine, Medieval, Gothic, Renaissance, Impact of Industrial Revolution on Architecture, new materials and technological development.	CO1 CO2	12
FIRST INTERNAL TEST			
III	**Creativity and Meaning in Design** Creativity in design – Function and Expression, Role of causes in the process of design, Understanding the concept of creativity, Theories on thinking- left / right brain, convergent and divergent thinking, lateral and vertical thinking, various techniques to generate creativity	CO3	6
IV	**Design Process** Need for integration of aesthetics and function in design, Formative ideas, Concepts related to spatial organization and characteristics, Importance of Massing in built form, Application of design process through case studies	CO3 CO4	6
SECOND INTERNAL TEST			

V	**Architectural inspirations, philosophies and theories of architects** Aalvar Aalto, Charles Correa, Eero Saarinen, F L Wright, Geoffery Bawa, Laurie Baker, Le Corbusier, Louis Sullivan, Mies Van de Rohe, Walter Gropius	CO1, CO2, CO3, CO4, CO5	9
END SEMESTER EXAMINATION			

Required Reading

- Emily Cole, 'The Grammar of Architecture', Metro Books, New York,2002
- Garry Stevens,' Reasoning Architect: Mathematics and Science in Design', McGraw-Hill Education,1990
- PatrickNuttgens,'TheStoryofArchitecture',PhaidonPressLimited,1983
- Robert Gilliam Scott, 'Design Fundamentals', McGraw-Hill Inc.,US, 1951

Further Reading

- Carmen Kagal, VISTARA, 'The Architecture ofIndia',1986
- Gabriele Leuthauser , 'Architecture in the 20th Century', Taschen GmbH, 2005
- Gautum Bhatia, 'Laurie Baker', Penguin India,2000
- Geoffery Broadbent, 'Design in Architecture', Wiley–Blackwell, 1973
- Helen Marie Evans and Carla David Dunneshil, "An invitation to design", Macmillan Publishing Co. Inc., New York,1982.

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
ART104	HISTORY OF ARCHITECTURE AND CULTURE-I	3-0-0-0	3	2021

Course Objectives:

The aim of the course is to understand architecture as a process evolved from culture- social, religious, economic, political and environmental aspects- of a place. It discusses the architectural developments in historical context and explores the cultural and contextual determinants that produced a specific architectural vocabulary. It also throws an insight into the development of architectural form and character with reference to technological innovations.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO-1	To understand the beginnings of architecture, how prehistoric shelters and settings for rituals evolved around the world in different cultures	Understanding and Analysing
CO-2	To relate the architectural innovations with the social practices, geographical context, materials, geology, hydrology, climate and other environmental aspects and generic forces that shape settlements and habitats.	Understanding and Analysing
CO-3	To understand the influence of culture and religion in forming architectural styles during the First Millennium in India.	Understanding and Analysing
CO-4	To understand the progress of Architecture into a noble process with a governing theory and aesthetics- prominent architectural styles, religious and secular architecture, materials, construction technology, and theory of architecture during the First Millennium in the cultural context of Europe.	Understanding, Analysing, Memorising

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous internal evaluation pattern:

Attendance : 4 Marks

Tests (2 numbers) : 20 Marks

Assignment/Quiz/Course project : 16 Marks

End semester examination pattern:

There will be two parts; Part A and B. Part A contains 5 questions with1 question from each module, having 4marks for each question. Students should answer all the questions (5x4= 20marks). Part B contains 2 questions from each of the 5 modules, of which the student should answer any one. Each question carries 8marks (Total 5x8=40). Part B questions can have subdivisions.

Syllabus

Prehistoric cultural practices and architecture- The first Agricultural Revolution and urban revolution- River Valley Civilizations, their architecture and town planning, Cultural and Religious developments in India and Asia after Indus Valley Civilization- Vedic and Buddhist Architecture. Forming a theory and Style of Architecture during Classical Period in Greece and Rome- Cultural and Religious changes and related Architectural Styles in Europe after the Rise of Christianity- Early Christian, Byzantine, Romanesque and Gothic Architecture.

Course Plan

Module	Topic	Course outcome	No. of hours
I	A brief overview of Paleolithic and Neolithic Culture- Art forms. Lascaux Cave. Evolution of shelters. Ritual sites, Settlements, Megaliths and types of Burial Systems. Gobekli Tepe (Gire Mirazan). Trabeated system. Newgrange, Stonehenge. Jericho culture. Catal Huyuk. Paleolithic sites in India- Bhopal Bhimbetka rock shelters. Visit to any megalith in Kerala/South India. (eg. Kudakkallu Parambu/Edakkal Caves)	CO-1, CO-2	6
II	Generic forces shaping settlements and habitats. Socialstructure and layout of cities in Mesopotamia, City of Ur. Ziggurat at Ur. Nile Valley civilization. Egyptian culture and burial, Transformation of mastabas to Pyramids, Great Pyramid of Giza. Mortuary temple of Queen Hatshepsut. Egyptian drawing methods. A brief overview of Mayan Architecture. Indus Valley civilization, culture, Layout and built forms of Mehrgarh - Mohanjodaro and Harappa.	CO-1, CO-2	9
FIRST INTERNAL TEST			
III	Aryan invasion and Vedic Age- an overview. Emergence of caste and class systems. Mahajanapadas in India. Early and Late Buddhism. Typologies of Buddhist Architecture. Chaitya Hall atKarli, Sanchi complex, Rock cut Ajanta Caves, Yungang Caves, China. Mahavihara at Nalanda.	CO-3	9

	Anuradhapura and Sigiriya, Sri Lanka. Evolution of Pagodas from stupa. Horyu ji Temple. Kofun in Japan. Gandhara architecture. Buddhist cave temples in South India. Visit to a Rock cut (Cave) temple in Kerala.		
IV	Background of emergence of Greek culture- Greek Temple form. Greek Orders. City Planning. Hippodamian system. Stoa, Agora, Acropolis- Parthenon. Theorizing Architecture- Vitruvius. Hellenistic Period- importance of sculpture. Roman Architectural innovations. Amphitheatre- The Colosseum, Forums, Baths, Roman urban villa. Roman vertical surfaces, concrete walls. Wall as an architectural element -fornix system, aedicule, Triumphal Arches. Arcuate Structural system, arches, vaults and domes. Aqueducts, Pantheon. Roman Basilica design, Hadrian's villa, Tivoli	CO-4	9
SECOND INTERNAL TEST			
V	Struggles and Rise of Christianity. Late Pagan and Early Christian Architecture. Catacombs. Congregational spaces. Old St. Peter's Basilica, Rome. Underground cities of Turkey. Byzantine Architecture. Greek Cross and Latin Cross. Pendentives. Haggia Sophia. Pre Romanesque Carolingian empire. The Pilgrimage'. Romanesque Architecture- Characteristics. Development of stone vaulting into groined systems– leading to development of church plan. Pisa Cathedral. Gothic Architecture- importance in culture - Characteristics of Gothic churches and cathedrals. Notre Dame, Paris.	CO-4	12
END SEMESTER EXAMINATION			

Text Books:

- A Global History of Architecture/ Francis. D. K. Ching, Mark Jarzombek, Vikramaditya Prakash. Published by John Wiley and sons, Third edition 2017
- A History of Architecture: Settings and Rituals/ Spiro Kostoff. Revisions by Greg Castilo. Published by Oxford University Press, 1985, 1995
- Sir Banister Fletcher, "A History of Architecture", CBS Publications (Indian Edition),1999.
- Percy Brown, 'Indian Architecture: Buddhist and Hindu Periods', D. B.Taraporevala,1965
- Satish Grover, 'The Architecture of India: Buddhist and Hindu', Vikas, 1980

Reference Books

- Leland M Roth; "Understanding Architecture: Its Elements, History and Meaning"; Craftsman House;1994
- Lloyd S. and Muller H.W., "History of World Architecture – Series", Faber and Faber
- Patrick Nuttgens,"The Story of Architecture FROM ANTIQUITY TO THE PRESENT", H.F.Ullmann Pub:1983
- Pier Luigi Nervi, General Editor, "History of World Architecture – Series", Harry N. Abrams, Inc. Pub., New York,1972.
- Vincent Scully, "Architecture – The Natural and the Manmade", Harper Collins Pub:1991.
- A World History of Architecture / Marian Moffett, Michael Fazio &Lawrence Wodehouse /McGraw-Hill
- Encyclopedia of Architectural Technology / Ed: Pedro Guedes / McGraw- Hill
- CRASH COURSE IN ARCHITECTURE / Eva Howarth / Caxton Editions
- The Great Ages of World Architecture / G. H. Hiraskar / Dhanpat Rai
- The Civilization of the Renaissance in Italy, 1860, English translation, by SGC Middle more, in 2 vols., London,1878)
- Erwin Panofsky, Renaissance and Renascences in Western Art, (New York: Harper and Row,1960)
- Arnold Hauser, Mannerism: The Crisis of the Renaissance and the Origins of Modern Art, Cambridge: Harvard University Press, 1965, ISBN 0-674- 54815-9
- Wolfflin, Heinrich (1971). Renaissance and Baroque. London:Collins.
- Stefan Muthesius (1994). Art, architecture and design in Poland, 966- 1990: an introduction.
- K.R. Langewiesche Nachfolger H. Koster Verlagsbuchhandlung. p. 34. ISBN3-7845-7611-7.
- Jean-Francois Gabriel, "Classical Architecture for the Twenty-first Century", Norton,2004

Course materials, Guidance and Evaluation methods

- Books, research papers, e-books, videos etc. to be provided to the students by the faculty and ensure that they read it, by initiating discussions.
- Faculty to act as facilitator and guide rather than one way lecturing.
- Book Reviews are to be part of assignments.
- Students are to be encouraged to watch movies and documentaries which give information about culture and architecture and prepare reviews/ reports and have discussions in class.
- As far as possible the students are to be encouraged to visit the architectural monuments in their vicinity and prepare reports and sketches, regardless of whether they are part of the syllabus.
- At the end of the course, each student has to prepare a short video on any of the topics in the syllabus.
- Each student should be encouraged to have a sketchbook with sketches of all the topics covered.

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
AET102	THEORY OF STRUCTURES II	2-1-0-0	3	2021

Course objectives:

This course provides fundamental concept of mechanics of deformable bodies and helps the students to develop their analytical and problem-solving skills. Through this course, the students will be able to understand the internal effects in various structural elements under various loading conditions.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO - 1	Recall the fundamental terms and theorems Associated with mechanics of linear elastic deformable bodies	Remembering
CO - 2	Explain the behaviour and response of various structural elements under various loading conditions.	Understanding
CO - 3	Calculate internal stresses/ strains, stress resultant in structural elements subjected to axial/ transverse loads and bending/twisting moments and present the results graphically	Applying
CO - 4	Calculate safe load carrying capacity of beams and columns	Applying

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous internal evaluation pattern:

Attendance : 4 Marks
Continuous assessment tests(2numbers) : 20 Marks
Assignment/Quiz/Course project : 16 Marks

End semester examination pattern:

There will be two parts; Part A and Part B. Part A contain 5 questions from each module, having 4marks for each question. Students should answer all the questions. Part B contains 2 questions from each module, of which the student should answer any one. Each question can have sub divisions and carry 8 marks.

Syllabus

Concept of deformable bodies ; Strength, Stiffness, Stability - Simple stresses and strains; axial and shear stresses; elastic constants - Deformation of axially loaded bars - uniform cross section, composite bars - Beam analysis- Shear force diagram and Bending moment diagram of cantilever, simply supported and overhanging beams with point loads, uniformly distributed loads &moment- Theory of simple bending, bending stresses in symmetrical beams, bending of composite beams – Concept of shear stresses in beams, distribution of shear stresses in symmetric cross sections – Torsion; torsional stresses in circular sections - Columns and Struts; Effective Length; Slenderness Ratio; Critical load; Safe load; Different end conditions ; Strength of columns

Course plan

Module	Topic	Course outcome	No. of hours
I	Review of statics Concept of deformable bodies – Strength, Stiffness, Stability- Bending and Buckling **Concept of stress, Types of stresses. Concept of strain , Types of strains. Stress – Strain relation - Hooke's law** **Young's Modulus of Elasticity, Shear Modulus, Bulk Modulus, Relation between elastic constants (Derivation not required)** - Numerical exercise **Stress-strain (-) diagram of mild steel – Proportionality limit, Yield point, Ultimate stress, True and Engineering Stress strain curve, Idealized Stress strain curves. Factor of safety, Working stress** - Numerical exercise **Axially loaded bars with uniform cross section– Calculation of stress, strain and deformation –** Numerical exercise **Deformation of axially loaded bars with varying axial loads** - Numerical exercise Analysis of axially loaded composite bars (with maximum two materials) - Numerical exercise	CO -1 CO –2 CO –3	8
II	**Beams – Different types. - Types of loading on beams.** **Concept of bending moment and shear force. Practical examples** **Shear Force and Bending Moment diagrams.** **Practical significance - Numerical example** Cantilever beams with point loads, UDL and moment - Numerical exercises	CO -1 CO –2 CO –3	8

	Simply supported beams with point loads, UDL and moments –Numerical exercises Simply supported overhanging beams (one side and both sides) with point load, UDL and moment – Numerical exercises		
FIRST INTERNAL TEST			
III	**Theory of simple bending – Assumptions and Limitations** **Variation of bending stress across the cross section - Maximum bending stress, section modulus, moment of resistance - Practical significance** **Section modulus calculation of different cross sections (solid rectangle, hollow rectangle, solid circle, hollow circle, I section)** - Numerical exercise **Bending stresses in symmetrical and composite beams** – Numerical exercise **Calculation of allowable loads in beams based on bending stress criteria. - Proportioning of beam sections to carry given load without exceeding the allowable bending stress** **- N**umerical exercise	CO –2 CO –3	7
IV	Shear stress in beams (Derivation of equation not required) Variation of shear stress across various cross sections – rectangular, circular and triangular sections (Derivation required) **Calculation of shear stress in symmetric cross sections - N**umerical exercise **Calculation of allowable loads in beams- based shear stress criteria –** **Numerical exercise**	CO –2 CO –3 CO –4	6
SECOND INTERNAL TEST			
V	Concept of torsion - Torsion equation (Derivation not required), Assumptions, Torsional stresses in circular sections, Polar moment of inertia, Polar modulus - Practical significance	CO –2 CO –3 CO –4	7

	Torsion of solid and hollow circular shafts, Variation of stress across the cross section - Numerical exercise **Power transmitted by circular shafts and hollow circular shafts. - Proportioning the shafts to transmit a given power based on shear stress and angle of twist considerations** Numerical exercise Definitions of Columns and Struts – Long, Medium, and Short columns – Effective Length – Slenderness Ratio Critical load – Safe load — Different end conditions — Euler's formula for critical load for columns with different end conditions (derivations not required)— Assumptions and its limitations **Effective length of columns with different end conditions -** Numerical exercise **Determination of the strength of columns – Proportioning of column sections -** Numerical exercise		
END SEMESTER EXAMINATION			

Text Books:

- Gere and Timoshenko, Mechanics of Materials, CBS Publishers and Distributors
- Stephen Timoshenko, Strength of Materials, Part 1 Elementary Theory and Problems, CBS Publishers and Distributors
- Stephen Timoshenko, Strength of Materials, Part 2 Advanced Theory and Problems, CBS Publishers and Distributors

Reference Books

- Henry J., Covan, Architectural structures: An introduction to structural mechanics, Pitman Publishing
- Philip Garrison, Basic structures for engineers and architects, Wiley – Blackwell publishers
- Francis D. K. Ching, Barry S. Onouye, Douglas Zuberbuhler, Building structures illustrated, Wiley publishers
- R.K Bansal., Strength of Materials, Lakshmi Publications PvtLtd
- Benjamin J., Engineering Mechanics, Pentex Book Publishers and Distributors
- S. Ramamrutham., Strength of Materials, Dhanpat Rai Publishing CompanyPvt
- Junarkar S. B. and Shah S. J., Mechanics of Structures (Vol. I), 30/e, Charotar Publishing House Pvt. Ltd., New Delhi, 2012
- Punmia B. C., A. K. Jain and A. K. Jain, Strength of Materials &Theory of Structures (Vol.I), Laxmi Publications, New Delhi, 2013.
- Vaidyanathan R. and P.Perumal, Structural Analysis (Vol.I), Laxmi Publications,2004
- A.P.Dongre , Structural Engineering for Architecture, Scitech Publications Ltd.

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
ARD102	ARCHITECTURAL DESIGN-I	0-0-8-2	10	2021

Course Objectives:

The key objective of this course is to develop a basic understanding of space, form, structure, and the built environment, to enable the conceptualization of form, space and structure through creative thinking and to initiate architectural design process deriving from first principles. And also to involve students in a design project(s) that will involve simple space planning and the understanding of the functional aspects of good design.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO-1	To get a basic understanding of space, form, structure, and the built environment, to enable the conceptualization of form, space and structure through creative thinking.	Understanding
CO-2	To initiate architectural design process deriving from first principles, building case study by choosing appropriate examples and space standards to enable them to formulate and concretize their concepts and architectural program.	Applying
CO-3	To acquire skills of drawing and representation, built environment and its components, construction technology and structures to apply to architectural design.	Analysing and evaluating
CO-4	To involve students in a design project(s) that will involve simple space planning understanding the functional aspects of good design, small scale building project(s) which will sensitize them to intelligent planning responsive to the environmental context.	Creating

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester Jury examination marks	End semester Jury examination duration
100	50	50	2-3 days

Continuous internal evaluation pattern:

Attendance : 5 Marks
Design Assignments/Reviews/Tests : 45 Marks

Syllabus :

Looking at the immediate built environment and understanding its fundamental components and their impact on the surroundings - Exploring personal experiences to behavioural needs and translating them into documented information that can be used as a basis for design - Documentation of a building of importance to understand its history and evolution through documents research and measured drawings -To understand the various structural systems in relation to its applications in buildings - Presentation skills in the 2-D format - Systematic introduction to issues related to design, its components and space standards

Course Plan:

Module	Topic	Course outcome	No. of hours
I	**Concept of space, form and enclosure** Design of a simple architectural space based on an understanding of anthropometrics and human scale in context of the built environment and experiencing spatial quality in relation to personal experiences to behavioural needs, understanding nature and culture as a contextual setting. *Scale/Complexity:* Projects involving small span, single use spaces with simple movement. *Typology/Project:* bedroom, bathroom, kitchen, exhibition pavilion, atrium or courtyard, children's environment, work module, phone kiosk, snack corner, ATM Centre, security cabin, etc.	CO-1, CO-2 CO-4	30
II	**Documentation of a Building of special interest.** Documentation of a complete building of a special	CO-1,	30

	interest in terms of history, building construction, architectural excellence or technology using photographs, measuring tapes etc., along with the relevant study of the building based on its history, morphology, and context. Measured drawing of plans, elevations, sections, isometric projections of building details etc. using pen and ink rendering technique.	CO-2	
FIRST INTERNAL TEST			
III	**Built environment and understanding its major components** Introduction to Architectural elements and space standards through exercises on observation and visual perception, understanding human scale in context of the built environment of varied scales and spatial quality, exercises relating to aesthetic and psychological experience of form and space in terms of scale, colour, light, texture, etc., and translating them into documented information that can be used as a basis for design.	CO-3	20
IV	**Study of simple structural systems and behaviour under load:** Working model of structures (Like post and lintel, cantilever, trusses, arches, space frame, suspension etc), Development of basic skill in design expression through visual analysis of structural forms, sculptural and spatial qualities of the structural system, Three dimensional projects related to structural systems developed through models and sketches.	CO-3	20
SECOND INTERNAL TEST			
V	**Integration of form and function in the Architectural design:** Design of a basic shelter: an architectural form with a specific function, stressing on concept generation and development of rich design process. Representation of ideas through sketches, diagrams, and architectural drawings with application of line quality, thickness and intensity as appropriate to the intent, isometric, axonometric, and oblique views, one and multi-point perspectives, sectional perspectives, light, shade, shadows and skiagraphy.	CO-4	50

	Scale/ Complexity: Small scale simple function private/public buildings predominantly single floor *Typology/Project:* Shop, flower kiosk, Bake house, petrol bunk, fire station, weekend cottage etc.		
END SEMESTER EXAMINATION/ JURY			

Reference Books

- Arthur L. Guptill and Susan E. Meyer, 'Rendering in Pen and Ink', Watson- Guptill,1997
- Francis D. K. Ching, 'Architectural Graphics', Wiley,2009.
- Francis D. K. Ching, 'Architecture: Form, Space and Order', John Wiley &Sons,2007.
- GeoffreyBroadbent`DesigninArchitecture'JohnWileyandSons,1973.
- Neuferts' Architect's Data
- Simon Unwin, 'Analysing Architecture', Routledge,2003.
- Simon Unwin, 'An Architecture Notebook Wall' Routledge,2000.
- Simon Unwin, 'Doorway', Routledge,2007.

Course materials, Guidance and Evaluation methods

- Books, research papers, e-books, videos etc. to be provided to the students by the faculty and ensure that they read it, by initiating discussions.
- The students need to be familiarized with the basic functional aspect of designing simple building type and its relevant spatial organization.
- The students need to be oriented to reciprocate and sensitize the design and concept to the environment and develop that design skill in all the project they undertake.
- Students need to be equipped to understand the relationship between the grammar of design and architecture by involving the students in seminars/ workshops and simple exercises which will look at building form analytically.
- Each student should be encouraged to have a sketchbook with sketches of all the topics covered.

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
ARS102	BUILDING MATERIALS AND CONSTRUCTION TECHNIQUES II	1-0-0-2	3	2021

Course objectives:

The goal of this course is to expose the students to elementary building materials and their applications. It aims to familiarize students to contemporary as well as vernacular and traditional building materials. It will also introduce students to prevailing &relevant BIS specifications. After this course, the students will be able to recognize materials in the market and use them in their design processes.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	Identify relevant BIS specifications for wood and concrete	Remembering
CO2	Identify various buildings materials including wood and concrete and their application for various construction needs.	Understanding
CO3	Use and work with various building materials in the workshop and construction yard and understand their behaviour.	Applying
CO4	Use the various building materials in their design processes appropriately	Applying

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	50	50	3 hours

Continuous internal evaluation pattern:

Attendance : 5 Marks
Continuous assessment tests (2 nos.) : 15 Marks
Portfolio presentation (15)/drawings (15) : 30Marks

End semester examination pattern:

There will be three parts; Part A, B and C. Part A will contain 5 questions with1 question from each module, having 3 marks for each question. Students should answer all the questions. Part B will contain 2 questions from each module, of which the student should answer any one. Each question carries 4 marks. Part C will have one essay question which can have subdivisions, to assess the student's capacity for analysing the topics and linking it with other subjects studied. The question carries 15 marks.

Syllabus

Classification, properties and uses of Building materials: Wood and concrete-Wood as a building material. Use of wood and bamboo in construction, methods and techniques - Concrete -both PCC and RCC- as a building material, properties and uses in construction.

Course plan

Module	Topic	Course outcome	No. of hours
I	**Classification of timber**, use of wood in construction. Types of timber and its suitability for construction Seasoning of wood various methods of seasoning Documentation and presentation of wood samples of various species as part of portfolio	CO2, CO3	**6**
II	**Study of wood joints and its details in doors, windows** etc. Drawings - wooden joints in architectural elements- doors windows, trusses etc. Construction of wood joints in carpentry workshop, discussion on the same with analysis and properties of joints.	CO2, CO3, CO4	**12**
FIRST INTERNAL TEST			
III	**Defects in timber** - various types and its causes Modern and traditional methods of treating timber. Treatment of samples of wood in construction yard, analysis and documentation of the same.	CO2, CO3, CO4	**7**

IV	**Bamboo as a building material** -types, properties, application. Comparison of bamboo with wood. Strength and workability as criteria Various steps involved in working with bamboo, required sizes of members. Methods of joining bamboo for various applications. Drawings- Joining details of bamboo for various Applications, Construction of bamboo joints in construction yard and documenting and presentation in portfolio	CO1, CO2, CO3, CO4	**11**
SECOND INTERNALTEST			
V	**Introduction to concrete as a building material**, relevant IS codes Concrete: Ingredients of plain cement concrete- grades, properties- applications and uses. Reinforced cement concrete, water- cement ratio, workability, curing Various types of concrete in construction such as Light weight concrete, Rapid setting concrete etc. Safe onsite experience - concrete - listing out observations, Documentation and presentation through seminar.	CO1, CO2, CO3, CO4	**9**
END SEMESTER EXAMINATION			

Text Book

- P.C. Varghese, 'Building Materials', Prentice hall of India Pvt Ltd, New Delhi,2005

Reference Books

- Harry Parker, 'Materials and Methods of Architectural Construction', John Wiley &Sons Canada,1958.
- H Leslie Simmons, 'Construction – Principles, Material &Methods', 7th edition, John Wiley &Sons Inc., New York, 2001.
- Relevant BIS codes.
- RosenHaroldJ,ConstructionmaterialsforArchitecture,KriegerPubCo,1992
- Doran, David; Cather, Bob; Doran, D. K; Cather, R - Construction materials reference book, Routledge,2013

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
ARS104	ARCHITECTURAL GRAPHICS AND DRAWING II	1-0-0-3	4	2021

Course Objectives:

To equip students with the necessary skills required to prepare different types technical drawings to represent buildings.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO-1	Prepare technical drawings using pen and ink	Applying
CO-2	Draw the orthographic projections of helix & helical springs	Applying
CO-3	Draw pictorial projections of simple solids	Applying
CO-4	Prepare architectural drawings of small buildings	Applying

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	50	50	3 hours

Continuous internal evaluation pattern:

Attendance : **5** Marks
Tests (2 numbers) : **15** Marks
Assignment/Quiz/Course project : **30** Marks

End semester examination pattern:

Contains a single question (50 marks) to prepare the architectural drawings of small buildings. The parts of the question should include the contents from all three modules.

Syllabus

Drafting with pen and ink, Orthographic projection of helix and helical springs, Sciography, Axonometric and perspective projections, Measured drawings of buildings.

Course Plan

Module	Topic	Course outcome	No. of Hours
I	**1 Drafting with pen and ink** Introduction to drafting with pen and ink **2 Orthographic projection of helix and helical springs** Application in architecture. Orthographic projection of spiral stairs **3 Sciography** Projection of shadows on plans and elevations of simple solids **Drawings:** 1. Projection of helix, helical springs and spiral stairs 2. Projection of shadows on plans and elevations of solids (prisms, pyramids, cylinder and cone)	CO1, CO2	12

II	**1 Axonometric Projection** Types of axonometric projections Isometric projection of solids **2 Perspective projection** One-point, two-point and three-point perspectives Projection of one-point and two-point perspectives (vanishing point method) **3 Application of sciography in pictorial views** Drawing shadows on isometric and perspective views **Drawings**: 1. Isometric projection of solids (prisms, pyramids, cylinder, cone and sphere) - projection of shadows 2. One-point and two-point perspectives of solids (prisms, pyramids, cylinder, cone and sphere) - projection of shadows	CO1, CO3	20
FIRST INTERNAL TEST			
III	**1 Measured drawing** Measured drawing of a small building Preparation of plans, elevations, sections and three-dimensional views Interior perspectives, sectional perspectives **Drawings:** 1. Plans,elevations and sections ofthe building 2. Isometric views of the building 3. Perspective views of the building with shadows 4. Interior perspectives of the building	CO1, CO4	28
SECOND INTERNAL TEST			
END SEMESTER EXAMINATION			

Reference Books

- Ching, Francis D. K., Architectural Graphics, Hoboken, New Jersey: John Wiley & Sons,2015
- Ching, Francis D. K., Design Drawing, Hoboken, New Jersey: John Wiley &Sons, 2010
- Norling. Earnest R., Perspective Made Easy, New York: Dover Publications, Inc.,1999

Course materials, Guidance and Evaluation methods

- All the drawings in the course should be prepared using pen and ink.
- Emphasis should be given to the quality of architectural drafting and presentation.

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
ARL102	CARPENTRY AND MODEL MAKING WORKSHOP	0-0-0-2	2	2021

Course Objectives:

The aim of the course is to Improve the student's overall capability in model making that helps them to translate their architectural ideas.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcom e	Description of Course Outcome	Prescribed learning level
CO-1	The course will equip the students with their necessary model making skills that would help them in their architectural explorations.	Understanding and Analysing
CO-2	Students will be able to demonstrate different wooden joineries and its applications.	Understanding , Analysing and Prototyping
CO-3	Students will be able to research on different wood finishes	Understanding and Analysing
CO-4	Students will be able to explore different geometrical form developments based on materials.	Understanding , Analysing and Prototyping

Mark distribution:

Total marks	Continuous internal evaluation marks
100	100

Continuous internal evaluation pattern:

Attendance	: 10 Marks
Presentation/Demonstration	: 40 Marks (Internal)
Marks for record/report	: 25 Marks (Internal)
Viva	: 25 Marks (Internal)

Syllabus

Material properties, Introduction to Modelling with Wood, Paper, Paper boards, Plaster of Paris, Clay, Sticks. Basic Model making technique, Different types of material and their techniques. Different types of wood joinery, tools and its surface finishes.

Course Plan

Module	Topic	Course outcome	No. of hours
I	Identification and familiarization of tools, Safety precautions for using carpentry tools.	CO-1	4
II	**Wooden Joinery :** Wooden joineries- Mortise-And- Tenon Joints, Tongue and groove joint, Lap joints, Dovetail Joints. **Preparation of surface :** Wooden Finishes – Sand papering, Use of Wax Polish and French polish.	CO-2, CO-3	10
FIRST INTERNAL TEST			
III	Geometrical form exploration displaying various material properties- Demonstrative exercises.	CO-4	8
IV	Free form exploration displaying various material properties- Demonstrative exercises.	CO-4	8
SECOND INTERNAL TEST			
END SEMESTER EXAMINATION			

Reference Books

- Jackson, A., & Day, D. (1996). Collins complete woodworker's manual.
- Knoll, W., &Hechinger, M. (2007). Architectural models: construction techniques.

  J. Ross Publishing.
- Roark T.Congdon, 'Architectural model building: Tools techniques and Materials' Bloomsburry Academic,02-Apr-2010

Course materials, Guidance and Evaluation methods

- Faculty to act as facilitator and guide rather than one way lecturing.
- Students are to be encouraged to visit carpentry workshops, familiarize with different materials and its usages, finishes etc. and prepare reports and demonstrate in class.
- At the end of the course, each student has to prepare a presentation/report and demonstration video of their works in the syllabus.
- Each student should have a record book with sketches and illustrations of all the topics covered.