CO's-PO's : B.ARCH.

FACULTY OF ARCHITECTURE AND PLANNING

INTEGRAL UNIVERSITY LUCKNOW

INTEGRAL UNIVERSITY, LUCKNOW
FACULTY OF ARCHITECTURE & PLANNING

COURSE: ARCHITECTURAL DESIGN-I
COURSE CODE: AR101

COURSE OBJECTIVES:

- To introduce student, the fundamentals of design and development of design vocabulary, to nurture design thinking and to enable them to apply the same thought process in development of design.
- Implementation of design through conceptualization and organization.
- To hone the creative skills by introducing creative exercises.
- To sensitize students to be more observant to their surroundings and promoting it as a basic creative instinct in them.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Know about the fundamentals of design and development of design vocabulary and to apply the same thought process in development of design.
CO2	Implement the design through conceptualization and organization.
CO3	Enhance the creative skills through creative exercises.
CO4	Understand their surroundings and promoting it as a basic creative instinct.

CO & PO MAPPING:

COURSE OUTCOMES		**PO1** (Design/Spatial)	**PO2** (Professional Competence)	**PO3** (Technical Competence)	**PO4** (Critical Thinking-Synthesis)	**PO5** (Social Responsibility)	**PO6**(Quantitative Reasoning)	**PO7** (Theoretical Foundation)	**PO8** (Innovative Thinking)
CO1	Know about the fundamentals of design and development of design vocabulary and to apply the same thought process in development of design.	3	1	-	3	-	-	2	3
CO2	Implement the design through conceptualization and organization.	3	1	-	2	-	-	2	3
CO3	Enhance the creative skills through creative exercises.	3	1	1	3	-	-	2	3
CO4	Understand their surroundings and promoting it as a basic creative instinct.	3	-	-	2	3	-	2	3

COURSE: BUILDING CONSTRUCTION AND MATERIALS- I
COURSE CODE: AR102

COURSE OBJECTIVES:

- Introduction to elementary building construction materials and techniques.
- To understand the basic physical and chemical properties of the materials.
- To familiarize students with different masonry techniques.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understanding of Binding materials, their classification, Manufacturing, properties and uses viz. soil, lime and cement.
CO2	Knowledge of basic construction materials, their characteristics, occurrences or production, classification, properties and uses viz. stone, bricks and other clay products.
CO3	Demonstrate fundamental knowledge of the systems and processes used to construct the building, including an understanding of industry terminology.
CO4	Market surveying and case studies so a student acquainted with the latest construction technology & materials.
CO5	Analyze, troubleshoot, and implement solutions in the field based on knowledge and experience.

CO-PO MAPPING:

	CO	**PO1** Design/Spatial	**PO2** Professional Competence	**PO3** Technical Competence	**PO4** Critical Thinking- Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	Understanding of Binding materials, their classification, Manufacturing, properties and uses viz. soil, lime and cement.	3	3	2	1	1	3	3	1
CO2	Knowledge of basic construction materials, their characteristics, occurrences or production, classification, properties and uses viz. stone, bricks and other clay products.	3	3	3	2	1	1	2	1
CO3	Demonstrate fundamental knowledge of the systems and processes used to construct the building, including an understanding of industry terminology.	3	2	3	2	1	2	2	1
CO4	Market surveying and case studies so a student acquainted with the latest construction technology & materials.	1	2	2	2	3	3	2	1
CO5	Analyze, troubleshoot, and implement solutions in the field based on knowledge and experience.	3	1	2	1	2	2	1	1
3: Strong contribution, 2: average contribution, 1: Low contribution									

COURSE: ARCHITECTURAL DRAWING-I
COURSE CODE: AR103

COURSE OBJECTIVES:

- The course aims at developing the requisite level of proficiency in drawing, which is seen as a primary communication tool in the practice of architecture just like language.
- Students shall be familiarized with a range of techniques of expression beginning with manual drawing.
- Familiarization with drafting tools and accessories. Learning drafting, lettering and rendering techniques.
- Comprehension and visualization of geometrical forms.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Develop the requisite level of proficiency in drawing with primary communication tool in the practice of architecture just like language.
CO2	Familiarize with a range of techniques of expression beginning with manual drawing.
CO3	Familiarize with drafting tools and accessories along with learning drafting, lettering and rendering techniques.
CO4	Know about the comprehension and visualization of geometrical forms.

CO & PO MAPPING:

COURSE OUTCOMES		PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking-	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Develop the requisite level of proficiency in drawing with primary communication tool in the practice of architecture just like language.	3	1	3	2	-	-	2	3
CO2	Familiarize with a range of techniques of expression beginning with manual drawing.	2	3	3	2	-	-	1	3
CO3	Familiarize with drafting tools and accessories along with learning drafting, lettering and rendering techniques.	3	2	3	2	-	-	2	3
CO4	Know about the comprehension and visualization of geometrical forms.	3	1	3	3	-	-	2	3

COURSE: ARCHITECTURAL GRAPHICS
COURSE CODE: AR 104

COURSE OBJECTIVES:

- Understanding the essentials of art.
- To develop and enhance drawing skills in various aspects of art, in various mediums and techniques.
- Understanding the need and objectives of presentation of visual environment.
- Developing an aptitude towards architectural and environmental assessment.
- Learning visual presentation of statistical data.
- Introduction to elementary Visual Communication Skills, such as, communication graphics (sketches, renderings, perspectives, architectural illustrations), scale models, photographs.

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COURSE OUTCOME (CO)

After completion of course, student will be able to:

COURSE OUTCOMES (CO)	DESCRIPTION
CO1	Demonstrate an understanding of basic art form & develop perception, the ability to think graphically and utilize drawing as a language of communication.
CO2	Learn the architectural rendering techniques for building exteriors and interiors by using pen & ink, color, values, tones, etc.
CO3	To develop a design idea into a coherent proposal and to communicate ideas and concepts through graphical representation.
CO4	Articulate an understanding of visual impact of colors, lines, shapes and textures used in design & construct conceptual and presentation models as a design presentation tool for aesthetic exploration.
CO5	To draw inspiration and develop sense of observation from their surroundings, society and things happening around them.

CO & PO MAPPING:

Course Outcomes:	PO1:Design/Spatial:	PO2:Professional Competence	PO3:Technical Competence	PO4:Critical Thinking- Synthesis	PO5:Social Responsibility	PO6:Quantitative Reasoning	PO7:Theoretical Foundation	PO8:Innovative Thinking
CO1 Demonstrate an understanding of basic art form & develop perception, the ability to think graphically and utilize drawing as a language of communication.	3		2	3		1	1	2
CO2 Learn the architectural rendering techniques for building exteriors and interiors using pen & ink, color, values, tones, etc.	2		3	3			2	1
CO3 To develop a design idea into a coherent proposal and to communicate ideas and concepts through graphical representation.	3	1	1	2			2	2
CO4 Articulate an understanding of visual impact of colors, lines, shapes and textures used in design & construct conceptual and presentation models as a design presentation tool for aesthetic exploration.	3	2	1	3		1	3	2
CO5 To draw inspiration and develop sense of observation from their surroundings, society and things happening around them.	2	3		1	3		3	3
3: Strong Association, 2: Average Association, 1: Low Association								

COURSE NAME: SURVEYING AND LEVELING

COURSE CODE: AR - 105

COURSE OBJECTIVES:

- Familiarization with the principles and techniques of Surveying and Leveling in Architecture.
- Interpretation and preparation of contour maps.
- To understand the fundamental concepts and methods of surveying using basic & advanced instruments for surveying and leveling.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To work with carpentry tools and equipments to be able to cut, plane, join, and finish wooden members. Making simple joints used in buildings and furniture and its significance on site.
CO2	Simple exercises to convert metal into desired shapes and forms.
CO3	To understand the process of making building models with various materials such as card-board, wood, plastics, plaster of Paris and metals, ability to make simple joints in timber, pipes and other materials, basic electrical circuits
CO4	To familiarize with making of actual scale model from card board, wood, sun pack and general metal etc.
CO5	Ability to prepare course file for workshop activities

CO-PO MAPPING:

	CO	PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking- Synthesis)	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Explain importance and need of surveying in architecture, Types and classification of surveys, Plane and geodetic surveying.	-	-	3	1	2	3	2	2
CO2	Equipment and methods of plane tabling. The prismatic compass and its use; whole circle bearing; quadrant bearing	-	3	3	1	-	2	3	2
CO3	Different types of leveling instruments, temporary and permanent adjustments, Characteristics of contour lines, direct and indirect methods of contouring, interpolation of contours.	-	3	3	1	1	2	3	2
CO4	Total Station and its application in surveying, Introduction to aerial survey, digital mapping, satellite Imaging, GPS, and uses of GIS in plane surveying.	-	3	3	2	-	3	2	2
CO5	On site lay outing of a small residential unit as per map and plan.	-	3	3	3	2	2	1	2

COURSE NAME: WORKSHOP PRACTICES

COURSE CODE: AR - 106

COURSE OBJECTIVES

- This course is aimed at imparting basic workshop and material handling skills and techniques necessary for preparing architectural models and art project while in calculating value for good craftsmanship.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Explain importance and need of surveying in architecture, Types and classification of surveys, Plane and geodetic surveying.
CO2	Equipment and methods of plane tabling. The prismatic compass and its use; whole circle bearing; quadrant bearing
CO3	Different types of leveling instruments, temporary and permanent adjustments, Characteristics of contour lines, direct and indirect methods of contouring, interpolation of contours.
CO4	Total Station and its application in surveying, Introduction to aerial survey, digital mapping, satellite Imaging, GPS and uses of GIS in plane surveying.
CO5	On site lay outing of a small residential unit as per map and plan.

CO-PO MAPPING:

	CO	**PO1** (Design/Spatial)	**PO2** (Professional Competence)	**PO3** (Technical Competence)	**PO4** (Critical Thinking- Synthesis)	**PO5** (Social Responsibility)	**PO6**(Quantitative Reasoning)	**PO7** (Theoretical Foundation)	**PO8** (Innovative Thinking)
CO1	Explain importance and need of surveying in architecture, Types and classification of surveys, Plane and geodetic surveying.	-	-	3	1	2	3	2	2
CO2	Equipment and methods of plane tabling. The prismatic compass and its use; whole circle bearing; quadrant bearing	-	3	3	1	-	2	3	2
CO3	Different types of leveling instruments, temporary and permanent adjustments, Characteristics of contour lines, direct and indirect methods of contouring, interpolation of contours.	-	3	3	1	1	2	3	2
CO4	Total Station and its application in surveying, Introduction to aerial survey, digital mapping, satellite Imaging, GPS, and uses of GIS in plane surveying.	-	3	3	2	-	3	2	2
CO5	On site lay outing of a small residential unit as per map and plan.	-	3	3	3	2	2	1	2

COURSE: COMPUTER APPLICATIONS-I
COURSE CODE: AR107

COURSE OBJECTIVES:

- To initiate students into theory and practice of Computer Applications in Architecture.
- To familiarize students with computers so as to understand complete management outlook of an architect's office besides architectural drawings.
- To teach graphic applications specially 2Dimensional for fast and attractive presentation of theme and ideas.
- To teach utilization of knowledge of 3D modeling and its application in design.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To Introduce students and initiate into theory and practice of Computer Applications in Architecture.
CO2	To familiarize students with computers so as to understand complete management outlook of an architects' office besides architectural drawings.
CO3	To teach graphic applications specially 2Dimensional for fast and attractive presentation of theme and ideas.
CO4	To teach utilization of knowledge of 3D modeling and its application in design.

CO-PO MAPPING:

	CO	PO1 Design/Spatial	PO2 Professional Competence	PO3 Technical Competence	PO4 Critical Thinking-Synthesis	PO5 Social Responsibility	PO6 Quantitative Reasoning	PO7 Theoretical Foundation	PO8 Innovative Thinking
CO1	How to Introduce students to initiate students into theory and practice of Computer Applications in Architecture.	3	3	3	1	1	1	3	3
CO2	How to familiarize students with computers so as to understand complete management outlook of an architects' office besides architectural drawings.	2	3	3	2	2	2	3	3
CO3	To teach graphic applications specially 2Dimensional for fast and attractive presentation of theme and ideas.	3	3	3	2	1	2	2	3
CO4	To teach utilization of knowledge of 3D modeling and its application in design.	3	3	3	2	2	3	3	3

COURSE: ENVIRONMENTAL SCIENCES
COURSE CODE: AR108

COURSE OBJECTIVES:

- The purpose of this subject is to introduce to the students the basics of Ecological and Environmental systems and their Importance and interdependence
- To understand the importance of environmental systems and its relation with human development.
- To give an overview of environmental sciences and the natural resources available for sustainable human life.
- To understand about legal rights and produces awareness in public and private professional conducts and ethics.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To make student know the basics of Ecological and Environmental systems and their Importance and interdependence
CO2	To understand the importance of environmental systems and its relation with human development.
CO3	To know about environmental sciences and the natural resources available for sustainable human life.
CO4	To know about legal rights and produces awareness in public and private professional conducts and ethics.

CO-PO MAPPING:

	CO	PO1 Design/Spatial	PO2 Professional Competence	PO3 Technical Competence	PO4 Critical thinking Synthesis	PO5 Social Responsibility	PO6 Quantitative Reasoning	PO7 Theoretical Foundation	PO8 Innovative Thinking
CO1	Know the basics of Ecological and Environmental systems and their Importance and interdependence	2	2	3	2	3		3	2
CO2	To understand the importance of environmental systems and its relation with human development.	2	3	3	1	3	1	3	2
CO3	Know about environmental sciences and the natural resources available for sustainable human life.	2	2	2	2	3	1	3	2
CO4	To know about legal rights and produces awareness in public and private professional conducts and ethics.	1	2	2		2		3	1

COURSE: ARCHITECTURAL DESIGN -II
COURSE CODE: AR 109

COURSE OBJECTIVES:

- To introduce architectural design as a process and as a final product; to understand fundamentals of space, form and order in architecture.
- Understanding design as function.
- To involve students in a design project that will develop their understanding of simple space planning and functional aspects of good design; to enable the students apply theoretical knowledge learnt in the previous semester in architectural design exercise.
- Indoor space, outdoor space, the concept of space in buildings. The relationship between man and space. Defining spaces and the degree of enclosure. Organization of spaces, fenestration and character of facade, enclosure and internal spaces.
- Quality and hierarchy of space (private/semi-private/public/semi-public)

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand architectural design as a process and as a final product and the fundamentals of space, form and order in architecture.
CO2	Understand the design as function.
CO3	Develop their understanding of simple space planning and functional aspects of good design and theoretical knowledge.
CO4	Know about the Indoor space, outdoor space, the concept of space in buildings and the relationship between man and space, defining spaces and the degree of enclosure, Organization of spaces, fenestration and character of facade, enclosure and internal spaces.
CO5	To make student understand and develop the quality and hierarchy of space (private/semi-private/public/semi-public).

CO & PO MAPPING:

COURSE OUTCOMES		PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking-Synthesis)	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Understand architectural design as a process and as a final product and the fundamentals of space, form and order in architecture.	3	1	-	3	-	-	2	3
CO2	Understand the design as function.	3	-	-	3	-	-	2	3
CO3	Develop their understanding of simple space planning and functional aspects of good design and theoretical knowledge.	3	1	-	2	1	-	3	2
CO4	Know about the Indoor space, outdoor space, the concept of space in buildings and the relationship between man and space, defining spaces and the degree of enclosure, Organization of spaces, fenestration and character of facade, enclosure and internal spaces.	3	1	-	2	3	-	3	2
CO5	Develop the quality and hierarchy of space (private/semi-private/public/semi-public).	3	1	-	3	2	-	2	3

COURSE: BUILDING CONSTRUCTION AND MATERIALS-II
COURSE CODE: AR 110

COURSE OBJECTIVES:

- To develop understanding about building elements and their construction principles
- To develop understanding about composition of various compatible building materials for construction.
- The subjects should also focus on developing design abilities by applying basic principles of construction and choosing appropriate materials and techniques as per market trends.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Know about building elements and their construction principles.
CO2	Understand the composition of various compatible building materials for construction.
CO3	Understand the design abilities by applying basic principles of construction and choosing appropriate materials and techniques as per current market trends.

CO & PO MAPPING:

COURSE OUTCOMES		PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking-	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Know about building elements and their construction principles.	1	2	3	2	-	-	3	2
CO2	Understand the composition of various compatible building materials for construction.	-	1	3	3		-	3	2
CO3	Understand the design abilities by applying basic principles of construction and choosing appropriate materials and techniques as per market trends.	3	2	3	2	2	1	3	3

COURSE: ARCHITECTURAL DRAWING AND GRAPHICS - I
COURSE CODE: AR 111

COURSE OBJECTIVES:

- The course aims at developing the requisite level of proficiency in drawing, which is seen as a communication tool in the practice of architecture just like language.
- Students shall be familiarized with a range of techniques of expression beginning with manual drawing.
- Learning drafting, lettering and rendering techniques.
- Visualization of geometrical forms.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Efficient in drawing, which is seen as a communication tool in the practice of architecture just like language.
CO2	Familiarize with a range of techniques of expression beginning with manual drawing.
CO3	Learn drafting, lettering and rendering techniques.
CO4	Visualize of geometrical forms.
CO5	Develop appropriate graphic skills and technical drawings which is helpful to explain the contents of a design.

CO-PO MAPPING:

	CO'S	**PO1** Design/Spatial	**PO2** Professional Competence	**PO3** Technical Competence	**PO4** Critical Thinking- Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	Efficient in drawing, which is seen as a communication tool in the practice of architecture just like language.	1	3	3	2		1	2	2
CO2	Familiarize with a range of techniques of expression beginning with manual drawing.	2	3	3	3		1	1	2
CO3	Learn drafting, lettering and rendering techniques.	1	2	2	3		1	1	3
CO4	Visualize of geometrical forms.	3	3	3	3	2	2	2	3
CO5	Develop appropriate graphic skills and technical drawings which is helpful to explain the contents of a design.	2	2	1	3		1	1	3

COURSE NAME: Architectural Structures - I

COURSE CODE: AR - 113

COURSE OBJECTIVES

- To understand the basic principles of structural mechanics, so that it can help in building a strong basis to understand study of structural design.
- Developing in students, material skills to analyze and understand fundamentals and working of various parts of different structural systems.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Theory of structures for architects. Technical names and functions of various structural components from foundation to roof. Fundamentals of mechanics.
CO2	Types of Loads - Dead Load, Live Load, Impact Load, Earthquake Load, Wind Load and Snow Load. Mechanical properties of different materials such as tensile strength, fatigue strength and comprehensive strength.
CO3	Definition, Cause, Effect, Units, Force as vector, Graphical representation. Resolution of forces by graphical and analytical methods. Types of forces – Co planar, Non-Co planar, Concurrent, Non-Concurrent, and parallel forces.
CO4	Elasticity, stress, strain, types of stresses, elastic limit, Hook's law, modulus of elasticity, stresses in composite bars, linear strain, Poison's ratio, shear stress, principal stresses and strains.
CO5	Definition, centre of gravity of plane figures, centre of parallel forces. Definition, important theorems, section modulus, calculation of moment of inertia by first principle and its application, moment of inertia of composite sections.

CO-PO MAPPING:

	CO	**PO1** (Design/Spatial)	**PO2** (Professional Competence)	**PO3** (Technical Competence)	**PO4 (**Critical Thinking- Synthesis)	**PO5** (Social Responsibility)	**PO6(**Quantitative Reasoning)	**PO7 (**Theoretical Foundation)	**PO8 (**Innovative Thinking)
CO1	Theory of structures for architects. Technical names and functions of various structural components from foundation to roof. Fundamentals of mechanics.	-	2	3	2	-	3	2	1
CO2	Types of Loads - Dead Load, Live Load, Impact Load, Earthquake Load, Wind Load and Snow Load. Mechanical properties of different materials such as tensile strength, fatigue strength and compressive strength.	-	2	3	2	-	3	2	1
CO3	Definition, Cause, Effect, Units, Force as vector, Graphical representation. Resolution of forces by graphical and analytical methods. Types of forces –Co planar, Non-Co planar, Concurrent, Non-Concurrent, and parallel forces.	-	2	3	2	-	3	2	1

CO4	Elasticity, stress, strain, types of stresses, elastic limit, Hook's law, modulus of elasticity, stresses in composite bars, linear strain, Poison's ratio, shear stress, principal stresses and strains.	-	3	3	2	-	3	3	2
CO5	Definition, centre of gravity of plane figures, centre of parallel forces. Definition, important theorems, section modulus, calculation of moment of inertia by first principle and its application, moment of inertia of composite sections.	-	2	3	2	-	3	2	1

COURSE: SITE EXPOSURE AND CONSTRUCTION YARD
COURSE CODE: AR 114

OBJECTIVES:

- To develop understanding of basic building elements / components; hands on experience about working tools; their application and site safety measures.
- To familiarize and hands on experience to the students with the construction method and techniques adopted for various stages of project execution on site.
- To understand the actual drawing requirement and the various aspects of drawing and site coordination required on site during the execution of a project.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To know about the basic building elements / components; hands on experience about working tools; their application and site safety measures.
CO2	Familiarize the students with the construction method and techniques adopted for various stages of project execution on site.
CO3	To develop and learn the actual drawing requirement and the various aspects of drawing and site coordination required on site during the execution of a project.

CO & PO MAPPING:

COURSE OUTCOMES		PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking-	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Know about the basic building elements / components; hands on experience about working tools; their application and site safety measures.	-	2	3	1	-	-	3	2
CO2	Familiarize the students with the construction method and techniques adopted for various stages of project execution on site.	1	2	3	3	-	-	2	2
CO3	Develop the actual drawing requirement and the various aspects of drawing and site coordination required on site during the execution of a project.	3	2	3	3	2	-	1	2

COURSE: COMPUTER APPLICATIONS-II
COURSE CODE: AR 115

COURSE OBJECTIVES:

- To introduce students to initiate students into theory and practice of Computer Applications in Architecture.
- To familiarize advanced learning of software available for architectural applications and familiarize the students with the concepts of 3D modeling.
- To enable them to experiment with forms, mapping, rendering and presentation techniques.
- To make students create integrated design documents by taking full advantage of the building model. Integration of practical exercises along with the design studio projects.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To Introduce students into theory and practice of Computer Applications in Architecture.
CO2	To familiarize Advanced learning of software available for architectural applications and also to familiarize the students with the concepts of 3D modeling.
CO3	To enable them to experiment with forms, mapping, rendering and presentation techniques.
CO4	To make students create integrated design documents by taking full advantage of the building model. Integration of practical exercises along with the design studio projects.

CO-PO MAPPING:

	CO	PO1 Design/Spatial	PO2 Professional Competence	PO3 Technical Competence	PO4 Critical Thinking-Synthesis	PO5 Social Responsibility	PO6 Quantitative Reasoning	PO7 Theoretical Foundation	PO8 Innovative Thinking
CO1	How to Introduce students to initiate students into theory and practice of Computer Applications in Architecture.	3	3	3	1	1	1	3	3
CO2	How to familiarize Advanced learning of software available for architectural applications and familiarize the students with the concepts of 3D modeling.	3	3	3	2	2	2	3	3
CO3	To enable them to experiment with forms, mapping, rendering and presentation techniques.	3	3	3	2	1	2	2	3
CO4	To make students create integrated design documents by taking full advantage of the building model. Integration of practical exercises along with the design studio projects.	3	3	3	2	2	3	3	3

COURSE: HISTORY OF ARCHITECTURE, ART AND CULTURE-I
COURSE CODE: AR116

COURSE OBJECTIVES:

- Familiarization with parameters responsible for evolution of human civilization and human settlements with a view to have a better understanding of history of architecture at later stages.
- Introduction to the architecture of the ancient world and understanding architecture of periods in terms of space, form and structure.
- To generate an understanding about the development of civilization and its architectural implications.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand evolution of human civilization and human settlements.
CO2	Understand the influence of geographical location, socio-cultural, religious, political systems, people's beliefs, climate and other factors on architecture
CO3	Know about the development of civilization, its architectural implications in terms of time, space, form and structure.
CO4	Develop an outlook on settlement patterns of ancient civilization and comparing same in modern societies
CO5	Identify problems related to settlements and thereby understand how to solve it

CO-PO MAPPING:

	CO	**PO1** Design/Spatial	**PO2** Professional Competence	**PO3** Technical competence	**PO4** Critical Thinking - Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	Understand evolution of human civilization and human settlements.				2	1		3	
CO2	Understand the influence of geographical location, socio-cultural, religious, political systems, people's beliefs, climate and other factors on architecture.				1	2		3	
CO3	Understand about the development of civilization, its architectural implications in terms of space, form and structure.	3		2	3			2	1
CO4	Develop an outlook on settlement patterns of ancient civilization and comparing same in modern societies	3	2		2			3	1
CO5	Identify problems related to settlements and thereby understand how to solve it		3	2	2	1		2	3
3: Strong contribution, 2: average contribution, 1: Low contribution									

EDUCATIONAL TOUR AND DOCUMENTATION
COURSE CODE: AR 117

COURSE OBJECTIVES:

- To develop understanding and get student familiarize about the well-known places, buildings and architects work in India.
- To introduce and get student familiarize about the usages and application of various architectural principles over the design, environment.
- To introduce the measuring technique of any site/ building etc and get it drafted on sheet.
- To develop the skill of visualization or transferring the visual image in to the sketches on sheets.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Know about the fundamentals of design and get familiarize about the architectural oriented places, famous buildings and their architects.
CO2	Implement the design through conceptualization and organization.
CO3	Enhance the creative skills through creative exercises.
CO4	Understand the measuring techniques of site and building etc. and present it on sheets.
CO5	Enhance the skill of visualization of architectural spaces and buildings by teaching techniques to sketch it on sheets.

CO & PO MAPPING:

COURSE OUTCOMES		PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking-	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Know about the fundamentals of design and get familiarize about the architectural oriented places, famous buildings and their architects.	3	1	2	-	2	2	1	3
CO2	Implement the design through conceptualization and organization.	2	2	1	2	2	1	1	3
CO3	Enhance the creative skills through creative exercises.	2	2	1	2	2	1	1	3
CO4	Understand the measuring techniques of site and building etc. and presented it on sheets.	-	1	2	2	-	1	1	1
CO5	Enhance the skill of visualization of architectural spaces and buildings and techniques to sketches it on sheets.	3	2	2	-	-	1	-	2

COURSE: ARCHITECTURAL DESIGN-III
COURSE CODE: AR201

COURSE OBJECTIVES:

- To explore the interrelationship between human behavior and space in a small unit environment, including, volume of space, shape, form, function and materials.
- Optimum space planning in the buildings
- Focus on studying patterns with circulation and layout in design of a building.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To apply the learning of the previous semesters
CO2	To teach students to map gathered information of visited physical setting
CO3	To transform the human behavioral needs into architectural program requirements
CO4	To compose the architectural spaces in a design project
CO5	To develop sensitivity towards informal settings and elements of built space.

CO-PO MAPPING:

	CO	**PO1** Design/Spatial	**PO2** Professional Competence	**PO3** Technical Competence	**PO4** Critical Thinking- Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	To apply the learning of the previous semesters	3	3	2	3	1	1	2	1
CO2	To map gathered information of visited physical setting	3	3	2	3	2	2	2	2
CO3	To transform the human behavioral needs into architectural program requirements	3	3	2	3	3	3	2	3
CO4	To compose the architectural spaces in a design project	3	3	2	3	2	2	2	3
CO5	To develop sensitivity towards informal settings and elements of built space.	3	3	2	3	3	1	2	3
3: Strong contribution, 2: average contribution, 1: Low contribution									

COURSE: BUILDING CONSTRUCTION AND MATERIALS-III
COURSE CODE: AR202

COURSE OBJECTIVES:

- To develop understanding about construction principles.
- To understand the use of temporary construction on the site and to generate awareness about new materials and methods of construction being employed in construction industry.
- Construction technology and appropriate materials for other building elements, interior finishes shall be considered under this subject from simple examples to complex.
- The subjects should also focus on developing design abilities by applying basic principles of construction and choosing appropriate materials and techniques as per market trends.
- To present the possibilities of applying diversified solutions related to materials, construction technology, finishes, decorations and aesthetics.

COURSE OUTCOME (CO)

After completion of course, student will be able to:

COURSE OUTCOMES (CO)	DESCRIPTION
CO1	To equip the students with the knowledge of various materials and techniques used for opening in a building and also about the temporary structures that aid the construction process.
CO2	To describe building systems, and how these systems assist in the expression of a design concept.
CO3	To grasp the relation between construction materials and their applicability to different types of structures (based on function, form and use).
CO4	Develop a fundamental understanding of material in construction systems and techniques, dimensions and intrinsic qualities that influence the design process.
CO5	Sound Graphical representation of construction techniques through drawing and different rendering medium; develop details and specifications for the design projects.

CO-PO MAPPING:

Course Outcomes:	**PO1:Design/Spatial:**	**PO2:Professional Competence**	**PO3:Technical Competence**	**PO4:Critical Thinking- Synthesis**	**PO5:Social Responsibility**	**PO6:Quantitative Reasoning**	**PO7:Theoretical Foundation**	**PO8:Innovative Thinking**
CO1 To equip the students with the knowledge of various materials and techniques used in the opening in a building and temporary structures that aid the construction process.	3	1	2	3		2	3	
CO2 To describe building systems, and how these systems assist in the expression of a design concept.	2		2	3	1	2	3	1
CO3 To grasp the relation between construction materials and their applicability to different types of structures (based on function, form and use).	3	2	1	3		3		2
CO4 Develop a fundamental understanding of materiality in construction systems and techniques, dimensions and intrinsic qualities that influence the design process.	2		3	1	3		3	2
CO5 Sound Graphical representation of concepts and ideas using drawing techniques and rendering medium and format; develop details and specifications for their design studio projects.	2	2	3	2		2	3	2
3: Strong Association, 2: Average Association, 1: Low Association								

COURSE: ARCHITECTURAL DRAWING & GRAPHICS -II
COURSE CODE: AR203

COURSE OBJECTIVES:

- The course aims at developing the requisite level of proficiency in drawing, which is seen as a primary communication tool in the practice of architecture just like language.
- Students shall be familiarized with a range of techniques of expression beginning with manual drawing.
- To introduce the students to graphic treatment of three-dimensional drawings.
- To develop perception and presentation of architectural forms and buildings.
- To familiarize the students with preparation of perspectives by innovative methods.

To introduce the students with perspectives of interiors.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understanding the proficiency in drawing, which is seen as a primary communication tool in the practice of architecture just like language?
CO2	Understanding the perspective of the buildings.
CO3	Demonstrate an understanding of furniture, people and accessories in one and two point projected perspective drawing.
CO4	Articulate an understanding of volumetric drawings used in interior design.

CO-PO MAPPING:

	CO	**PO1** Design/Spatial	**PO2** Professional Competence	**PO3** Technical Competence	**PO4** Critical Thinking- Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	Understanding the proficiency in drawing, which is seen as a primary communication tool in the practice of architecture just like language?	2	1	3	1	1	1	3	1
CO2	Understanding the perspective of the buildings.	2	1	2	2	1	1	2	2
CO3	Demonstrate an understanding of furniture, people and accessories in one and two point projected perspective drawing.	2	1	2	2	1	1	2	1
CO4	Articulate an understanding of volumetric drawings used in interior design.	3	2	2	2	1	1	2	2
3: Strong contribution, 2: average contribution, 1: Low contribution									

COURSENAME: ARCHITECTURAL STRUCTURES- II

COURSE CODE: AR - 204

COURSE OBJECTIVES

- To understand the basic principles of structural mechanics, so that it can help in building a strong basis to understand study of structural design.
- Developing in students, material skills to analyze and understand fundamentals and working of various parts of different structural systems.
- Analysis and design of indeterminate structures and their use.
- Understanding structural design in RCC.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Three-moment theorem. Slope deflection method: introduction; analysis; yielding of supports.
CO2	Study of Geo-tech. engineering and Soil Mechanics
CO3	Overview of construction materials: cement; aggregate; water; reinforcement. Grades of concrete; workability and durability, design and nominal mix. Design philosophies
CO4	Earthquake resistant architecture: need for study, importance for learning earthquake design and construction, scope of study.
CO5	Seismic Zones of India: Seismic effects on Architectural Structures: Inertia forces in structures, effects of deformation in structures

CO-PO MAPPING:

	CO	**PO1** (Design/Spatial)	**PO2** (Professional Competence)	**PO3** (Technical Competence)	**PO4 (**Critical Thinking- Synthesis)	**PO5** (Social Responsibility)	**PO6(**Quantitative Reasoning)	**PO7 (**Theoretical Foundation)	**PO8 (**Innovative Thinking)
CO1	Three-moment theorem. Slope deflection method: introduction; analysis; yielding of supports.	-	1	3	2	-	3	1	1
CO2	Study of Geo-tech. engineering and Soil Mechanics	-	2	3	2	1	3	1	1
CO3	Overview of construction materials: cement; aggregate; water; reinforcement. Grades of concrete; workability and durability, design and nominal mix. Design philosophies	-	3	3	2	2	2	2	1
CO4	Earthquake resistant architecture: need for study, importance for learning earthquake design and construction, scope of study.	1	2	3	2	-	3	2	1
CO5	Seismic Zones of India: Seismic effects on Architectural Structures: Inertia forces in structures, effects of deformation in structures	-	2	3	2	1	3	2	-

COURSE: SOCIETY, CULTURE AND BUILT EVIRONMENT
COURSE CODE: AR205

COURSE OBJECTIVES:

- Knowledge about relationship between human and environment
- Knowledge about different types of communities and its classification with respect to income, religion.
- Know about different type human settlements in urban and rural areas
- Knowledge about growth and development both in terms of income and values.
- Knowledge about role of architects and town planners to seek a balanced living condition.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	knowledge about relationship between human and environment
CO2	Knowledge about different types of communities and its classification with respect to income, religion.
CO3	know about different type of human settlements in urban and rural areas
CO4	Knowledge about growth and development both in terms of income and values.
CO5	Knowledge about role of architects and town planners to seek a balanced living condition.

CO-PO MAPPING:

	CO	PO1 Design/Spatial	PO2 Professional Competence	PO3 Technical Competence	PO4 Critical Thinking-Synthesis	PO5 Social Responsibility	PO6 Quantitative Reasoning	PO7 Theoretical Foundation	PO8 Innovative Thinking
CO1	knowledge about relationship between human and environment	2	3	3	1	2	1	3	2
CO2	Knowledge about different types of communities and its classification with respect to income, religion.	2	3	3	1	3	2	3	2
CO3	know about different type human settlements in urban and rural areas	3	3	3	2	2	2	2	2
CO4	Knowledge about growth and development both in terms of income and values.	3	3	2	2	2	3	3	2
CO5	Knowledge about role of architects and town planners to seek a balanced living condition.	2	3	2	1	3	2	2	1

COURSE: HISTORY OF ARCHITECTURE, ART & CULTURE - II
COURSE CODE: AR 206

COURSE OBJECTIVES:

- Familiarization with parameters responsible for evolution of human civilization and human settlements with a view to have a better understanding of history of architecture at later stages.
- Introduction to the architecture of the ancient world and understanding architecture of periods in terms of space, form and structure.
- To generate an understanding about the development of civilization and its architectural implications.
- To underline the ideological content of works of art and methods of interpretation.
- To emphasize the influence of political and socio-cultural, physiological factors on art & architecture.

COURSE OUTCOME (CO)

After completion of course, student will be able to:

COURSE OUTCOMES (CO)	DESCRIPTION
CO1	Understand the reasons of emergence, growth and termination of prevailing architectural periods.
CO2	Analytical understandings on theories of design prevalent in ancient period (Greek and roman) and also to understand the evolution of form and spaces
CO3	To understand the importance of historical, geographical, religious, social, building materials and construction techniques, climatic conditions in molding architecture spaces and structures
CO4	To understand the evolution of Churches as a new structure and also the factors responsible for establishment of Christianity as religion and its architectural impacts
CO5	To understand the morphological development of Architecture in India from post Vedic period and confined till Hindu Architecture

CO-PO MAPPING:

Course Outcomes:	**PO1:Design/Spatial:**	**PO2:Professional Competence**	**PO3:Technical Competence**	**PO4:Critical Thinking- Synthesis**	**PO5:Social Responsibility**	**PO6:Quantitative Reasoning**	**PO7:Theoretical Foundation**	**PO8:Innovative Thinking**
CO1 Understand the reasons of emergence, growth and termination of prevailing architectural trends.	3			3	1	3	1	2
CO2 Analytical understandings on theories of design to be able to translate creative thinking of space.	3		2	3		2	1	3
CO3 Develop understanding on problem identification related to design, space and thereby solving it.	2	3		3		3	1	1
CO4 Assess the merits of an architectural design in terms of key social, aesthetic and functional aspects.	3		2	2		3	3	1
CO5 Learn various ideologies and context of designs thereby developing their own theories and applying the same knowledge in their own design skills.	3	2			3	2	3	1
3: Strong Association, 2: Average Association, 1: Low Association								

COURSE: COMPUTER APPLICATIONS-III
COURSE CODE: AR207

COURSE OBJECTIVES:

- To introduce students to initiate students into theory and practice of Computer Applications in Architecture.
- To familiarize advanced learning of software available for architectural applications and familiarize the students with the concepts of 3D modeling.
- To enable them to experiment with forms, mapping, rendering and presentation techniques.
- To make students create integrated design documents by taking full advantage of the building model. Integration of practical exercises along with the design studio projects.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To Introduce students into theory and practice of Computer Applications in Architecture.
CO2	To familiarize Advanced learning of software available for architectural applications and familiarize the students with the concepts of 3D modeling.
CO3	To enable them to experiment with forms, mapping, rendering and presentation techniques.
CO4	To make students create integrated design documents by taking full advantage of the building model. Integration of practical exercises along with the design studio projects.

CO-PO MAPPING:

	CO	**PO1** Design/Spatial	**PO2** Professional Competence	**PO3** Technical Competence	**PO4** Critical Thinking- Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	How to Introduce students to initiate students into theory and practice of Computer Applications in Architecture.	3	3	3	1	1	1	3	3
CO2	How to familiarize Advanced learning of software available for architectural applications and familiarize the students with the concepts of 3D modeling.	3	3	3	2	2	2	3	3
CO3	To enable them to experiment with forms, mapping, rendering and presentation techniques.	3	3	3	2	1	2	2	3
CO4	To make students create integrated design documents by taking full advantage of the building model. Integration of practical exercises along with the design studio projects.	3	3	3	2	2	3	3	3

COURSE: BUILDING SERVICES- WATER SUPPLY &SANITATION
COURSE CODE: AR 208

COURSE OBJECTIVES:

- Knowledge of sources, treatment and conveyance of water.
- Knowledge of pipes, fittings & water supply system.
- Introduction to sanitation, sanitary fittings, fixtures and joints.
- Knowledge of drainage systems and rain water harvesting.
- Implementation of building services water supply & sanitation in design.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To know about the Sources of water supply, Quality and Quantity, Treatment, Conveyance, Distribution and Storage, size of overhead tank and underground tank based on the occupancy in different type of buildings as per NBC.
CO2	To understand Pipes-types, sizes and materials along with their joining details & Domestic hot and cold water supply systems with market survey.
CO3	To Understand Basic principles of sanitation, collection and conveyance of waste matter from buildings, Quantity and quality of refuse, working and installation of sewers and sewer appurtenances.
CO4	To know Drainage systems, gradients used in laying drains and sewers, self-cleansing and non-scouring velocities for drain pipes, Rain water harvesting types and methods and its calculation.
CO5	To know calculation of shaft size as per NBC norms and preparing design layout and details as per the NBC Standards.

CO-PO MAPPING:

	CO	**PO1** Design/Spatial	**PO2** Professional Competence	**PO3** Technical Competence	**PO4** Critical Thinking- Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	Know about the Sources of water supply, Quality and Quantity, Treatment, Conveyance, Distribution and Storage, size of overhead tank and underground tank based on the occupancy in different type of buildings as per NBC.		1	2	2		3	3	1
CO2	Able to understand Pipes-types, sizes and materials along with their joining details & Domestic hot and cold water supply systems with market survey.	1	3	3	2		2	2	1
CO3	Basic principles of sanitation, collection and conveyance of waste matter from buildings, Quantity and quality of refuse, working and installation of sewers and sewer appurtenances.	2	2	3	3	1	2	3	1
CO4	Drainage systems, gradients used in laying drains and sewers, self-cleansing and non-scouring velocities for drain pipes, Rain water harvesting types and methods and its calculation.	2	3	3	2		3	3	2
CO5	Introduction and calculation of shaft size as per NBC norms and preparing design layout and details as per the NBC .Standards.	2	2	2	1		1	3	2

COURSE: ARCHITECTURAL DESIGN-III
COURSE CODE: AR210

COURSE OBJECTIVES:

- To learn the art of collecting data and to carry out analysis for the process of evolving design and individuality of approach.
- Understanding elementary site planning: organization, scale, hierarchy, orientation and climate.
- Focus on design as a function of specific agenda.
- Focus on studying patterns in horizontal circulation in built area.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To apply the learning of the previous semesters
CO2	To teach students to create design for medium size and large span buildings of limited functions.
CO3	To transform the layout and services of large public buildings with specialized services.
CO4	To compose the architectural spaces in a design project
CO5	To develop sensitivity towards informal settings and elements of built space.

CO-PO MAPPING:

	CO	**PO1** Design/Spatial	**PO2** Professional Competence	**PO3** Technical Competence	**PO4** Critical Thinking- Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	To apply the learning of the previous semesters	3	3	2	3	1	1	2	1
CO2	To teach students to create design for medium size and large span buildings of limited functions.	3	3	2	3	2	2	2	2
CO3	To transform the layout and services of large public buildings with specialized services.	3	3	2	3	3	3	2	3
CO4	To compose the architectural spaces in a design project	3	3	2	3	2	2	2	3
CO5	To develop sensitivity towards informal settings and elements of built space.	3	3	2	3	3	1	2	3
3: Strong contribution, 2: average contribution, 1: Low contribution									

COURSE: BUILDING CONSTRUCTION &MATERIALS IV
COURSE CODE: AR 211

COURSE OBJECTIVES:

- To develop understanding about construction principles.
- Construction technology and appropriate materials for structural systems, roofing, enveloping and interior finishes shall be considered under this subject from simple examples to complex.
- The subjects should also focus on developing design abilities by applying basic principles of construction and choosing appropriate materials and techniques as per market trends.

COURSE OUTCOME (CO)

After completion of course, student will be able to:

COURSE OUTCOMES (CO)	DESCRIPTION
CO1	To equip the students with the knowledge of various materials and techniques used in finishes, partition, and roof covering of a building and staircase that facilitate the vertical circulation.
CO2	To describe building systems, and how these systems assist in the expression of a design concept.
CO3	To grasp the relation between construction materials and their applicability to different types of structures (based on function, form and use).
CO4	Develop a fundamental understanding of material in construction systems and techniques, dimensions and intrinsic qualities that influence the design process.
CO5	Sound Graphical representation of concepts and ideas using drawing techniques and rendering medium and format; develop details and specifications for their design studio projects.

CO-PO MAPPING:

Course Outcomes:	PO1:Design/Spatial:	PO2:Professional Competence	PO3:Technical Competence	PO4:Critical Thinking- Synthesis	PO5:Social Responsibility	PO6:Quantitative Reasoning	PO7:Theoretical Foundation	PO8:Innovative Thinking
CO1 To equip the students with the knowledge of various materials and techniques used in finishes, partition, and roof covering of a building and staircase that facilitate the vertical circulation.	3	1	2	3		2	3	
CO2 To describe building systems, and how these systems assist in the expression of a design concept.	2		2	3	1	2	3	1
CO3 To grasp the relation between construction materials and their applicability to different types of structures (based on function, form and use).	3	2	1	3		3		2
CO4 Develop a fundamental understanding of materiality in construction systems and techniques, dimensions and intrinsic qualities that influence the design process.	2		3	1	3		3	2
CO5 Sound Graphical representation of concepts and ideas using drawing techniques and rendering medium and format; develop details and specifications for their design studio projects.	2	2	3	2		2	3	2
3: Strong Association, 2: Average Association, 1: Low Association								

COURSE NAME: CLIMATOLOGY
COURSE NAME: AR212

COURSE OBJECTIVES

- This subject area also known by the term building science in earlier times enlightened the students to the processes by which building and entire habitats can be designed to respond to nature, ***with climate as the basic parameter of design.***
- Introduction of elementary principles of ***bioclimatic studies*** with respect to buildings and human comfort.
- Introducing principle of ***thermal comfort and its implication*** in design.
- Enabling student to understand ***design strategies*** for different climatic regions.
- Familiarizing students with ***modern techniques*** to analyze climatic parameters and design buildings accordingly.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Theoretically understand design with climate as the basic parameter of design.
CO2	Prepare design strategies for different climatic regions.
CO3	Analyze, troubleshoot, and implement solutions with climate as the basic parameter of design.
CO4	Utilize modern as well as traditional techniques to derive a climate responsive design,

CO-PO MAPPING:

	CO	PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking- Synthesis)	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Theoretically understand design with climate as the basic parameter of design.	3	2	1	2	2	1	3	1
CO2	Prepare design strategies for different climatic regions.	2	2	1	2	3	2	2	3
CO3	Analyze, troubleshoot, and implement solutions with climate as the basic parameter of design.	3	2	3	3	2	3	2	3
CO4	Utilize modern as well as traditional techniques to derive a climate responsive design,	3	3	3	1	1	2	1	3

COURSE NAME: Architectural Structures- III

COURSE CODE: AR - 213

COURSEOBJECTIVES

- To understand the basic principles of structural mechanics, so that it can help in building a strong basis to understand study of structural design.
- Developing in students, material skills to analyze and understand fundamentals and working of various parts of different structural systems.
- Understanding structural design in RCC

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Column: Design of axially and eccentrically loaded short and long columns by working stress and the limit state methods, use of design aids.
CO2	Retaining Wall: Types, stability criteria, design of cantilever retaining wall. Staircase: effective span of staircase, distribution of loading on staircase, design of various types of staircase.
CO3	Types, theory and design of isolated and combined column footings; raft and pile foundations.
CO4	Requirement or good detailing, cover to reinforcement, spacing of reinforcement, reinforcement requirements, reinforcement splicing, curtailment and bar bending schedule
CO5	Construction joints, expansion and contraction joints.

CO-PO MAPPING:

	CO	**PO1** (Design/Spatial)	**PO2** (Professional Competence)	**PO3** (Technical Competence)	**PO4 (**Critical Thinking- Synthesis)	**PO5** (Social Responsibility)	**PO6 (**Quantitative Reasoning)	**PO7 (**Theoretical Foundation)	**PO8 (**Innovative Thinking)
CO1	Column: Design of axially and eccentrically loaded short and long columns by working stress and the limit state methods, use of design aids.	3	2	3	2	-	3	2	1
CO2	Retaining Wall: Types, stability criteria, design of cantilever retaining wall. Staircase: effective span of staircase, distribution of loading on staircase, design of various types of staircase.	1	2	3	1	2	-	2	2
CO3	Types, theory and design of isolated and combined column footings; raft and pile foundations.	3	2	3	2	-	3	2	1
CO4	Requirement or good detailing, cover to reinforcement, spacing of reinforcement, reinforcement requirements, reinforcement splicing, curtailment and bar bending schedule	1	3	2	1	2	3	2	2
CO5	Construction joints, expansion and contraction joints.	1	2	3	1	2	-	2	2

COURSE: SITE PLANNING AND SUSTAINABLE ARCHITECTURE
COURSE CODE: AR214

COURSE OBJECTIVES:

- To teach the importance of site and its content in architectural creations.
- To orient the students towards several influencing factors which governs the siting of a building or group of building in a given site.
- To teach various technique techniques of site analysis through exercises and case study.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Students will learn the methodology of preparing the site analysis diagram.
CO2	To understand the concept of sustainability and sustainable development.
CO3	To inform the various issues like climate change, ecological footprint, etc.
CO4	To understand low impact construction practices, life cycle costs and alternative energy resources.
CO5	Familiarize the students with the various rating systems of building practices with case.

CO-PO MAPPING:

	CO	**PO1** Design/Spatial	**PO2** Professional Competence	**PO3** Technical Competence	**PO4** Critical Thinking- Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	Students will learn the methodology of preparing the site analysis diagram.	3	3	2	3	1	1	2	1
CO2	To understand the concept of sustainability and sustainable development.	3	3	2	3	2	2	2	2
CO3	To inform the various issues like climate change, ecological footprint, etc.	3	3	2	3	3	3	2	3
CO4	To understand low impact construction practices, life cycle costs and alternative energy resources.	3	3	2	3	2	2	2	3
CO5	Familiarize the students with the various rating systems of building practices with case.	3	3	2	3	3	1	2	3
3: Strong contribution, 2: average contribution, 1: Low contribution									

COURSE: HISTORY OF INDIAN ARCHITECTURE, ART & CULTURE - III
COURSE CODE: AR-215

COURSE OBJECTIVES:

- Understanding of period in terms of contexts of location, climate and other parameters.
- Introduction to the architecture of the ancient world and understanding architecture of periods in terms of space, form and structure.
- Familiarizing with typical examples of building type.
- To generate an understanding about the development of civilization and its architectural implications.

COURSE OUTCOME (CO)

After completion of course, student will be able to:

COURSE OUTCOMES (CO)	DESCRIPTION
CO1	Understand the reasons of emergence, growth and termination of prevailing architectural trends.
CO2	Analytical understandings on theories of design to be able to translate creative thinking of space.
CO3	Develop understanding on problem identification related to design, space and thereby solving it.
CO4	Assess the merits of an architectural design in terms of key social, aesthetic and functional aspects.
CO5	Learn various ideologies and context of designs thereby developing their own theories and applying the same knowledge in their own design skills.

CO-PO MAPPING:

Course Outcomes:	**PO1:Design/Spatial:**	**PO2:Professional Competence**	**PO3:Technical Competence**	**PO4:Critical Thinking- Synthesis**	**PO5:Social Responsibility**	**PO6:Quantitative Reasoning**	**PO7:Theoretical Foundation**	**PO8:Innovative Thinking**
CO1 Understand the reasons of emergence, growth and termination of prevailing architectural trends.	3			3	1	3	1	2
CO2 Analytical understandings on theories of design to be able to translate creative thinking of space.	3		2	3		2	1	3
CO3 Develop understanding on problem identification related to design, space and thereby solving it.	2	3		3		3	1	1
CO4 Assess the merits of an architectural design in terms of key social, aesthetic and functional aspects.	3		2	2		3	3	1
CO5 Learn various ideologies and context of designs thereby developing their own theories and applying the same knowledge in their own design skills.	3	2			3	2	3	1
3: Strong Association, 2: Average Association, 1: Low Association								

COURSE: COMPUTER APPLICATIONS (Advance Modeling & Simulation)-IV
COURSE CODE: AR216

COURSE OBJECTIVES:

- To introduce students to initiate students into theory and practice of Computer Applications in Architecture.
- To familiarize advanced learning of software available for architectural applications and familiarize the students with the concepts of 3D modeling.
- To enable them to experiment with forms, mapping, rendering and presentation techniques.
- To make students create integrated design documents by taking full advantage of the building model. Integration of practical exercises along with the design studio projects.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To Introduce students into theory and practice of Computer Applications in Architecture.
CO2	To familiarize Advanced learning of software available for architectural applications and familiarize the students with the concepts of 3D modeling.
CO3	To enable them to experiment with forms, mapping, rendering and presentation techniques.
CO4	To make students create integrated design documents by taking full advantage of the building model. Integration of practical exercises along with the design studio projects.

CO-PO MAPPING:

	CO	PO1 Design/Spatial	PO2 Professional Competence	PO3 Technical Competence	PO4 Critical Thinking-Synthesis	PO5 Social Responsibility	PO6 Quantitative Reasoning	PO7 Theoretical Foundation	PO8 Innovative Thinking
CO1	How to Introduce students to initiate students into theory and practice of Computer Applications in Architecture.	3	3	3	1	1	1	3	3
CO2	How to familiarize Advanced learning of software available for architectural applications and familiarize the students with the concepts of 3D modeling.	3	3	3	2	2	2	3	3
CO3	To enable them to experiment with forms, mapping, rendering and presentation techniques.	3	3	3	2	1	2	2	3
CO4	To make students create integrated design documents by taking full advantage of the building model. Integration of practical exercises along with the design studio projects.	3	3	3	2	2	3	3	3

COURSE: BUILDING SERVICES - ELECTRICAL AND LIGHTING
COURSE CODE: AR 217

COURSE OBJECTIVES:

- The course aims at developing the elementary building services of electrical services.
- Students shall be familiarized with a range of electrical accessories and its design consideration.
- Introduction to illumination schemes.
- Students shall be familiarized with wiring systems and design consideration of lighting schemes.
- Application of electrical services in Design.

COURSE OUTCOMES (CO):

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Learn elementary building services of electrical services.
CO2	Familiarize with a range of electrical accessories and its design consideration.
CO3	Learn illumination schemes.
CO4	Familiarize with wiring systems and design consideration of lighting schemes.
CO5	Implicate electrical services in Design.

After completion of the course, a student will be able to

CO-PO MAPPING:

	CO'S	**PO1** Design/Spatial	**PO2** Professional Competence	**PO3** Technical Competence	**PO4** Critical Thinking- Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	Learn elementary building services of electrical services.	1	3	3	2	1	2	2	1
CO2	Familiarize with a range of electrical accessories and its design consideration.	2	3	3	3	1	2	3	2
CO3	Learn illumination schemes.	3	2	2	3	1	2	2	3
CO4	Familiarize with wiring systems and design consideration of lighting schemes.	3	3	3	3	2	2	2	3
CO5	Implicate electrical services in Design.	3	3	2	3	1	1	1	3

COURSE: B. ARCH.
COURSE CODE: AR 301

COURSE OBJECTIVES:

- Making student learn the art of collecting data and to carry out analysis for the process of evolving design and individuality of approach.
- Understanding site planning: organization, scale, hierarchy, orientation and climate.
- Understanding complex services in multi-storied buildings; understanding the architectural content of services in buildings.
- Implication of knowledge of design fundamentals and knowledge gained in other subjects to develop better design solutions.
- Developing appropriate graphic skills and presentation techniques (models, rendering) to explain the contents of a design.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Learn the art of collecting data and to carry out analysis for the process of evolving design and individuality of approach.
CO2	Understanding site planning: organization, scale, hierarchy, orientation and climate.
CO3	Understand complex services in multi-storied buildings; understanding the architectural content of services in buildings.
CO4	Implicate knowledge of design fundamentals and knowledge gained in other subjects to develop better design solutions.
CO5	Develop appropriate graphic skills and presentation techniques (models, rendering) to explain the contents of a design.

CO-PO MAPPING:

	CO	**PO1** Design/Spatial	**PO2** Professional Competence	**PO3** Technical Competence	**PO4** Critical Thinking- Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	Learn the art of collecting data and to carry out analysis for the process of evolving design and individuality of approach.	3	2	2	2		1	1	2
CO2	Understanding site planning: organization, scale, hierarchy, orientation and climate.	3	3	2	3	2	2	1	3
CO3	Understand complex services in multi-storied buildings; understanding the architectural content of services in buildings.	3	3	3	3	1	2	2	3
CO4	Implicate knowledge of design fundamentals and knowledge gained in other subjects to develop better design solutions.	2	2	3	3		2	3	3
CO5	Develop appropriate graphic skills and presentation techniques (models, rendering) to explain the contents of a design.	2	2	1	3		1	1	3

COURSE: Building Construction & Materials IV
COURSE CODE: AR 302

COURSE OBJECTIVES

- To develop understanding about construction principles.
- The subjects should also focus on developing design abilities by applying basic principles of construction and choosing appropriate materials and techniques.
- Construction technology and appropriate materials for structural systems, roofing, enveloping and interior finishes shall be considered under this subject from simple examples to complex.
- To introduce and familiarize the students with the basics of seismic design and construction methods.
- To understand the use of temporary construction on the site and to generate awareness about new materials and methods of construction being employed in construction industry.
- To understand design limitations due to authority guidelines and making drawings/ details necessary for final execution of a project.

COURSE OUTCOME (CO)

After completion of course, student will be able to:

COURSE OUTCOMES (CO)	DESCRIPTION
CO1	To equip the students with the knowledge of various materials and techniques used temporary construction work.
CO2	To describe long span building systems, and how these systems assist in the expression of a design concept.
CO3	To grasp the relation between construction materials and their applicability to different types of structures.
CO4	Develop a fundamental understanding of materiality in construction systems and techniques, dimensions and intrinsic qualities that influence the design process.
CO5	Sound Graphical representation of concepts and ideas using drawing techniques and rendering medium and format; develop details and specifications for their design studio projects.

CO-PO MAPPING

Course Outcomes:	PO1:Design/Spatial:	PO2:Professional Competence	PO3:Technical Competence	PO4:Critical Thinking- Synthesis	PO5:Social Responsibility	PO6:Quantitative Reasoning	PO7:Theoretical Foundation	PO8:Innovative Thinking
CO1 To equip the students with the knowledge of various materials and techniques used temporary construction work.	3	1	2	3		2	3	
CO2 To describe long span building systems, and how these systems assist in the expression of a design concept.	2		2	3	1	2	3	1
CO3 To grasp the relation between construction materials and their applicability to different types of structures.	3	2	1	3		3		2
CO4 Develop a fundamental understanding of materiality in construction systems and techniques, dimensions and intrinsic qualities that influence the design process.	2		3	1	3		3	2
CO5 Sound Graphical representation of concepts and ideas using drawing techniques and rendering medium and format; develop details and specifications for their design studio projects.	2	2	3	2		2	3	2
3: Strong Association, 2: Average Association, 1: Low Association								

COURSE NAME: Building Specification, Estimating and Costing
COURSE CODE: AR – 303

OBJECTIVES

- To initiate the students into theory and practice of estimating and quantity surveying.
- To inculcate awareness regarding factors effecting cost of buildings.
- To familiarize the student with the commonly used methods of preparing estimates of Architectural Projects.
- To acquaint students with methodology of writing specifications with reference to building trades, materials, workmanship and performance of different items of work and introducing the students to specifications as an integral part of contract document for building projects.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Aim and object, Scope and importance of subject**,** types of estimates etc.
CO2	Principles of analysis of rates, rates of labour and materials, exercises in rate analysis of different building works.
CO3	Correct form of specification writing – avoiding ambiguity and conflicting statements. Form and sequence of clauses, study and use of standard specification.
CO4	Detailed specification writing of various building materials, e.g. bricks, sand, lime, glass, paints, metals, timber and its products.
CO5	Superstructure and sub structure works.

CO-PO MAPPING:

	CO	**PO1** (Design/Spatial)	**PO2** (Professional Competence)	**PO3** (Technical Competence)	**PO4** (Critical Thinking, Synthesis)	**PO5** (Social Responsibility)	**PO6(**Quantitative Reasoning)	**PO7 (**Theoretical Foundation)	**PO8 (**Innovative Thinking)
CO1	Importance of subject and scope of work	-	1	2	2	1	1	2	1
CO2	Principles of analysis of rates, rates of labor and materials, exercises in rate analysis of different building works	-	3	2	1	-	3	3	3
CO3	Correct form of specification writing – avoiding ambiguity and conflicting statements. Form and sequence of clauses, study and use of standard specification.	-	2	3	1	-	3	2	1
CO4	Detailed specification writing of various building materials, e.g. bricks, sand, lime, glass, paints, metals, timber and its products.	1	3	3	2	1	3	3	2
CO5	Superstructure and sub structure works.	1	3	3	2	-	2	3	2

COURSE: BUILDING BYE LAWS AND CODE OF PRACTICES
COURSE CODE: AR 304

COURSE OBJECTIVES:

- Familiarization with Development Control Rules and Building byelaws.
- To acquaint the students with various codes of practices/ acts relating to building construction
- To make the student appreciate the implications of issues emerging from an urban context.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To familiarize student with development of design according to Control Rules and Building Bye laws of Local Authority.
CO2	To make students aware about the various codes of practices and different acts regarding the construction of building
CO3	To make students understand how to maintain the overall massing of the city in an urban context.
CO4	To understand the plan approval process from the sanctioning authority.

CO & PO MAPPING:

COURSE OUTCOMES		PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking-Synthesis)	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Development of Design According to Control Rules and Building Bye laws of Local Authority.	3	3	-	1	3	-	-	1
CO2	Aware the various codes of practices and different acts regarding the construction of building	-	3	-	-	3	-	-	1
CO3	Understand to maintain the overall massing of the city in an urban context.	3	2	1	1	2	-	-	2
CO4	Know the plan approval process from the sanctioning authority.	1	3	2	2	2	-	1	2

COURSE NAME: Structural Design and System-IV

COURSE CODE: AR - 305

OBJECTIVES

- To understand the basic principles of structural mechanics, so that it can help in building a strong basis to understand study of structural design.
- Developing in students, material skills to analyze and understand fundamentals and working of various parts of different structural systems
- Analysis and design of indeterminate structures and their use.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Analysis of force and stress in trusses.
CO2	Application of bending equation, bending stresses in symmetrical and asymmetrical sections.
CO3	Shear stress and its distribution in various sections.
CO4	Deflection of beams, Differential equation of deflected beam, double integration method, Macaulay's method, statically determinate beams and propped cantilever, moment area method.
CO5	Columns and Struts, End conditions, effective length, slenderness ratio, Euler's and Rankin's formulae.

CO-PO MAPPING:

	CO	**PO1** (Design/Spatial)	**PO2** (Professional Competence)	**PO3** (Technical Competence)	**PO4 (**Critical Thinking- Synthesis)	**PO5** (Social Responsibility)	**PO6(**Quantitative Reasoning)	**PO7 (**Theoretical Foundation)	**PO8 (**Innovative Thinking)
CO1	Analysis of force and stress in trusses.	1	2	3	2	-	3	2	1
CO2	Application of bending equation, bending stresses in symmetrical and asymmetrical sections.	1	3	2	2	-	3	2	1
CO3	Shear stress and its distribution in various sections.	1	3	3	2	-	3	2	1
CO4	Deflection of beams, Differential equation of deflected beam, double integration method, Macaulay's method, statically determinate beams and propped cantilever, moment area method.	1	2	3	2	-	3	2	1
CO5	Columns and Struts, End conditions, effective length, slenderness ratio, Euler's and Rankin's formulae.	1	2	3	2	-	3	2	1

COURSE NAME: Structural Design and Systems - V
COURSE CODE: AR - 306

OBJECTIVES

- To understand the basic principles of structural mechanics, so that it can help in building a strong basis to understand study of structural design.
- Developing in students, material skills to analyze and understand fundamentals and working of various parts of different structural systems.
- Analysis and design of indeterminate structures and their use.
- Design of structural elements in reinforced cement concrete and steel structures.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Pre- Stressed Concrete principles and systems, loss of pre-stress, analysis and design of pre-stress beams.
CO2	Effect of earthquake on concrete buildings, Role and design of beams, columns and joints in RC buildings. Planning for reducing earthquake effects on buildings.
CO3	Design of riveted and welded connections (simple cases only), tension and compression members, beam and plate girder, introduction to grillage foundation and trusses.
CO4	Elements of Earthquake Engineering, zoning, base shear, lateral forces, ductile detailing and introduction to new codes.
CO5	Practical problems using STAAD

CO-PO MAPPING:

	CO	**PO1** (Design/Spatial)	**PO2** (Professional Competence)	**PO3** (Technical Competence)	**PO4 (**Critical Thinking- Synthesis)	**PO5** (Social Responsibility)	**PO6 (**Quantitative Reasoning)	**PO7 (**Theoretical Foundation)	**PO8 (**Innovative Thinking)
CO1	Pre- Stressed Concrete principles and systems, loss of pre-stress, analysis and design of pre-stress beams.	2	3	3	2	-	2	2	1
CO2	Effect of earthquake on concrete buildings, Role and design of beams, columns and joints in RC buildings. Planning for reducing earthquake effects on buildings.	1	2	3	2	-	1	1	-
CO3	Design of riveted and welded connections (simple cases only), tension and compression members, beam and plate girder, introduction to grillage foundation and trusses.	3	3	3	3	-	3	2	1
CO4	Elements of Earthquake Engineering, zoning, base shear, lateral forces, ductile detailing and introduction to new codes.	1	2	3	2	-	2	1	1
CO5	Practical problems using STAAD	1	3	3	2	2	3	1	3

COURSE: HISTORY OF ARCHITECTURE, ART & CULTURE - MODERN
COURSE CODE: AR307

COURSE OBJECTIVES:

- Understanding of period in terms of contexts of technology and other parameters.
- To understand the development in the modern period with emphasis on the underlying parameters, philosophy, intentions and expressions of associated periods/ movements as a response to the context of time, location and aspirations.
- Familiarizing with typical examples of building type.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Know about the period in terms of contexts of technology and other parameters.
CO2	Know the development in the modern period with emphasis on the underlying parameters, philosophy, intentions and expressions of associated periods/ movements as a response to the context of time, location and aspirations.
CO3	Understand the building type and its architectural style.

CO & PO MAPPING:

COURSE OUTCOMES		PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking-	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Know about the period in terms of contexts of technology and other parameters.	1	-	3	3	2	-	3	2
CO2	Know the development in the modern period with emphasis on the underlying parameters, philosophy, intentions and expressions of associated periods/ movements as a response to the context of time, location and aspirations.	1	-	-	3	3	-	3	2
CO3	Understand the building type and its architectural style.	1	2	-	3	1	-	3	3

COURSE: THEORY OF DESIGN
COURSE CODE: AR 308

COURSE OBJECTIVES:

- To expose the students to elementary theories of design enabling them to study, analyze and develop a value judgement for architectural appreciation.
- In a nutshell this subject should be able to help them expand their awareness and perceptiveness thereby helping them to create better design solution.
- Studies of Folk and crafts, indigenous Architectural studies, Influence of tradition, culture and
- Socio-economic developments on art and Architecture.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Know about the elementary theories of design enable them to study, analyze and develop a value judgement for architectural appreciation
CO2	Help them expand their awareness and perceptiveness thereby helping them to create better design solution
CO3	Know about the Folk and crafts, indigenous Architectural studies, Influence of tradition, culture and socio- economic developments on art and Architecture.

CO & PO MAPPING:

COURSE OUTCOMES		PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking- Synthesis)	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Know about the elementary theories of design enable them to study, analyze and develop a value judgement for architectural appreciation	3	3	3	3	2	1	3	2
CO2	Help them expand their awareness and perceptiveness thereby helping them to create better design solution	3	3	3	3	3	-	1	3
CO3	Know about the Folk and crafts, indigenous architectural studies, Influence of tradition, culture and socio-economic developments on art and Architecture.	2	2	2	2	3	1	3	2

COURSE: BUILDING SERVICES - MECHANICAL
COURSE CODE: AR-309

COURSE OBJECTIVES

- To understand advanced building services pertaining to natural and mechanical ventilation, and their application to build forms.
- To make students aware about Fire- fighting methods, rules, regulations and equipment's.
- To understand the incorporation of Mechanical and fire-fighting Services in building design.
- To understand and prepare layout and details for design project in architectural design.

COURSE OUTCOME (CO)

After completion of course, student will be able to:

COURSE OUTCOMES (CO)	DESCRIPTION
CO1	Demonstrate an understanding of building construction as it relates to firefighter safety, building codes, fire prevention, code inspection, and firefighting strategy.
CO2	Understand the basic fundamentals of mechanical systems.
CO3	Understanding the concept of Fire and methods used as fire-fighting.
CO4	Understanding of working of Lift and escalator as a mechanical device
CO5	Develop an understanding of local codes in reference to the topics of this course

CO-PO MAPPING

Course Outcomes:	PO1:Design/Spatial:	PO2:Professional Competence	PO3:Technical Competence	PO4:Critical Thinking- Synthesis	PO5:Social Responsibility	PO6:Quantitative Reasoning	PO7:Theoretical Foundation	PO8:Innovative Thinking
CO1 Demonstrate an understanding of building construction as it relates to firefighter safety, building codes, fire prevention, code inspection, and firefighting strategy.	3			3	1	3	1	2
CO2 Understand the basic fundamentals of mechanical systems.	3		2	3		2	1	3
CO3 Understanding the concept of Fire and methods used as fire-fighting.	2	3		3		3	1	1
CO4 Understanding of working of Lift and escalator as a mechanical device	3		2	2		3	3	1
CO5 Develop an understanding of local codes in reference to the topics of this course	3	2			3	2	3	1
3: Strong Association, 2: Average Association, 1: Low Association								

COURSE: Building Services-Acoustics
COURSE CODE: AR-310

COURSE OBJECTIVES:

- To initiate students into theory and practice of acoustics.
- Applying in architectural design and preparing layout and details

COURSE OUTCOME (CO)

After completion of course, student will be able to:

COURSE OUTCOMES (CO)	DESCRIPTION
CO1	Understand standard measurement methods that are used in building acoustics and Analyze acoustic properties of typically used materials for design consideration. .
CO2	Apply prediction methods to assess the transmission of noise in buildings, its mitigation and reverberation of sound.
CO3	Select appropriate building constructions for the solution of practical noise problems and evaluate their performance
CO4	Make basic room acoustic measurements and determine the various indicators used for auditorium acoustics
CO5	Learn various ideologies and context of designs thereby developing their own theories and applying the same knowledge in their own design skills.

Course Outcomes:	PO1:Design/Spatial:	PO2:Professional Competence	PO3:Technical Competence	PO4:Critical Thinking- Synthesis	PO5:Social Responsibility	PO6:Quantitative Reasoning	PO7:Theoretical Foundation	PO8:Innovative Thinking
CO1 Understand standard measurement methods that are used in building acoustics and Analyze acoustic properties of typically used materials for design consideration. .	3			3	1	3	1	2
CO2 Apply prediction methods to assess the transmission of noise in buildings, its mitigation and reverberation of sound.	3		2	3		2	1	3
CO3 Select appropriate building constructions for the solution of practical noise problems and evaluate their performance	2	3		3		3	1	1
CO4 Make basic room acoustic measurements and determine the various indicators used for auditorium acoustics	3		2	2		3	3	1
CO5 Learn various ideologies and context of designs thereby developing their own theories and applying the same knowledge in their own design skills.	3	2			3	2	3	1
3: Strong Association, 2: Average Association, 1: Low Association								

COURSE: BUILDING CONSTRUCTION AND TECHNOLOGY-III
COURSE CODE: AR 402

COURSE OBJECTIVES:

- To develop understanding about construction principles.
- The subjects should also focus on developing design abilities by applying basic principles of construction and choosing appropriate materials and techniques.
- Construction technology and appropriate materials for structural systems, roofing, enveloping and interior finishes shall be considered under this subject from simple examples to complex.
- To introduce and familiarize the students with the advance construction techniques and methods.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To know about the construction equipment's like Electric hand tools, Earth Moving and Excavation and Transportation machines.
CO2	Understand Defects and Remedies in Buildings.
CO3	Know Modular Coordination, Standardization in building design and their components
CO4	Know construction techniques about Domes, Shells and Folded Plates.
CO5	Understand Communication Systems & mechanical means of transportation both vertical and horizontal transportation in a building.

CO-PO MAPPING:

	CO	**PO1** Design/Spatial	**PO2** Professional Competence	**PO3** Technical Competence	**PO4** Critical Thinking- Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	Know about the construction equipment's like Electric hand tools, Earth Moving and Excavation and Transportation machines.		1	3	3		2	2	2
CO2	Able to understand Defects and Remedies in Buildings.	1	2	3	2	1	3	3	2
CO3	Modular Coordination, Standardization in building design and their components	3	2	3	3		2	2	3
CO4	Know construction techniques about Domes, Shells and Folded Plates.	3	3	3	2		2	3	3
CO5	Understand Communication Systems & mechanical means of transportation both vertical and horizontal transportation in a building.	2	3	3	2		2	1	2

COURSE: RESEARCH SKILLS AND PROJECT INTRODUCTION
COURSE CODE: AR403

COURSE OBJECTIVES:

- Introduction to Scientific methods especially used for research in architectural projects and construction technology
- To make students aware of presentation methodologies, evaluation and report writing
- Introduction to the architectural thesis projects and preparation of synopsis
- Introduce a range of primary and secondary research tools

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Define, articulate and use terminology, concepts, and theory in their field and know how to use them
CO2	Articulate a clear research question or problem and formulate a hypothesis thereby preparing a synopsis for architectural thesis project
CO3	Identify and demonstrate appropriate research methodologies, know when to use them and apply problem solving skills to constructively address research setbacks
CO4	Identify and practice research ethics and responsible conduct in research
CO5	Use library and other tools to search for existing body of research relevant to their topic

CO-PO MAPPING:

	CO	**PO1** Design/Spartial	**PO2** Professional Competence	**PO3** Technical competence	**PO4** Critical Thinking - Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	Define, articulate and use terminology, concepts, and theory in their field and know how to use them		2	3	3		3	3	2
CO2	Articulate a clear research question or problem and formulate a hypothesis thereby preparing a synopsis for architectural thesis project	1	1	3	2	1		2	3
CO3	Identify and demonstrate appropriate research methodologies, know when to use them and apply problem solving skills to constructively address research setbacks		3	3	3	1		2	3
CO4	Identify and practice research ethics and responsible conduct in research		2	2	1	3			3
CO5	Use library and other tools to search for existing body of research relevant to their topic		1	2	3		2	3	3
3: Strong contribution, 2: average contribution, 1: Low contribution									

COURSE: ADVANCE SERVICES
COURSE CODE: AR 404

COURSE OBJECTIVES:

- Knowledge of service issues related to buildings.
- Knowledge of building services in high rise and complex structures.
- Understanding complex services in multi-storied buildings; understanding the architectural content of services in buildings.
- Knowledge of advancement and latest techniques used in high rise and complex structures..
- Implementation of building services in high rise buildings.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand water supply & Plumbing systems in high rise building complexes and complex structures.
CO2	Know sanitation and Waste disposal systems in high rise building complexes and complex structures
CO3	Understand mechanical & Communication systems in high rise building structures.
CO4	Know acoustics Design parameters for determining the acoustical behavior of spaces
CO5	Understand Fire protection and prevention systems in high rise building complexes and complex structures.

CO-PO MAPPING:

	CO	**PO1** Design/Spatial	**PO2** Professional Competence	**PO3** Technical Competence	**PO4** Critical Thinking- Synthesis	**PO5** Social Responsibility	**PO6** Quantitative Reasoning	**PO7** Theoretical Foundation	**PO8** Innovative Thinking
CO1	Understand water supply & Plumbing systems in high rise building complexes and complex structures.	1	3	2	2		3	3	1
CO2	Know sanitation and Waste disposal systems in high rise building complexes and complex structures	1	3	3	2		2	2	1
CO3	Understand mechanical & Communication systems in high rise building structures.	2	2	3	3	1	2	3	1
CO4	Know acoustics Design parameters for determining the acoustical behavior of spaces	2	3	3	2		3	3	2
CO5	Understand Fire protection and prevention systems in high rise building complexes and complex structures.	2	2	2	1	2	1	3	2

COURSE NAME: Advance Structural Design and System
COURSE NAME: AR405

OBJECTIVES

- To clarify the basic principles underlying the inventions of various structural ideas with a view to bridge the gap between architectural theory and structural reality.
- Introducing to the architecture of the ancient world and understanding architecture in terms of ***space, form and structure***.
- To understand the relationship between architectural structure and architectural form with a view
- to stimulate the faculty of conceiving and developing new systems

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand The role of structures in architecture.
CO2	Bridging the gap between architectural theory and structural reality.
CO3	Understand Structures relationship with ***aesthetics***, ***space, form and structure***.
CO4	Analyze, troubleshoot, and implement solutions with new functions.

CO-PO MAPPING:

	CO	**PO1** (Design/Spatial)	**PO2** (Professional Competence)	**PO3** (Technical Competence)	**PO4** (Critical Thinking- Synthesis)	**PO5** (Social Responsibility)	**PO6**(Quantitative Reasoning)	**PO7** (Theoretical Foundation)	**PO8** (Innovative Thinking)
CO1	Understand The role of structures in architecture.	3	1	1	3	2	1	3	3
CO2	Bridging the gap between architectural theory and structural reality.	3	3	2	1	1	2	1	1
CO3	Understand Structures relationship with ***aesthetics***, ***space, form and structure***.	3	2	1	1	2	2	3	3
CO4	Analyze, troubleshoot, and implement solutions with new functions.	3	2	2	3	1	2	1	1

COURSE: PROFESSIONAL PRACTICE-I
COURSE CODE: AR406

COURSE OBJECTIVES:

- To introduce the aspects of professional conduct, duties and responsibilities, legal rights and procedure of architectural profession.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Acknowledge the social responsibilities and duties of an architect.
CO2	Comply with COA norms, regulations, guidelines and able to process their registration with COA.
CO3	Recognize the critical role of various national and International professional bodies in promotion and regulation of architectural profession.
CO4	Appraise the morals and ethics in architectural profession, familiarity with the conditions of engagements and Architect's liability as per COA.
CO5	Knowledge of legal provisions for architectural practice and develop the ability to set-up practice and office management

CO-PO MAPPING:

	CO	PO1 Design/Spatial	PO2 Professional Competence	PO3 Technical Competence	PO4 Critical Thinking- Synthesis	PO5 Social Responsibility	PO6 Quantitative Reasoning	PO7 Theoretical Foundation	PO8 Innovative Thinking
CO1	Acknowledge the social responsibilities and duties of an architect.		3		1	3		2	2
CO2	Comply with COA norms, regulations, guidelines and able to process their registration with COA.		3	3		2		3	1
CO3	Recognize the critical role of various national and International professional bodies in promotion and regulation of architectural profession..		3		1			3	1
CO4	Appraise the morals and ethics in architectural profession, familiarity with the conditions of engagements and Architect's liability as per COA.		3	2		3		3	1
CO5	Knowledge of legal provisions for architectural practice and develop the ability to setup practice and office management		3	2	1	3		3	1
3: Strong contribution, 2: average contribution, 1: Low contribution									

COURSE NAME: ELECTIVE 2: ARCHITECTURAL CONSERVATION
COURSE NAME: AR413

OBJECTIVES

- Initiating students in ***theory and understanding*** of Architectural Conservation.
- Making students well verse in ***process of Conservation*** at undergraduate level so that these could further developed in the profession or studies at post graduate levels if the student so desires.
- Studying and finding ***better techniques*** that can be apply to improve the Architectural Conservation.
- Understanding the ***scope and limitation of the Conservation*** of Heritage Buildings.
- Understanding Architectural ***Conservation as a profession***.
- Discussion on ***Previous research works/ articles*** on Heritage Conservation.
- Understanding Types of ***Conservations in architecture and various Applications***.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand conservation and its process.
CO2	Study and find better techniques of conservation.
CO3	Analyze, troubleshoot, and implement conservation related solutions with previously done works and researches.
CO4	Learn the process of documenting the work of conservation.

CO-PO MAPPING:

	CO	PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking- Synthesis)	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Understand conservation and its process.	1	3	3	2	3	2	3	1
CO2	Study and find better techniques of conservation.	2	2	3	3	3	2	1	3
CO3	Analyze, troubleshoot, and implement conservation related solutions with previously done works and researches.	3	3	3	1	2	2	1	1
CO4	Learn the process of documenting the work of conservation.	2	3	3	1	1	2	1	1
CO5									

COURSE: PRACTICAL TRAINING-I
COURSE CODE: AR417

COURSE OBJECTIVES:

- To enable the student to gain the kind and range of practical experience which will prepare them for their likely responsibilities, immediately after qualifying B.Arch courses.
- To acquaint with various work, procedures etc. of the architecture profession.
- To maximize exposure of new material, technologies, building practices, etc.
- To sensitize students to be more observant to their surroundings by visiting the site .
- To enhance the professional development skill to deal with the client, labour, vendor,etc .
- To know the environment of a well established office that can be helpful for future purposes.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Become a responsible person immediately after qualifying B.Arch. courses.
CO2	Learn various work, procedures etc. of the architecture profession.
CO3	Explore new material, technologies, building practices, etc.
CO4	Understand the site features and way of construction with various technologies.
CO5	Enhance the professional development skill to deal with the client, labor, vendor, etc.
CO6	Know the environment of a well established office that can be helpful for future purposes.

CO & PO MAPPING:

COURSE OUTCOMES		PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking-Synthesis)	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Become a responsible person immediately after qualifying B.Arch. courses.	-	3	2	-	3	-	-	-
CO2	Learn various work, procedures etc. of the architecture profession.	3	3	2	3	-	-	1	3
CO3	Explore new material, technologies, building practices, etc.	2	2	3	3	2	2	1	3
CO4	Understand the site features and way of construction with various technology.	2	3	3	2	3	3	1	3
CO5	Enhance the professional development skill to deal with the client, labor, vendor, etc.	1	3	3	2	3	1	1	3
CO6	Know the environment of a well-established office that can be helpful for future purposes.	-	3	1	-	2	1	-	-

COURSE: PRACTICAL TRAINING-II
COURSE CODE: AR 501

COURSE OBJECTIVES:

- To enable the student to gain the kind and range of practical experience which will prepare them for their likely responsibilities, immediately after qualifying B.Arch. courses.
- To acquaint with various work, procedures etc. of the architecture profession.
- To maximize exposure of new material, technologies, building practices, etc.
- To sensitize students to be more observant to their surroundings by visiting the site.
- To enhance the professional development skill to deal with the client, labor, vendor, etc.
- To know the environment of a well-established office that can be helpful for future purposes.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Become a responsible person immediately after qualifying B.Arch. courses.
CO2	Learn various work, procedures etc. of the architecture profession.
CO3	Explore new material, technologies, building practices, etc.
CO4	Understand the site features and way of construction with various technologies.
CO5	Enhance the professional development skill to deal with the client, labor, vendor, etc.
CO6	Know the environment of a well-established office that can be helpful for future purposes.

CO & PO MAPPING:

COURSE OUTCOMES		PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking- Synthesis)	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Become a responsible person immediately after qualifying B.Arch. courses.	-	3	2	-	3	-	-	-
CO2	Learn various work, procedures etc. of the architecture profession.	3	3	2	3	-	-	1	3
CO3	Explore new material, technologies, building practices, etc.	2	3	3	3	2	2	1	3

CO4	Understand the site features and way of construction with various technology.	2	3	3	2	3	3	1	3
CO5	Enhance the professional development skill to deal with the client, labor, vendor, etc.	1	3	3	2	3	1	1	3
CO6	Know the environment of a well-established office that can be helpful for future purposes.	-	3	1	-	2	1	-	-

COURSE: PROFESSIONAL PRACTICE-II
COURSE CODE: AR502

COURSE OBJECTIVES:

- To acquaint the students with most of the general aspects of valuation and arbitration, Easement rights.

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to:

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Acquaintance with the building contract documents.
CO2	Knowledge of tender documents.
CO3	Techniques of valuation of landed and building property.
CO4	Understand the procedure of arbitration and preparation of awards.
CO5	Knowledge of legal provisions for easement rights.

CO-PO MAPPING:

	CO	PO1 Design/Spatial	PO2 Professional Competence	PO3 Technical Competence	PO4 Critical Thinking- Synthesis	PO5 Social Responsibility	PO6 Quantitative Reasoning	PO7 Theoretical Foundation	PO8 Innovative Thinking
CO1	Acquaintance with the building contract documents.		3	2			2	3	
CO2	Knowledge of tender documents.		3	2			2	3	
CO3	Techniques of valuation of land and building property		3	2			2	3	
CO4	Understand the procedure of arbitration and preparation of awards		3	2			1	3	
CO5	Knowledge of legal provisions for easement rights		3	2			2	3	
3: Strong contribution, 2: average contribution, 1: Low contribution									

COURSE: ENERGY CONSCIOUS ARCHITECTURE
COURSE CODE: AR511

COURSE OBJECTIVES:

- To introduce students to how energy conscious architecture can be adopted as an alternative in today's perspective.
- Sustainable architecture aims to create environment-friendly and energy efficient building by actively harnessing renewable nature sources of energy (solar energy etc) and utilizing materials that least pollute the environment.
- The objectives include creating awareness of designing energy efficient building envelopes that respond to the climate of a place bldg. lighting of resource–efficient practices in India, advocating of the application of renewable energy system and the promotion of efficient lighting & HVAC system to reduce energy demand.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	How energy conscious architecture can be adopted as an alternative in today's perspective.
CO2	How to create energy efficient building by actively harnessing renewable nature sources of energy (solar energy etc) and utilizing materials that least pollute the environment.
CO3	Know about the designing of energy efficient building envelopes that respond to the climate of a place bldg.
CO4	Aware about resource–efficient practices in India, advocating of the application of renewable energy system and the promotion of efficient lighting & HVAC system to reduce energy demand.

CO-PO MAPPING:

	CO	PO1 Design/Spatial	PO2 Professional Competence	PO3 Technical Competence	PO4 Critical Thinking- Synthesis	PO5 Social Responsibility	PO6 Quantitative Reasoning	PO7 Theoretical Foundation	PO8 Innovative Thinking
CO1	How energy conscious architecture can be adopted as an alternative in today's perspective.	2	3	3	1	2		3	1
CO2	How to create energy efficient building by actively harnessing renewable nature sources of energy (solar energy etc) and utilizing materials that least pollute the environment.	2	3	3	1	3	3	3	3
CO3	Know about the designing of energy efficient building envelopes that respond to the climate of a place bldg.	3	3	3	2	1	1	2	3
CO4	Aware about resource–efficient practices in India, advocating of the application of renewable energy system and the promotion of efficient lighting & HVAC system to reduce energy demand.2	3	3	2	3	2	3	3	3

COURSE NAME: ELECTIVE 3: SOLID WASTE MANAGEMENT
COURSE NAME: AR1003

OBJECTIVES

- Initiating students in ***theory and understanding*** of solid waste management.
- Making students well verse in ***management of solid waste*** at undergraduate level so that these could further developed in the profession or studies at post graduate levels if the student so desires.
- Studying and finding ***better techniques*** that can be apply to improve the management of solid wastes so that they could be less harmful to environment.
- Understanding the ***scope and limitation*** of the solid waste management in industry.
- Changing aspects of waste management and ***latest solutions***.
- Understanding ***waste management as a profession***.
- Discussion on ***Previous research works/ articles*** on waste management.
- Understanding Types of ***solid waste management's and various Applications***.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand solid waste management and its process.
CO2	Study and find better techniques of waste management.
CO3	Analyze, troubleshoot, and implement solid waste related solutions with previously done works and researches.
CO4	Learn the process of documenting the work of waste management.

CO-PO MAPPING:

	CO	PO1 (Design/Spatial)	PO2 (Professional Competence)	PO3 (Technical Competence)	PO4 (Critical Thinking- Synthesis)	PO5 (Social Responsibility)	PO6(Quantitative Reasoning)	PO7 (Theoretical Foundation)	PO8 (Innovative Thinking)
CO1	Understand solid waste management and its process.	1	3	3	2	3	2	3	1
CO2	Study and find better techniques of waste management.	2	2	2	3	3	2	1	3
CO3	Analyze, troubleshoot, and implement solid waste related solutions with previously done works and researches.	3	3	3	1	2	2	1	1
CO4	Learn the process of documenting the work of waste management.	2	3	2	1	3	2	1	1