



# **D. Y. Patil College of Engineering and Technology**

Kasaba Bawada, Kolhapur

An Autonomous Institute

## **Structure & Syllabus**

**Second Year B. Arch. (Autonomous)**



**(School of Architecture)**

**2021-2022**

**Syllabus structure - Semester-III**

Sr. No	Course Code	Course Type	Name of the Course	Teaching Scheme Per Week			Credits	Total Marks	Evaluation scheme			
				Lecture Hours	Tutorial Hours	Practical/ Studio Hours			Type	Max. Marks	Min. Marks for Passing	
											Individual Course	Aggregate
1	201AR201	PC	Architectural Graphics and Drawing-III	1	-	3	4	100	ISE	50	25	50
									MSE	-	-	
									ESE (OE)	-	-	
									ESE (TH)	50	23	
2	201AR202	PC	** Architectural Design – III	1	-	6	7	200	ISE	100	50	100
									MSE	-	-	
									ESE (OE)	100	45	
									ESE (TH)	-	-	
3	201AR203	PC	History of Architecture - I	3	-	-	3	100	ISE	20	10	50
									MSE	30	14	
									ESE (OE)	-	-	
									ESE (TH)	50	23	
4	201AR204	BS & AE	* Building Construction & Materials – III	2	-	2	4	100	ISE	20	10	50
									MSE	30	14	
									ESE (OE)	-	-	
									ESE (TH)	50	23	
5	201AR205	BS & AE	** Structural Engineering for Architecture - I	3	-	-	3	100	ISE	20	10	50
									MSE	30	14	
									ESE (OE)	-	-	
									ESE (TH)	50	23	
6	201AR206	BS & AE	Climatology & Architecture	3	-	-	3	100	ISE	20	10	50
									MSE	30	14	
									ESE (OE)	-	-	
									ESE (TH)	50	23	
7	201AR207	BS & AE	Basic Building Services-I	2	-	-	2	100	ISE	20	10	50
									MSE	30	14	
									ESE (OE)	-	-	
									ESE (TH)	50	23	
8	201AR208	PE	Professional Elective – I	1	-	1	2	100	ISE	50	25	50
									MSE	-	-	
									ESE (OE)	50	23	
									ESE (TH)	-	-	

Sr. No	Course Code	Course Type	Name of the Course	Teaching Scheme Per Week			Credits	Total Marks	Evaluation scheme			
				Lecture Hours	Tutorial Hours	Practical/ Studio Hours			Type	Max. Marks	Min. Marks for Passing	
											Individual Course	Aggregate
9	201AR209	SEC	Computer Technology in Architecture - III	-	-	2	2	50	ISE	50	25	25
									MSE	-	-	
									ESE (OE)	-	-	
									ESE (TH)	-	-	
10	201ARMC 210	MC	Indian Crafts	2	-	-	-	50	ESE (TH)	50	25	25
<b>TOTAL</b>				<b>18</b>	<b>-</b>	<b>14</b>	<b>30</b>	<b>1000</b>		<b>1000</b>		<b>500</b>

ISE - In Semester Evaluation    MSE - Mid Semester Examination    ESE - End Semester Examination  
OE - Oral Examination    TH - Theory    MC - Mandatory Course

NOTE :-

- As per CoA Gazette 2020 norms, minimum passing percentage for each individual course to be minimum 45%.
- ESE Theory paper will be of 100 marks converted into 50 marks.

\* Means combined passing for & ESE ( OE ) & ESE ( TH )

\*\* Means combined passing for ISE & MSE & ESE ( OE ) & ESE ( TH ) as applicable.

One lecture means period of One Hour (60 Minutes) and One Studio means studio period of One Hour (60 Minutes)

Total weeks – 14 weeks per semester

#### ABBREVIATIONS

<b>PC</b>	Professional Core
<b>BS &amp;AE</b>	Building Sciences And Applied Engineering
<b>PE</b>	Professional Elective
<b>PAECC</b>	Professional Ability Enhancement Core Courses
<b>SEC</b>	Skill Enhancement Courses
<b>MC</b>	Mandatory Course

#### MANDATORY COURSE

1	201ARMC210	Indian Crafts	Introduction to crafts in India through history. Types of Indian crafts. Study of any one craft of India.
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#### PROFESSIONAL ELECTIVE- I

Sr. No.	Course Code	Name of the Course	Semester
I	201AR208A	Art Appreciation	III
	201AR208B	Art in Architecture	

**Syllabus structure – Semester-IV**

Sr. No	Course Code	Course Type	Name of the Course	Teaching Scheme Per Week			Credits	Total Marks	Evaluation scheme			
				Lecture Hours	Tutorial Hours	Practical / Studio Hours			Type	Max. Marks	Min. Marks for Passing	
											Individual Course	Aggregate
1	201AR211	PC	Architectural Graphics and Drawing-IV	1	-	3	4	100	ISE	50	25	50
									MSE	-	-	
									ESE (OE)	-	-	
									ESE (TH)	50	23	
2	201AR212	PC	** Architectural Design – IV	1	-	6	7	300	ISE	100	50	150
									MSE	-	-	
									ESE (OE)	100	45	
									ESE (TH)	100	45	
3	201AR213	PC	History of Architecture - II	3	-	-	3	100	ISE	20	10	50
									MSE	30	14	
									ESE (OE)	-	-	
									ESE (TH)	50	23	
4	201AR214	BS & AE	* Building Construction & Materials – IV	2	-	2	4	150	ISE	20	10	75
									MSE	30	14	
									ESE (OE)	50	23	
									ESE (TH)	50	23	
5	201AR215	BS & AE	** Structural Engineering for Architecture - II	3	-	-	3	100	ISE	20	10	50
									MSE	30	14	
									ESE (OE)	-	-	
									ESE (TH)	50	23	
6	201AR216	BS & AE	Basic Building Services – II	2	-	-	2	100	ISE	20	10	50
									MSE	30	14	
									ESE (OE)	-	-	
									ESE (TH)	50	23	
7	201AR217	PE	Professional Elective – II	1	-	1	2	50	ISE	50	25	25
									MSE	-	-	
									ESE (OE)	-	-	
									ESE (TH)	-	-	
8	201AR218	PE	Professional Elective – III	1	-	2	3	100	ISE	50	25	50
									MSE	-	-	
									ESE (OE)	50	23	
									ESE (TH)	-	-	

Sr. No	Course Code	Course Type	Name of the Course	Teaching Scheme Per Week			Credits	Total Marks	Evaluation scheme			
				Lecture Hours	Tutorial Hours	Practical / Studio Hours			Type	Max. Marks	Min. Marks for Passing	
											Individual Course	Aggregate
9	201AR219	SEC	Computer Technology in Architecture - IV	-	-	2	2	50	ISE	50	25	25
									MSE	-	-	
									ESE (OE)	-	-	
									ESE (TH)	-	-	
10	201ARMC220	MC	Environmental Studies	2	-	-	-	50	ESE (TH)	50	25	25
<b>TOTAL</b>				<b>14</b>	<b>-</b>	<b>16</b>	<b>30</b>	<b>1100</b>		<b>1100</b>		<b>550</b>

ISE – In Semester Evaluation    MSE – Mid Semester Examination    ESE – End Semester Examination  
 OE – Oral Examination    TH – Theory    MC – Mandatory Course

NOTE :-

- As per CoA Gazette 2020 norms, minimum passing percentage for each individual course to be minimum 45%.
- ESE Theory paper will be 100 marks converted into 50 marks.

\* Means combined passing for & ESE ( OE ) & ESE ( TH )

\*\* Means combined passing for ISE & MSE & ESE ( OE ) & ESE ( TH ) as applicable.

One lecture means period of One Hour (60 Minutes) and One Studio means studio period of One Hour (60 Minutes)

Total weeks – 14 weeks per semester

#### ABBREVIATIONS

<b>PC</b>	Professional Core
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<b>SEC</b>	Skill Enhancement Courses
<b>MC</b>	Mandatory Course

#### LIST OF MANDATORY COURSES

1	201ARMC220	Environmental Studies	Introduction to environmental aspects and to enhance knowledge skills and attitude to environment and to provide student firsthand knowledge on various local environmental aspects.
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**PROFESSIONAL ELECTIVE- II & III**

<b>Sr. No.</b>	<b>Course Code</b>	<b>Elective</b>	<b>Name of the Course</b>	<b>Semester</b>
1	201AR217A	Professional Elective - II	Photography	IV
	201AR217B		Painting	
2	201AR218A	Professional Elective - III	Furniture Design	IV
	201AR218B		Graphic and Product Design	

**Course Plan**

<b>Course Title : Architectural Graphics And Drawing - III</b>	
<b>Course Code : 201AR201</b>	<b>Semester : III</b>
<b>Teaching Scheme : L-T- P : 1-0-3</b>	<b>Credits : 4</b>
<b>Evaluation Scheme : ISE Marks : 50</b>	<b>ESE ( TH ) Marks : 50</b>

**Course Description:**

This course intends to develop graphical understanding and visualization of students to express their ideas through three dimensional sketches and drawings in perspective. Perspective drawing is method of drawing realistic views and its understanding helps in designing buildings proportionate to human scale. Rendering with various techniques and media further enhances the perspective drawing.

**Course Objectives:**

1. To understand methodology of perspective drawing.
2. To draw perspective views with various angles, stationary points and eye levels.
3. To apply knowledge of one point and two point perspective in design projects.
4. To develop rendering skills with manual presentation as well as by using softwares.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C201.1</b>	Draw perspectives of simple and complex objects.
<b>C201.2</b>	Analyze effects of various angles, stationary points and eye levels on perspective.
<b>C201.3</b>	Draw sketches in perspective as a part of design process.
<b>C201.4</b>	Represent perspective drawings with rendering.

**Prerequisite:** Students should have an understanding and flair of sketching of various types viz. object sketching, memory sketching etc.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) And Program Specific Outcomes (PSOs)**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		B T L	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2		
<b>C201.1</b>	3	-	-	-	-	-	-	-	-	-	3	-	-	-	-	3
<b>C201.2</b>	3	-	-	-	-	-	-	-	-	-	3	-	2	-	-	4
<b>C201.3</b>	3	-	-	-	-	-	-	-	-	-	3	-	-	-	3	3
<b>C201.4</b>	3	-	-	-	3	-	-	-	-	-	3	-	2	-	-	3

Contents	Hours
<b>Unit 1-Two point perspective drawing</b> Introduction to two point perspective drawing, its relevance in profession. Various eye levels – worm’s eye level, normal eye level and bird’s eye level, effect of eye level on perspective. Studio exercises based on various eye levels. Perspective drawing of various geometrical objects – simple and complex, small buildings and building elements.	12
<b>Unit 2-One point perspective drawing</b> Introduction to one point perspective drawing, its relevance in profession. Studio exercises of one point perspectives of various interior spaces.	12
<b>Unit 3-Rendering</b> Rendering of two point and one point perspectives by using various media. Inclusion of human figures, vehicles, elements of landscape, street furniture, electrical fittings etc. in perspective rendering.	12
<b>Unit 4 - Computer application in Graphics</b> Application of Course Computer – III in Graphics – III. Drawing perspective of small buildings by using revit, Google sketch-up software. Studio exercises based on this.	12

**Reference Books:**

1. Gill Robert: Rendering with pen and ink, Edition 2013, Affiliated East – West Press Private Limited.
2. Jax Themier, B.W., How to Paint and Draw, Thames and Hudson, 1985.
3. M.G.Shah, C. M. Kale, S. Y. Patki : A Reference book of Building Drawing, 3rd edition, McGraw-Hill, 1997.



**Course Plan**

<b>Course Title :Architectural Design-III</b>	
<b>Course Code : 201AR202</b>	<b>Semester : III</b>
<b>Teaching Scheme : L-T-P : 1-0-6</b>	<b>Credits : 7</b>
<b>Evaluation Scheme : ISE Marks : 100</b>	<b>ESE (OE) Marks : 100</b>

**Course Description:**

This course will introduce students to issues related to architecture with respect to social, cultural, environmental, economical and political along with aesthetic aspects of built and unbuilt spaces, through reading, discussions, interactions, surveys etc. It will help them to understand, analyse and correlate built and unbuilt spaces, in consideration with site context and development. The design process will enable them to respond to the identified issues and create an analytical design framework that addresses the above aspects. A detail study and analysis of architects' philosophy and works will have tangible and intangible benefits during their design intervention.

**Course Objectives:**

During the course, the student should be able to :

1. Solve progressively complex exercises involving spatial relations in two dimensions, three dimensions and time.
2. Apply fundamental designs skills as a response to architect's wider responsibilities towards society, culture and the environment.
3. Experiment with design solutions using analytical and creative framework with respect to site development.
4. Correlate built and unbuilt spaces to social spaces with an understanding of design principles, services, structural behaviour and construction techniques and materials.

**Course Outcomes (COs):**

After successful completion of the course, the students are able to:

<b>C202.1</b>	Analyze site potential with respect to built environment and surroundings.
<b>C202.2</b>	Correlate small social spaces with architectural design.
<b>C202.3</b>	Understand design intervention w.r.t social cultural, environmental, economical, political and aesthetic aspects.
<b>C202.4</b>	Create a design solution in consideration with aesthetic, functional and technical aspects.

**Prerequisite** : Basic knowledge of anthropometry and design principles.

**Course Articulation Matrix: Mapping of Course Outcomes (COs)  
with Program Outcomes (POs) & Program Specific Outcomes (PSOs)**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		BTL
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C202.1</b>	2	2	2	2	-	-	-	-	1	-	-	2	-	-	4
<b>C202.2</b>	3	2	2	2	-	-	-	-	2	-	-	2	-	-	4
<b>C202.3</b>	3	2	2	2	-	-	-	-	2	-	-	2	-	-	2
<b>C202.4</b>	3	3	3	3	-	-	-	-	2	-	-	3	2	2	3

Contents	Hours
<p><b>Unit-1- Literature Study</b> Critical analysis of design philosophy and works of architects' (Indian) through group discussions and presentation. Questionnaire design for case study and site study. Activity mapping - Study of detailed routine (timetable) during weekdays, weekends, vacation and festivals. (whichever applicable) resolved through activity mapping in terms of spaces required to perform.</p>	14
<p><b>Unit-2- Building By-laws</b> Spaces studies and functions with respect to site development and building by laws Group discussions &amp; group presentation.</p>	14
<p><b>Unit-3- Case study and Site analysis.</b> Site analysis and development in accordance with built spaces and site surroundings. Case study analysis , presentation and report.( live case study/studies and net case study/studies)</p>	14
<p><b>Unit-4- Design Intervention</b> Architectural programming based upon following design criteria and considerations as per priority:</p> <ul style="list-style-type: none"> <li>• Contextual</li> <li>• Aesthetic</li> <li>• Functional</li> <li>• Cultural</li> <li>• Climatic</li> <li>• Technological</li> </ul> <p>Design of a multi cellular and multilevel space for a major project, (without aid of mechanical vertical transportation system.) such as primary, health care center, library, community hall ,health club, primary school, kindergarten etc.</p>	42



**Reference Books:**

1. Joseph De Chiara, Time saver standards for building types McGrawHill Inc., US; 3rd Revised edition.
2. Ernst Neufert, Neufert- architects data Third edition, Wiley India Pvt Ltd.
3. Robert W. Gill, Rendering with Pen and Ink, Thames & Hudson.
4. D. K. Ching , Third edition - Form, Space & Order, John Wiley & Sons, Inc.
5. Charles Harris, Time saver standards for landscape architecture, Second edition, McGraw Hill Education.
6. Wucius Wong, Principles of three dimensional Design, VanNostrand Reinhold NY.
7. Maier Manfred, Basic principles of Design, Van Nostrand Reinhold NY
8. Yatin Pandya - Elements of Space Making, Mapin Pub., 2007.
9. Ramsey and Sleeper -Architectural Graphics Standards, John Wiley & Sons.

**Course Plan**

<b>Course Title : History of Architecture- I</b>	
<b>Course Code : 201AR203</b>	<b>Semester : III</b>
<b>Teaching Scheme : L-T-P : 3-0-0</b>	<b>Credits : 3</b>
<b>Evaluation Scheme : ISE +MSE Marks- 20 + 30</b>	<b>ESE (TH)Marks : 50</b>

**Course Description:**

The courses History of Architecture - I &II deal with Architecture of Indian subcontinent , studied as per the timeline extending from to early settlements till Nineteenth century. The course History of Architecture -I in Semester III , covers the journey of Indian Architecture from Indus valley civilization till advent of Islamic Architecture in India. The course will develop an overall understanding of contributing factors such as socio-cultural, climatology, geographical and political, for design development of different historic styles.. The course is designed to arouse in the student a sense of curiosity and to sharpen powers of observation. The importance of the timelessness of architecture shall be emphasized. Students shall undertake a study of architecture from the Indian sub-continent. The study of the building shall also encompass how it has been built, using the building materials and technology available,

**Course Objectives:**

1. To introduce different concepts of settlement pattern and their evolution.
2. To explain the philosophy ,evolution, characteristics and style of temple forms in various parts of India.
3. To illustrate various components of temple complexes and their functions.
4. To explain characteristic features of early Islamic architecture in India.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C203.1</b>	Understand development of construction technology of Indian temples in a particular time era.
<b>C203.2</b>	Understand architectural ornamentation in a particular time era.
<b>C203.3</b>	Distinguish , different architectural styles and situations evolved within the restraints imposed by prevalent social and cultural environment and availability of material, climate and geography.
<b>C203.4</b>	Appraise a historical structure.

**Prerequisite:** Student should have internalized knowledge of the courses - Human Settlement and History of Civilization – I (Semester –I) and Human Settlement and History of Civilization –II(Semester –II)

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)**

Course Outcomes (COs)	Program Outcomes (POs)												(PSO)		BTL
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C203.1</b>	3	2	-	-	-	-	2	-	2	-	-	-	1	1	2
<b>C203.2</b>	3	2	-	-	-	-	2	-	2	-	-	-	1	1	2
<b>C203.3</b>	3	2	-	-	-	-	2	-	2	-	-	-	1	1	4
<b>C203.4</b>	3	2	-	-	-	-	2	-	2	-	-	-	1	1	5

Contents	Hours
<p><b>Unit 1 - Prehistoric Architecture in India, Vedic culture &amp; Buddhist Architecture.</b></p> <p><b>Brief introduction of –</b></p> <p>Early settlements of Indus valley civilization River valley cultures - Study of Political systems, concept of settlement, impact of climate, social structure and their related shelter types, planning types, method of building structures and detailing. Study of building materials used. Layout of Mohenjodaro, House plan. Community well. Great Bath, Granary.</p> <p>Aryan architecture of the Ganga basin, Vedic principles of planning, Architectural elements in the overall layout of the settlement,</p> <p>Evolution of the basic forms dictated by materials and needs.</p> <p>Inception &amp; Development Buddhist architecture in India, Hinayana &amp; Mahayana Phase.</p> <p>Types of structures and elements developed Eg: Stupas, Viharas, Chaityas, Rock cut examples. Smaller elements like Stambas, railings, ornamental paintings etc.</p>	6
<p><b>Unit 2 –Hindu Temple Architecture-Early phase &amp; evolution of Dravidian style - I</b></p> <p><b>Brief introduction of –</b></p> <p>Inception and development of the early Hindu temple form with reference to Vedic and Buddhist planning principles and design elements. Discuss the factors for the evolution of temple forms in various parts of India. Investigate the philosophy of temple design.</p> <p>Evolution of Hindu temple - Indo Aryan- Early temples of Gupta phase at Udayagiri, Tigwa, Sanchi &amp; Deogarh.</p> <p>Developments under chalukyas at Aihole, Pattadakal and Badami in Karnataka and at Ellora (rock cut and structural)</p> <p>Early Dravidian experiments by Pallavas - Rathas at Mahabalipuram, Shore temple, Kailasanatha temple &amp; Vaikuntaperumal temple in terms of essential layout and elements of a temple.</p> <p>Evolution of Dravidian temple Architecture style in South India.</p>	6

<p>Evolution of Cholas - emergence of large-scale layout of temple complexes - Brihadeshwara temple complex at Tanjore and Gangaikondacholapuram temple. Vimanasandmultiple shrines in the same complex. Pandyan contribution - Gopurams and addition of elements to existing temples.</p>	
<p><b>Unit 3 - Hindu Temple Architecture- Dravidian style - II</b> Brief introduction of – Development of Dravidian temple complexes and temple towns in South India . Differentiate between the styles of temples and their characteristics. Identify the various components of temple complexes and their functions Hoysala style -Evolution and development of star shaped temples and other related special features like Navaranga, multiple shrines etc. e.g. Temples of Belur, Halebid and Somnathpur. Later Dravidian style of Vijayanagar style through examples at Hampi, Vittala temple, Virupaksha and Hazara Rama temple and features like giant sculptures, Kalyanamantapa etc. Nayaks - Contributions &amp; developments through examples at Madurai (Meenakshi temple) and Srirangam (Ranganatha temple)</p>	6
<p><b>Unit 4 - Hindu Temple Architecture- Indo Aryan style - I</b> Brief introduction of – Inception and development of Indo Aryan temple Architecture style in North India. Orissan style - Features and layout, form, shikara, internal &amp; external treatment and their aesthetics. Mukteshwara and Lingaraja temple at Bhubaneshwar and Jagannath temple at Puri. E.g. Raja Rani Temple at Bhubaneshwar and the Sun Temple at Konark. Gujarat style - Development of typical basic unit of temple &amp; additional features like entrance arches and bathing tanks etc. Sun Temple, Modhera</p>	6
<p><b>Unit 5 - Hindu Temple Architecture- Indo Aryan style-II</b> Brief introduction of – Evolution of Indo Aryan temple in North India. Khajuraho style - temple layout, grouping and ornamental features. Eg: Khandaraya Mahadeva and Lakshmana temples. Jain Architecture - Architectural features and examples at RanakpurMt.Abu.</p>	6
<p><b>Unit 6 - Indo Islamic Architecture Part -II</b> Brief introduction of – The advent of Islamic Architecture into India and its impact on structural and construction systems; Influences of Islamic ideas on secular and religious architecture in India; Initiation and development of the mosque, tomb and fort typologies in the Imperial period. Coming of Islam to India in 11th century A.D. Imperial style - Delhi: Slave, Khilji, Tughlaq, Sayyid &amp; Lodi dynasties. Development of basic mosque and tomb prototypes. Eg: Qtub complex, Quwwat-ul-Islam, Tomb of Iltumish, Alai Darwaza, Tomb of Ghiyasuddin Tughlaq, Khirki masjid, Octogonal and square tombs. Distinctive features of each of these dynasties</p>	6

**Reference Books:**

1. The Temple Architecture of India by Adam Hardy, First Edition ,Published by John Wiley & Sons
2. The Indian Temple Architecture: Form And Transformation by Adam Hardy , First Edition, Abhinav Publications.
3. The Hindu Temple :An Introduction to its meaning and forms by GeogreMichell.
4. "Architecture of India - Buddhist and Hindu" by Grover Satish, First Edition , Published by Vikas Publishing House Pvt. Ltd
5. "Islamic Architecture in India - " by Grover Satish, First Edition, Published by Vikas Publishing House Pvt. Ltd .
6. "Indian Architecture - Islamic period" by Brown, Percy
7. "Indian Architecture – Hindu period" by Brown, Percy, Int Book H
8. "History of Architecture in India" by Tadgell Christopher , Published by Phaidon Press, 1994
9. "A History of Architecture on the Comparative Method", by Sir Banister Fletcher, Published by Phaidon Press, 1994

<b>PO</b>	<b>Title of PO</b>	<b>Activity</b>
PO 7	Environment and sustainability	Case study of one historic building to analyze the materials & technology used in societal & environmental context.
PO 9	Individual and team work	Group work for study of architectural style of particular era and its presentation

**Course plan**

<b>Course Title : Building Construction &amp; Materials – III</b>	
<b>Course Code : 201AR204</b>	<b>Semester : III</b>
<b>Teaching Scheme : L-T-P : 2-0-2</b>	<b>Credits : 4</b>
<b>Evaluation Scheme : ISE +MSE Marks- 20 + 30</b>	<b>ESE (TH)Marks : 50</b>

**Course Description:**

This course offers art and science of building construction and materials. Emphasis will be on building component such as foundations, floors, staircases, doors, windows etc. and their construction material. Thumb rule for those components. Methods and the process of translating design ideas into built form.

**Course Objectives:**

1. To acquire the knowledge of construction technology and materials.
2. To understand the importance of specifications.
3. To apply knowledge of building construction and materials as an integral part of Architectural designs.
4. To introduce modern techniques of land survey.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C204.1</b>	Understand building components and construction methods.
<b>C204.2</b>	Design specifications for various building and construction components.
<b>C204.3</b>	Prepare design of buildings with due consideration to construction technology & materials.
<b>C204.4</b>	Apply survey data for designing purpose.

**Prerequisite:** Understanding of structural typology of building & knowledge of basic building materials.



**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		B T L
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C204.1</b>	3	-	3	-	-	-	3	-	3	3	-	3	-	-	2
<b>C204.2</b>	3	-	3	-	-	-	3	-	3	3	-	3	2	-	3
<b>C204.3</b>	3	-	2	-	-	-	2	-	2	2	-	2	-	-	3
<b>C204.4</b>	3	-	2	-	-	-	2	-	2	2	-	2	-	-	3

Contents	Hours
<b>Unit 1</b> <b>Material</b> <b>Cement:</b> Ingredients and properties of cement, Types of cement, Grades of cement, Initial and final setting time. <b>Construction</b> <b>Footing types</b> - Footing types for masonry walls, R.C.C, and masonry columns-(stripe footing, stepped footing, isolated footing, combined footing, eccentric footing, strap footing).	8
<b>Unit 2</b> <b>Material</b> <b>Cement:-</b> Tests of cement, ISI Standards, Pozzolona material and its properties. <b>Construction</b> <b>Shallow foundations</b> - Grillage foundation in steel and timber. Dewatering of excavation trenches	8
<b>Unit 3</b> <b>Material</b> <b>Cement Concrete-</b> Ingredients of cement concrete, properties of ingredients, proportion, strength. Concrete preparation, mixing, hoisting and depositing, shuttering and centering, types of reinforcement and its laying. <b>Construction</b> <b>Deep foundation-</b> Pile foundation –Introduction, design criteria, types of piles ,precast pile, cast in situ piles, friction piles, end bearing piles, reinforcement details, Method of construction.	8
<b>Unit 4</b> <b>Material</b> <b>Ready Mix Concrete-</b> Introduction to ready mix concrete ( RMC ), mix design, strength, transportation and casting techniques. <b>Construction</b> <b>Staircase:</b> - Definitions, Terminology, Tread, riser, going, stringer, nosing, flight, landing, head room, handrail, balusters, balustrade, newel post etc. Types of staircases: straight flight, dog-legged, open-well, quarter turn, three quarter turn, Bifurcated, Geometrical, Circular, Spiral, Helical etc.	8

<p><b>Unit 5</b> <b>Material</b> Steel - Market forms of steel, properties of steel, uses of steel, structural steel and reinforcement steel, <b>Construction</b> Construction details &amp; materials of construction for Steel staircase, R.C.C. staircase</p>	8
<p><b>Unit 6- Introduction to survey</b> Definition of surveying and leveling, importance, types. Instruments used in surveying Introduction to land record survey &amp; different maps Concepts of contour and its applications and practical by using total station survey Introduction to GIS &amp; GPS</p>	8

**Text Books:**

1. Dr. B.C Punmia (2012) Building Construction (10th edition) Laxmi Publications.
2. S.C. Rangwala (2013) Engineering materials (Fortieth edition), Charotar Publishing pvt.ltd.
3. S.K. Duggal (2016) Building materials (4th edition) – New age international publishers.
4. W.B. McKay (2015) Building construction Vol. 1 (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition).
5. Rangwala, S. (2004). Building Construction. 22nd Ed. Anand : Charotar Publishing.
6. Sushil-Kumar, T. B. (2003). Building Construction. 19th Ed. Delhi : Standard Publications

**Reference Books:**

1. National Building Code of India 2016 (Volume 1) and relevant I.S.I. Specifications.
2. Barry, R. (1999). The Construction of Buildings Vol. II. 5th Ed. New Delhi : East-West Press.
3. Bindra, S. P. and Arora, S. P. (2000). Building Construction: Planning Techniques and Methods of Construction, 19th Ed. New Delhi : Dhanpat Rai Publications.
4. Chudley, R. (2008). Building Construction Handbook. Noida : Elsevier.
5. McKay, W. B. (2005). Building Construction Metric Vol. 1–IV, 4th Ed. Mumbai : Orient Longman.
6. Meghashyam, K. K. (2005). Reinforced Concrete Constructions for 21st C. New Delhi : J.M. Jaina.
7. T.P. Kanetkar and S.V. Kulkarni, surveying and leveling Vol.-II
8. R.R. Agor, Surveying and leveling.

PO	Title of PO	Activity
PO 9	Individual and team work	Group work for study of architectural style of particular era and its presentation

**Course Plan**

<b>Course Title : Structural Engineering For Architecture - I</b>	
<b>Course Code : 201AR205</b>	<b>Semester : III</b>
<b>Teaching Scheme : L-T-P : 3-0-0</b>	<b>Credits : 3</b>
<b>Evaluation Scheme : ISE +MSE Marks- 20 + 30</b>	<b>ESE (TH) Marks : 50</b>

**Course Description:**

This Course brings the architectural imagination from paper to the ground in reality. It provide through knowledge about structural component – beam, different stresses in beams like bending stress, shear-stress, deflection- slope. concepts of composite beam .This Course helps students to visualize sizes of beams according to material used, span of the beam and loads acting on beams. It also provides knowledge of role of properties of soil in design and analysis of retaining wall retaining earth and water and foundation design concept of load bearing wall, introduction to steel table, design of compression and tension member in steel.

**Course Objectives:**

1. To introduce concept of different stresses developed in beam due to loading
2. To explain concept of stress analysis in horizontal and vertical components.
3. To introduce different properties of soil and their application in design.
4. To develop architectural vision towards structural components.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C205.1</b>	Evaluate the different stresses developed in component.
<b>C205.2</b>	Select proper path for stresses analysis in horizontal and vertical component.
<b>C205.3</b>	Recognize different characters of soil and its application.
<b>C205.4</b>	Develop an aesthetic attitude towards structural components.

**Prerequisite:** Basic knowledge of centre of gravity and moment of inertia.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)/ Program Specific Outcomes (PSOs)**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		BTL
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C205.1</b>	2	3	2	-	-	-	-	2	2	-	-	-	-	-	2
<b>C205.2</b>	2	3	2	-	-	-	-	2	2	-	-	-	-	-	3
<b>C205.3</b>	2	3	2	-	-	-	-	2	2	-	-	-	-	2	3
<b>C205.4</b>	2	3	2	-	-	-	-	2	2	-	-	-	2	-	3

Contents	Hours
<p><b>Unit No. 1 –Bending stresses in beams and composite section</b> Theory of simple bending. simple model making to understand concept of stresses due to bending. Equation of bending stress (no derivation) and its application. concept of composite section and its analysis. simple problems on it.</p>	6
<p><b>Unit No. 2 –Deflection in beams</b> Concept of deflection and slope, limit of deflection, its application for simply supported beam with udl and point load ,cantilever beam with udl and point load ( only formulas and application ) ( no derivations)</p>	6
<p><b>Unit No. 3 Shear stress</b> Concept of shear stress with simple model making. Theory of shear stress. Distribution of shear stress over rectangular, circular, -section and T-section(only formulas and stress diagram). Simple sums on it.</p>	6
<p><b>Unit No. 4 – Retaining wall</b> Concept of retaining wall. structural action of stem of retaining wall .stresses developed at the base of retaining wall retaining water and earth ( no surcharge) of rectangular and trapezoid section ( no derivation) simple problems on it to understand the concept of tensile and compressive stresses.</p>	6
<p><b>Unit No. 5 – Soil mechanics</b> Soil as three phase system. soil properties and characteristics relevant to design of foundation.( void ratio, porosity, bulk density ,moisture content, degree of saturation, liquid limit and plastic limit)simple problems on it. Test for assessing load bearing capacity of soil. Criteria for selection of foundation type for different soil conditions, effect of water level settlement of soil. Improvement of soil properties. Design procedure for simple load bearing foundations.</p>	9
<p><b>Unit No. 6 – Tension and compression</b> Introduction to steel table, use of IS800, design procedure of simple tension and compression members of wood and steel.( only theory part)</p>	3

**Text Books:**

1. M. N. Avadhanulu and P. G. Kshirasagar. A text book of Engineering Physics, S. Chand Publishing, 9th Revised Edition (2014).
2. S.Ramamrutham, Strength of material.
3. R.S.Khurmi, Strength of materials.
4. B.C. Punmia, Soil mechanics and Foundations.

**Reference Books:**

1. RK Bansal and Sanjay Bansal, Strength of Material Laxmi Publications, New Delhi.
2. F.L. Singer, Engineering Mechanics, Harper Collins Publications.
3. Curt Siegel, Structure and form in modern architecture, Crosby Lockwood And Son Ltd.
4. Alan Holgate, The art in structural design, Oxford University Press, New York.

PO	Title of PO	Activity
PO 8	Ethics	Case study related to failure of structures for understanding importance of ethical practice according to design standards.
PO 9	Individual and team work	Model making and debate on application of different structural concepts in aesthetic manner.

**Course Plan**

<b>Course Title : Climatology and Architecture</b>	
<b>Course Code : 201AR206</b>	<b>Semester : III</b>
<b>Teaching Scheme : L-T-P : 3-0-0</b>	<b>Credits : 3</b>
<b>Evaluation Scheme : ISE + MSE Marks : 20+30</b>	<b>ESE (TH) Marks: 50</b>

**Course Description:**

This course contains the basic understanding of the relation between climate and architecture. The course intends to teach the students about the various design strategies for building in different types of climatic zones. Students are exposed to the classification of climate at global level. The course will be taught in congruence with the design studio and assignments for the Course will be linked to the design exercises of previous semester, which will achieve learning and understanding of the practical application of the course. Currents trends of using software for climatic analysis will also be introduced to the students' through this course.

**Course Objectives:**

1. To understand the climate at micro and macro level and the factors responsible for change of climate
2. To analyze various tools to modulate different types of climate to the comforts of human being.
3. To apply the gained knowledge from objective 1 and 2 through various illustrations of various architects work in different climatic conditions
4. To create climate responsive design by implementing the gained knowledge on first year semester II design assignment for all climatic conditions in sketch form.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C206.1</b>	Understand the different types of climate at global level.
<b>C206.2</b>	Analyze the climatic forces on built spaces
<b>C206.3</b>	Apply the climate responsive design process
<b>C206.4</b>	Create the unique design requirements according to climate

**Prerequisite:** Nil

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		BTL
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
C206.1	3	-	-	-	-	-	2	-	-	-	-	2	-	-	2
C206.2	3	-	-	-	-	-	2	-	-	-	-	2	-	-	3
C206.3	3	-	-	-	-	-	2	-	-	-	-	2	-	2	3
C206.4	3	-	-	-	-	-	2	-	-	-	-	2	-	-	3

Contents	Hours
<p><b>Unit 1 – Climate: the given condition</b></p> <p><b>Global climatic factors-</b> Introduction to climate, its relation to human shelter, comfort and environment, earth-sun relationship and atmospheric depletion, solar radiation quality and quantity, tilt of earth’s axis, radiation at earth’s surface, earths thermal balance, wind-thermal forces, trade winds.</p> <p><b>Elements of climate-</b>Temperature, humidity, vapour pressure, precipitation, driving rain, sky condition, special characteristics</p>	6
<p><b>Unit 2 – Classification of climate</b></p> <p>Climatic zones, tropical climates, warm humid climates, warm humid island climates, hot dry desert climate, hot dry maritime desert climate, composite climate, tropical upland climate.</p> <p><b>Site climate-</b> the designers task, local factors, air temperature, temperature inversion, humidity, precipitation, sky conditions, Use of courtyards, Daylight factor, Lighting - Windows, Room proportions and other building elements, Daylight penetration, Calculation of daylight factor</p>	6
<p><b>Unit 3 – Comfort: the desirable conditions</b></p> <p><b>Thermal comfort factors-</b>body’s heat production, body’s heat loss, heat loss on various thermal environments.</p> <p><b>Thermal comfort indices-</b> effective temperature, bio-climatic chart, comfort scales and design.</p> <p><b>Effective temperature-</b>its use- mean radiant temperature, the comfort zone.</p>	6
<p><b>Unit 4 – Climate responsive scientific process of design</b></p> <p>Graphic representation of design process, landform, vegetation, water bodies, street widths and orientation, open spaces and built spaces, ground character, plan form, plan elements, building orientation, surface area to volume ratio, roof forms, fenestration, external colors and textures, roof materials, walls, internal finishes. Examples of contemporary climate responsive architecture India and Abroad</p>	6
<p><b>Unit 5 – Climate responsive designing projects and case studies</b></p> <p>Study of various climate responsive design projects by renowned architects.</p>	6

<p><b>Unit 6 – Practical implementation architectural design</b> Redesigning the design assignment of Semester II (F.Y.B. Arch) with respect to different climatic zones. Introduction to Application of software in climate responsive design, Introduction of various green building rating systems.</p>	<p>6</p>
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**Text Books**

1. Climate Responsive architecture by Arvind Krishnan
2. Manual Of Tropical Housing And Building – Part I – Climatic Design by O.H. Koenigsberger

**Reference Books:**

1. An Introduction To Building Physics by Narashimhan
2. Housing Climate & Comfort by M.Evans
3. Man, Climate And Architecture, Applied Science, Banking Essex by B. Givoni





**Course Plan**

<b>Course Title : Basic Building Services-I</b>	
<b>Course Code : 201AR207</b>	<b>Semester : III</b>
<b>Teaching Scheme : L-T- P : 2-0-0</b>	<b>Credits : 2</b>
<b>Evaluation Scheme : ISE + MSE Marks : 20+30</b>	<b>ESE (TH) Marks: 50</b>

**Course Description:**

Services help the occupants to live/work inside a building with comfort and ease. Building Services are the systems installed in buildings which make them comfortable, functional, efficient and safe. The course intends to study water supply (cold and hot) to buildings as well as drainage and sanitation requirements for a building.

**Course Objectives:**

1. To develop awareness about building services, their need and importance.
2. To know how a building functions with the help of various services.
3. To identify the need of a particular service needed -here supply of water and drainage disposal system.
4. To estimate water demand and draw plumbing, drainage and sewage networks for residential and public buildings.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C207.1</b>	Apply knowledge while planning a building.
<b>C207.2</b>	Understand what services are required for a building.
<b>C207.3</b>	Incorporate technology required to provide services for the building they design.
<b>C207.4</b>	Design certain details required for various services in a building and allot spaces for the same.

**Prerequisite:** An attitude to learn and be observant regarding building design.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) And Program Specific Outcomes ( PSOs )**

Course Outcomes (COs)	Program Outcomes(POs)												(PSOs)		B T L
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C207.1</b>	3	2	2	2	-	-	-	-	2	-	-	2	-	-	3
<b>C207.2</b>	2	1	1	1	-	-	-	-	1	-	-	1	-	-	2
<b>C207.3</b>	3	2	2	2	-	-	-	-	2	-	-	2	2	-	3
<b>C207.4</b>	3	2	2	2	-	-	-	-	2	-	-	2	-	2	3

Contents	Hours
<b>Unit 1.- Introduction of water supply systems</b> Quantity of water supply, Sources of water supply at plot level. Municipal water supply system, rooftop rainwater Harvesting (Recycling of water.) Metering of water supply, municipal mains, layout inside plot, sump, underground water storage tank, construction in various materials.	4
<b>Unit 2.- Water supply fittings</b> Overhead water storage tank, design and construction. Valves, taps, pipes- materials and joints.	4
<b>Unit 3.- Domestic water supply</b> Layout of water supply in toilets. Hot water supply, domestic water heaters. Hot water piping materials, insulation to hot water piping	4
<b>Unit 4- Introduction of drainage system</b> Design of drainage system at plot level. Location of fittings, sanitary fittings, types of soil and waste fittings. Traps of various types, materials. Pipes used for drainage- materials and fittings. One pipe, two pipe systems.	4
<b>Unit 5.- Drainage connections</b> Chambers and manholes- types. Connection to central drainage. Septic tank, SUBO septic tank, Two Pit toilet, soak pit.	4
<b>Unit 6.- Treatment and maintenance of drainage</b> Construction and maintenance of drains, testing of drains, Ventilation of drains. Layout of toilets (Residential toilet, public toilets) Sewage treatment plant. Bio gas plant	4

**Text Books:**

1. Rangwala :Water supply and sanitary engineering edition : 29th revised and enlarged edition :2016
2. Arun K.R. Jain and B.C. Punmia. : Water Supply Engineering
3. J.A. Swaffie :Water, Sanitary and Waste Services for Buildings

**Reference Books**

1. William Paul Gerhard :Sanitation and sanitary engineering .
2. National Building Code, India



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**Curriculum w.e.f.2021-2022**

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PO 9	Individual and team work	Group presentation of case studies describing services for those buildings.
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**Course Plan**

<b>Course Title : Professional Elective –I - Art Appreciation</b>	
<b>Course Code : 201AR208A</b>	<b>Semester : III</b>
<b>Teaching Scheme : L-T-P :1-0-1</b>	<b>Credits : 2</b>
<b>Evaluation Scheme :ISE Marks : 50</b>	<b>ESE ( OE ) Marks : 50</b>

**Course Description:**

Art Appreciation is a general introduction to the visual arts, its brief history, its different media and techniques. This course reviews two- and three-dimensional art forms, methods, and media; examines the visual elements and principles of design; and briefly surveys art styles from the prehistoric to the 20th Century. This course offers students to be familiar with the different types of art and to learn how to speak/write intelligently about art. Art appreciation requires the acquisition of a critical and formal language in which students come to identify, describe, analyze and compare the visual characteristics of various works using the correct art vocabulary. Art appreciation cultivates a deeper and more expansive awareness of art, its relevance and importance in architecture.

**Course Objectives:**

1. To understand the relevance of art in human life and society in general.
2. To develop an ability to recognize design principles and elements in selected works of art.
3. To analyze a given art form through its critical appreciation.
4. To co-relate different art forms with space and architecture.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C208A.1</b>	Understand the role of different art forms in defining tradition and culture of a place.
<b>C208A.2</b>	Experiment and have hands on skill for given art form assignment.
<b>C208A.3</b>	Analyze and critically appreciate various art forms.
<b>C208A.4</b>	Develop a creative framework to understand the different art forms in relation to space and in relation to architectural design studio assignment.

**Prerequisite:** Students should have a understanding of basic principles of aesthetics.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) And Program Specific Outcomes ( PSOs )**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		BTL
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C208A.1</b>	2	-	3	-	3	2	-	-	3	3	-	2	-	-	2
<b>C208A.2</b>	2	-	3	-	3	2	-	-	3	3	-	2	-	-	3
<b>C208A.3</b>	2	-	2	-	2	2	-	-	2	2	-	2	-	-	4
<b>C208A.4</b>	2	-	2	-	2	2	-	-	2	2	-	2	-	1	5

Contents	Hours
<b>Unit 1: Introduction to Art</b> What is Art? Different art forms. Understanding of the art forms on basis of visual elements such as line, shape, light, texture, etc. Understanding of the art forms on basis of principles of design such as : unity, variety, focal point, balance, proportion, etc.	4
<b>Unit 2: Brief History of Art</b> A brief review of art in different time periods from Prehistoric to Modern period. Its importance and evaluation during specific time period.	4
<b>Unit 3: Art appreciation and art evaluation.</b> Evaluation Art Criticism	4
<b>Unit 4: Different art media.</b> Study and Assignments based on different conventional art media. for. painting, murals, collage, etc. Study and assignments based on contemporary art media like clay, glass, metal, wood, fiber, recycled material, etc.	4
<b>Unit 5: Case Study</b> Visit / virtual tour to local museums, art galleries, theme exhibitions, etc. for art appreciation and evaluation.	4
<b>Unit 6: Art in relation with Space and Architecture</b> Study of an art form in relation with space and its application in Architectural design studio assignment.	4



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**Curriculum w.e.f.2021-2022**

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**Reference Books:**

1. Janson and Janson: History Of Art ,Published September 22nd 1997 by Thames and Hudson.
2. Yatin Pandya - Elements of Space Making, Mapin Pub., 2007.
3. John Berger Ways Of Seeing, Published British Broadcasting Corporation and Penguin books.
4. Malcolm Miles, “Art, Space and the City”, Routledge; 1st edition (4 September 1997).
5. Gill Robert: Rendering with pen and ink, Edition 2013, Affiliated East – West Press Private Limited.

**Course Plan**

<b>Course Title : Professional Elective– I - Art In Architecture</b>	
<b>Course Code : 201AR208B</b>	<b>Semester : III</b>
<b>Teaching Scheme : L-T-P : 1-0-1</b>	<b>Credits : 2</b>
<b>Evaluation Scheme : ISE Marks: 50</b>	<b>ESE (OE) Marks : 50</b>

**Course Description:**

This course is the introduction to various art forms, artistic expressions, to evolve design skills. Intend of the course is to develop artistic sense along with critical analysis of various art forms in relation to architecture.

**Course Objectives:**

1. To understand various types of art forms applicable to field of architecture.
2. To develop sensitivity towards artistic expressions.
3. To apply knowledge of art to enhance built environment.

**Course Outcomes (COs):**

After successful completion of the course, the students are able to:

<b>C208B.1</b>	Correlate various art forms with architecture.
<b>C208B.2</b>	Synthesize understanding of art forms with respect to cultural context of built spaces.
<b>C208B.3</b>	Design artwork for built environment.

**Prerequisite:** Basic knowledge of Aesthetics and visual arts – I & II.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		B T L
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C208B.1</b>	2	1	2	-	2	-	-	-	-	2	-	2	-	-	2
<b>C208B.2</b>	3	2	3	-	3	-	-	-	-	3	-	3	-	2	3
<b>C208B.3</b>	2	1	2	-	2	-	-	-	-	2	-	2	-	-	4

<b>Contents</b>	<b>Hours</b>
<b>Unit-1- Introduction to Art and its importance</b> Correlating various art forms with Architecture. ( Visual arts and Performing arts)	6
<b>Unit-2- Art forms in pre - modern era</b> Principles, characteristics and derivations by artists and architects with respect to arts movement of pre - modern era ( any four)	6
<b>Unit-3 Art forms in modern era</b> Principles, characteristics and derivations by artists and architects with respect to arts movement of modern era ( any four)	6
<b>Unit-4 Art forms in postmodern era</b> Principles, characteristics and derivations by artists and architects with respect to arts movement of postmodern era ( any four)	6

**Reference Books:**

1. Janson and Janson: History Of Art ,Published September 22nd 1997 by Thames and Hudson.
2. Yatin Pandya - Elements of Space Making, Mapin Pub., 2007.
3. John Berger Ways Of Seeing, Published British Broadcasting Corporation and Penguin books.
4. Malcolm Miles, "Art, Space and the City", Routledge; 1st edition (4 September 1997).
5. Gill Robert: Rendering with pen and ink, Edition 2013, Affiliated East – West Press Private Limited.



**Course Plan**

<b>Course Title : Computer Technology in Architecture -III</b>	
<b>Course Code : 201AR209</b>	<b>Semester : III</b>
<b>Teaching Scheme : L-T-P : 0-0-2</b>	<b>Credits : 2</b>
<b>Evaluation Scheme : ISE Marks : 50</b>	<b>ESE Marks :- Nil</b>

**Course Description:**

Theoretical understanding of software's required for architectural drawings and its presentation is a need of time. This course will help students to understand the theoretical concepts of Revit. This will also help students to work on 2D and 3D drawings simultaneously. Students will be able to generate rendering skills, use of different materials, and light effects in Revit. These commands will help them to prepare presentation drawings, rendered views comparatively short time.

**Course Objectives:**

1. To teach students various commands required for 2D and 3D drafting.
2. To teach the techniques to generate required results from the software.
3. To teach theoretical concepts for different methods of presentation skills.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C209.1</b>	Develop understanding of computer aided drafting.
<b>C209.2</b>	Comprehends computer aided drafting and its parameter as tools and its application in architecture.
<b>C209.3</b>	Evaluates CAD techniques for quicker methods and presentation skills.

**Prerequisite:** Basic understanding of Computer is compulsory, Knowledge of Auto-cad is preferred.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		BTL
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C209.1</b>	3	-	-	-	2	-	-	-	-	-	-	2	-	-	3
<b>C209.2</b>	3	-	-	-	2	-	-	-	-	-	-	2	-	2	3
<b>C209.3</b>	3	-	-	-	2	-	-	-	-	-	-	2	-	-	3

<b>Contents</b>	<b>Hours</b>
<b>Unit 1 – The Basics of the Toolbox</b> Select, modify, and replace elements, Using the Properties Palette, Matching Properties, Using the Context Menu, Edit elements interactively, Moving Elements, Using Temporary Dimensions, Nudging Elements, Moving with Nearby Elements, Copying Elements, Rotating and Mirroring Elements, Arraying Elements, Scaling Elements, Aligning Elements, Trimming or Extending Lines and Walls	4
<b>Unit 2 – Editing the Toolbox</b> Use other editing tools, Using the Join Geometry Tool, Using the Split Face and Paint Tools , Copying and Pasting from the Clipboard, Edit Pasted , Paste Aligned, Using a Topo surface, Creating a Topo surface from Imported CAD Data, Modifying the Surface with Sub region, Creating a Building Pad, Create site context for your project	4
<b>Unit 3 – Configuring Drafting Standards</b> Define settings for graphic quality and consistency, Discovering Object Styles, Using Line Settings, Setting Line Weights, Setting Line Patterns, Setting Line Styles, Organize views for maximum efficiency, Creating and Assigning Filters, Using View Templates,	4
<b>Unit 4 –Configuring Drafting Templates</b> Create custom annotation families, Introducing Tag Family, Creating a Custom Door Tag, Customizing View Tags, Fundamentals Start a project with a custom template, Transferring Project Standards, Develop a template management strategy	4
<b>Unit 5 – Work sharing concepts</b> Understand key work sharing concepts, Enable work sharing on your project, Selecting a Starting View, Creating a Local File, Moving Elements between Worksets, Organize work sets in your model	4
<b>Unit 6 – Working in a Team</b> Manage work flow with work sharing, Understand element ownership in worksets, Understanding Editing Requests, Placing an Editing Request, Collaborate in the cloud All above commands will be used to make the drawing of design assignment of Sem. II of F.Y.B. Arch.	4

**Reference Books:**

1. Autodesk Revit 2021 Architecture Basics By Elise Moss
2. Autodesk Revit 2021 Architectural Command Reference by Jeff Hanson, Daniel John Stine AIA, CSI, CDT

**Course Plan**

<b>Course Title : Indian Crafts ( Mandatory Course )</b>	
<b>Course Code : 201ARMC210</b>	<b>Semester : III</b>
<b>Teaching Scheme : - L-T-P 2-0-0</b>	<b>Credits : Non Credit</b>
<b>Evaluation Scheme : ISE Marks : Nil</b>	<b>ESE(TH) Marks : 50</b>

**Course Description:**

The course Indian crafts deals with unique cultural identity of India with its diversity and richness. India has an unbroken, living vibrant tradition of crafts. Indian Crafts as hands on experiment with a strong component of field study and applied creative activity. It also reveals the relationship between the craft and architecture.

**Course Objectives:**

1. To introduce Indian crafts for understanding integral role of crafts community to the cultural environment of a place.
2. To develop among students values of conservation for Indian crafts heritage.
3. To develop an understanding of Indian crafts to the aesthetics of built spaces.
4. To apply knowledge of Indian crafts to create artifacts and crafts objects for enhancement of built environment.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C210.1</b>	Understand the various Indian crafts and its relation to built spaces.
<b>C210.2</b>	Create awareness for conservation of Indian crafts.
<b>C210.3</b>	Introduce Indian culture through the crafts and learn variety of skills for different crafts making through hands on experiment
<b>C210.4</b>	Apply the knowledge of crafts making to for assignments and in their design solutions.

**Prerequisite:** An attitude to learn and internalize the artistic orientation and skills taught.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) And Program Specific Outcomes ( PSOs )**

Course Outcomes(COs)	Program Outcomes(POs)												(PSOs)		BTL
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C210.1</b>	2	-	2	-	-	-	-	-	2	-	2	2	-	-	2
<b>C210.2</b>	2	-	2	-	-	-	-	-	3	-	3	2	-	-	2
<b>C210.3</b>	2	-	2	-	-	-	-	-	3	-	3	2	-	2	1
<b>C210.4</b>	2	-	2	-	-	-	-	-	3	-	3	2	-	-	3

Contents	Hours
<p><b>Unit 1 – General Introduction</b> An introduction to the crafts traditions of India, different crafts, their classifications, with regards to following. Philosophy and aesthetics, Materials, processes and techniques, Economy and marketing</p>	6
<p><b>Unit 2 –Field Studies</b> In this part of the course students will be required to do field study by interaction with various craftsmen. Documentation in the form of photographs, sketches, measure drawings. Study of immediate environment and learn about everyday crafts in their everyday lives, household crafts found at home for festivals (e.g. Toranas, Patakas, Mehandi, traditional Rangoli), in their town/village, artisans and crafts communities who live in their locality. Study of old traditional houses in the form of measure drawings and sketches of building elements like doors , windows, trusses, brackets etc.</p>	6
<p><b>Unit 3 – Study of Indian Crafts Tradition</b> Brief introduction of following crafts and materials Bamboo crafts Clay Stone work Jewellery Textile Crafts Paper Craft</p>	4
<p><b>Unit 4 – Crafts application</b> Hands on experiment for creation of different crafts objects using different materials. Application in their design projects. Bamboo articles, Stone carving, Clay models, Jewelry designs, Block printing, Paper models</p>	8

**Reference Books:**

1. Handmade In India by Aditi Ranjan and M.P. Ranjan.
2. Arts and Crafts of India (Arts & Crafts), Ilay Cooper, John Gillow
3. Traditional Indian Textiles , Ilay Cooper, Nicholos Bernard
4. World Textiles: A Sourcebook (Fabric Folios), Diane Waller, Shelagh weir & others.
5. The Craft and Art of Bamboo, Carol Stangle

PO 9	Individual and team work	Hands on experiment in group, for creation of different crafts objects using different materials.
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**Course Plan**

<b>Course Title : Architectural Graphics and Drawing - IV</b>	
<b>Course Code : 201AR211</b>	<b>Semester : IV</b>
<b>Teaching Scheme : L-T- P : 1-0-3</b>	<b>Credits : 4</b>
<b>Evaluation Scheme : ISE Marks : 50</b>	<b>ESE ( TH ) Marks : 50</b>

**Course Description:**

This course intends to develop understanding towards application of sciography as a tool of design. Shadows can be used efficiently to create comfortable environment for buildings in regions having hot climate in order to design climate responsive buildings. Understanding of shadow patterns

**Course Objectives:**

1. To understand methodology of drawing shadows in two and three dimensional objects.
2. To apply knowledge of sciography in design projects.
3. To develop rendering skills with manual presentation as well as by using softwares.

**Course Outcomes (COs):**

At the end of the course the student should be able to :

<b>C211.1</b>	Draw shadows of simple and complex objects.
<b>C211.2</b>	Use of sciography as a tool of design.
<b>C211.3</b>	Represent two dimensional and perspective drawings with rendering.

**Prerequisite:** Students should have an understanding about perspective drawing.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)**

**And Program Specific Outcomes ( PSOs )**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		B T L
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C211.1</b>	3	-	-	-	-	-	-	-	-	-	-	-	-	-	3
<b>C211.2</b>	3	-	2	-	-	-	-	-	-	3	-	2	-	-	3
<b>C211.3</b>	3	-	-	-	-	-	-	-	-	3	-	-	-	3	3

<b>Contents</b>	<b>Hours</b>
<b>Unit 1-Sciography</b> Introduction to sciography in plan and elevation of simple and complex geometrical objects. -Sciography of object, when it is away from the vertical plane. -Sciography of object, when it is near to vertical plane. -Sciography on vertical plane in case of when object is away from the ground	12
<b>Unit 2-Sciography in perspective</b> Introduction of sciography in perspective. Sciography in perspective of different basic objects like cube, cone, pyramid, circular shape objects. Sciography of small buildings in plan and perspective. Case studies and photographic documentation of various shadow patterns, shadows as part of aesthetical design.	12
<b>Unit 3-Rendering</b> Architectural rendering with sciography using manual skills.	12
<b>Unit 4 Software Application</b> -Using different rendering techniques with Photoshop. -Use of sketch up software for sciography Study of shadow profiles at various geographical locations by using sketch-up / Photoshop	12

**Reference Books:**

1. Gill Robert: Rendering with pen and ink, Edition 2013, Affiliated East – West Press Private Limited.
2. Jax Themier, B.W., How to Paint and Draw, Thames and Hudson,1985.
3. M. G. Shah, C. M. Kale, S. Y. Patki : A Reference book of Building Drawing, 3<sup>rd</sup> edition, McGraw-Hill 1997.

**Course Plan**

<b>Course Title : Architectural Design-IV</b>	
<b>Course Code : 201AR212</b>	<b>Semester : IV</b>
<b>Teaching Scheme : L-T-P : 1-0-6</b>	<b>Credits : 7</b>
<b>Evaluation Scheme : ISE Marks : 100</b>	<b>ESE Marks : (OE)100 + (TH) 100</b>

**Course Description:**

This course will introduce students to issues related to architecture with respect to social, cultural, environmental, economical and political along with aesthetic aspects of built and unbuilt spaces, through reading, discussions, interactions, surveys etc. It will help them to understand, analyze and co-relate built and unbuilt spaces, in consideration with site context and development. The design process will enable them to respond to the identified issues and create an analytical design framework that addresses the above aspects.

**Course Objectives:**

During the course, the student should be able to:

1. Solve progressively complex exercises involving spatial relations in two dimensions, three dimensions and time.
2. Apply fundamental design skills as a response to architect's wider responsibilities towards society, culture and the environment.
3. Experiment with design solutions using analytical and creative framework with respect to site development.
4. Correlate built and unbuilt spaces to residential spaces with an understanding of design principles, services, structural behaviour and construction techniques and materials.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C212.1</b>	Analyze site potential with respect to built environment and surroundings.
<b>C212.2</b>	Correlate potential of multilevel residential spaces with architectural design.
<b>C212.3</b>	Understand design intervention with respect to social, cultural, environmental, economical, political and aesthetic aspects.
<b>C212.4</b>	Create a design framework in consideration with aesthetic, functional and technical aspects.

**Prerequisite:** Basic knowledge of building by-laws and activity mapping.



**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		B T L
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C212.1</b>	2	2	2	2	-	-	-	-	1	-	-	2	-	-	4
<b>C212.2</b>	3	2	2	2	-	-	-	-	2	-	-	2	-	-	4
<b>C212.3</b>	3	3	3	3	-	-	-	-	2	-	-	3	-	-	2
<b>C212.4</b>	3	3	3	3	-	-	-	-	2	-	-	3	2	2	2

<b>Contents</b>	<b>Hours</b>
<p><b>Unit1 Literature Study</b> Questionnaire design for case study and site study. Activity mapping - Study of detailed routine (timetable) during weekdays, weekends, vacation and festivals. (Whichever applicable) resolved through activity mapping in terms of spaces required to perform.</p>	14
<p><b>Unit 2 Settlement Study</b> Study of a rural settlement , analysis and documentation covering following points: Settlement pattern Housing typology with respect to context.</p>	14
<p><b>Unit 3 Case study and Site analysis</b> Site analysis and development in accordance with built spaces and site surroundings. Case study analysis , presentation and report.( live case study/studies and net case study/studies)</p>	14
<p><b>Unit 4 Design Intervention</b> Architectural programming based upon following design criteria and considerations as per priority: Contextual Aesthetic Functional Cultural Climatic Technological Design of a multilevel residence as a major project, (without aid of mechanical vertical transportation system.) in accordance with the above criteria.</p>	42



**D.Y.PATIL COLLEGE OF ENGINEERING & TECHNOLOGY**

**KASABA BAWADA, KOLHAPUR-416006**

**An Autonomous Institute**

**S.Y B. Arch.**

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**Curriculum w.e.f. 2021-2022**

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**Reference Books:**

1. Joseph De Chiara, Time saver standards for building types McGrawHill Inc., US; 3rd Revised edition.
2. Ernst Neufert, Neufert- architects data Third edition, Wiley India Pvt. Ltd.
3. Robert W. Gill, Rendering with Pen and Ink, Thames & Hudson.
4. D. K. Ching , Third edition - Form, Space & Order, John Wiley & Sons, Inc.
5. Charles Harris, Time saver standards for landscape architecture, Second edition, McGraw Hill Education.
6. Wucius Wong, Principles of three dimensional Design, VanNostrand Reinhold NY.
7. Maier Manfred, Basic principles of Design, VanNostrand Reinhold NY
8. Yatin Pandya - Elements of Space Making, Mapin Pub., 2007.
9. Ramsey and Sleeper -Architectural Graphics Standards, John Wiley & Son

**Course Plan**

<b>Course Title : History of Architecture- II</b>	
<b>Course Code : 201AR213</b>	<b>Semester : IV</b>
<b>Teaching Scheme : L-T-P : 3-0-0</b>	<b>Credits : 3</b>
<b>Evaluation Scheme : ISE + MSE Marks : 20+30</b>	<b>ESE (TH) Marks - 50</b>

**Course Description:**

The courses History of Architecture - II deal with Architecture of Indian subcontinent, studied as per the timeline extending from to early settlements till Nineteenth century. The course History of Architecture - II in Semester IV , covers the journey of Indian Architecture from Regional Indo Islamic Style till Contemporary Architecture of post independent India. The course will develop an overall understanding of contributing factors such as sociocultural, climatology, geographical, religious and political factors of that region, for Design development of different historic ,modern and contemporary styles.. Students will understand the roll of foreign architects and their influence on the works of Indian Architects, their response to context and climate, approach and philosophies regarding form and function, use of new material and technology.

**Course Objectives:**

1. To explain relation between culture and architecture of historic period in India.
2. To identify phases of historic, modern& contemporary architecture in India
3. To explain the innovative building construction techniques of historic & contemporary Architecture.
4. To illustrate the impact of social, economical & political factors on Architectural styles.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C213.1</b>	Analyze impact of culture on architecture of historic period in India.
<b>C213.2</b>	Differentiate between various phases of architecture in India.
<b>C213.3</b>	Compare construction techniques of historic and contemporary Architecture.
<b>C213.4</b>	Analyze socio-cultural & economic impact on architecture

**Prerequisite:** Student should have internalized knowledge of the course -History of Architecture- I(Semester –III)

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		B T L
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C213.1</b>	3	2	-	-	-	-	2	-	2	-	-	-	1	1	2
<b>C213.2</b>	3	2	-	-	-	-	2	-	2	-	-	-	1	1	2
<b>C213.3</b>	3	2	-	-	-	-	2	-	2	-	-	-	1	1	4
<b>C213.4</b>	3	2	-	-	-	-	2	-	2	-	-	-	1	1	5

Contents	Hours
<p><b>Unit 1 - Indo Islamic Architecture Part -II</b></p> <p>Brief Introduction of- Synoptic study of Regional styles of Punjab, Jaunpur, Bengal, Gujarat, Development of Provincial styles and their distinctive features. Punjab - Eg: Rukn -e- Alam Tomb Jaunpur – e.g. Atala Masjid, Jami Masjid and Laldarwaza mosques. Bengal - Eg: Adina masjid, Eklakhi tomb, Chotasona and Badasona Masjid (study of essential and typical features only) Ahmedabad - Integration of Hindu and Muslim style in building features - exclusive features e.g. Jami masjid at Ahmedabad and ways of Gujarat, recreational complex at Sarkhej.</p>	6
<p><b>Unit 2 - Indo Islamic Architecture Part -III</b></p> <p>Brief Introduction of- Indo Islamic architecture - Synoptic study of Regional styles of Malwa, Bijapur, Gulbarga and Bidar Malwa- Mandu Jami mosque, Jahazmahal, Hindola Mahal, Asharfi Mahal Bijapur, Gulbarga and Bidar - variations in design approach between Bijapur, Gulbarga and Bidar in planning and features - forms and finishes. e.g. Gol Gumbaz, Ibrahim Rauza at Bijapur Jami masjid at Gulbarga and Bidar, Madrasa of Md. Gawan at Bidar, Charminar, Bidarfort, Golkonda fort.</p>	6
<p><b>Unit 3 - Mughal Architecture</b></p> <p>Brief Introduction of- Synoptic study of Mughal Architecture in India ,Development under Humayun, Akbar, Jehangir and Shahjehan as well as Aurangazeb. Exclusive features, different buildings types and complex structural systems and their use. e.g. Mughal gardens, Humayun's tomb, FatehpurSikhri -details, Buland Darwaza, tomb of Salim Chisti, further development of Diwan -I-Khas and Diwan -I- Am. Akbar's tomb, Tajmahal, Tomb of Itmaud Daulah at Agra. Layout of Red fort at Delhi, Bibi-ka-maqbarah at Aurangabad.</p>	6

<p><b>Unit 4 - Colonial Architecture in India</b> Brief Introduction of- Early buildings of the Dutch, Portuguese and the English in various parts of India; Inception and growth of Madras, Calcutta and Bombay. Growth and development of the bunga Jow, the hill station, the cantonment and the residency in response to the perceived needs of the British in India; Indo-Saracenic Architecture of the Indian sub-continent; The making of New Delhi.</p>	6
<p><b>Unit 5 - Contemporary Architecture in India - I</b> Brief Introduction of- Works of Le-Corbusier in Chandigarh and Ahmedabad (Legislative Assembly Complex including High Court, Legislative assembly and Secretariat, Chandigarh and Mill Owners' Building, Ahmedabad) Louis Kahn's contributions - the IIM, Ahmedabad. Laire Baker (Centre for Development Studies, Thiruvananthapuram and St. John Cathedral at Tiruvalla).</p>	6
<p><b>Unit 6 - Contemporary Architecture in India - II</b> Brief Introduction of-Ideas and works of BV Doshi (Sangath, Office Building, Ahmedabad, IIM- Bangalore and Gufa, Ahmedabad), Charles Correa (Concept of Tube house, Ahmedabad, KanchenJunga Apartments, Mumbai and MRF Headquarters, Chennai), Raj Rewal (Pragati Maidan, New Delhi and Asian Games Village, New Delhi), Karan Grover (CII-Sohrabji Godrej Green Business Centre (CIIGBC), Hyderabad, Goa Assembly Building at Porvorim, Goa.), Sanjay Mohe (NIFT, Hyderabad, Karunarshraya, Bangalore)</p>	6

**Reference Books:**

1. The Temple Architecture of India by Adam Hardy, First Edition ,Published by John Wiley & Sons
2. The Indian Temple Architecture: Form And Transformation by Adam Hardy , First Edition, Abhinav Publications.
3. The hindu Temple :An Introduction to its meaning and forms by GeogreMichell.
4. "Architecture of India - Buddhist and Hindu" by Grover Satish, First Edition , Published by Vikas Publishing House Pvt. Ltd
5. "Islamic Architecture in India - " by Grover Satish, First Edition , Published by Vikas Publishing House Pvt. Ltd .
6. "Indian Architecture - Islamic period" by Brown, Percy, published by Int Book H
7. "Indian Architecture – Hindu period" by Brown, Percy, published by Int Book H
8. published by Int Book H
9. "History of Architecture in India" by Tadgell Christopher , published by Phaidon Press, 1994
10. "A History of Architecture on the Comparative Method", by Sir Banister Fletcher, Published by Phaidon Press, 1994
11. "Modem Architecture in India" by Bahga, Bahga and Bahga, published by Galgotia Pub. Co
12. "After the masters" by Vikram Bhatt and Peter Scriver, published by Grantha Corporation

PO	Title of PO	Activity
PO 7	Environment and sustainability	Case study of one historic building to analyze the materials & technology used in societal & environmental context.
PO 9	Individual and team work	Group work for study of architectural style of particular era and its presentation

**Course Plan**

<b>Course Title : Building Construction &amp; Materials – IV</b>	
<b>Course Code : 201AR214</b>	<b>Semester : IV</b>
<b>Teaching Scheme : L-T-P : 2-0-2</b>	<b>Credits : 4</b>
<b>Evaluation Scheme : ISE + MSE Marks : 20 +30</b>	<b>ESE Marks : (OE) 50 + (TH) 50</b>

**Course Description:**

This course offers art and science of building construction and materials. Emphasis will be on building component such as flooring, footing, staircase, door, window etc and their construction material. Thumb rule for those components. Methods and the process of translating design ideas into built form.

**Course Objectives:**

1. To familiarize students to market survey of building materials.
2. To explain various details of construction.
3. To explain construction process through visits to ongoing construction sites.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C214.1</b>	Select appropriate building materials through market surveys.
<b>C214.2</b>	Prepare construction drawings
<b>C214.3</b>	Supervise the construction process.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)**

**And Program Specific Outcomes ( PSOs )**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		B T L
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C214.1</b>	3	-	3	-	-	-	3	-	3	3	-	3	-	-	2
<b>C214.2</b>	3	-	3	-	-	-	3	-	3	3	-	3	-	2	3
<b>C214.3</b>	2	-	2	-	-	-	2	-	2	2	-	2	-	-	2

<b>Contents</b>	<b>Hours</b>
<b>Unit 1</b> <b>Material</b> <b>Processed wood</b> Plywood and block board - types and uses. Veneers – types and uses. Market survey of plywood, block boards and veneers. <b>Construction</b> <b>Doors</b> Pivoted doors, sliding doors, sliding folding doors, hardware& accessories, joinery, materials used in doors (wood, metal, glass, aluminum, & PVC).	8
<b>Unit-2</b> <b>Material</b> <b>Types of boards</b> Particle boards, cement boards, Bagas boards, MDF boards – their uses. <b>Construction-Gates</b> M. S. Gate types - sliding gates, hinged gates, wicket gates.	8
<b>Unit-3</b> <b>Material-Aluminium</b> Properties, types and uses of aluminium, finishes given to aluminium, market survey of aluminium <b>Construction-Aluminium Windows and Ventilators</b> Aluminium sliding windows, casement windows, louvered windows and ventilators , fixed windows, bay windows, hardware, window sections. Fixing of m.s. grills.	8
<b>Unit-4</b> <b>Material-Natural flooring materials</b> Functions of flooring materials, natural flooring materials such as mud, brick, stone, Laterite etc. <b>Construction-Slabs</b> R.C.C. slabs, one way slab, two way lab, cantilever slabs, R.C.C. beams, Reinforcement details, slab and beam schedules, Thumb rules and I.S.I standards, slabs form work, etc.	8
<b>Unit-5</b> <b>Material-Artificial flooring materials</b> Artificial flooring tiles such as ceramic, vitrified, glazed, porcelain, their application, market survey of flooring tiles. <b>Construction-Floors for large spans</b> Filler slab, Ribbed slab, Plate slab, Plate slab with drops and column capitals.	8
<b>Unit-6</b> <b>Material-Admixtures</b> Admixtures - functions, types, properties and uses. <b>Construction</b> Earthquake resistant structures in RCC, precautionary measures.	8

**Text Books:**

1. Dr. B.C Punmia (2012) Building Construction (10th edition) Laxmi Publications.
2. S.C.Rangwala (2013) Engineering materials (Fortieth edition), Charotar Publishing pvt.ltd.
3. S.K. Duggal( 2016) Building materials (4th edition) – New age international publishers.
4. W.B. McKay (2015) Building construction Vol. 1 (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition).
5. Rangwala, S. (2004). Building Construction. 22nd Ed. Anand : Charotar Publishing.
6. Sushil-Kumar, T. B. (2003). Building Construction. 19 th Ed. Delhi : Standard Publications.

**Reference Books:**

1. National Building Code of India 2016 (Volume 1) and relevant I.S.I. Specifications.
2. Barry, R. (1999). The Construction of Buildings Vol.II. 5th Ed. New Delhi : East-West Press.
3. Bindra, S. P. and Arora, S. P. (2000). Building Construction: Planning Techniques and Methods of Construction, 19th Ed. New Delhi : Dhanpat Rai Publications.
4. Chudley, R. (2008). Building Construction Handbook. Noida : Elsevier.
5. McKay, W. B. (2005). Building Construction Metric Vol. 1–IV, 4th Ed. Mumbai :Orient Longman.
6. Meghashyam, K. K. (2005). Reinforced Concrete Constructions for 21st C. New Delhi :J.M. Jaina.
7. T.P. Kanetkar and S.V. Kulkarni, surveying and leveling Vol-II



**Course Plan**

<b>Course Title : Structural Engineering For Architecture - II</b>	
<b>Course Code : 201AR215</b>	<b>Semester : IV</b>
<b>Teaching Scheme : L-T-P : 3-0-0</b>	<b>Credits : 3</b>
<b>Evaluation Scheme : ISE + MSE Marks : 20+30</b>	<b>ESE (TH) Marks : 50</b>

**Course Description:**

This Course brings the architectural imagination from paper to the ground in reality. It provide through knowledge about fixed beam, continuous beam, elastic stability of column, design of tension and compression member(steel), Uniaxial and biaxial bending and Steel trusses and Girders.

**Course Objectives:**

1. To introduce concept of Fixed and Continuous beam.
2. To explain concept of Elastic stability of columns and its uniaxial and biaxial bending.
3. To select the appropriate section for tension and compression member.
4. To explain steel trusses.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C215.1</b>	Predict the behaviour of fixed and continuous beam.
<b>C215.2</b>	Explain concept of Elastic stability of column.
<b>C215.3</b>	Select proper steel section for tension and compression member.
<b>C215.4</b>	Explain steel trusses and girders.

Prerequisite: Basic knowledge of centre of gravity and moment of inertia. Stress and strain.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)**

**And Program Specific Outcomes ( PSOs )**

Course Outcomes (COs) /	Program Outcomes (POs) /												(PSOs)		B T L
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C215.1</b>	2	3	2	2	-	-	-	-	2	-	-	-	-	-	2
<b>C215.2</b>	2	3	2	3	-	-	-	-	2	-	-	-	-	-	3
<b>C215.3</b>	2	3	2	3	-	-	-	-	2	-	-	-	-	2	3
<b>C215.4</b>	2	3	2	3	-	-	-	-	3	-	-	-	2	-	3

<b>Contents</b>	<b>Hours</b>
<p><b>Unit 1 – Fixed Beams</b> Advantages and disadvantages of fixed beam, structural action of the fixed beam, determination of negative and positive bending moment for point load and udl. numerical based on above ( by applying formulas).application of this knowledge in architecture.</p>	6
<p><b>Unit 2 –continuous beam</b> Advantages and disadvantages of continuous beam, Three Moment Theorem for continuous beam, structural action in continuous beam, positive and negative bending moment for point load and UDL ( with simple support at end ,one end fixed and one simple support ,both end fixed)., non clerical based on above application ( up to 3 spans only.) of the knowledge in architecture.</p>	6
<p><b>Unit 3 - Elastic stability of column</b> Introduction, actual length of column, effective length of column, Formulas for effective length of column for various end conditions (no derivation)(one end fixed one hinged ,both hinged, both fixed, one end fixed and one free.) classification of columns based on slenderness ratio. Euler`s theory of long columns, assumptions and limitations of Eulers theory, critical load by Eulers theory. Rankines theory. numerical based on above concept.</p>	9
<p><b>Unit 4 – Uniaxial and biaxial bending</b> Introduction to the concept of uniaxial and biaxial eccentricity, depending upon the loading conditions the structural action of the column, calculation of stresses in Steel columns with uniaxial and biaxial eccentric loads. simple numerical on above.</p>	6
<p><b>Unit 5 – Design of tension and compression member( Steel)</b> Steel structures, identification of tension and compression member in the trusses and , understanding the process of design of single angle and Double angle section in tension understanding the method of design compression members significance of slenderness ratio design of simple and compound sections, design of lacing and battens (only theory) ( problems on single sections).</p>	6
<p><b>Unit 6 – Steel trusses</b> Study of the various types of roof trusses and when a particular truss can be used, section of trusses according to the span,(Key elevations) .concept of combinations of loads acting on roof, gusseted plate connections along with sketches (theory only).</p>	3

**Text Books:**

1. M. N. Avadhanulu and P. G. Kshirasagar. A text book of Engineering Physics, S. Chand Publishing, 9th Revised Edition (2014).
2. S. Ramamrutham ,Strength of material.
3. R.S.Khurmi, Strength of materials.
4. S.K.Duggal , Design if steel structures.

**Reference Books:**

1. RK Bansal and Sanjay Bansal, Strength if material Laxmi Publications, New Delhi.
2. F.L. Singer, Engineering Mechanics, Harper Collins Publications.
3. Curt Siegel, Structure and form in modern architecture, Crosby Lockwood And Son Ltd.
4. S.K. Duggal , Design if steel structures.

<b>PO</b>	<b>Title of PO</b>	<b>Activity</b>
PO 9	Individual and team work	Model making and debate on application of different structural concepts in aesthetic manner.

**Course Plan**

<b>Course Title : Basic Building Services-II</b>	
<b>Course Code : 201AR216</b>	<b>Semester : IV</b>
<b>Teaching Scheme : L-T-P : 2-0-0</b>	<b>Credits : 2</b>
<b>Evaluation Scheme : ISE + MSE Marks : 20+30</b>	<b>ESE (TH) Marks : 50</b>

**Course Description:**

Services help the occupants to live/work inside a building with comfort and ease. Building Services are the systems installed in buildings which make them comfortable, functional, efficient and safe. The course intends to study electrification for a building. It also includes lighting requirements and gas pipeline provision for a building.

**Course Objectives:**

- 1.To develop awareness about building services, their need and importance.
- 2.To know how a building functions with the help of various services.
- 3.To identify the need of a particular service needed -here lighting requirements (Natural and artificial) and electrical outlets inside residential and public buildings.
- 4.To be able to draw electrical layout, gas pipeline layout and design lighting needs.

**Course Outcomes (COs):** At the end of the course the student should be able to:

<b>C216.1</b>	Apply knowledge while planning a building.
<b>C216.2</b>	Are able to understand what services are required for a building.
<b>C216.3</b>	Incorporate technology required to provide Services for the building they design.
<b>C216.4</b>	Design certain details required for various Services in a building and allot spaces for the same.

**Prerequisite:** Students should have an understanding about perspective drawing.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) And Program Specific Outcomes ( PSOs )**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		B T L
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C216.1</b>	2	1	1	1	-	-	-	-	1	-	-	1	-	-	3
<b>C216.2</b>	3	2	2	2	-	-	-	-	2	-	-	2	-	-	2
<b>C216.3</b>	3	2	2	2	-	-	-	-	2	-	-	2	2	-	3
<b>C216.4</b>	3	2	2	2	-	-	-	-	2	-	-	2		2	3

<b>Contents</b>	<b>Hours</b>
<b>Unit 1- Introduction to Electricity</b> Generation of electricity, clean and green energy concepts. Small generators, stand by systems, inverters, UPS etc. Ampere, volts, A.C, D.C supply, three phase, single phase etc. Supply of electricity at plot level. Substation, transformer.	4
<b>Unit 2.- Electrical supply</b> H.T. panel, L.T panel, Underground and overhead cabling. Metering of electricity. Electric supply at plot level. Bus bar, meter board, earthing, distribution board, fuse, MCB, ULCB etc.	4
<b>Unit 3.- Electrical fixture</b> Switch boards, switches, sockets, wiring systems, wires and cables. Domestic appliances-white goods, brown goods, fans.	4
<b>Unit 4- Natural Lighting</b> Day lighting -Types of lighting. Amount of sky radiation, sky component, glare. Terminology in lighting: Luminous flux, Lux, candela, reflection factor. Strategies: Opening size, direction, shading, overhangs, fins, louvers, setbacks, shades, skylights, monitors. Side lighting (Exterior sun shades) Top lighting (Interior sun shades).	4
<b>Unit 5.- Artificial Lighting</b> Artificial Lighting -Source- properties of light. Lighting at night and during the day. Characteristics of lighting: Intensity, uniformity, brightness, direction. Lamps-types. Lighting-types. Luminaries. Garden lighting- Trees, flowers, buildings, pathways. Indoor lighting and outdoor lighting.	4
<b>Unit 6- Gas pipeline</b> Components: MS seamless scheduled, non-return valve, LPG cylinders, Pressure regulator, ball valve, main line, pressure gauge, gas taps, riser, meter. Advantages and disadvantages. Meter rate to consumer, supplier facilities. Maintenance.	4

**Reference books:**

1. M.K. Giridharan :Electrical Systems Design.
2. Fred Hall & Roger Greeno : Building Services Handbook-Students corner .
3. H. Joshi :Residential, Commercial and Industrial Electrical Systems.
4. Mark Karle : Lighting Design Basics .
5. Gary Gordon : Interior lighting for Designers.
6. Admir Jukanovic :Architectural Lighting design .
7. Arthur D. Little : Handbook on Natural gas Pipeline Safety in residential Areas.



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**Curriculum w.e.f. 2021-2022**

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PO 9	Individual and team work	Group presentation of case studies describing services for those buildings.
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**Course Plan**

<b>Course Title : Professional Elective – II - Photography</b>	
<b>Course Code : 201AR217A</b>	<b>Semester : IV</b>
<b>Teaching Scheme : L-T- P : 1-0-1</b>	<b>Credits : 2</b>
<b>Evaluation Scheme : ISE Marks : 50</b>	<b>ESE Marks : - Nil</b>

**Course Description:**

The course intends to explore photography as a tool of observation and documentation. It will develop understanding of perspective view seen from various angles. Photography also will enable students to note minute details through close up photography. The course explores of photojournalism, specifically architectural photography, which is one of the contemporary careers.

**Course Objectives:**

1. To understand photography as a means of communication.
2. To give exposure to photography as means of documentation.
3. To develop skill of composition through photography .

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C217A.1</b>	Use effectively photography in various presentations.
<b>C217A.2</b>	Prepare photographic documentation.
<b>C217A.3</b>	Apply photography as a tool of design.

**Prerequisite:** Students should have handled DSLR or mobile camera.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) And Program Specific Outcomes ( PSOs )**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		B T L
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C217A.1</b>	3	-	-	-	3	-	-	-	3	3	-	2	-	-	3
<b>C217A.2</b>	3	-	-	-	3	-	-	-	3	3	-	2	-	-	3
<b>C217A.3</b>	3	-	-	-	3	-	-	-	3	3	-	2	-	2	3

Contents	Hours
<b>Unit 1: Historical background of photography</b> Camera Obscura, Invention of Pinhole Camera, evolution of camera, films and printing processes.	2
<b>Unit 2 : Equipment of photography</b> Traditional and modern equipment of photography - SLR & DSLR cameras, mobile phone cameras, different types of lenses -normal lens, wide angle lens, fish eye lens, prime lens, telephoto lens, Aperture-shutter speed-slow and fast shutter speeds, applications of slow and fast shutter speeds, ISO, when to use ISO function, reflectors, indoor lighting, Different Image capturing formats-RAW, TIFF, JPEG, Storage Devices- SD card CF card, etc. photo editing software ( photoshop )	6
<b>Unit 3: Lighting for Photography</b> Natural and artificial light - different properties of light- direction, intensity, color. Systems for artificial lighting – indoor and outdoor.	2
<b>Unit 4 : Photojournalism</b> History of photojournalism, Role of photojournalists in a newsroom, Principles and Ethics and of photojournalism. Spot News, general news, Street Photography, off-beat photography, and documentary photography, war, terror, and crime.	4
<b>Unit 5: Architectural photography</b> Architectural photography as a tool for research, documentation and presentation. Architectural photography as a profession, photography for reputed magazines & journals,	6
<b>Unit 6 : Works of renowned photographers</b> Case studies of works of renowned photographers from India and abroad.	4

**Reference Books:**

1. Schulz, Adrian. Architectural Photography: Composition, Capture, and Digital Image Processing, Rocky Nook, 2012.
2. McGrath, Norman . Photographing Buildings Inside and Out, Watson-Guptill Publications, 1993.



**Course Plan**

<b>Course Title : Professional Elective – II - Painting</b>	
<b>Course Code : 201AR217B</b>	<b>Semester : IV</b>
<b>Teaching Scheme : L-T- P : 1-0-1</b>	<b>Credits : 2</b>
<b>Evaluation Scheme : ISE Marks : 50</b>	<b>ESE Marks :- Nil</b>

**Course Description:**

The course intends to develop aesthetic sense of the students through the understanding of various important well known aspects and modes of visual art expression in India's rich cultural heritage. It also encompasses practical exercises in drawing and painting to develop their mental faculties of observation, imagination, creation and physical skills required for its expressions.

**Course Objectives:**

1. To give exposure to painting as a primary medium for artistic expression.
2. To explain processes in painting art.
3. To apply knowledge of painting in portfolio presentation.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C217B.1</b>	Develop painting as a medium of artistic expression.
<b>C217B.2</b>	Develop ability to create ideas in painting art.
<b>C217B.3</b>	Apply painting art in architectural presentations.

**Prerequisite:** Students should have basic knowledge of Color wheel.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) And Program Specific Outcomes ( PSOs )**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		B T L
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C217B.1</b>	2	-	2	-	-	-	-	-	3	-	-	-	-	-	3
<b>C217B.2</b>	2	-	2	-	-	-	-	-	3	-	-	-	-	1	3
<b>C217B.3</b>	2	-	2	-	-	-	-	-	3	-	-	-	-	-	1

Contents	Hours
<b>Unit 1: Historical background of painting</b> Overview of historical and modern art movements and works of famous artists of India and abroad. .	6
<b>Unit 2 : Introduction to various artistic styles and traditions</b> Personal style, regional style, period style, etc. in Indian context.	8
<b>Unit 3: Types of Painting</b> Portraits, landscape, still life, abstract, etc.	6
<b>Unit 4 : Painting Mediums &amp; Techniques</b> Water color, acrylic and oil, paper; wood & canvas. Painting techniques - brush strokes and textures.	4

**Reference Books:**

1. Hashim Akib, Colin Allbrook. Artist's Painting Techniques Explore Water colours, Acrylics, and Oils Dorling Kindersley Limited, 2016.
2. Steve Allrich. Oil Painting for the Serious Beginner, Watson-Guptill Publications, 1996.

**Course Plan**

<b>Course Title : Professional Elective - III - Furniture Design</b>	
<b>Course Code : 201AR218A</b>	<b>Semester : IV</b>
<b>Teaching Scheme : L-T-P : 1-0-2</b>	<b>Credits : 3</b>
<b>Evaluation Scheme : ISE Marks : 50</b>	<b>ESE (OE) Marks : 50</b>

**Course Description:**

Furniture Design is subordinate to interior designing. The course intends to develop students' mind set towards interior furniture designing and detailing of those furniture with due consideration of various styles, concepts, & updated materials etc.

**Course Objectives:**

1. To develop vision for interior spaces.
2. To inculcate sensitivity to understand relevance of Architectural spaces and forms with reference to furniture and its material and structure.
3. To apply holistic understanding of furniture design and detailing with reference to Architecture.
4. To make the students to create the design of furniture as an integral part of Architectural form and space.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C218A.1</b>	Able to draw furniture with respect to scale, proportion, spatial relationships.
<b>C218A.2</b>	Appraise aesthetics in furniture design
<b>C218A.3</b>	Create compositions with the use of principles of design.
<b>C218A.4</b>	Apply the knowledge of structure ,material , rendering techniques for furniture design assignments and portfolio

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) And Program Specific Outcomes ( PSOs )**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		B T L
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C218A.1</b>	2	2	2	2	2	-	-	-	3	-	-	2	-	-	2
<b>C218A.2</b>	2	2	2	2	2	-	-	-	3	-	-	2	-	-	2
<b>C218A.3</b>	2	2	2	2	2	-	-	-	3	-	-	2	-	2	3
<b>C218A.4</b>	2	2	2	2	2	-	-	-	3	-	-	2	-	-	3

<b>Contents</b>	<b>Hours</b>
<b>Unit 1 –Design overview</b> History of furniture design. Styles of furniture design. Household furniture, commercial furniture, street furniture.	3
<b>Unit 2 – Fundamentals of furniture design.</b> Structural stability of furniture with respect to material. Eco-friendly furniture material & their use Study of materials with respect to different climate	6
<b>Unit 3 – Furnishing and fittings</b> Hardware & fixtures etc. Market updates regarding various structural and finishing materials used for furniture.	3
<b>Unit 4 – Modular furniture</b> Concept of modular furniture, types and materials. Designing of foldable furniture	12
<b>Unit 5 – Analysis of space and furniture</b> Elements of spatial definition (Form defining space) elevated base plane, depressed base plane-vertical and horizontal space defining elements – depth and density of space – spatial juxtaposition and interpretation – spatial character of elementary shapes – qualities of Architectural space – Degree of enclosure all with respect to furniture.	6
<b>Unit 6- Furniture technologies</b> Introduction to furniture Technologies such as 3D printing, augmented reality, Internet of Things, Artificial Intelligence	6

**Reference Books:**

1. Francis D.K. Ching, Architecture form, space and order, John Miley And Sons.
2. V. S. Parmar, Design Fundamentals In Architecture, Somaiya Publication Pvt. Ltd -.
3. Francis D.K. Ching, Architectural graphics, John Miley And Sons.
4. Ahmed A. Kasu, Interior Design, Ashish Book Centre, Mumbai, 2018.

PO 9	Individual and team work	Group work for presentations on case studies of furniture, market survey etc.
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**Course Plan**

<b>Course Title : Professional Elective - III - Graphic and Product Design</b>	
<b>Course Code : 201AR218B</b>	<b>Semester : IV</b>
<b>Teaching Scheme : L-T-P : 1-0-2</b>	<b>Credits : 3</b>
<b>Evaluation Scheme : ISE Marks : 50</b>	<b>ESE ( OE ) Marks : 50</b>

**Course Description:**

Graphic & Product Design is a course that explores graphic communication through the understanding of the elements and principles of design; as well as, manufacturing, and use of products around us, the design process, from idea development through the final execution of a document & Product.

**Course Objectives:**

1. To understand principals of Graphic and Product design.
2. To create awareness about sustainable use of materials for Graphic & Product design.
3. To coordinate multiple, interdisciplinary tasks in order to achieve a common objective.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C218B.1</b>	Apply functionality, ergonomics and aesthetics for a usable product.
<b>C218B.2</b>	Understand environmental issues of products.
<b>C218B.3</b>	Develop entrepreneurial skills & soft skills towards Specialization field.

**Prerequisite:** Two dimensional and three dimensional sketching, understanding of anthropology and proportions.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) And Program Specific Outcomes ( PSOs )**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		B T L
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C218B.1</b>	2	2	2	2	2	-	-	-	3	-	-	2	-	-	3
<b>C218B.2</b>	2	2	2	2	2	-	-	-	3	-	-	2	-	-	3
<b>C218B.3</b>	2	2	2	2	2	-	-	-	3	-	-	2	-	-	3

<b>Contents</b>	<b>Hours</b>
<b>Unit 1 – Introduction to Graphic &amp; Product Design.</b> Fundamentals of graphic design, history, career options, works of prominent designers & the graphic & product design process.	3
<b>Unit 2 - Design elements, Principals and Application of Graphic design</b> Overview of basic design principles - color, harmony, rhythm, balance, Proportion, etc. Visual perception & graphical thinking. Study of tools of graphic expression.	3
<b>Unit 3 – Design elements, Principals and Application - Product Design</b> Form, color, symbols, user specific criteria, material, technology, recyclability and packaging. Product development cycle and phases. Information input and processing.	3
<b>Unit 4 – Application of Graphic Design</b> Evolve comprehensive corporate identity program Developing environmental graphics / signage Brand promotion. Exercises on design of books, posters, promotional materials, stationery, trade marks & corporate logos.	12
<b>Unit 5 – Application of Product Design</b> To design industrial products e.g. Building accessories, Watch, Water Bottle, Accessories baggage, etc.	9
<b>Unit 6 – Application of Softwares in graphics &amp; product design</b> 3D Studio Max, Sketch Up, Photoshop, Illustrator, adobe series, Corel draw etc.	6

**Reference Books:**

1. Elements of Design by Anderson, Donald M. Holt – Rinehart and Winston, New York (1961)
2. Thinking with Type, Book by Ellen Lupton, Published by Princeton Architectural Press.
3. Graphic Design School: A Foundation Course for Graphic, by David Dabner and Sandra Stewart, Thames & Hudson
4. Product Design and Development, by Karl Ulrich and Steven D. Eppinger, McGraw-Hill Education (India) Pvt. Limited.
5. Ergonomics in Product Design, Send points Publishing Company Limited.
6. Kathy Baxter and Catherine courage, Understanding your users: A Practical guide to user requirements methods, tools.

PO 9	Individual and team work	Presentations on history of graphic and product design, design of small products etc.
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**Course Plan**

<b>Course Title : Computer Technology in Architecture -IV</b>	
<b>Course Code : 201AR219</b>	<b>Semester : IV</b>
<b>Teaching Scheme : L-T-P : 0-0-2</b>	<b>Credits : 2</b>
<b>Evaluation Scheme : ISE Marks : 50</b>	<b>ESE Marks : Nil</b>

**Course Description:**

Theoretical understanding of software's required for architectural drawings and its presentation is a need of time. This course will help students to understand the theoretical concepts of Revit. This will also help students to work on 2D and 3D drawings simultaneously. Students will be able to generate rendering skills, use of different materials, and light effects in Revit. These commands will help them to prepare presentation drawings, rendered views, documentation of projects comparatively short time.

**Course Objectives:**

1. To teach students various commands required for 3D drafting
2. To teach the techniques to prepare presentation drawings.
3. To teach theoretical concepts for documentation and working in the Construction Phase

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C219.1</b>	Develop understanding of computer aided drafting in 3D
<b>C219.2</b>	Comprehend computer aided drafting and its parameter as tools and its application in architecture
<b>C219.3</b>	Evaluate techniques for quicker methods.

**Prerequisite:** Successful completion of computer technology Course , Semester III

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		BTL
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
<b>C219.1</b>	3	-	-	-	2	-	-	-	-	-	-	2	-	-	3
<b>C219.2</b>	3	-	-	-	2	-	-	-	-	-	-	2	-	2	3
<b>C219.3</b>	3	-	-	-	2	-	-	-	-	-	-	2	-	-	3

<b>Contents</b>	<b>Hours</b>
<b>Unit 1 – Collaboration and Teamwork</b> Interoperability: Working Multiplatform,	4
<b>Unit 2 – Modeling and Massing for Design</b> Advanced Modeling and Massing, Conceptual Design and Design Analysis	4
<b>Unit 3 – Modeling techniques for Design</b> Working with Phasing, Groups, and Design Options, Visualization	4
<b>Unit 4 –Extended Modeling Techniques</b> Creating Walls and Curtain Walls, Modeling Floors, Ceilings, and Roofs, Designing with the Family Editor, Creating Stairs and Railings	4
<b>Unit 5 – Documentation</b> Detailing Your Design, Documenting Your Design, Annotating Your Design.	4
<b>Unit 6 –Construction and Beyond</b> Working in the Construction Phase, Presenting Your Design, Working with Point Clouds Architectural Design assignment from Sem III will be used to draft with help of all above commands.	4

### **Reference Books**

1. Elise Moss: Autodesk Revit 2021 Architecture Basics.
2. Jeff Hanson, Daniel John Stine AIA, CSI, CDT : Autodesk Revit 2021 Architectural Command Reference



**Course Plan**

<b>Course Title : Environmental Studies ( Mandatory Course )</b>	
<b>Course Code : 201ARMC220</b>	<b>Semester : IV</b>
<b>Teaching Scheme : L-T-P : 2-0-0</b>	<b>Credits : Non Credit</b>
<b>Evaluation Scheme : ISE Marks : Nil</b>	<b>ESE(TH) Marks : 50</b>

**Course Description:**

Environmental Studies course enhance a student's knowledge in a variety of currently relevant topics related to environmental awareness and pollution. The course aims to identify environmental problems, come-up with suitable solutions and create awareness for a hygienic and eco-friendly environmental.

**Program Specific Outcomes (PSOs):**

<b>PSO1</b>	Students will acquire the ability to design the built environments in tandem with the intangible aspects of architecture.
<b>PSO2</b>	Students will acquire the ability to gain knowledge through non linear way of learning and apply it to design the built environment.

**Course Objectives:**

1. Recognize the structure and functions of ecosystems with their importance.
2. Understand the environmental and social problems with global concern.
3. Understand the importance of environmental management for its protection.
4. Acquire problem solving skills through visits to different locations, identifying the environmental problems, proposing the solution models and exhibiting to the society and government authorities.

**Course Outcomes (COs):**

At the end of the course the student should be able to:

<b>C220.1</b>	Understand the importance of ecosystem and biodiversity in view of its conservation.
<b>C220.2</b>	Understand the concept of hazardous waste and to promote healthier environment.
<b>C220.3</b>	Explain the importance of environmental management through pollution control boards.
<b>C220.4</b>	Propose solutions for problems related with environmental well beings through location visits and model exhibitions.

<b>Prerequisite:</b>	Understanding of Environmental Education course.
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**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)**

Course Outcomes (COs)	Program Outcomes (POs)												(PSOs)		BTL
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
C220.1	-	-	-	-	-	1	3	2	-	-	-	-	-	-	2
C220.2	-	-	-	-	-	1	2	-	-	-	-	-	-	-	2
C220.3	-	-	-	-	-	1	3	-	1	1	-	-	-	-	2
C220.4	-	-	-	-	-	2	3	1	1	-	-	-	-	-	3
Unit No	Course Content														Hrs
<b>1</b>	<b>Ecology and Biodiversity</b>														8
	Definition, types, importance and examples of ecology, types of community relationships: Symbiosis, predation and competition. Ecosystem: structure and functions, biotic and abiotic components, energy flows, ecological succession, food chain, food web & ecological pyramid, types of ecosystems, degradation of ecosystems and its impact. Biodiversity hotspots: Western ghats, eastern Himalayas, threats to biodiversity and conservation of biodiversity, environmental ethics.														
<b>2</b>	<b>Environment and Health</b>														7
	Air Pollution, water pollution. E-waste, waste minimization technology, Plastic waste, Population growth of the world and reduced health content of the environment, energy crisis, biofuels, Occupational health hazards, Concept of Carbon footprint.														
<b>3</b>	<b>Environmental Management</b>														5
	Role of Central Pollution Control Board (CPCB) and Maharashtra Pollution Control Board (MPCB) in environmental protection of India. Concept of sustainability, ISO Certification.														
<b>4</b>	<b>Field Work</b>														5
	Visit to a local area for documentation of environmental assets- River/forest/grassland/hill/mountain OR Visit to a local polluted site-Urban/Rural/Industrial/Agricultural OR Study of common plants, insects, birds OR Study of simple ecosystems- Ponds, Lakes, Rivers, Hill slopes, etc.														



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Curriculum w.e.f. 2021-2022

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**Text Book:**

1. Trivedi R.K. and P.K Goel, Introduction to Air Pollution, Tech-science Publications.
2. Mhaskar A.K., Matter Hazardous, Techno-Science Publication.

**Reference Books:**

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